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LOS ALAMOS, NEW MEXICO 87544

OFFICE MEMORANDUM

TO : M. A. Rogers, H-12, MS-490 DATE: February 27, 1979

THRU : T. K. Keenan, H-7, MS-518 TKK

FROM : J. L. Warren, H-7, MS-517 J L Warren

SUBJECT : RADIONUCLIDE CONTENT OF AREA T SHAFTS

SYMBOL : H-7B-79-9

0580 TA-21

Cynthia Murphy now has spent many weeks reviewing H-7 liquid waste records of disposal of cement paste into the Area T shafts. The quantity and quality of the available data varies considerably over the years. In many instances, we have had to use our best judgement in interpreting available data, including or excluding specific values.

Where possible, values for ^{241}Am and ^{239}Pu content have been taken from the results of CMB-11 analyses of the input waste stream. Fortunately, most of the contamination is found in only one input stream, the "^{241}Am-waste", which routinely was analyzed. However, values for generally much smaller levels of contamination found in other input streams (eg. plant sludge, KOH, etc.) appear to be available only from H-7 lab analyses, and we find what we feel is considerable inaccuracy in much of this old data. Errors in the H-7 lab analyses appear to have resulted from residual contamination in the system, poor sampling technique, and/or inaccurate laboratory techniques. Consequently, for numerous pug mill runs which include no ^{241}Am-waste, we are unable at this time to assign any quantity of contaminants to the waste in these runs. We are reasonably certain, however, that the amounts are very small, typically much less than a gram quantity of Pu or Am.

Additionally, all of the pug mill runs which included ^{241}Am waste also contained significant volumes of these other low activity waste streams. The listed ^{239}Pu and ^{241}Am values in most cases, however, are only for the ^{241}Am-waste. As above, the error in not having values for the low-activity streams should, in our opinion, be extremely small. We do intend to try to identify any of these current unknown quantities.

The enclosed data sheets for the Area T shafts also contain many comments in which we have tried to identify when data were not available, when we have "accepted" the H-7 analyses and when and why we have not accepted the H-7 data. Where the H-7 data was the only available information, we have included the values in our totals when the numbers appeared reasonable.

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Another result of the inaccuracy of the H-7 lab analyses, and lack of other input data, is the absence at this time of values for ^{238}Pu, uranium, and MFP in the shafts. In terms of total radioactivity, these contaminants will add very little to the content of the shafts. We will attempt to identify values for these radionuclides in the future, if possible.

Finally, a source of error is assigning contents to specific shafts results from the H-7 procedure of disposing wash water into a different shaft than the one receiving the paste. The result is that the radionuclide contents assigned to shafts that received wash solutions will be less than what is actually in the shaft due to the residual material carried with the wash. On the other hand, all shafts which received only the cement paste will have slightly less contamination than assigned due to material disposed elsewhere via the wash. Overall, however, the content of the Area T site is not altered.

These data are considered "official" now by H-7, and will be entered into our solid waste computer records. As indicated above, the data are not yet complete, and we do expect to include later, if at all possible, data for ^{238}Pu, uranium, and MFP content of the cement paste. Also, please let us know if you disagree with our inclusion or exclusion of data as we have indicated. We do want to make the LASL waste disposal records as accurate as is possible.

JLW:cm

xc: J. Steger, H-12, MS-490
W. Hansen, H-8, MS-490
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H-7b File (2)

TA-21, AREA T SHAFT DISPOSAL DATA

Shaft No.	Grams ^{241}Am	Grams ^{239}Pu	Date of 1st PMR	Date of Last PMR	Comments
1	21.836	20.767	8/10/73	10/25/73	PMR 258 contained 763mg ^{238}Pu and 55[illegible]grams ^{239}Pu according to H-7 analysis;these numbers are believed very high and are not included in the Pu amount. PMR 266 contained 640mg PU^{238} and 709grams ^{239}Pu according to H-7 analysis; these numbers are believed very high and are not included in the PU amount.
2	2.635	3.688	9/23/70	10/14/70	PMR 92 contained no ^{241}Am and had no H-7 analysis
3	5.524	10.208	5/1/68	4/10/69	PMR 1 and 2 amounts used were taken from H-7 analysis
5	25.007	12.001	5/25/71	9/9/71	^{239}Pu amounts figured in for PMRs 132,135,137,139 are from H-7 analysis
6	10.6	10.96			There is no information available at this time regarding date of first and last PMR
8	30.61	44.97	8/29/74	9/31/77	
9	24.243	24.977	11/9/69	2/16/70	
10	4.378	3.97	7/15/71	7/20/71	
11	2.675	3.217	11/6/69	11/19/69	
13	35.924	39.608	5/23/74	7/2/74	
17	17.278	31.897	12/5/68	4/10/69	H-7 analysis indicated 50.13g. ^{239}Pu (2/13/69), 14.96 grams ^{239}PU (2/21/69) and 91.32g ^{239}Pu (2/28/69); these numbers believed very high and are not included in Pu amount.
18	17.757	18.758	8/14/69	11/6/69	
19	6.414	16.333	5/24/68	9/5/68	PMRs 3,4,5 amounts used were from H-7 analysis. PMR 12 contained no ^{241}Am; the ^{239}Pu amount figured in was from H-7 analysis.

Shaft No.	Grams ^{241}Am	Grams ^{239}Pu	Date of 1st PMR	Date of Last PMR	Comments
20	27.455	11.562	12/10/70	2/11/71	PMRs 104,106, and 110 contained no ^{241}AM and has no H-7 analysis. PMR111 has .385grams ^{239}Pu according H-7 analysis which was figured in.
21	23.532	13.255	3/8/72	6/12/72	PMRs 172,175 contained no ^{241}AM and had no H-7 analysis. PMRs 169,170,177 and 183 have the H-7 analysis for Pu figured in.
22	20.761	18.802	6/3/70	8/10/70	
23	32.609	20.412	2/18/71	5/25/71	PMR 119 contained no ^{241}Am, and has H-7 analysis for Pu figured in.
24	26.039	17.427	3/16/70	5/6/70	
25	10.382	7.235	9/22/70	9/15/70	
26	5.829	4.538	2/16/70	3/16/70	
27	18.768	32.539	8/13/68	11/22/68	
28	34.837	40.429	12/13/73	3/13/74	
29	10.215	4.224	5/17/72	6/12/72	PMR 183 contained no ^{241}Am and has H-7 analysis for Pu figured in.
30	19.52	14.048	8/10/70	11/5/70	PMRs 85,88, and 95 contained no ^{241}Am and had no H-7 analysis for Pu.
31	3.059	2.965	7/30/71	2/18/72	PMRs 146,154 contained no ^{241}Am and H-7 analysis for Pu is figured in. PMR 146 contained 6 Thermocouples and was a test run.
32	9.74	5.355	5/6/70	6/3/70	
33	21.275	24.764	3/28/69	8/14/69	
34	22.157	11.425	10/5/71	2/7/72	PMRs 144,146,147,149,154, and 161 contained no ^{241}Am H-7 analysis for Pu is figured in above amount.

Shaft No.	Grams ^{241}Am	Grams ^{239}Pu	Date of 1st PMR	Date of Last PMR	Comments
35	26.253	16.037	6/12/72	8/10/72	PMR 188 had no ^{241}Am, and no H-7 analysis on Pu. PMR 194 had no ^{241}Am, and H-7 analysis for Pu is included in tha above Pu amount.
36	26.915	12.408	11/19/71	3/2/72	PMRs 149,155,161, and 166 contained no ^{241}Am, the H-7 analysis for Pu is included in the above amount.
41	18.789	20.479	8/17/72	10/4/72	PMR 199 contained no ^{241}Am, and had no H-7 analysis for Pu.
42	2.573	4.203	11/30/70	12/8/70	PMR 102 contained no ^{241}Am, and had no H-7 analysis. for Pu.
43	30.628	28.12	2/7/75	4/3/75	PMR 332 contained no ^{241}Am, H-7 analysis showed 644grams ^{239}Pu; this amount was not included in the above Pu amount as it is believed very high. PMR 336 contained no ^{241}Am, H-7 analysis showed 442 grams ^{239}Pu; this amount was not included in the above Pu amount as it is believed very high.
44	22.004	14.542	6/10/71	11/12/71	PMRs 128,142,144, and 147 contained no ^{241}Am, the H-7 analysis for Pu is included in above amount
46	37.002	33.031	10/4/72	2/3/73	PMR 203 contained no ^{241}Am, the H-7 analysis for PU is included in the above amount. PMR 212 contained no ^{241}Am, H-7 analysis showed 92grams; ^{239}Pu this amount was not included in the above Pu amount as it is believed very high. PMR 222 contained no ^{241}, H-7 analysis showed 112grams ^{239}Pu; this amount was not included in the above Pu amount as it is believe very high.
47	16.157	16.552	4/25/75	5/13/75	
48	24.317	21.71	4/5/74	5/16/74	PMR 289 contained no ^{241}Am, H-7 analysis showed 2279 grams ^{239}Pu; this amount was not included in the above amount of Pu as it is believed very high.
49	51.391	62.244	10/16/74	12/5/74	

Shaft No.	Grams ^{241}Am	Grams ^{239}Pu	Date of 1st PMR	Date of Last PMR	Comments
50	22.027	18.46	10/17/72	3/28/73	PMR 203 contained no ^{241}Am, H-7 analysis for ^{239}Pu is included in the above amount. PMR 212 contained no ^{241}Am, 66grams ^{239}Pu was shown in H-7 analysis; this amount believed very high and not included in the above amount. PMR 222 contained no ^{241}Am, H-7 analysis for ^{239}Pu showed 102grams this amount was not used in above amount as believed very high.
51	12.193	11.398	10/4/73	4/5/74	
52	12.463	26.485	11/17/72	2/23/73	PMR 222 contained no ^{241}Am, H-7 analysis for 23 u showed 96grams; ^{239}Pu this amount believed very high and not included in the above Pu amount. 4-55gal. drums of ^{233}U were put into this shaft.
53	35.248	28.68	10/4/73	12/6/73	
54	35.5	25.792	2/28/73	5/23/78	PMR 233 contained no ^{241}Am, H-7 analysis showed 246 grams ^{239}Pu;this amount believed very high and not included in above Pu amount. PMR 239 contained no ^{241}Am, H-7 analysis showed 307 grams ^{239}Pu;this amount believed very high and not included in above amount.
55	27.735	45.886	7/9/74	8/23/74	
56	33.905	23.931	3/30/73	6/22/73	PMR 233 contained no ^{241}Am, H-7 analysis showed 2 grams ^{239}Pu;this amount believed very high and not included in above Pu amount. PMR 239 contained no ^{241}Am, H-7 analysis showed 213 grams ^{239}Pu;this amount believed very high and not included in above Pu amount. PMR 243 contained no ^{241}Am, H-7 analysis showed 184grams ^{239}Pu;this amount believed very high and not included in above amount. PMR 248 contained no ^{241}Am, H-7 analysis showed 301 grams ^{239}Pu this;amount believed very high and not included in above amount.

Shaft No.	Grams ^{241}Am	Grams ^{239}Pu	Date of 1st PMR	Date of Last PMR	Comments
57	12.389	19.147	4/[illegible]/75	4/22/75	PMR 339 contained no ^{241}Am, H-7 analysis showed 464grams ^{239}Pu which is believed very high and not included in the above Pu amount.
58	8.414	7.746	11/29/72	1/17/73	PMR 216 contained no ^{241}Am, H-7 analysis showed 395 grams ^{239}Pu which is believed very high and not included in the above Pu amount. 4-55gal drums of ^{233}U were put in this shaft, the total amount of ^{233}U in shafts 52 and 58 is 713grams
59	32.37	44.17	12/20/74	2/7/75	
60	34.258	38.214	5/29/73	8/3/73	PMR 243 contained no ^{241}Am, H-7 analysis showed 276 grams ^{239}Pu which is believed very high and not included in the above Pu amount. PMR 248 contained no ^{241}Am, H-7 analysis showed 227grams ^{239}Pu which is believed very high and not included in the above Pu amount.
70	30.99	79.85	10/17/75	12/11/75	
75	36.772	32.938	5/13/75	7/2/75	
76	55.18	56.74	8/21/75	10/9/75	
78	.85	7.57	2/20/76	5/12/76	
80	4.18	19.97	12/16/75	2/20/76	
82	2.47	8.88	7/28/76	12/27/76	
83	5.0	19.61	12/11/75	12/16/75	
84	.31	9.49	5/19/76	3/4/77	
87	.43	7.71	3/4/77	10/4/77	
90	.09	.43			There is no information available at this time regarding the date of the first PMR, this shaft is still active 2/6/79.

Shaft No.	Grams ^{241}Am	Grams ^{239}Pu	Date of 1st PMR	Date of Last PMR	Comments
91	.49	1.88			There is no information available at this time regarding the dates of the first and last PMRs.
92	4.[illegible]4	6.4			There is no information available at this time regarding the dates of the first and last PMRs.
94	.54	1.6			There is no information available at this time regarding the dates of the first and last PMRs.

Shafts used for Wash Water

Shaft No.	No. of PMRs into Shaft	Comments
1	22	From 5/24/74 thru 10/2/74 wash water was discharged into Grit Chamber.
2	34	
10	41	From 10/16/74 thru 3/23/77 wash water was discharged into Shaft 8 then pumped out the next day to the Grit Chamber.
11	44	
13	13	From 4/7/77 until records end in 1977 the wash water went into shaft 95.
25	2	
4	33	
41	51	
44	6	
45	1	
48	63	
52	4	
55	10	

TOTALS INTO TA-21, AREA T SHAFTS

	Grams ^{241}Am	Grams ^{239}Pu	Grams ^{233}U
Cement Paste	1155.35	1242.14	
Spheres*		1221.00	
Drums			713.00
Totals	1155.35	2463.14	713.00

* Spheres are located in shafts 3, 17, 18, 19, and 26.