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OFFICE MEMORANDUM

TO : Tom Keenan, H-7 Group Leader, MS 518 DATE: February 5, 1976

THRU : R. D. Baker, CMB-Division Leader, MS 756

FROM : G. R. Waterbury & Al Zerwekh

SUBJECT: TRANSURANIC WASTE AND DEVELOPMENT PROGRAM (A412)
MONTHLY REPORT FOR JANUARY, 1976

SYMBOL : CMB-1

ANALYTICAL CHEMISTRY

1510 Report

Radiolysis Studies: Eight drums in covered-trench storage are being monitored for temperature and gas content, and gas samples are removed on a regular schedule for mass spectrometric analysis (Table I). The analyses of the gas mixtures showed that the gas in drum No. 301, recently placed in intermediate storage, was in the explosive range, and a sample of the gas was found to be explosible in the explosimeter. Radiolytic attack of the waste, described as oxide, rags, and mixed combustibles, generated this gas mixture in just 36 days. The distribution of the ^{238}Pu on the waste matrix must be optimum for very efficient α-radiolysis. This is the first explosible gas mixture found in a waste drum. It emphasizes the importance of avoiding gas-tight seals to allow gases to diffuse from drums in storage. No pressure has built up in this or any other instrumented drum in LASL interim storage. The gas mixture in drum No. 301 will be analyzed again at the end of 60 days of storage. Laboratory tests of the explosivity of gases generated in experimental cylinders are continuing.

Corrosion Studies: Electron microprobe examinations (Table II) of coated and uncoated steel samples, that have

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Table I

Data from ^{238}Pu-contaminated Waste in Covered-Trench Storage
09 January 1976, Ambient Temperature 4°C

Drum Number	^{238}Pu Content g	Waste Content Kg	Days in Storage	Temperature, °C: In-Side Drum	Temperature, °C: Out-Side Drum	Temperature, °C: Soil Under Cask	Sample With-Drawn From	Gas Composition (Mol %): H_2	CH_4	O_2	CO_2	CO	N_2
223	14.9	17.9	434	17.0	17.0	8.0	DRUM	1.0	0.1	12.0	7.0	1.0	77.0
							CASK	<0.1	<0.1	20.0	<0.1	0.1	78.0
224	22.1	14.5	434	21.0	18.0	12.0	DRUM	0.2	<0.1	18.5	1.0	0.2	78.5
							CASK	<0.1	<0.1	20.0	<0.1	0.1	79.0
232	29.4	10.2	434	23.5	17.5	12.0	DRUM	6.0	0.3	6.6	12.0	3.0	71.0
							CASK	0.4	<0.1	20.0	<0.1	0.3	79.0
233	17.0	14.5	434	23.0	17.0	11.0	DRUM	<0.1	<0.1	19.0	0.8	<0.1	79.0
							CASK	<0.1	<0.1	21.0	<0.1	<0.1	78.0
255	19.9	20.0	184	19.0	15.0	11.0	DRUM	<0.1	<0.1	18.0	0.6	<0.1	80.0
							CASK	<0.1	<0.1	19.0	0.2	<0.1	80.
260	20.2	13.6	188	32.0	12.0	9.5	DRUM	<0.1	<0.1	18.7	0.8	<0.1	80.0
							CASK	<0.1	<0.1	20.0	0.1	<0.1	79.0
281	19.7	26.0	36	--	15.0	9.5	DRUM	1.0	<0.1	18.0	3.0	0.7	76.0
301	18.7	23.6	36	--	15.0	11.0	DRUM	11.0	0.5	10.0	11.0	4.0	62.0