Zerwekh

LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO 87544

OFFICE MEMORANDUM

TO : Tom Keenan, Group Leader H-7, MS 518 DATE: June 3, 1977

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

FROM : G. R. Waterbury & Al Zerwekh, MS 740

SUBJECT: TRANSURANIC WASTE RESEARCH & DEVELOPMENT PROGRAM (A412) MONTHLY REPORT FOR MAY, 1977

SYMBOL : CMB-1

ANALYTICAL CHEMISTRY

1500 Report

Radiolysis Studies: Tests to determine possible radiolytic degradation of two filtering materials, GORE-TEX with WEBRIL BACK and GORE-TEX HEAVY POLYESTER that were contaminated with finely divided $^{239}PuO_2$, have been in progress for 240 days in two closed experimental cylinders. For the first 150 days, the pressure remained constant, but in the period between 150 and 240 days, the pressure in the cylinder containing the WEBRIL BACKED material gradually increased to 17.25 kPa. The HEAVY POLYESTER material has not generated enough gas to pressurize its cylinder.

Additional samples of gaseous contents of four drums containing ^{238}Pu-contaminated waste in covered trench storage were analyzed, and the results for these most recent samples were compared with previous analyses from the same drums (Table I). After approximately 2.5 yrs, Drum 223 has not generated a significant quantity of hydrogen. The percentage of oxygen has slowly decreased and the CO_2 has increased, while the nitrogen has remained almost constant. These facts indicate a reasonably tight seal. Air probably diffuses into the drum only on a replacement basis as gas samples are removed. The results from Drum 224 indicate that the ^{238}Pu is not in effective contact with the waste matrix. Initial gas generation was slow in Drum 281, but the hydrogen, oxygen, and CO_2 showed significant changes after storage for

1.5 yr. The gaseous mixture contained 6.6 mol % hydrogen and 8.9 mol % oxygen but was not explosible. Drum 380 appeared to be generating a significant quantity of hydrogen after 15 days, but the 35-day sample indicated no change. Frequent monitoring of the latter two drums will be continued.

Meetings and Discussions: On May 6, with Bob Reisdorf and Harold Owens of Midwest Research Institute, to discuss destruction of chemical carcinogens by incineration; on May 17 with Jay Doty, Bruce Peterson, and Joe Garner of Mound to discuss contaminated waste packaging and WIPP criteria compatibility; on May 19 with Don Ziegler and Lou Richey, Rocky Flats, to discuss incineration technology for low-level waste. From May 23 through 27, Al Zerwekh attended the Symposium on Management of Low-Level Radioactive Waste at Atlanta, Georgia.

Glenn R Waterbury

G. R. Waterbury

Enc. a/s
GRW:vmw

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TABLE I

Data from ^{238}Pu-contaminated Waste in Covered-Trench Storage

Latest measurements taken 11 May 1977

Drum Number	^{238}Pu Content g	Waste Content KG	Days in Storage	Temperature, °C: Inside Drum	Outside Drum	Ambient	Soil Under Cask	Sample Withdrawn From	Gas Composition (Mol %): H_2	CH_4	O_2	CO_2	CO	N_2
223	14.9	17.9	(Dec) 41	12.5	11.5	2.0	7.0	Drum	0.8	0.1	16.0	6.3	2.0	74.0
			(Feb) 94	12.0	12.0	5.0	7.0	Drum	0.9	0.1	15.0	5.4	0.9	77.0
			(May) 176	14.5	14.5	24.5	6.0	Drum	1.0	0.1	15.0	5.6	1.3	77.0
			(Jul) 238	24.0	23.0	27.0	16.0	Drum	1.0	0.1	13.0	6.2	1.8	77.0
			(Jan) 434	17.0	17.0	5.0	8.0	Drum	1.0	0.1	12.0	7.0	1.0	77.0
			(Jul) 626	23.5	24.0	23.0	19.0	Drum	0.9	0.1	11.2	7.5	0.8	78.6
			(May) 918	19.0	20.0	21.0	10.5	Drum	1.4	0.1	8.6	10.7	0.8	77.4
								Cask	0.1	<0.1	18.4	0.4	0.4	79.8
224	22.1	14.5	(Dec) 41	18.0	12.5	2.0	7.0	Drum	0.2	<0.1	19.0	1.4	0.7	77.0
			(Feb) 94	16.5	12.0	5.0	7.0	Drum	0.2	<0.1	19.0	1.2	0.3	78.0
			(May) 176	19.0	13.5	24.5	6.0	Drum	0.2	<0.1	20.0	1.2	0.4	78.0
			(Jul) 238	29.0	24.0	27.0	16.0	Drum	0.2	<0.1	18.0	1.3	0.3	79.0
			(Jan) 434	21.0	18.0	4.0	12.0	Drum	0.2	<0.1	18.5	1.0	0.2	79.5
			(May) 918	19.0	20.0	21.0	10.5	Drum	0.2	<0.1	17.2	1.4	0.4	79.8
								Cask	<0.1	<0.1	19.1	<0.1	0.3	79.5
281	19.7	26.0	(Jan) 36	--	15.0	4.0	9.5	Drum	1.0	<0.1	18.0	3.0	0.7	76.0
			(Jul) 223	--	24.5	23.0	15.5	Drum	1.0	0.2	16.0	4.0	0.8	77.0
			(May) 517	--	18.5	21.0	10.5	Drum	6.6	0.2	8.9	10.5	0.6	72.3
380	27.5	27.7	(Apr) 15	16.0	12.0	13.5	15	Drum	1.8	0.2	18.5	3.9	2.6	72.1
								Cask	0.3	<0.1	21.4	<0.1	0.7	76.5
			(May) 35	22.0	20.0	21.0	10.5	Drum	1.7	0.2	17.9	3.9	2.0	73.5
								Cask	0.3	<0.1	20.0	<0.1	0.5	78.2

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OFFICE MEMORANDUM

TO : Tom Keenan, Group Leader H-7, MS 518 DATE: March 1, 1977

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

FROM : G. R. Waterbury and Al Zerwekh

SUBJECT: TRANSURANIC WASTE RESEARCH & DEVELOPMENT PROGRAM (A412) MONTHLY REPORT FOR FEBRUARY, 1977

SYMBOL : CMB-1

ANALYTICAL CHEMISTRY

Incinerator Feed Studies: Laboratory studies of weight reduction factors upon burning various waste matrices in air at 1100°C showed that the ash from opaque polyvinyl-chloride (PVC) was 6.12% of the sample and consisted mainly of coloring materials and filler. A PVC sample of translucent sheeting left only a 0.16% residue which did not contain significant amounts of cations. This is believed to be more typical of plastic bags used to contain TRU-contaminated solid waste. Other waste matrices currently being incinerated include paper, rags, isoprene, and polyethylene.

Radiolysis Studies: Two experimental cylinders containing GORE-TEX with WEBRIL BACK and GORE-TEX HEAVY POLYESTER, contaminated with finely divided $^{239}PuO_2$, were closed for 150 days without pressurizing. In the period between 150 and 180 days, the cylinder containing the WEBRIL BACKED material began to pressurize and the pressure is presently 10.5 kPa. Due to this surprising change, observation of these cylinders will be continued.

Another group of 115-ℓ drums containing ^{238}Pu-contaminated trash is being prepared for interim storage in concrete casks in the LASL waste storage trenches. Two of these drums containing hydrogenous waste plus 27.5 and 40.0 g of ^{238}Pu, respectively, are being instrumented to monitor gaseous contents and temperature. This makes a total of 12 drums which are being observed.

Meetings and Discussions: On February 10, 1977, LASL personnel met with Sandia personnel at Sandia for a Waste Management Technical Information Exchange, and on February 18 they met with R. D. Werner and several design engineers from ARHCO to discuss radiolysis and gas pressurization of containers.

Glenn R Waterbury

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