

OFFICE MEMORANDUM

TO : J. A. Mohrbacher, H-8
VIA : J. L. Warren, H-8
FROM : J. W. Enders, H-8
SUBJECT : CY 1973 ANNUAL REPORT FOR SOLID RADIOACTIVE WASTE DISPOSAL
SYMBOL : H8-WM-94

DATE: January 10, 1974

Data for the fourth quarter of 1973 is included in this report. As some of the data is based on estimates, this should be kept in mind if any conclusions are to be drawn from the report.

Sources of information include The Zia Company L M & R Section, Eng.-4, Supply and Property Dept., Accounting Dept., and LA Notebooks #14909, 17339, 17338, 17337, 17336, 17845 and 12442.

In May, solid radioactive waste management was transferred from H-1 to H-8 Group and in July, a new section, Waste Management, was formed with J. A. Mohrbacher as Section Leader. Also, in July, a new format for reporting data to the AEC on a monthly schedule was started. The Waste Management Site Plan for FY 1973 was prepared and submitted by J. E. Herceg, H-8, in June. Revision of Standard Operating Procedures was started in order to make minor changes to reflect the transfer of waste disposal/storage operations from H-1 to H-8. Eventually, it is planned to incorporate these Procedures into a LASL Solid Radioactive Waste Management Manual.

Disposal of about 26 kg of ^{235}U residues was carried out in December. Clearance to bury this material had been pending for over one year.

In February, it was discovered that sludge drums stored in Pit No. 8 were leaking. As the sludge had been classified as TRU, >10 nCi/g, retrievable waste, the problem was posed of either re-packaging or burial. Several proposals have been prepared that indicated burial of these drums was the most feasible action. In December, a LASL Policy Statement on ^{238}Pu was submitted to the AEC for approval. The Policy states that ^{238}Pu waste will be stored retrievably at activity concentrations greater than 100 nCi/g. If approved, the sludge drums will be buried in place.

A considerable quantity of material classified as TRU, <10 nCi/g, (nonretrievable) has been stockpiled along the east side of Pit No. 17 as pit space was not available. If the above sludge drums can be buried, it is proposed that this stockpiled waste be moved into Pit No. 8 and be buried with the sludge. This should completely fill Pit No. 8. Two new pits, 7 and 24 were excavated in August and September and with approval from H-8 and ENG-1 it is planned to start using Pit. No. 7 for nonretrievable burial of TRU <10 nCi/g waste when the current Pit No. 17 is filled (within 1-2 months).

1341
Report



TO: J. A. Mohrbacher

2-

DATE: January 10, 1974

Pit No. 24 will be used for uranium waste when the current Pit No. 21 has been filled (within 3-4 months).

It is anticipated that Zia Crafts expenditures at Area G will be considerably increased after the first of the year in order to carry out the following work:

- A. relocate stockpiled material (by Pit No. 17) into either Pit No. 8 or 7
- B. place final three-foot thick cover on Pit No. 17
- C. relocate ^{238}Pu material (in crates and drums), now in Pit No. 5, to either Pit No. 7 or 12
- D. place final dirt cover on Pit No. 5
- E. repair crates now located in Pit No. 12.

Work on an engineered storage facility for ^{238}Pu residues has been started in Area G and should be completed in January 1974. Emplacement of 115-litre drums filled with ^{238}Pu residues should get underway immediately after completion of the facility.

An all-terrain forklift for use in stacking and off-loading operations at Area G was ordered and delivered in November. However, because it did not meet specifications, it was returned to the vendor.

COST AND VOLUME DATA EXPLANATION

1. Small Plastic Bags - These bags are used as liners for metal trash cans and cardboard boxes. The bags cost 6¢ each per Supply and Property Stock Catalog (GS-2308) and measure 0.33 m x 0.30 m x 0.61 m. The reported number of these bags used is conservative, since it (the number used) is for only those used at the CMR Building.
2. Large Plastic Bags - These 0.13 mm thick bags (GS-2306) measure 0.53 m x 0.66 m x 1.02 m and the current cost is 18¢ each. The volume of a filled bag is about 0.115 m³. This volume was determined about one year ago as a result of measurements taken by the CMR Building, H-1 Section personnel of filled bags.
3. Cardboard Boxes - These boxes cost 20¢ each and the volume estimate of 0.062 m³ is based on the box's physical dimensions. The total number reported is based on information given to H-8 when a Dempster Dumpster container is reported to be full.

TO: J. A. Mohrbacher, H-8

-3

DATE: January 10, 1974

4. Masking Tape - (GS-3854/1W-7) The cost per roll of \$1.00 is an annual average and usage based on an estimate which is probably conservative.
5. 210-Litre Drums - (LG-1110, 1CC Spec. 17H) An annual average cost of \$11.00 each is used and a volume of 0.210 m³ is based on the drum's dimensions.
6. 115-Litre Drums - (LG-1102) These drums cost \$6.17 each and the volume is at 0.115 m³.
7. Plywood Crates - An estimated cost of \$275.00 per crate is used and the volume reported is based on the crate's physical dimensions.
8. Zia Janitor Charge - The charge is based on a time study which indicates one man-hour per day, per man is required to package waste and load Dempster Dumpsters.
9. H-8 - The costs reported are based on estimates for two people working full time on solid radioactive waste disposal and include salary, overhead and materials.
10. Protective Clothing - These costs are based on estimates. Zia personnel are required to wear protective clothing during certain waste disposal activities.
11. Road and Ruin Excavation - This is a 20-year cost write-off of charges for construction of about two miles of access road to Area G and excavation of several Indian ruins that were located in Area G. The balance remaining as of 12-31-73 amounts of \$2 448.00
12. Zia Labor - This is an estimate based on work carried out in Area G and includes Zia Operator salary and overhead plus heavy equipment charges.
13. Transport Dempster Dumpsters - The charges are based on a cost per mile as reported by The Zia Company's Accounting Dept. and actual mileage reported by The Zia Company's L M & R Section.
14. Excavate Five Pits - This is a cost write-off for five currently used disposal pits and was completed at the end of the third quarter.
15. Excavate Pits No. 7 and 24 - Although the excavation costs are reported to have not been charged to Area G costs, a cost write-off is included for these pits starting with the fourth quarter. The estimated total of \$28 000 (for both pits) will be written off over a two-year period. The balance as of 12/31/73 amounts to \$24 502.00.

TO: J..A. Mohrbacher, H-8

-4

DATE: January 10, 1974

16. H-8 Vehicles - These charges are based on information supplied by Supply and Property Dept. for two pickup trucks and one 1-ton truck.
17. H-8 Radios - Information furnished by E-1 for charges for one radio console and three mobile units.
18. Fencing - This cost write-off is for additional fencing installed when Area G was expanded in 1971. The balance as of 12/31/73 is \$5 988.00.
19. Drilling Disposal Shafts - These charges are based on estimates, based on previous reported costs for this work.
20. Drum Disposal - This job involves lowering drums into six-foot-diameter disposal shafts and is based on estimates of time and equipment required to do the work.
21. Ready Mix Cement - Disposal shafts, when filled, are plugged with a three-foot-thick cap of cement. The charge is based on an estimate for this work.

PACKAGING MATERIALS

	<u>1st qtr</u>	<u>2nd qtr</u>	<u>3rd qtr</u>	<u>4th qtr</u>	1973 <u>TOTAL</u>
1. Small Plastic Bags	3 261	3 095	3 123	2 864	12 343
2. Large Plastic Bags	1 294	994	1 828	950	5 066
3. Boxes	6 844	7 317	5 139	4 263	23 563
4. Drums (210-litre)	557	365	280	247	1 449
5. Drums (115-litre)	33	55	86	106	280
6. Masking Tape (# rolls)	1 500	1 500	1 500	1 500	6 000
7. Crates	15	65	7	34	121
8. Drums (50-litre)		2	7	2	11

TO: J. A. Mohrbacher, H-8

-5

DATE: January 10, 1974

DISPOSAL COSTS

1. Small Plastic Bags	196	185	187	172	740
2. Large Plastic Bags	233	179	229	171	812
3. Boxes	1 368	1 462	1 027	853	4 710
4. Tape	1 500	1 500	1 500	1 500	6 000
5. Drums (210-litre)	6 127	4 015	3 080	2 717	15 939
6. Drums (115-litre)	203	339	530	654	1 726
7. Crates	3 750	16 350	1 400	9 350	30 850
8. Zia Janitor	13 980	13 980	13 980	13 980	55 920
9. H-8	11 289	11 500	11 400	11 500	45 689
10. Protective Clothing	300	300	300	300	1 200
11. Rd. & Ruin Excav.	135	135	135	135	540
12. Zia Labor	6 224	3 597	3 600	3 700	17 121
13. D. D. Transport	3 442	3 097	4 125	2 700	13 364
14. Excav. 5 Pits	3 000	3 000	3 000	-	9 000
15. Excav Pits 7 & 24	-	-	-	1 166	1 166
16. H-8 Vehicles	240	240	240	240	960
17. H-8 Radios	165	165	165	165	660
18. Fencing	1 218	1 218	1 218	1 218	4 872
19. Drill Shafts	800	-	-	-	800
20. Drum Disposal	500	-	-	-	500
21. Ready-Mix Cement	-	-	-	300	300
22. Drums (50-litre)	-	10	17	5	32
	<u>\$54 670.</u>	<u>\$61 272.</u>	<u>\$46 133.</u>	<u>\$50 826.</u>	<u>\$212 901.</u>
Cost/m ³	\$22.65	\$26.51	\$40.07	\$48.51	\$30.74

DISPOSAL COST SUMMARY:

The disposal costs presented do not contain certain other charges due to difficulty in obtaining them. It is believed that the cost per unit volume (dollars per cubic foot) would be substantially increased if these charges were included. A list of those charges not included are as follows:

- A. 2.29mm Liners (for H-7 sludge drums). The cost is estimated to be \$12 000 for 1973.

TO: J. A. Mohrbacher, H-8

-6

DATE: January 10, 1974

- B. Zia Rigger and Zia Labor Costs for Transportation of Waste Material to Area G. In most cases, the total Work Order charge does not reflect the actual transportation costs. An estimate for 1973 would amount to \$20 000 for Zia labor and \$22 000 for Zia Riggers. This total (42 000) is probably higher than "normal" due to Laboratory site decommissioning and rehabilitation carried out in 1973.
- C. Health Physics. A certain amount of man-hours per day is used by Health Physics for surveillance of waste disposal activities. A time study would be required to provide an estimate of this cost. A very rough estimate of \$40 000 per year would be sharply increased in the future if monitoring of all waste packages is started.
- D. H-8 Staff. A considerable portion of one staff member's time has been spent on waste disposal operations. This is in addition to the H-8 charge in the cost summary that includes one staff member and one technician, full time. An estimate of \$35 000 for 1973 for this charge would be realistic.

In summary, if the above charges were included in waste disposal costs, the cost per unit volume (dollars per m³) would be in excess of \$45.

WASTE VOLUME = (m³)

	<u>1st Qtr</u>	<u>2nd Qtr</u>	<u>3rd Qtr</u>	<u>4th Qtr</u>	<u>1973 Total</u>
I. U Waste					
A. Pit No. 5					
1. TU Chips	2.7	2.7	1.4	1.3	8.1
2. Graphite	14.8	6.1	24.5	6.1	51.5
3. Drums	-	0.3	-	4.3	4.6
4. Boxes	0.1	-	-	-	0.1
5. Crates	-	-	-	60.5	60.5
	<u>17.6</u>	<u>9.1</u>	<u>25.9</u>	<u>72.2</u>	<u>124.8</u>
B. Pit No. 16					
1. Equipment	57.3	-	-	-	57.3
2. Drums	-	-	-	21.3	21.3
	<u>57.3</u>	<u>-</u>	<u>-</u>	<u>21.3</u>	<u>78.6</u>
C. Pit No. 21					
1. Boxes	173.7	155.3	127.7	120.4	577.1
2. Crates	-	-	-	-	-
3. Loose	560.9	193.9	255.1	61.4	1 071.3
	<u>734.6</u>	<u>349.2</u>	<u>382.8</u>	<u>197.2</u>	<u>1 663.8</u>
D. Shafts	6.0	2.1	0.5	0.1	8.7
	<u>815.5</u>	<u>360.4</u>	<u>409.2</u>	<u>290.8</u>	<u>1 875.9</u>

TO: J. A. Mohrbacher, H-8

7-

DATE: January 10, 1974

	<u>1st Qtr</u>	<u>2nd Qtr</u>	<u>3rd Qtr</u>	<u>4th Qtr</u>	<u>1973 Total</u>
II. TRU Waste					
A. Pit No. 5 (²³⁸ Pu, >100 nCi/g)					
1. Crates	17.2	214.8	22.1	-	254.1
2. Drums	0.1	0.7	-	-	0.8
	<u>17.3</u>	<u>215.5</u>	<u>22.1</u>	<u>-</u>	<u>254.9</u>
B. Pit No. 8 (²³⁸ Pu sludge, <100 nCi/g)					
1. Drums (in pit)	118.3	-	13.8	-	132.1
2. Drums (on ground)	-	8.9	57.1	28.6	94.6
	<u>118.3</u>	<u>8.9</u>	<u>70.9</u>	<u>28.6</u>	<u>226.7</u>
C. Pit No. 12 (²³⁹ Pu, >10 nCi/g)					
1. Drums (115-litre)	-	2.7	4.1	9.1	15.9
2. Drums (210-litre)	3.8	4.8	1.6	1.6	11.8
3. Crates	60.8	116.7	9.3	-	186.8
4. Other	156.9	-	54.2	179.2	390.3
	<u>221.5</u>	<u>124.2</u>	<u>69.2</u>	<u>189.9</u>	<u>604.8</u>
D. Pit No. 17 (²³⁹ Pu, <10 nCi/g)					
1. Plastic Bags	146.7	112.7	120.9	107.7	488.0
2. Boxes	253.0	300.8	192.6	145.4	891.8
3. Drums (115-litre)	-	5.2	1.2	-	6.4
4. Drums (210-litre)	4.1	2.9	2.0	4.5	13.5
5. Crates	-	2.7	-	-	2.7
6. Loose	454.5	616.3	104.3	71.8	1 246.9
7. Drums (50-litre)	-	0.2	0.5	0.2	0.9
	<u>858.3</u>	<u>1 040.8</u>	<u>421.5</u>	<u>329.6</u>	<u>2 650.2</u>
E. East Side, Pit No. 17 (²³⁹ Pu, <10 nCi/g)					
1. Crates	44.4	164.1	-	53.6	262.1
2. Other	170.0	36.3	36.4	45.1	287.8
	<u>214.4</u>	<u>200.4</u>	<u>36.4</u>	<u>98.7</u>	<u>549.9</u>

TO: J. A. Mohrbacher, H-8

8

DATE: January 10, 1974

F. Disposal Shafts (²³⁹ Pu, >10 nCi/g)	1.7	1.7	1.5	2.1	7.0
G. Oil Shaft (²³⁹ Pu, <10 nCi/g)	7.7	-	3.4	-	11.1
H. Area T (Pu/Am, >10 nCi/g) Cement Paste	153.1	188.4	104.1	107.3	552.9
I. Area A (<10 nCi/g)	-	170.0	11.5	0.1	181.6
III. FP/IA (shafts)	0.6	0.6	0.1	-	1.3
IV. T ²	5.0	0.8	1.4	0.7	7.9

WASTE SUMMARY

I.	Total U Waste	1 875.9 m ³
II.	Total TRU Waste	
	1. ²³⁹ Pu, <10 nCi/g	3 392.8
	2. ²³⁹ Pu, >10 nCi/g	1 164.7 - 552.9 (CEMENT PASTE) <u>611.8</u>
	3. ²³⁸ Pu, <100 nCi/g	226.7
	4. ²³⁸ Pu, >100 nCi/g	254.9
III.	Total FP/IA Waste	1.3
IV.	Total T ² Waste	7.9
	1973 TOTAL	6 924.2 m ³

ISOTOPE MASS/ACTIVITY DISPOSAL SUMMARY

<u>Mass</u>	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>1973 Total</u>
²³⁹ Pu, grams	387.904	497.377	335.634	1 252.649	2 473.564
²³⁵ U, grams	284.800	234.700	0.000	25 991.000	26 510.500
U, kg	1 201.0378	2 363.7477	1 161.5300	1 115.6110	5 841.9265
<u>Curies</u>					
TRU*	203.013	244.549	160.910	232.600	841.072
U	0.071	1.011	0.002	0.531	1.615
FP/IA	241.535	194.479	191.720	49.500	677.234
T ²	10.000	101.000	1 355.000	51.000	1 517.000
Total Curies	454.619	541.039	1 707.632	333.631	3 036.921

* Includes, but not limited to ²⁴¹Am, ²³⁸Pu, and ²³⁹Pu.