

Zerwekh

OFFICE MEMORANDUM

TO : K. J. Schiager, H-8  
THRU : R. D. Baker, CMB-Division Leader  
FROM : G. R. Waterbury & Al Zerwekh  
SUBJECT: Transuranic Waste & Development Program (A412) Monthly Report for  
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1. Corrosion studies of coated and uncoated mild steel coupons are continuing, and samples will be taken for electron microprobe examination during the next reporting period. Planning for various tests on the fibre drums received from Continental Can Company is underway.

2. Radiolysis Studies. The first phase of the study of the effect of pressure on gas generation in TRU-contaminated waste was completed. Two similar stainless steel cylinders, each containing 52.5 g of cellulose contaminated with 62 mg of  $^{238}\text{Pu}$ , were used in these tests. The pressure in cylinder No. 26 reached 689.5 kPa (full scale on the gauge) in 31.2 simulated years. A sample of the gas was analyzed mass spectrometrically (Table I). The pressure in cylinder No. 1 reached 103.4 kPa 11 times during this period, and the gas was bled off and analyzed each time (Table I).

The compositions of the gases in the two cylinders are quite comparable, with the possible exception of the oxygen content which is lower in cylinder No. 26. There appears to be some decrease in the rate of gas generation as the pressure increases, but there is still a significant volume of flammable gases generated. Depending on the construction and ventilation of a contaminated waste storage facility, this rate of gas generation would probably achieve an explosive mixture of hydrogen and air in the void spaces.

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After the eleventh gas sample was taken from cylinder No. 1 and the gas pressure was reduced to 6.89 kPa, this cylinder was kept at  $-13^{\circ}\text{C}$ . Cylinder No. 22, which duplicated cylinder No. 1 in all respects, was kept at  $20^{\circ}\text{C}$  after the eleventh gas sample had been taken and the pressure reduced to 6.89 kPa. The gas pressures attained 103.4 kPa in cylinder No. 1 at  $-13^{\circ}\text{C}$  in 43 days and in only 30 days in cylinder No. 22 at  $20^{\circ}\text{C}$ . Cylinder No. 22 is now being kept at  $33^{\circ}\text{C}$  to determine how long it will take to generate a pressure of 103.4 kPa at the higher temperature.

Further tests on the tan powder, that was found throughout cellulosics matrices subjected to radiolytic attack, showed that the powder was readily combustible and had an ash content less than 1 wt %. Elemental constituents of the ash were Si, Ti, Fe, Cu, and Zn, all of which were present originally in the uncontaminated waste matrices. Waste matrices other than cellulosics have not shown powdered degradation products, with the exception of strongly contaminated neoprene drybox glove material. A rust-colored granular material was separated from it and has been submitted for analysis.

Back-filling of the second storage trench for  $^{238}\text{Pu}$ -contaminated waste has been completed at the IASL Disposal Site. Four of the sealed concrete casks in the trench have been instrumented to provide the following data: temperature inside and outside selected drums, and outside the casks; and gas samples (and pressures, if any) from inside drums, and from inside and outside of casks. The accompanying photographs, Figures 1 through 4, show details of the installation of the sampling devices.

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