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RED LAW '97

December 20, 1996

Susan Jones
US Department of Energy
EM 37, TREVION II
1000 Independence Ave. SW
Washington, D.C. 20585-0002

Dear Ms. Jones:

It was beneficial to meet in Washington D.C. last week to discuss the Department of Energy's Mixed Waste Regulatory Reform Proposal: Immobilization Technologies for Debris Waste. As indicated at the meeting, I had some technical questions regarding the proposal. Attached are those comments. I also included some comments on the language that DOE had proposed for inclusion into the 40 Code of Federal Regulations Parts 261 and 268.

I shall be looking forward to the next discussion on the proposal. If there are any questions, please call me at (505) 827-1867 or 827-1558.

Sincerely,

Janice Archuleta

Janice Archuleta,
Environmental Specialist

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enclosure

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cc: Benito J. Garcia, Chief, Hazardous and Radioactive Materials Bureau
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Comments to DOE's Regulatory Reform Proposals --Immobilized Mixed Debris and Vitrified Mixed Waste Exiting Subtitle C Control After Treatment

General Concerns:

How will States be able to finance technological specialization necessary for the permitting process of vitrification, and other microencapsulation, and macroencapsulation technologies?

How will DOE be able to ensure that what they say is in their waste is what is in the waste? Is there a waste acceptance criteria or quality assurance plan?

Specific Concerns:

I. Listed below are comments to DOE Technical Data Package (June 1996).

1. From on-site experience at DOE facilities (i.e., Los Alamos National Laboratory) some previously labeled mixed waste containers have proved to be misleading, if not incorrect. The technical data package considers the MWIR database for listings of the contaminants of concern (COCs), is this assumption reliable, especially for the older-generated waste? For the macroencapsulation treatment technology, proposed regulation changes, and risk analyses focus on the COCs being 81% inorganic debris that is characteristically RCRA hazardous for toxic characteristic metals. It may be found that upon opening mixed waste containers prior to treatment, the waste contained is different than indicated on the label and that the COCs are also different; perhaps less of the waste contain metals and does in fact contain a higher per cent of volatile organics (VOCs) (Tab 8, p.2-2). The technical data package mainly looked at risk associated with the metals and not VOCs, nor any other potential COC. What action would DOE take if the present risk analyses were found to not adequately address the "actual" waste streams?
2. For macroencapsulation, there is insufficient data presented to support that the low density polyethylene (LDPE) capsule would be able to withstand 100 years or more of seasonal environmental changes. Studies referenced (high density polyethylene) HPDE durability but it appears as though no durability tests have been performed on LDPE. Also an NRC publication states, "A detailed examination of the available literature on high density polyethylene has been performed with the conclusion that the data available to predict the long-term behavior of the high density polyethylene have large uncertainties."[1]
3. For macroencapsulation, there is insufficient data presented to support that the LDPE capsule would be able to withstand pressures from production of gases from decomposition of materials within. Studies referenced HPDE durability but it appears as though no tests of this type have been performed on LDPE.
4. In DOE Order 5820.2A[2], it is stated that liquids must be $\leq$ 0.5% of the waste processed to a stable form. For a 55 gallon drum, 0.5% is equal to 1.0 liter (1.1 quarts) of liquid. Should a container breach with this much liquid inside, it is probable that the leachate will prove to be

an environmental contaminant.

5. 10 CFR 61[3] and DOE Order 5820.2A do have similar requirements for environmental monitoring, however, being that DOE is self- regulating, the latitude of interpretation for the requirements is usually not as conservative as that for a licensee certified by the NRC. For example, at a NRC regulated facility, there may be stipulated in the license that there be 30 groundwater monitoring wells to provide sufficient data for "early warning of releases of radioactive materials from the disposal area before they leave the site boundary."[3] At a DOE facility, groundwater monitoring wells may be limited to only a few to measure "migration of radionuclides and disposal unit subsidence".[2] (DOE Order 5820.2A is in the process of being revised, however, it is not known whether the revision would meet the New Mexico Environment Department [NMED] requirements for the protection of the environment for this waste form).
6. Microbial testing following cementation microencapsulation as stated in the technical support report (Tab8; Section 3.0) would be performed according to American Society for Testing and Materials (ASTM) G21 and G22 biodegradation tests. A NUREG document titled "Microbial Degradation of Low-Level Radioactive Waste" (NUREG/CR-6341, June 1996)[4] posed that researchers had doubts concerning the tests: that they were not applicable for use with cement-solidified LLW. The purpose of the research program was to develop modified microbial degradation test procedures that would be more appropriate than the existing procedures for evaluation of the effects of microbiologically influenced chemical attack on cement-solidified LLW. The testing methodology listed and results reported in the document concluded that the ability of cement-based waste forms to retain or retard the loss of encapsulated radionuclides was compromised due to the action of microorganisms." Also "[B]because samples of actual radioactive waste forms will represent new untested material, it is suggested that the conservative test conditions be used for the purpose of the Branch Technical Position Testing." These new testing procedures which are more stringent should be taken into consideration for use in integrity testing.
7. Risk-based studies in the technical report do not take into consideration any synergistic effects for the COCs.
8. Will encapsulation materials be capable of producing bis (2-ethylhexyl) phthalate when in contact with an organic compound? This compound is a common product of organic materials in contact with plastics and poly-carbon materials, such as plastic containers and piping. This material is a hazardous waste if disposed as such, however, if made by a "natural" process, it cannot be regulated. Testing for this by-product with waste that contains VOCs or semi-volatile organic compounds (SVOCs) should be performed prior to microencapsulation or microencapsulation material acceptance.
9. In Section 9, Performance Evaluation for RCRA Metal Disposal in DOE Low-Level Radioactive Waste Disposal Facilities, groundwater contaminant pathways were compared for six disposal facilities complex-wide because it is considered to be the dominant transport pathway for human exposure from shallow land disposal facilities. However, at Los Alamos, the low-level radioactive disposal facility is located on top of a mesa. This scenario could result in potential releases in time from natural erosion processes; this pathway should be

assessed for risk. In addition, the DOE hydrogeologic site characterization for this disposal site has not been validated and New Mexico Environment Department (NMED) has raised questions concerning assumptions used in the LANL Performance Assessment. Other states may also have found that they also have concerns on the validity of the hydrogeologic assumptions used for the Performance Assessment models at the sites in their states.

10. For vitrification, durability tests have been performed on a number of waste streams. Please make the durability testing results (inclusive of accelerated seasonal testing) available for NMED personnel. (This could easily be accomplished by personnel traveling to Sandia National Lab or Los Alamos National Lab and looking at the reference documents and copying relevant data packages).

II. Listed below are comments to DOE's suggested Regulatory Revision Language. Overall it was found that the suggested language was very vague and should be more specific.

A. Vitrification Language

1. 40 CFR 261.3 DOE suggested language, "Terms and conditions, as necessary to ensure integrity of the final waste form..." *Integrity* should be defined in concise technological terms e.g., temperature and pressure thresholds to be withstood, as well as other specific vitrification criteria.
2. 40 CFR 261.3 DOE suggested language. No mention is made of any leachability testing. This should be inserted.
3. 40 CFR 268.40 DOE suggested language, "...provided that the treated waste meets the extract level for the following inorganics...or the treated waste meets the extract levels for applicable minimize threat standards for these inorganics." What are *applicable minimize threat standards*? This should be deleted or defined concisely and the language should reflect that TCLP testing standards should be used for the applicable elements.

B. Macroencapsulation Language

1. 40 CFR 261.3(f) DOE language. "...persons claiming this exclusion in an enforcement action will have the burden of proving by clear and convincing evidence that the material meets all of the exclusion requirements." Why should the burden of proof be only in the case of *an enforcement action*? Language should be changed to reflect regulatory adaptation that not only occurs in the case of enforcement but that the evidence needed as a part of the integrity standards should be established in the developmental stages of the permitting process. Also exclusion requirements should be cited or specifically listed here. (Regulators and facilities should be on the same track from the very beginning of the regulatory process.)
2. 40 CFR 268.45(I) DOE language. Additional language should be inserted that ensures the treated products meet temperature and pressure testing requirements, and testing requirements that mimic seasonal changes (as a minimal requirement). Integrity should be adequately described.

3. 40 CFR 268.45, Table 1, Microencapsulation technology description. "Stabilization of the debris with the ...leachability of the hazardous contaminants is reduced." There should be language added so that the reduced leachability amount of the hazardous contaminants is known, e.g., *reduced to meet TCLP standards.*

REFERENCES

1. Sullivan, T.M., R. J. MacKinnon, R. R. Kinsey, A. Aronson, M. Divadeenam. *Breach, Leach, and Transport - Multiple Species Data Input Guide, A Computer Model for Simulating Release of Contaminants from a Subsurface Low-Level Waste Disposal Facility*. Brookhaven National Laboratory. Prepared for U.S. Nuclear Regulatory Commission. NUREG/CR-6492. November, 1996.

2. U. S. Department of Energy. DOE Order 5820.2A, Radioactive Waste Management. 1988.

3. Nuclear Regulatory Commission. 1982. 10 Code of Federal Regulations Part 61, Licensing Requirements for Land Disposal of Radioactive Waste.

4. Rogers, R.D., M.A. Hamilton, R.H. Veeh, J.W. McConnell, Jr. *Microbial Degradation of Low-Level Radioactive Waste*. Idaho National Engineering Laboratory. Lockheed Idaho Technologies Company. Prepared for U. S. Regulatory Commission. NUREG/CR-6341, INEL-95/0215. June 1996.