

M E M O R A N D U M   T O   F I L E

July 20, 1992

To:            Susan Collins  
From:          Stephanie Stoddard  
Re:            Notes from 7/20 LANL Meeting

Mr. Bob Villarreal gave an overview of his involvement in the WIPP Contact Handled Source Term Test Program. There are nine testing programs in all. The "performance assessment" language in the 11/14/90 no-migration petition or 40CFR 191.13 is the basis for all the testing done in the STTP.

Mr. Villarreal is the Compliance/Technical Supervisor for the actinide solubility portion of the Contact Handled-TRU Waste Source Term Test Program. A series of tests will be run using actual mixed waste which is currently in storage at TA-54: 39 liter-scale tests with brine and 24 drum-scale tests with brine. He has funding from DOE for three years total: one year for methods development, and two years for experimentation.

Mr. Villarreal reviewed the process and procedures to be followed during the liter and drum-scale testing. The state's position is that "treatment" as defined in the CFR is occurring to the radioactive component. The effect of the process on the hazardous component is "treatment" but the intent of the process is not. HRMB feels it is appropriate that we maintain a measure of jurisdiction over these processes. HRMB believes our jurisdiction falls under 265.1(a). LANL does not necessarily agree with our interpretation, but has at this meeting indicated a willingness to cooperate with the minimum reporting requirements associated with treatability studies under 264.1(e) and the waste analysis requirements under 265.13.



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## **WIPP PERFORMANCE DEMONSTRATIONS**

- Major area of uncertainty is the amount of gas generated in the waste by
  - 1) Corrosion
  - 2) Microbial decomposition
  - 3) Radiolysis
- Effect of brine on gas generation and solubility of radionuclides (actinides).
- Effect of various parameters of gas generation and solubility of actinides
- Bin scale tests
  - dry
  - wet (brine)
- Alcove tests
- Laboratory tests (simulated)
- Liter scale tests with brine (actual)
- Drum scale tests with brine (actual)

## **CH-TRU WASTE SOURCE-TERM TEST PROGRAM**

- **Test program to measure:**
  - 1) **Actinide source-term from CH-TRU wastes immersed in WIPP brine.**
  - 2) **Source terms for Pb and other toxic constituents of CH-TRU wastes immersed in WIPP brine.**
  - 3) **Quantity, identify, and rate of production of soluble and evolved gases produced radiolytically, microbially, and via corrosion to complement full-scale tests.**
  - 4) **The effect of in-situ controlling variables present in wastes on the solubility of actinides and hazardous materials.**
- **Test program will provide data for WIPP PA according to 40 CFR 268 (EPA RCRA) and 40 CFR 191 (radionuclide migration).**

## **TECHNICAL REQUIREMENTS OF WIPP TEST PROGRAM**

1. Use actual waste as per test matrix and DOE/WIPP TRUCON codes
2. Drum scale tests on Level I and II Wastes
3. Liter scale tests on Level III Wastes
4. Place wastes in test containers
5. Spike wastes with actinides /  $\text{PuCl}_2$
6. Add brine, bentonite, and perhaps other influencing variables
7. Maintain at  $30 \pm 5^\circ\text{C}$
8. Agitate
9. Sample and analyze leachate
10. Sample and analyze soluble/evolved gases
11. Store sample
12. Report Results

## **ANALYTICAL REQUIREMENTS OF TEST PROGRAM**

1. Activity determination (total)
2. Ph measurement (pH)
3. Eh measurement
4. Filtration
5.  $\alpha$ -activity filtered and unfiltered
6. Actinide concentrations, filtered and unfiltered,  $10^{-10}$ M
7. Nonactinide analyte concentrations
- ~~8. Actinide concentrations (colloidal and noncolloidal)~~
9. Particle size analyses (unfiltered leachate)
10. Anion analyses
11. Total Inorganic Carbon (TIC)
12. ~~Total Organic Carbon (TOC)~~
13. Dissolved organic compounds in filtered leachate
14. Suspended organic compounds in unfiltered leachate
15. Headspace gas analyses for inorganic and organic Cpd
16. ~~Speciation studies~~
17. Characterization of microorganisms

## METHODS DEVELOPMENT

Methods development time will be divided into:

1. Procurement and set-up of analytical equipment/instrumentation
2. Adaptation of equipment to glovebox and radioactive laboratory hood environment
3. Development of methods specifically to perform analyses in the following brine solutions spiked with Th, U, Np, Pu, Am, and Cm with added  $PbCl_2$ .

**TABLE II. BRINE A CONSTITUENTS**

1. 292.1g	$MgCl_2 \cdot 6H_2O$	8. 0.52g	NaBr
2. 100.1g	NaCl	9. 0.125g	LiCl
3. 57.2g	KCl	10. 0.027g	RbCl
4. 6.2g	$NaSO_4$	11. 0.015g	$SrCl_2 \cdot 6H_2O$
5. 1.95g	$Na_2B_4O_7 \cdot 10H_2O$	12. 0.013g	KI
6. 0.52g	$CaCl_2$	13. 0.0125g	$FeCl_3 \cdot 6H_2O$
7. 0.96g	$NaHCO_3$	14. 0.0013g	CsCl
		15. add 2.5 ml	12M HCl

4. Establish precision and accuracy of measurements with Brine A and Brine B
5. Complete design under "Design of Equipment and Sampling System"
6. Complete developments under "Methods Development" section.