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NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
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STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

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August 2, 2006

Ms. Angela P. Colarusso, Acting Federal Project Director
Waste Management Project
National Nuclear Security Administration
Nevada Site Office
P.O. Box 98518
Las Vegas, NV 89193-8518

Re: Regulatory Position Regarding Void Space

The Nevada Division of Environmental Protection, Bureau of Federal Facilities (NDEP) has been reviewing the issue of allowable void space in mixed low level radioactive waste containers sent to the Nevada Test Site (NTS) for disposal. This issue was identified during a site visit to the Savannah River Site in May, 2006, and during the process of observing Real Time Radiography verification activities at the NTS.

In order to address this issue, NDEP has reviewed the regulatory background related to the 10% void space requirement in the NTS Waste Acceptance Criteria (NTSWAC). NDEP has also reviewed information provided by the National Nuclear Security Administration Nevada Site Office and consulted with EPA Region IX. NDEP has concluded that when several conditions have been met, the 10% void space requirement may be waived. These conditions include the waste generator making every effort to completely fill the container, the strength of the container meeting the strength requirement identified in the NTSWAC, and documentation, including photographs, being available for NDEP review.

The enclosed Regulatory Clarification provides a detailed analysis and defines the conditions under which the 10% void space requirement may be waived.

Sincerely,

T. H. Murphy
Chief
Bureau of Federal Facilities

THM/DRE

Enclosure

cc: Jhon Carilli, NNSA/NSO WMP
Gary Pyles, NNSA/NSO WMP

Regulatory Clarification of DOE MLLW Debris Disposal at NTS Pit 3

Overview

NDEP is concerned not only with container void space, but with the inherent compressibility of the waste stream itself. The macro-encapsulation process for mixed hazardous waste, as defined by EPA and necessary to meet Land Disposal Requirements, does not address the issue of compressibility, and only requires that the waste end state be impervious to leaching of hazardous materials into the environment. By means of this fact sheet NDEP is providing guidance toward interpreting and enforcing the void space requirements for debris waste streams.

Background

Low Level Mixed Waste (LLMW) debris is a consistently uniform waste stream across the DOE complex. Typical LLMW solid materials found in this waste stream include job control waste (paper, wipes, cloth rags, uniforms, cartons, gloves, booties), wood boxing, floor sweepings, nails, bolts, plastic suits, breathing air hoses, plastic sheeting, drum liners, sponges, miscellaneous rubber, HEPA filters, canister filters, labware, glassware, small hand tools, pipe lengths, and plastic bottles. The physical form can and does result in settling in the container under its own weight during storage and transportation. A container filled with debris may be over 100% full at the time of filling; that is, the waste level can be higher than the top of the container, then be compressed down when the lid is applied. However, after short periods of storage time, settling occurs which may exceed the 10% total void space limit specified by the regulations and by the WAC.

Regulatory Considerations

The NTS Waste Acceptance Criteria (WAC), Section 3.3.6.2 (DOE/NV-325-Rev 6), and 40 CFR 265.315 have a requirement that containers be either

a) filled to at least 90 % when placed in the landfill; or

b) crushed, shredded or similarly reduced in volume to the maximum practical extent before placement in the landfill.

The preamble language in the July, 26, 1982 Federal Register, 47 FR 32331, states that the purpose of the 90 % full criteria is to minimize differential landfill subsidence over time due to the collapse of decaying containers having void spaces. Such subsidence poses a serious threat to the continuity and proper functioning of the final cover of the landfill. The preamble language further states that owners and operators having partially filled containers may either

a) fill them to greater than 90% of their capacity,

b) empty, and then crush or shed them to their maximum practical extent, or

c) reduce the volume of the partially full containers to the extent technology and safety will allow.

Section 3.2.5 of the WAC requires the disposal package to be capable of supporting a uniformly-distributed load of 3,375 pounds/ft^2. This is necessary to support other waste packages and earth cover without crushing during stacking and covering operations.

However, this requirement does not apply to bulk waste, waste packaged in steel drums, and cargo containers, which are exempt.

NDEP Comments and Interpretation

Radiological dose, contamination issues, and safety concerns most often prevent the compaction or puncturing of the plastic bags containing this debris stream, and as a result, additional waste cannot be added to the container to reduce settling. A light weight filler material such as vermiculite or Fuller's clay ***could*** be added to the container to reduce void spaces; yet even with additional waste and filler material there will still be settling during the cross-country journey to NTS. Lastly, overfilling containers does not address the inherent compressibility of the waste material and its potential to significantly crush/compress if the container was to fail.

At first glance, the package strength requirement in the WAC adds additional protection against crushing and resulting landfill subsidence, yet there is currently an issue with regard to drummed waste. In practice, steel drums (which are exempt from the WAC strength requirements) are often stacked and are sometimes laid down on their sides, which is a more compressible configuration than standing upright. This could possibly lead to a greater chance of container failure and subsequent landfill subsidence.

The macro-encapsulation process for mixed hazardous waste, as defined by EPA and necessary to meet Land Disposal Requirements, does not address this compressibility issue, and only requires that the waste end state be impervious to leaching of hazardous materials into the environment.

In summary, NDEP is concerned not only with container void space, but with the inherent compressibility of the waste stream itself. Since the current regulations do not address compressibility, we are left with interpreting and enforcing the void space requirements for this debris waste stream. NDEP will be working both internally and with EPA to further explore the compressibility issues raised here. Additional guidance on this subject will be provided to NNSA/NSO when appropriate.

In light of these specific waste stream issues, NDEP proposes to currently allow for greater than 10% void space per container provided that

1) each container is initially filled to greater than 100% prior to sealing, and a filler material (vermiculite, kitty litter, etc.) is added in generous amounts to decrease the void volume to the greatest extent possible;
2) pictures or video that clearly shows this filling process are taken and linked by a tracking number to each waste container;
3) procedures are in place that clearly demonstrate that containers are as full as practicable, and
4) each container meets the NTS WAC package strength requirement.

This regulatory interpretation will only apply to Low Level Mixed Waste debris streams. NDEP feels the intent of the regulation will have been satisfied without environmental impact. Any settling resulting from interim storage or transport will not result in the return of the container to the generator if the void space exceeds 10% if such exceedance is shown by RTR.