

WM2014 Conference Panel Report

PANEL SESSION 72: 10 CFR Part 61.55 Waste Classification Scheme: Is it State of the Art or Are Any Changes Warranted?

Co-Chairs: Larry Camper, *US NRC*
Christine Gelles, *US DOE*,

Panel Reporter: Rateb (Boby) Abu Eid, *US NRC*,

Panelists:

1. **Christopher McKenney**, *Branch Chief, Performance Assessment Branch, US NRC*;
2. **Mark Gilbertson**, *Deputy Assistant Secretary for Site Restoration, US DOE*
3. **Lisa Edward**, *Senior Program Manager, Nuclear Chemistry, LLW & Radiation Management Group, Electric Power Research Institute, EPRI*
4. **William Dornsife**, *Executive Vice President, Licensing and Regulatory Affairs, Waste Control Specialists (WCS), Inc.*
5. **Rusty Lundberg**, *Director, Utah Division of Radiation Control, Utah*,
6. **Thomas Magette**, *Managing Director, CP&I, Price Waterhouse, Coopers LLP*,

This panel session focused on “Low-Level Waste Shallow Land (e.g.; Near Surface) Disposal” under NRC’s waste classification framework of Title 10 of the Code of Federal Regulations, Part 61.55 (10CFR61.55). The Session topic is of importance as the NRC is considering a comprehensive revision to risk-inform the waste classification framework in order to address any conforming changes to the regulations as needed, using updated assumptions and referencing the latest International Committee on Radiation Protection (ICRP) methodology. This initiative will include the performance of a technical analysis for public comment concerning the disposal in a near surface facility of any long-lived radionuclide, including uranium.

The panel was charged to discuss the current classification framework to determine if the system is working as intended and what, if any, changes should be made to the existing system. In this context, participants shared views with policy and decision makers, as well as with disposal facility operators, on radioactive waste classification and near surface disposal options and key issues.

Summary of Presentations

Christopher McKenney outlined 10 CFR Part 61 original rule which was based on analysis of the waste types and volumes expected circa 1981. He explained the requirements for a licensee or applicant to demonstrate compliance with the current performance objectives in Part 61; namely:

- 61.41: Protection of the public from releases.
- 61.42: Protection of inadvertent intruders
- 61.43: Protection of individuals during operations
- 61.44: Stability of the disposal site after closure.

Subsequently, he summarized limits in Part 61 classification Tables 1&2, to designate Classes A, B, C, and GTCC. These Tables were derived based on simple disposal practices

WM2014 Conference Panel Report

that assumed random mixing of waste packages. Concentrations in Tables were increased by factor of 4, 10 or 20 to account for mixing. Scenarios included intruder construction (possibility of discovery) [acute], and intruder agriculture [chronic] but no ground water. Intake to Dose conversion factors used ICRP 2 (1959). He added that several radionuclides of interest were “NOT” included in the table (e.g.; Uranium, Thorium, Radium, and Chlorine-36). This is because at time of original rule, either (a) not large amounts going to commercial sites; and/or (b) not part of Atomic Energy Act authority. He closed his presentation by noting that the NRC Commission directed staff to update the tables in a future rulemaking including adding uranium. In addition, advise on potential legislative changes due to their inclusion in Federal Law. He emphasized that this rulemaking has not started yet.

Mark Gilbertson presented US DOE regulatory approach to LLW classification. He indicated that US DOE has used a risk-informed, performance-based regulatory approach for more than 25 years. Regulations were prescribed through two primary directives: DOE Order 435.1 (Radioactive Waste Management) and DOE Order 458.1 (Radiation Protection of the Public and Environment). Radioactive waste is classified by DOE as High-Level Waste, Transuranic Waste, and Low-Level Waste. LLW is any waste that is not HLW or TRU. It does not include uranium or thorium mill tailings. Waste disposal is implemented from an integrated protection system perspective using defense-in-depth principles. He then described defense-in-depth concept, and the documentation required for DOE LLW disposal facility focusing on the Integrated & Iterative Regulatory Framework philosophy. Then he described performance assessment and the basis for waste acceptance criteria; taking into account inadvertent intruder, no advertent intruder and striving to reduce potential for and/or consequences of intrusion. He noted that intrusion should be considered in the context of intervention and optimization, not as a dose constraint or objective.

Lisa Edward discussed 10CFR61 Table 1 and 2 limits based on ICRP 2 and NUREG/CR-1759. She added that since then there continues to be advances in the models for human anatomy and the biological behavior of radionuclides, particularly in ICRP 26/30, ICRP 60/72, and ICRP 103 dose conversion factors (DCF) under development. She questioned “What are the impacts of the new DCFs on the waste classification tables? She added that EPRI recalculated the limits in 10 CFR Part 61 Tables using the Impacts code (e.g.; same code as was used originally used to derive current classification limits); updated the DCF’s using ICRP 60/72; all other original assumptions were maintained. She presented the ratios between the old and new values based on such calculations and assumptions. She concluded that for Phantom 4 nuclides; only H-3 dose went down; whereas Carbon, Iodine, and Technetium doses went up. She emphasized those nuclides doses that typically control class went down. She closed her presentation with a statement: “*Leaving tables as is does not reflect the best science and understanding of the risk.*”

William Dornsife discussed the major issues with updating the waste classification framework considering the WCS perspective. He emphasized that the current waste classification system is memorialized in Federal and State laws that are unlikely to change. He added that Agreement State laws defining waste classification would need to be changed if Part 61 was changed. Further, State Compact laws would probably not change since based on Federal laws and could have a different regulatory verses “Compact” definition; and could

WM2014 Conference Panel Report

lead to creation of orphan waste if concentrations would decrease. He recognized that the current classification system is based primarily on the intruder scenario. He questioned “what will be the intruder assumptions for the new classification system? How will wet versus dry sites be considered? In other words, limits could be significantly different. He added that current system assumes wet site but most current sites are dry; therefore, at some dry sites, some radionuclides may have no limits. His perspective for each potential disposal facility is to be evaluated as a total system considering natural and engineered barriers to identify the types and volumes of waste that can be disposed (Waste Acceptance Criteria (WAC)). His main conclusion is “*No obvious health and safety benefits to updating the waste classification system.*”

Rusty Lundberg discussed waste classification based on the Utah perspective. He iterated that Utah prohibits disposal of radioactive waste other than Class A waste. He recommended a notion to move toward WACs if there is a new Waste Classification meanwhile preserving the Waste Classification construct. He added that host state resources would be impacted in addition to a need for close coordination with disposal facility and waste generators. Finally, he informed of related Items – Utah ongoing activities regarding independent verification; DU rule; and the PA rule.

Thomas Magette discussed 10 CFR Part 61.55 waste classification scheme by raising the question “Is the Waste Classification Scheme state of the art? His answer was “No.” In this context, he outlined the technical shortcomings pertaining to (a) assumptions about the waste stream are outmoded and non-representative; (b) fate and transport modeling at a non-representative hypothetical site; (c) use of outdated dose conversion weighting factors; and (d) no consideration of current advancements in disposal techniques. He discussed site-specific approach and concluded that there is no need for another Part 61 rulemaking and there will be no generic limits superior to a site-specific approach. He added, future changes in waste streams, disposal technologies, and radiobiology should not necessitate regulatory changes. The waste classification tables in 10 CFR 61.55 should be considered *a*, but not *the*, preferred regulatory approach. He believed that the Tables can be used for compliance and site-specific analysis can be used to determine specific waste acceptance criteria.

Questions and Answer & Conclusions

Several questions and comments were raised regarding whether to update, or not to update, the Tables in 10 CFR Part 61 with different views from the panelists and the audience. Certain participants proposed that the NRC should focus on hard-to-detect radionuclides in waste disposal management and on site-specific analysis for specific waste streams not included under 10 CFR Part 61 such as DU. Several questions were also raised regarding GTCC waste category and limits as well as coordination between States, Compacts, and regulators. Some expressed concern regarding use of site-specific analysis as it may result in more activities disposed than was planned for disposal facilities.

In summary, the session elucidated insights of emerging issues influencing disposal of LLW in the USA. This Session was of interest to the public, and to Federal, State, and Industry officials; as well as to consultants and technical and safety analysts.