Public Meeting Questions: Specific Request for Comment

The NRC is seeking stakeholder participation and involvement in identifying the various technical issues that should be considered in the development of a draft regulatory basis for the disposal of GTCC and transuranic radioactive waste through means other than a deep geologic disposal, including near surface disposal. To assist in this process, the NRC staff is requesting that stakeholders respond to the questions below. In addition, the NRC staff has conducted some initial technical analyses to assist its understanding of potential hazards with near surface disposal of GTCC and transuranic wastes, which are contained in draft "*NRC Staff Analyses Identifying Potential Issues Associated with the Disposal of Greater-Than-Class C Low-Level Radioactive Waste*," (ADAMS Accession No. ML17362A012). The draft analyses should assist in providing responses to the following questions:

Question 1: What are the important radionuclides that need to be considered for the disposal of the GTCC and transuranic wastes?

The U.S. Department of Energy has described three broad categories of GTCC wastes, including a range of transuranic radionuclides, in its "Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste" (http://www.gtcceis.anl.gov/documents/index.cfm). The three categories are entitled activated metals, sealed sources, and other wastes. The attributes (e.g., radionuclide concentrations, heat generation, and waste form) vary significantly between the three categories. Certain waste streams represent a very specific waste form (e.g., stainless steel for most activated metals; very concentrated amounts in sealed sources) that may require specific treatment to mitigate potential safety, security and criticality concerns. Some waste streams may contain sufficient quantities of specific radionuclides that will present a significant thermal output and/or gas generation through radiolysis. Still other waste streams may contain a significant quantity of fissile radionuclides (e.g., some isotopes of uranium and plutonium). The NRC is interested in identifying those radionuclides that could be important for evaluating the

safety and security of: (1) storage associated with the operational period at a disposal facility, and (2) the post-closure period, including inadvertent intruder protection. Additionally, the NRC is interested in obtaining available data and information to support the characteristics of GTCC and transuranic wastes.

Question 2: How might GTCC and transuranic wastes affect the safety and security of a disposal facility during operations (i.e., pre-closure period)?

The presence of sufficient quantities of high activity radionuclides and/or fissile radionuclides in GTCC and transuranic wastes may impact the design and operational activities associated with a disposal facility prior to disposal. The NRC is interested in identifying those design and operational activities at a disposal facility that may be impacted by GTCC and transuranic wastes. For example, the requirements in 10 CFR part 73 would require licensees to develop safeguards systems to protect against acts of radiological sabotage and to prevent the theft or diversion of Special Nuclear Material (i.e., transuranic waste such as plutonium, uranium-233, or uranium enriched in the isotopes uranium-233 or uranium-235) if a sufficient amount of Special Nuclear Material were present above ground at the disposal facility.

Question 3: How might GTCC and transuranic wastes affect disposal facility design for post-closure safety including protection of an inadvertent intruder?

The NRC is considering disposal units (e.g., a single trench, borehole, and vault) that would contain a single category of waste (e.g., sealed sources) as well as disposal units that contain a mixture of all three waste types. However, the NRC believes the best approach for understanding the issues would be to assume that waste within a disposal unit would be separated by the waste category and not be co-mingled. Such an approach could provide a clear understanding of the issues associated with how a specific waste category might affect disposal facility design. Certain waste streams associated with GTCC and transuranic wastes have larger inventories and concentrations of radionuclides than was typically considered at LLRW disposal facilities. For example, certain GTCC and transuranic wastes in sufficient

quantities have the potential for: (1) significant thermal output that could affect degradation processes within a disposal unit, and (2) hydrogen gas generation through radiolysis that could also affect degradation processes of the waste package and waste form. Additionally, waste streams associated with GTCC and transuranic wastes may have fissile materials that require facilities to be designed to limit the potential for a criticality event or limit the amount of fissile material that can be disposed. There is a potential balance between security/safety and economic feasibility of design, construction, and operation. The NRC would like to hear from the stakeholders on these aspects as well. The information provided on economic feasibility would be in concert with the NRC's strategies on examining the cumulative effects of potential regulatory actions. The NRC is interested in identifying the various scenarios that should be considered in evaluating the post-closure safety for the disposal of GTCC and transuranic wastes especially scenarios associated with specific issues and concerns that may not have been previously considered for commercial disposal facilities (e.g., synergistic effects of the thermal output on geochemical processes affecting release of radionuclides).

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OFFICE	DUWP				
NAME	CMaupin				
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