Idaho National Engineering Laboratory

MDS -2- 94

From : M. D. Staiger
Phone : 526-3122
Date : April 5, 1994
Subject: Calcine Disposal at CFA

To : R. R. Bone
Environmental Assurance

cc : J. P. Law
W. B. Palmer
M. E. Feldman

Remediation efforts by EG&G in the pit south of CFA -674 have uncovered materials containing mercury. Discussions between EG&G and former WINCO employees in 1992 identified this as a "Waste Calcine" disposal area. Subsequent field observations found additional outcroppings of similar materials nearby. These new "finds" are of a concern because of added remediation scope. Hopi Salomon of EG&G requested assistance from WINCO Applied Technology personnel to confirm that the material was calcine.

Hopi took me on a tour of the area where I confirmed that the material is calcine. I have since looked back through some old reports and letter files to get an estimate of the amount of material that may have been disposed at the site as a result of development activities. The results of this investigation are summarized in the attached spreadsheet. I estimate that approximately 70 cubic meters of calcine were produced. As much as 450 kilograms of mercury (probably HgO) contaminate about 60% of the calcine. I noted that some experiments used radioactive isotopes as tracers but I was not able to establish levels. If these tracer runs were disposed at the pit they represent less than 0.5% of the volume. I also telephoned several people who worked in the area as operators or engineers during the period. These discussions confirmed that it was routine practice to dispose of the calcine product in the pit area but they were unable to shed additional light on the fate of the radioactive batches.

I suggest that you pass this information on to Hopi as you deem most appropriate. If you have questions or need additional assistance contact me at 6-3122.

M D Staiger

M. D. Staiger, Fellow Engineer
Waste Immobilization and Calcine Retrieval

Westinghouse Idaho Nuclear Company, Inc. Box 4000 - Idaho Falls, Idaho 83415

References

"Pilot Plant Studies With a Six-Inch Diameter Fluidized Bed Calciner", D. R. Evans, IDO-14539, April 1961

"Development Of A Fluidized Bed Calcination Process For Aluminum Nitrate Wastes In A Two-Foot-Square Pilot Plant Calciner. Part I. Equipment Development And Initial Process Studies", B. P. Brown, etal., IDO-14586, June 1960

"Development Of A Fluidized Bed Calcination Process For Aluminum Nitrate Wastes In A Two-Foot-Square Pilot Plant Calciner. Part II. Factors Affecting The Intra-Particle Porosity of Alumina", B. R. Wheeler, etal., IDO-14587, July 1962

"Development Of A Fluidized Bed Calcination Process For Aluminum Nitrate Wastes In A Two-Foot-Square Pilot Plant Calciner. Part III. Intermediate Process Studies --Runs 11 Through 22", B. P. Brown, etal., IDO-14618, June 1964

"Development Of A Fluidized Bed Calcination Process For Aluminum Nitrate Wastes In A Two-Foot-Square Pilot Plant Calciner. Part IV. Final Process Studies --Runs 23 Through 37", B. P. Brown, etal., IDO-14627, June 1964

"Chemical Processing Technology Quarterly Progress Report April - June 1963", IDO-14621, January 1964

Twelve Inch Calciner History File Miscellaneous Letter Reports. unpublished

Six Inch Calciner Operation Summary Sheet unpublished

ESTIMATED MERCURY AMOUNTS AND CALCINE AMOUNTS from 2'X2' PILOT PLANT CALCINER

Run	Start Date	Finish Date	Run Time Hours	onstream time %	Feed Rate l/hr	Approx Vol Liters	Oper Temp cent.	Feed Chemistry Al	molar HNO3	NaNO3	Hg(NO3)2	gm-moles mercury	kg of Hg in mercury	% ret. in calcine	kilogram Hg in product	kilogram of calcine	m**3 of calcine
1	1/19/59	3/11/59	1217	81	40	39285	500	1.95	1.25	0.089	0.006	236	47	30	14	2801	2.888
2	3/13/59	3/30/59	397	69	40	11021	500	1.95	1.25	0.089	0.006	66	13	30	4	786	0.810
3	3/30/59	4/12/59	297	100	40	11880	500	1.95	1.25	0.089	0.006	71	14	30	4	847	0.873
4	6/12/59	7/5/59	1055	74	40	31059	500	1.95	1.25	0.089	0.006	186	37	30	11	2215	2.283
5	7/7/59	7/21/59	336	10	70	2446	450	1.95	1.25	0.089	0.006	15	3	54	2	174	0.180
6	11/12/59	11/28/59	383	89	80	27116	500	1.95	1.25	0.089	0.006	163	33	30	10	1933	1.993
7	11/29/59	1/19/60	1008	40	0	0	500	1.95	1.25	0.089	0.006	0	0	30	0	0	0.000
8	1/20/60	2/5/60	155	100	80	12400	500	1.95	1.25	0.089	0.006	74	15	30	4	884	0.911
	1/21/60	1/31/60	241	100	80	19280	500	1.95	1.25	0	0	0	0	30	0	1375	1.417
9	3/13/60	4/20/60	517	91	80	37638	500	1.95	1.25	0.089	0.006	226	45	30	14	2684	2.767
	4/4/60	4/20/60	372	86	77	24634	500	1.95	1.25	0	0	0	0	30	0	1756	1.811
10	4/20/60	6/8/60	786	98	77	59312	500	1.95	1.25	0.089	0.006	356	71	30	21	4229	4.360
	5/19/60	6/2/60	377	100	80	30160	500	1.95	1.25	0	0	0	0	30	0	2150	2.217
11	7/18/60	7/29/60	274	100	80	21920	500	1.95	1.25	0.089	0.006	132	26	30	8	1563	1.611
12	8/9/60	8/17/60	188	93	118	20631	400	1.29	2.84	0.078	0.015	309	62	64	40	1471	1.516
13	10/24/60	10/30/60	140	100	88	12320	400	1.29	2.84	0.078	0.0157	193	39	64	25	878	0.906
14	11/7/60	11/17/60	231	73	114	19224	400	1.31	2.97	0.081	0.0156	300	60	64	38	1371	1.413
15	12/6/60	12/18/60	137	57	90	7028	500	1.40	2.89	0.086	0.016	112	23	30	7	501	0.517
	12/13/60	12/16/60	67	100	90	6030	400	1.40	2.89	0.086	0.016	96	19	64	12	430	0.443
16	12/28/60	1/5/61	212	100	90	19080	400	1.95	1.25	0.089	0.006	114	23	64	15	1360	1.402
17	1/24/61	2/9/61	322	99	90	28690	425	1.95	1.25	0.089	0.006	172	35	58	20	2046	2.109
18	2/20/61	4/19/61	24	100	90	2160	550	1.00	1.25	0.089	0.006	13	3	15	0	154	0.159
18	2/20/61	4/19/61	23	100	90	2070	500	1.90	1.25	0.089	0.006	12	2	30	1	148	0.152
18	2/20/61	4/19/61	23	100	90	2070	450	1.54	1.25	0.089	0.006	12	2	54	1	148	0.152
18	2/20/61	4/19/61	24	100	90	2160	400	1.96	1.25	0.089	0.006	13	3	64	2	154	0.159
18	2/20/61	4/19/61	27	100	90	2430	375	1.01	1.25	0.089	0.006	15	3	72	2	173	0.179
18	2/20/61	4/19/61	224	100	90	20160	350	1.10	1.25	0.089	0.006	121	24	75	18	1437	1.482
18	2/20/61	4/19/61	95	100	90	8550	300	1.15	1.25	0.089	0.006	51	10	84	9	610	0.628
18	2/20/61	4/19/61	24	100	90	2160	250	1.80	1.25	0.089	0.006	13	3	93	2	154	0.159
19	4/25/61	5/4/61	220	98	85	18326	400	1.29	2.84	0.078	0.015	275	55	64	35	1307	1.347
20	5/10/61	5/18/61	197	98	40	7722	400	1.29	2.85	0.01	0.015	116	23	64	15	551	0.568
21	8/2/61	8/24/61	230	100	80	18400	400	1.29	2.34	0.078	0	0	0	64	0	1312	1.352
	8/19/61	8/24/21	127	100	80	10160	500	1.29	2.34	0.078	0.015	152	31	30	9	724	0.747
22	9/6/61	9/14/61	204	100	80	16320	400	1.30	2.32	0.078	0.015	245	49	64	31	1164	1.200
23	10/3/61	10/26/61	56	100	80	4480	400	1.29	2.34	0.078	0.015	67	13	64	9	319	0.329
			72	100	80	5760	500	1.29	2.34	0.078	0.015	86	17	30	5	411	0.423
			26	100	80	2080	550	1.29	2.34	0.078	0.015	31	6	15	1	148	0.153
24	10/31/61	11/9/61	221	100	80	17680	400	1.29	2.34	0.078	0.015	265	53	64	34	1261	1.300
25	12/12/61	12/21/61	79	100	40	3160	400	1.29	2.34	0.078	0.015	47	10	64	6	225	0.232
			24	100	80	1920	400	1.29	2.34	0.078	0.015	29	6	64	4	137	0.141
26	1/9/62	1/18/62	81	100	40	3240	400	1.29	2.34	0.078	0	0	0	64	0	231	0.238
			52	100	80	4160	400	1.29	2.34	0.078	0	0	0	64	0	297	0.306
27	1/23/62	2/1/62	111	100	115	12765	400	1.29	2.34	0.078	0	0	0	64	0	910	0.938
			63	100	94	5922	550	1.29	2.34	0.078	0	0	0	64	0	422	0.435
28	2/14/62	3/15/62	337	85	80	22916	400	1.29	2.34	0.078	0	0	0	64	0	1634	1.684
29	3/30/62	4/5/62	10	100	120	1200	400	1.29	2.34	0.078	0	0	0	64	0	86	0.088
			131	100	150	19650	400	1.29	2.34	0.078	0	0	0	64	0	1401	1.444
30	5/8/62	5/16/62	193	100	150	28950	400	1.29	2.34	0.078	0	0	0	64	0	2064	2.128
31	5/22/62	5/31/62	221	100	150	33150	400	1.29	2.34	0.078	0	0	0	64	0	2364	2.437
32	7/31/62	8/8/62	200	82	100	16400	400	1.29	2.34	0.078	0	0	0	64	0	1169	1.205
33	10/9/62	10/18/62	221	100	100	22100	300	1.29	2.34	0.078	0	0	0	64	0	1576	1.624
34	10/23/62	11/29/62	586	100	100	58600	300	1.29	2.34	0.078	0	0	0	64	0	4178	4.307
35	3/12/63	3/21/63	195	100	83	16185	300	1.29	2.34	0.078	0	0	0	64	0	1154	1.190
36	5/23/63	5/27/63	110	88	100	9680	300	1.29	2.34	0.078	0	0	0	64	0	690	0.712
37	8/6/63	8/29/63	457	100	98	44786	300	1.29	2.34	0.078	0	0	0	64	0	3193	3.292
38	10/5/64																
						888626							880		434	63359	65.319

Attachment
MDS-2-94
RR Bone
April 7, 1994

ESTIMATED MERCURY AMOUNTS AND CALCINE AMOUNTS FROM THE 6 INCH DIAMETER PILOT PLANT CALCINER

Run	Date	Feed Rate l/hr	Run Time Hours	Approx Vol Liters	Oper Temp cent.	Feed Chemistry Al	Feed Chemistry molar HNO3	Feed Chemistry NaNO3	Hg(NO3)2	gm-mole mercury	kg of Hg in Feed	% ret. in calcine	kilogram Hg in product	kilogram of calcine	m**3 of calcine	
1				0	400	2.2	1.25	0.02	0.008	0	0	64	0.0000	0.00	0.000	Cs-137 ?
2				0	400	2.2	1.25	0.02	0.008	0	0	64	0.0000	0.00	0.000	Cs-137 ?
3				0	400	2.2	1.25	0.02	0.008	0	0	64	0.0000	0.00	0.000	Cs-137 ?
4				0	400	2.2	1.25	0.02	0.008	0	0	64	0.0000	0.00	0.000	Cs-137 ?
5				0	400	2.2	1.25	0.02	0.008	0	0	64	0.0000	0.00	0.000	Cs-137 ?
6				0	400	2.2	1.25	0.02	0.008	0	0	64	0.0000	0.00	0.000	Cs-137 ?
7				0	425	2.2	1.25	0.02	0.008	0	0	58	0.0000	0.00	0.000	Cs-137 ?
8		4.80	3.70	17.76	375	2.2	1.25	0.02	0.008	0.0007	0.000142	64	0.0001	1.26	0.001	
9		7.00	1.00	7	450	2.2	1.25	0.02	0.008	0.0003	0.000056	54	0.0000	0.50	0.001	
10		2.70	5.00	13.5	400	2.2	1.25	0.02	0.008	0.0005	0.000108	64	0.0001	0.96	0.001	
11		3.00	8.50	25.5	400	2.2	1.25	0.02	0.008	0.001	0.000204	64	0.0001	1.81	0.002	
12		3.00	11.00	33	400	2.2	1.25	0.02	0.008	0.0013	0.000264	64	0.0002	2.34	0.002	
13		2.40	17.70	42.48	310	2.2	1.25	0.02	0.008	0.0017	0.00034	84	0.0003	3.02	0.003	
14		2.70	9.00	24.3	400	2.2	1.25	0.02	0.008	0.001	0.000194	64	0.0001	1.73	0.002	
15		4.20	9.00	37.8	310	2.2	1.25	0.02	0.008	0.0015	0.000302	84	0.0003	2.68	0.003	
test		3.60	6.00	21.6	350	2.2	1.25	0.02	0.008	0.0009	0.000173	75	0.0001	1.53	0.002	
16		2.00	4.50	9	400	2.2	1.25	0.02	0.008	0.0004	0.000072	64	0.0000	0.64	0.001	
17		4.40	11.50	50.6	405	2.2	1.25	0.02	0.008	0.002	0.000405	64	0.0003	3.59	0.004	Cs-137
18		4.60	9.70	44.62	450	2.2	1.25	0.02	0.008	0.0018	0.000357	54	0.0002	3.17	0.003	
19		4.90	6.00	29.4	470	2.2	1.25	0.02	0.008	0.0012	0.000235	45	0.0001	2.09	0.002	
20		3.30	14.50	47.85	400	2.2	1.25	0.02	0.008	0.0019	0.000383	64	0.0002	3.40	0.004	
21		4.40	11.50	50.6	400	2.2	1.25	0.02	0.008	0.002	0.000405	64	0.0003	3.59	0.004	
22		4.00	13.00	52	360	2.2	1.25	0.02	0.008	0.0021	0.000416	72	0.0003	3.69	0.004	Cs-137
23		4.00	35.70	142.8	360	2.2	1.25	0.02	0.008	0.0057	0.001142	72	0.0008	10.14	0.010	
24		3.50	8.00	28	360	2.2	1.25	0.02	0.008	0.0011	0.000224	64	0.0001	1.99	0.002	
25		3.50	29.70	103.95	500	2.2	1.25	0.02	0.008	0.0041	0.000832	30	0.0002	7.38	0.008	
test		4.70	16.00	75.2	185	2.2	1.25	0.02	0.008	0.003	0.000602	98	0.0006	5.34	0.006	
26		3.50	46.50	162.75	400	2.2	1.25	0.02	0.008	0.0065	0.001302	64	0.0008	11.56	0.012	Cs-137
27		3.60	49.50	178.2	300	2.2	1.25	0.02	0.008	0.0071	0.001426	93	0.0013	12.65	0.013	
28		3.80	74.00	281.2	400	2.2	1.25	0.02	0.008	0.0112	0.00225	64	0.0014	19.97	0.021	
29		3.60	66.00	237.6	300	2.2	1.25	0.02	0.008	0.0095	0.001901	64	0.0012	16.87	0.017	
30		3.70	67.00	247.9	300	2.2	1.25	0.02	0.008	0.0099	0.001983	93	0.0018	17.60	0.018	
31		3.60	28.00	100.8	500	2.2	1.25	0.02	0.008	0.004	0.000806	30	0.0002	7.16	0.007	
32		2.30	51.70	118.91	400	2.2	1.25	0.02	0.008	0.0047	0.000951	64	0.0006	8.44	0.009	
33		2.10	22.00	46.2	400	2.2	1.25	0.02	0.008	0.0018	0.00037	64	0.0002	3.28	0.003	
34		3.70	112.00	414.4	400	2.2	1.25	0.02	0.008	0.0165	0.003315	64	0.0021	29.42	0.030	Cs-137 Sr-90
35		3.60	110.00	396	400	2.2	1.25	0.02	0.008	0.0158	0.003168	64	0.0020	28.12	0.029	
36		1.70	108.00	183.6	400	2.2	1.25	0.02	0.008	0.0073	0.001469	64	0.0009	13.04	0.013	
37		3.60	242.00	871.2	400	2.2	1.25	0.02	0.008	0.0347	0.00697	64	0.0045	61.86	0.064	Sr-90
38		1.90	202.00	383.8	400	2.2	1.25	0.02	0.008	0.0153	0.00307	64	0.0020	27.25	0.028	
39a		1.90	176.00	334.4	400	2.2	1.25	0.02	0.008	0.0133	0.002675	64	0.0017	23.74	0.024	
b		3.00	110.00	330	400	2.2	1.25	0.02	0.008	0.0132	0.00264	64	0.0017	23.43	0.024	
40		6.30	92.00	579.6	400	2.2	1.25	0.02	0.008	0.0231	0.004637	64	0.0030	41.15	0.042	
41a		4.00	87.00	348	400	2.2	1.25	0.02	0.008	0.0139	0.002784	64	0.0018	24.71	0.025	
b		5.70	14.00	79.8	400	2.2	1.25	0.02	0.008	0.0032	0.000638	64	0.0004	5.67	0.006	
c		6.00	352.00	2112	400	2.2	1.25	0.02	0.008	0.0842	0.016896	64	0.0108	149.95	0.155	
42a	Apr-57	4.80	217.00	1041.6	400	2.2	1.25	0.02	0.008	0.0415	0.008333	64	0.0053	73.95	0.076	Ru-106
b	Apr-57	4.60	108.00	496.8	400	2.2	1.25	0.02	0.008	0.0198	0.003974	64	0.0025	35.27	0.036	
43a		3.60	62.00	223.2	400	2.2	1.25	0.02	0.008	0.0089	0.001786	64	0.0011	15.85	0.016	
b		8.20	21.00	172.2	400	2.2	1.25	0.02	0.008	0.0069	0.001378	64	0.0009	12.23	0.013	Ru-106
c		4.60	548.00	2520.8	400	2.2	1.25	0.02	0.008	0.1005	0.020166	64	0.0129	178.98	0.185	
44a		5.30	48.00	254.4	400	2.2	1.25	0.02	0.008	0.0101	0.002035	64	0.0013	18.06	0.019	
b		3.70	48.00	177.6	400	2.2	1.25	0.02	0.008	0.0071	0.001421	64	0.0009	12.61	0.013	
c		5.20	48.00	249.6	350	2.2	1.25	0.02	0.008	0.01	0.001997	75	0.0015	17.72	0.018	
d		3.60	48.00	172.8	350	2.2	1.25	0.02	0.008	0.0069	0.001382	75	0.0010	12.27	0.013	
e		5.40	48.00	259.2	400	2.2	1.25	0.02	0.008	0.0103	0.002074	64	0.0013	18.40	0.019	
f		5.30	48.00	254.4	400	2.2	1.25	0.02	0.008	0.0101	0.002035	64	0.0013	18.06	0.019	
g		5.10	48.00	244.8	350	2.2	1.25	0.02	0.008	0.0098	0.001958	75	0.0015	17.38	0.018	
h		5.30	48.00	254.4	350	2.2	1.25	0.02	0.008	0.0101	0.002035	64	0.0013	18.06	0.019	
i		3.70	55.00	203.5	400	2.2	1.25	0.02	0.008	0.0081	0.001628	64	0.0010	14.45	0.015	

Attachmer.
MDS-2-94
RR Bone
April 7, 1994

Run	Date	Feed Rate l/hr	Run Time Hours	Approx Vol Liters	Oper Temp cent	Feed Chemistry Al	HNO3	NaNO3	Hg(NO3)2	gm-mole mercury	kg of Hg in Feed	% ret. in calcine	kilogram Hg in product	kilogram of calcine	m**3 of calcine					
j		4.30	48.00	206.4	400	2.2	1.25	0.02	0.008	0.0082	0.001651	64	0.0011	14.65	0.015					
k		3.60	50.00	180	400	2.2	1.25	0.02	0.008	0.0072	0.00144	64	0.0009	12.78	0.013					
l		4.30	51.00	219.3	350	2.2	1.25	0.02	0.008	0.0087	0.001754	64	0.0011	15.57	0.016					
m		3.60	44.00	158.4	350	2.2	1.25	0.02	0.008	0.0063	0.001267	75	0.0010	11.25	0.012					
n		4.80	14.00	67.2	350	2.2	1.25	0.02	0.008	0.0027	0.000538	75	0.0004	4.77	0.005					
o		5.50	46.00	253	400	2.2	1.25	0.02	0.008	0.0101	0.002024	64	0.0013	17.96	0.019					
p		5.40	46.00	248.4	350	2.2	1.25	0.02	0.008	0.0099	0.001987	75	0.0015	17.64	0.018					
45a		3.30	47.00	155.1	400	2.2	1.25	0.02	0.008	0.0062	0.001241	64	0.0008	11.01	0.011	Ru-106				
b		5.30	43.00	227.9	400	2.2	1.25	0.02	0.008	0.0091	0.001823	64	0.0012	16.18	0.017					
c		5.80	57.00	330.6	400	2.2	1.25	0.02	0.008	0.0132	0.002645	64	0.0017	23.47	0.024					
46a		4.40	35.00	154	400	2.2	1.25	0.02	0.008	0.0061	0.001232	64	0.0008	10.93	0.011					
b		4.10	64.00	262.4	400	2.2	1.25	0.02	0.008	0.0105	0.002099	64	0.0013	18.63	0.019					
c		1.80	70.00	126	400	2.2	1.25	0.02	0.008	0.005	0.001008	64	0.0006	8.95	0.009					
d		1.90	63.00	119.7	400	2.2	1.25	0.02	0.008	0.0048	0.000958	64	0.0006	8.50	0.009					
e		1.80	105.00	189	400	2.2	1.25	0.02	0.008	0.0075	0.001512	64	0.0010	13.42	0.014					
f		3.20	96.00	307.2	400	2.2	1.25	0.02	0.008	0.0123	0.002458	64	0.0016	21.81	0.022					
g		3.00	107.00	321	400	2.2	1.25	0.02	0.008	0.0128	0.002568	64	0.0016	22.79	0.023					
h		4.10	92.00	377.2	400	2.2	1.25	0.02	0.008	0.015	0.003018	64	0.0019	26.78	0.028					
Wir-1a	Apr-58	5.50	184.00	1012	400	2.2	1.25	0.02	0.008	0.0404	0.008096	64	0.0052	71.85	0.074					
b	Apr-58	5.00	90.00	450	400	2.2	1.25	0.02	0.008	0.0179	0.0036	64	0.0023	31.95	0.033					
Wir-2	May-58	3.60	53.00	190.8	400	2.2	1.25	0.02	0.008	0.0076	0.001526	64	0.0010	13.55	0.014					
Wir-3	May-58	1.70	29.00	49.3	390	2.2	1.25	0.02	0.008	0.002	0.000394	66	0.0003	3.50	0.004					
Wir-4a	May-58	2.40	34.00	81.6	400	2.2	1.25	0.02	0.008	0.0033	0.000653	64	0.0004	5.79	0.006					
b	May-58	2.50	50.00	125	400	2.2	1.25	0.02	0.008	0.005	0.001	64	0.0006	8.88	0.009					
c	May-58	2.30	35.00	80.5	400	2.2	1.25	0.02	0.008	0.0032	0.000644	64	0.0004	5.72	0.006					
Wir-5	May-58	2.50	102.00	255	400	2.2	1.25	0.02	0.008	0.0102	0.00204	64	0.0013	18.11	0.019	Ru-106				
Wir-6a	Jun-58	2.60	38.00	98.8	400	2.2	1.25	0.02	0.008	0.0039	0.00079	64	0.0005	7.01	0.007					
b	Jun-58	4.40	21.00	92.4	400	2.2	1.25	0.02	0.008	0.0037	0.000739	64	0.0005	6.56	0.007					
Wir-7	Jun-58	2.40	48.00	115.2	400	2.2	1.25	0.02	0.008	0.0046	0.000922	64	0.0006	8.18	0.008					
Wir-8	Jun-58	2.70	25.00	67.5	400	2.2	1.25	0.02	0.008	0.0027	0.00054	64	0.0003	4.79	0.005					
Wir-9	Jun-58	2.40	66.00	158.4	400	2.2	1.25	0.02	0.008	0.0063	0.001267	64	0.0008	11.25	0.012					
Wir-10	Jun-58	2.50	26.00	65	400	2.2	1.25	0.02	0.008	0.0026	0.00052	64	0.0003	4.62	0.005					
Wir-11a	Jun-58	2.60	60.00	156	400	2.2	1.25	0.02	0.008	0.0062	0.001248	64	0.0008	11.08	0.011					
b	Jun-58	2.50	28.00	70	400	2.2	1.25	0.02	0.008	0.0028	0.00056	64	0.0004	4.97	0.005					
c	Jun-58	2.50	23.00	57.5	400	2.2	1.25	0.02	0.008	0.0023	0.00046	64	0.0003	4.08	0.004					
d	Jun-58	2.50	86.00	215	400	2.2	1.25	0.02	0.008	0.0086	0.00172	64	0.0011	15.27	0.016					
e	Jun-58	2.50	34.00	85	400	2.2	1.25	0.02	0.008	0.0034	0.00068	64	0.0004	6.04	0.006					
Wir-12a	Jun-58	2.40	112.00	268.8	400	2.2	1.25	0.02	0.008	0.0107	0.00215	64	0.0014	19.08	0.020					
b	Jun-58	2.30	43.00	98.9	400	2.2	1.25	0.02	0.008	0.0039	0.000791	64	0.0005	7.02	0.007					
c	Jun-58	2.30	136.00	312.8	400	2.2	1.25	0.02	0.008	0.0125	0.002502	64	0.0016	22.21	0.023					
d	Jun-58	2.50	38.00	95	400	2.2	1.25	0.02	0.008	0.0038	0.00076	64	0.0005	6.75	0.007					
Wir-13a	Jun-58	2.40	58.00	139.2	400	2.2	1.25	0.02	0.008	0.0056	0.001114	64	0.0007	9.88	0.010					
b	Aug-58	2.30	129.00	296.7	400	2.2	1.25	0.02	0.008	0.0118	0.002374	64	0.0015	21.07	0.022					
Wir-14a	Aug-58	2.40	110.00	264	400	2.2	1.25	0.02	0.008	0.0105	0.002112	64	0.0014	18.74	0.019					
Wir-15a	Sep-58	2.60	38.00	98.8	400	2.2	1.25	0.02	0.008	0.0039	0.00079	64	0.0005	7.01	0.007					
b	Sep-58	2.50	147.00	367.5	400	2.2	1.25	0.02	0.008	0.0147	0.00294	64	0.0019	26.09	0.027					
c	Sep-58	2.40	221.00	530.4	400	2.2	1.25	0.02	0.008	0.0212	0.004243	64	0.0027	37.66	0.039					
d	Sep-58		96.00	0	400	1.95	1.25	0.09	0.006	0	0	64	0.0000	0.00	0.000					
e	Sep-58	2.60	41.00	106.6	400	1.95	1.25	0.09	0.006	0.0032	0.00064	64	0.0004	7.57	0.008					
Wir-16	Nov-58	3.30	39.00	128.7	400	1.95	1.25	0.09	0.006	0.0038	0.000772	64	0.0005	9.14	0.009					
Wir-17a	Nov-58	2.80	48.00	134.4	400	1.95	1.25	0.09	0.006	0.004	0.000806	64	0.0005	9.54	0.010					
b	Nov-58	3.00	45.00	135	400	1.95	1.25	0.09	0.006	0.004	0.00081	64	0.0005	9.59	0.010					
c	Nov-58	2.70	18.00	48.6	400	1.95	1.25	0.09	0.006	0.0015	0.000292	64	0.0002	3.45	0.004					
d	Nov-58	3.30	24.00	79.2	400	1.95	1.25	0.09	0.006	0.0024	0.000475	64	0.0003	5.62	0.006					
Wir-18		3.90	312.00	1216.8	400	1.95	1.25	0.09	0.006	0.0364	0.007301	64	0.0047	86.39	0.089					
Wir-19		3.60	61.00	219.6	400	1.95	1.25	0.09	0.006	0.0066	0.001318	64	0.0008	15.59	0.016					
Wir-Spl-1		4.50	380.00	1710	400	1.95	1.25	0.09	0.006	0.0511	0.01026	64	0.0066	121.41	0.125					
Wir-20		3.50	600.00	2100	400	1.95	1.25	0.09	0.006	0.0628	0.0126	64	0.0081	149.10	0.154	U				
Wir-21		3.70	408.00	1509.6	400	1.95	1.25	0.09	0.006	0.0452	0.009058	64	0.0058	107.18	0.110	Ru-106				
Wir-Spl-2		4.70	360.00	1692	400	1.95	1.25	0.09	0.006	0.0506	0.010152	64	0.0065	120.13	0.124					
Wir-Spl-3		3.80	96.00	364.8	400	1.95	1.25	0.09	0.006	0.0109	0.002189	64	0.0014	25.90	0.027					
				34033.82							0.25338		0.1640	2416.40	2.491					

ESTIMATED MERCURY AMOUNTS AND CALCINE AMOUNTS FROM THE 12 INCH DIAMETER PILOT PLANT CALCINER

Run	Date	Feed Rate l/hr	Run Time Hours	Approx Vol Liters	Oper Temp cent.	Zr	F	Ca	Feed Chemistry Al	molar HNO3	NaNO3	Hg(NO3)2	gm-mole mercury	kg of Hg in mercury	% ret. in calcine	kilogram Hg in product	kilogram of calcine	m**3 of calcine		
1	19 Sep 61	9	140	1260	400				1.74	0.59	0.04	0.011	13.86	2.78	64	1.78	88.200	0.091		
2	14-Nov-61	9	161	1449	400				1.74	0.59	0.04	0.011	15.94	3.20	64	2.05	101.430	0.105		
3	3-Jul-62	9	131	1179	400				1.74	0.59	0.04		0.00	0.00		0.00	82.530	0.085		
	10-Jul-62	9	35	315	400				1.29	2.34	0.08		0.00	0.00		0.00	22.050	0.023		
4	28-Aug-62	10	644	6440	400				1.29	2.34	0.08		0.00	0.00		0.00	450.800	0.465		
5	10-Dec-62	10	168	1680	400				1.29	2.34	0.08		0.00	0.00		0.00	117.600	0.121		
6	28-Jun-63	10	96	960	400				1.29	2.34	0.08		0.00	0.00		0.00	67.200	0.069		
7	10-Aug-63	10	94	940	400	0.43	2.45	1.21	0.66	1.03			0.00	0.00		0.00	65.800	0.068	Contained 2 g/l U	
8	5-Nov-64	10	55	550	400							0.001	0.55	0.11	64	0.07	38.500	0.040		
9	5-May-65	10	232	2320	400				1.5	0.1b	0.36	0.011	25.52	5.12	64	3.28	162.400	0.167		
10	18-May-65	10	32	320	400	0.4	2		0.77	0.1b	1.5	0.0005	0.16	0.03	64	0.02	22.400	0.023		
11	21-May-65	10	133	1330	400	0.24	1.68		0.8	1.1		0.0045	5.99	1.20	64	0.77	93.100	0.096		
12	22-Jun-95	10	70	700	500	0			0.7	0.9	2.4	0.001	0.70	0.14	30	0.04	49.000	0.051		
		10	79	790	500	0.43	2.1		0.9	0.9	1.6	0.00055	0.43	0.09	30	0.03	55.300	0.057		
13	24-Aug-65	10	50	500	400	0.39	2.6	0.17	0.39	1.44			0.00	0.00		0.00	35.000	0.036		
		10	90	900	400	0.37	2.23	0.62	0.36	1.33			0.00	0.00		0.00	63.000	0.065		
14	7-Dec-65	10	211	2110	400	0.3	2.12	0.97	0.39	1.16			0.00	0.00		0.00	147.700	0.152		
15	4-Jan-66	10	140	1400	400				1.55	0.6	0.0174	0.0085	11.90	2.39	64	1.53	98.000	0.101		
16	1-Feb-66	10	232	2320	400				1.38	2.08	0.052	0.0053	12.30	2.47	64	1.58	162.400	0.167		
17	8-Mar-66	10	112	1120	400				1.64	0.75	0.065	0.012	13.44	2.70	64	1.73	78.400	0.081		
18	14-Mar-66	10	86	860	300	0.3	2	1.00	0.45	1.2			0.00	0.00		0.00	60.200	0.062		
19	12-Sep-66	10	67	670	400				1.3	1.3	0.763	0.0061	4.09	0.82	64	0.52	46.900	0.048		
20	10-Oct-66	10	112	1120	400				1.3	1.3			0.00	0.00		0.00	78.400	0.081		
	16-Oct-66	22	128	2816	400				1.3	1.3			0.00	0.00		0.00	197.120	0.203		
21	10-Jan-67	16	212	3392	400	0.25	1.61	0.93	0.33	1.4			0.00	0.00		0.00	237.440	0.245		
22	31-May-67	15	233	3495	500				1.43	1.18		0.0031	10.83	2.17	64	1.39	244.650	0.252		
23	30-Sep-67	30	239	7170	500	0.11	0.86		0.03	1.52			0.00	0.00		0.00	501.900	0.517		
24	4-Dec-67	28	53	1484	400				1.41	0.9			0.00	0.00		0.00	103.880	0.107		
25	26-Dec-67	20	93	1860	480								0.00	0.00		0.00	130.200	0.134		
				51450.00												14.78		3.713		