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UNC NUCLEAR INDUSTRIES

A UNC RESOURCES Company

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Memorandum

To: E. M. Greagor

Date: April 23, 1986

MAM-DE-335

From: M. A. Mihalic M.A.M.

Subject: 183-H SOLAR EVAPORATION BASINS

The Decommissioning Engineering Subsection has been assigned the task of developing a plan for decommissioning the basins. Included is the disposal of the chemical wastes in basins No's 2, 3, and 4. As part of this effort, samples of both the solid and liquid phase wastes were taken and sent to Rockwell Analytical Labs for chemical and radiological analyses.

For purposes of project documentation and in developing the final plan for disposal of these wastes it is requested that your organization review the attached analyses (listed as Appendix B) and determine the proper waste classification for both the liquids and solids. It is desired that the classifications be provided to Decommissioning Engineering no later than May 15, 1986.

For your information a copy of Special Procedure DO-16, which outlines the sampling criteria used, is also attached.

Should you have any questions or require additional information, please contact B. J. Carlson at 373-4935.

MAM:sh

Attachment

cc: BJ Carlson w/o attachment
BW Mathis "
EW Powers "
MAM-File H1.9/LB

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APPENDIX B

183-H SOLAR BASIN #2 LIQUID SAMPLES

Component	Units	Sample Location S2-1	S2-2	S2-3	S2-5	S2-6	S2-8
Al	PPM	3.58	5.46	<2.95	<2.97	<2.95	<3.00
Ba		<.47	<.46	<.43	<.43	<.43	<.43
Be		<.05	<.05	<.05	<.05	<.05	<.05
Ca		5.50	.81	1.78	1.45	1.11	1.26
Cd		<2.39	<2.35	<2.16	<2.18	<2.16	<2.20
Cr		7.59	7.64	15.14	13.57	15.31	15.39
Cu		1.13	.71	4.66	4.14	4.66	4.72
Hg		<2.17 E-2	<2.14 E-2	<1.97 E-2	<1.98 E-2	<1.97 E-2	<2.00 E-2
Fe		<.85	<.84	<.77	<.78	<.77	<.79
Pb		<7.74	<7.61	<7.01	<7.07	<7.01	<7.12
Mn		<19.15	<18.78	<17.30	<17.44	<17.30	<17.58
Ni		<1.53	<1.50	4.62	3.28	4.10	4.57
K		36.37	41.43	170.2	155.2	173.3	168.3
Ag		<.93	<.92	<.84	<.85	<.84	<.86
Na		71368	70345	107708	103819	112596	118811
Si		24.9	25.9	<1.73	<1.74	<1.73	<1.75
Sn		<23.94	<23.53	<21.68	<21.85	<21.68	<22.02
U		1.24	1.34	138.6	48.57	84.25	242.4
V		<.10	<.10	.10	<.10	<.10	.09
Zr		11.2	5.56	2.91	1.67	.87	1.44
F		4692	4888	2124	2051	1899	1976
Cl		<52.1	<51.2	235.1	191.9	232.3	223.2
PO4		<5682	<5585	<5145	<5186	<5145	<5227
NO2		207.6	224.5	416.6	408.9	445.6	419.6
NO3		120226	125060	239700	231762	242142	237584
SO4		20883	18801	8925	10597	9455	9299
CO3		2651	2626	5292	4534	4914	5041
HCO3		<17.4	90.6	40.9	16.67	28.35	20.00
TOC		6.96	53.0	148	119	85.1	141
Density	g/ml	1.15	1.17	1.27	1.26	1.27	1.25
pH	-	11.9	11.8	10.9	11.2	11.1	10.8
Caustic Ratio	lb/gal	None	None	1.48 E-2	1.16 E-2	1.31 E-2	1.61 E-2
Solids @ pH 12	%	None	None	None	None	None	None
Water	%	79.8	82.1	67.5	67.2	67.0	64.6
Cond.	umho/cm	1.18 E+5	>1.40 E+5	1.20 E+5	>1.40 E+5	>1.40 E+5	>1.40 E+5

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BASIN #2 LIQUID SAMPLES (Cont'd)

Component	Units	Sample Location S2-1	S2-2	S2-3	S2-5	S2-6	S2-8
Am-241	uCi/l	<6.00 E-4	<2.00 E-3	<6.80 E-4	<6.00 E-4	<2.00 E-3	<7.00 E-4
Pu-238		1.45 E-6	3.87 E-5	3.78 E-5	3.44 E-5	<1.00 E-6	6.21 E-6
PU-239/240		9.15 E-6	1.46 E-4	1.47 E-4	7.31 E-5	2.66 E-5	7.97 E-5
Tc-99		7.05 E-1	7.04 E-1	1.53 E0	1.44 E0	1.60 E0	1.60 E0
Cs-137		<1.00 E-4	<4.00 E-4	<1.00 E-4	<1.00 E-4	<4.00 E-4	<1.00 E-4
Alpha		<1.00 E-2	<1.00 E-2	3.50 E-2	1.30 E-2	2.40 E-2	5.00 E-2
Beta		7.00 E-1	7.40 E-1	1.50 E0	1.50 E0	1.50 E0	1.50 E0

183-H SOLAR BASIN #3 LIQUID SAMPLES

Component	Units	Sample Location S3-1	S3-2	S3-3	S3-5	S3-6	S3-8
Al	PPM	<3.09	<3.00	<2.93	<2.95	<3.04	<2.95
Ba		<.45	<.43	<.42	<.43	<.44	<.43
Be		<.05	<.05	<.05	<.05	<.05	<.05
Ca		2.58	.88	1.17	.80	1.32	1.12
Cd		<2.27	<2.20	<2.15	<2.16	<2.23	<2.16
Cr		10.82	5.44	4.71	4.74	5.36	5.60
Cu		3.76	1.49	12.70	13.05	12.29	16.86
Hg		<2.07 E-2	<2.00 E-2	<1.95 E-2	<1.97 E-2	<2.03 E-2	<.197 E-2
Fe		<.81	<.79	<.77	<.77	<.80	<.77
Pb		<7.36	<7.12	<6.96	<7.01	<7.24	<7.01
Mn		<18.16	<17.58	<17.16	<17.30	<17.86	<17.30
Ni		<1.45	1.56	4.00	3.91	4.28	4.85
K		86.92	87.89	154.3	167.5	178.6	180.7
Ag		<.89	<.86	<.84	<.84	<.87	<.84
Na		82839	80740	112075	122009	135322	117483
Si		9.84	10.94	8.18	9.81	<717.0	7.51
Sn		<28.44	<27.53	<28.00	<28.22	<29.14	<28.22
U		.7	3.14	5.82	3.74	3.73	12.91
V		<.1	<.1	<.1	<.1	<.1	<.1
Zr		2.07	1.84	1.02	.73	.72	.66
F		1978	2310	1707	1765	1745	1705
Cl		82.33	77.14	236.0	189.3	167.5	168.1
PO4		<5400	<5227	<5105	<5145	<5312	<5145
NO2		452.5	426.9	718.8	623.1	635.9	623.1
NO3		191636	187984	263984	268504	266146	258740
SO4		20800	16215	6139	6823	6662	6558
CO3		3888	4945	7314	7135	7270	7466
HCO3		34.71	27.20	46.09	40.16	44.72	43.31
TOC		131	112	258	198	177	193
Density	g/ml	1.21	1.25	1.28	1.27	1.23	1.27
pH		11.6	11.4	11.6	11.7	11.7	11.5
Caustic Ratio	lb/gal	1.17 E-3	5.87 E-3	9.68 E-4	None	None	3.37 E-3
Solids @ pH 12	%	None	None	None	None	None	None
Water	%	66.4	71.1	63.7	61.6	61.8	64.7
Cond.	umho/cm	1.36 E+5	137 E+5	>1.40 E+5	>1.40 E+5	>1.40 E+5	>1.40 E+5

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BASIN #3 LIQUID SAMPLES (Cont'd)

Component	Units	Sample Location S3-1	S3-2	S3-3	S3-5	S3-6	S3-8
AM-241	uCi/l	<6.00 E-4	<1.50 E-3	<6.00 E-4	<1.60 E-3	<1.50 E-3	<6.40 E-4
Pu-238		<1.00 E-6	6.01 E-5	3.01 E-6	<1.00 E-6	3.36 E-6	<1.00 E-6
Pu-239/240		5.58 E-5	2.13 E-4	8.74 E-5	8.08 E-6	5.88 E-6	1.32 E-5
Tc-99		1.38 E0	1.41 E0	2.38 E0	2.03 E0	1.95 E0	2.10 E0
Cs-137		<1.00 E-4	<4.00 E-4	<1.00 E-4	<4.00 E-4	4.40 E-4	<1.00 E-4
Alpha		<5.00 E-3	<5.00 E-3	<5.00 E-3	<9.00 E-3	<1.10 E-2	<1.20 E-2
Beta		1.25 E0	1.30 E0	1.90 E0	2.00 E0	1.90 E0	2.00 E0

183-H SOLAR BASIN #4 LIQUID SAMPLES

Component	Units	Sample Location S4-2	S4-3	S4-5	S4-6	S4-8
Al	PPM	<3.15	<2.95	<3.00	<2.95	<2.97
Ba		<.46	<.43	<.43	<.43	<.43
Be		<.05	<.05	<.05	<.05	<.05
Ca		1.07	.98	.70	1.59	1.53
Cd		<2.31	<2.16	<2.20	<2.16	<2.18
Cr		7.34	10.84	10.69	14.65	12.91
Cu		1.99	11.85	13.82	19.46	13.21
Hg		<2.10 E-2	<1.97 E-2	<2.00 E-2	<1.97 E-2	<1.98 E-2
Fe		<.83	<.77	<.79	14.59	7.26
Pb		<7.48	<7.01	<7.12	<7.01	<7.07
Mn		<18.46	<17.30	<17.58	<17.30	<17.44
Ni		2.27	2.47	2.33	5.08	4.60
K		114.7	166.9	162.3	176.1	173.5
Ag		<.90	<.84	<.86	<.84	<.85
Na		90220	113500	102258	118207	118416
Si		21.09	5.63	4.98	15.10	10.20
Sn		<30.12	<28.22	<28.67	<28.22	<28.44
U		300	79.52	76.32	88.18	76.42
V		.29	<.1	.10	.11	<.1
Zr		3.36	30.71	39.20	57.48	30.16
F		3337	1586	1733	1750	1583
Cl		126.9	185.1	185.5	189.3	189.6
PO4		<5491	<5145	<5227	<5144	<5186
NO2		502.6	463.7	463.7	485.4	344.3
NO3		194857	265087	275280	262157	258333
SO4		12916	8850	8453	8018	8157
CO3		2910	6285	6433	6379	6382
HCO3		17.65	59.84	54.40	56.69	43.65
TOC		78.2	160	123	145	116
Density	g/ml	1.19	1.27	1.25	1.27	1.26
pH	-	10.2	9.75	9.69	9.60	9.86
Caustic Ratio	lb/gal	1.81 E-2	2.13 E-2	2.19 E-2	2.53 E-2	2.04 E-2
Solids @ pH 12	%	1.00	<1.00	<1.00	<1.00	<1.00
Water	%	72.3	64.3	64.0	61.7	61.1
Cond.		1.34 E+5	>1.40 E+5	>1.40 E+5	>1.40 E+5	>1.40 E+5

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BASIN #4 LIQUID SAMPLES (Cont'd)

		Sample Location				
Component	Units	S4-2	S4-3	S4-5	S4-6	S4-8
AM-241	uCi/l	<1.80 E-3	<2.00 E-3	<8.00 E-4	<8.00 E-4	<9.00 E-4
Pu-238		4.07 E-6	<1.00 E-6	<1.00 E-6	9.72 E-6	<1.00 E-6
Pu-239/240		1.09 E-5	6.63 E-5	1.26 E-5	1.33 E-4	7.99 E-6
Tc-99		1.30 E0	1.80 E0	1.87 E0	1.92 E0	1.91 E0
Cs-137		<3.00 E-4	<4.00 E-4	<1.00 E-4	<1.00 E-4	<1.00 E-4
Alpha		7.80 E-2	2.60 E-2	3.70 E-2	1.70 E-2	3.50 E-2
Beta		1.30 E0	1.80 E0	1.80 E0	1.70 E0	1.70 E0

183-H SOLAR BASIN #2 SOLID SAMPLES

Component	Units	Sample Location S2-1	S2-2	S2-3	S2-5	S2-6	S2-8
Al	PPM	4465	3205	1462	540	640	1365
Ba		<149	<157	<63	<42	<60	<63
Be		7.66	7.75	5.12	4.44	5.22	5.76
Ca		634	548	158	183	285	199
Cd		<745	<784	<316	<212	<300	<317
Cr		727	597	389	292	308	391
Cu		152525	154529	130933	98991	112291	129734
Hg		<1.47	<1.55	<.624	<.419	3.00	<.626
Fe		1559	1069	1478	641	656	993
Pb		<2409	<2539	<1022	<685	<971	<1025
Mn		<5948	<6266	<2525	<1693	<2398	<2532
Ni		<475	<501	<202	<135	<191	<202
K		<5653	<5954	<2397	<1608	<2277	<2404
Ag		<293	<308	203	119	139	247
Na		42175	69383	68613	145371	158682	99054
Si		92628	41467	2490	649	2801	1361
Sn		<7435	<7841	<3157	<2117	<2998	<3166
U		44.1	28.0	2100	1500	1300	2500
V		<2.9	<3.1	<1.25	2.51	2.37	3.13
Zr		35336	34429	34216	27722	28344	30060
F		5690	6310	6790	18090	12300	16760
Cl		<70	<70	<38	<750	<750	<759
PO4		<650	<650	<315	<6260	<6260	<6260
NO2		----	----	----	----	----	----
NO3		76100	81530	175150	154220	167400	156550
SO4		16250	152250	6550	29530	8420	12290
CO3		----	----	----	----	----	----
HCO3		----	----	----	----	----	----
TOC		3828	3257	2485	343	237	1278
DTA Exotherm	-	None	None	None	None	None	None
Water	%	57.7	55.6	50.9	45.7	55.0	51.2

SOLAR BASIN #2 SOLID SAMPLES (Cont'd)

		Sample Location					
Component	Units	S2-1	S2-2	S2-3	S2-5	S2-6	S2-8
AM-241	pCi/g	<2.30 E+1	<3.10 E+1	<2.80 E+1	<1.00 E+1	<2.90 E+1	<1.60 E+1
Pu-238		<1.00 E0	1.71 E0	<1.00 E0	<1.00 E0	<1.00 E0	<1.00 E0
Pu-239/240		5.32 E0	1.23 E1	<1.00 E0	<1.00 E0	1.18 E0	<1.00 E0
Tc-99		<1.23 E+3	1.39 E+3	1.11 E+3	1.10 E+3	1.03 E+3	1.14 E+3
Cs-137		<4.00 E0	1.20 E+1	6.40 E0	<1.00 E0	<4.00 E0	<5.00 E0

183-H SOLAR BASIN #3 SOLID SAMPLES

Component	Units	Sample Location S3-1	S3-2	S3-3	S3-5	S3-6	S3-8
Al	PPM	1088	793	1856	378	1656	1172
Ba		<55	<65	<58	<23	<60	<56
Be		12.0	10.8	7.33	6.71	7.14	7.41
Ca		76	269	876	143	471	233
Cd		<277	<327	<289	<117	<301	<280
Cr		203	165	516	368	425	409
Cu		113425	155492	152027	147228	150400	155915
Hg		<2.74	<3.24	5.15	2.08	3.33	3.32
Fe		1229	1142	1151	715	1010	1037
Pb		<896	<1060	<937	<378	<973	<905
Mn		<2214	<2617	<2314	1054	<2405	<2234
Ni		239	236	185	125	<192	<178
K		<2102	<2485	<2197	<888	<2283	<2122
Ag		198	239	211	169	154	163
Na		27441	75601	61053	128642	67810	80546
Si		4829	3782	8680	657	8151	2359
Sn		<2768	<3273	<2894	<1169	<3007	<2794
U		1800	58.0	88.0	100.0	1800	1900
V		3.29	2.59	3.78	3.24	3.57	3.76
Zr		36684	47644	33654	28117	31399	30172
F		1810	2310	4740	11870	9070	4470
Cl		<70	<70	<380	<380	<380	<380
PO4		<650	<650	<3150	<3150	<3150	<3150
NO2		----	----	----	----	----	----
NO3		138260	132990	186000	179800	181350	184450
SO4		14910	11670	5040	6940	9290	4630
CO3		----	----	----	----	----	----
HCO3		----	----	----	----	----	----
TOC		1086	414	2450	303	1175	1083
DTA Exotherm	-	None	None	None	None	None	None
Water	%	56.7	53.5	54.6	51.8	52.5	52.2

SOLAR BASIN #3 SOLID SAMPLES (Cont'd)

		Sample Location					
Component	Units	S3-1	S3-2	S3-3	S3-5	S3-6	S3-8
Am-241	pCi/g	<1.20 E+1	<1.70 E+1	<1.50 E+1	<7.00 E0	<3.00 E+1	<1.40 E+1
Pu-238		<1.00 E0	<1.00 E0	<1.00 E0	9.40 E0	<1.00 E0	<1.00 E0
Pu-239/240		<1.00 E0	<1.00 E0	1.07 E0	6.10 E+1	<1.00 E0	<1.00 E0
Tc-99		1.00 E+3	9.10 E+2	1.63 E+3	1.43 E+3	1.30 E+3	1.45 E+3
Cs-137		1.40 E+1	<2.00 E0	<5.00 E0	5.90 E0	4.00 E0	<4.00 E0

183-H SOLAR BASIN #4 SOLID SAMPLES

Component	Units	Sample Location S4-2	S4-3	S4-5	S4-6	S4-8
Al	PPM	531	<723	<643	435	<824
Ba		<59	<106	<95	<63	<121
Be		10.91	1.9	0.2	2.5	1.4
Ca		311	239	220	201	371
Cd		<296	<531	<473	<313	<608
Cr		249	201	206	286	192
Cu		118534	95441	89652	114994	6981
Hg		<2.93	8.42	9.93	16.1	14.4
Fe		818	1224	1281	2028	2108
Pb		<960	<1722	<1533	<1014	<1967
Mn		<2372	<4254	<3776	<2506	<4860
Ni		<190	<340	<303	<200	<388
K		<2251	<4038	<3594	<2379	<4615
Ag		196	<209	<186	194	<239
Na		83469	142718	135880	127373	129870
Si		306	573	2014	773	1121
Sn		<2962	<5314	<4728	<3133	<6077
U		3700	2100	1800	540	10000
V		4.69	<2.1	<1.9	<1.9	<2.4
Zr		44228	25673	26217	30987	19591
F		5740	17900	19330	15190	21750
Cl		100	120	140	<750	130
PO4		<650	<650	<650	<6260	<650
NO2		----	----	----	----	----
NO3		150660	173600	184450	189100	173600
SO4		9750	51150	44180	15960	54990
CO3		----	----	----	----	----
HCO3		----	----	----	----	----
TOC		170	299	272	601	428
DTA Exotherm	-	None	None	None	None	None
Water	%	58.6	46.5	47.5	51.1	53.8

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SOLAR BASIN #4 SOLID SAMPLES (Cont'd)

		Sample Location				
Component	Units	S4-2	S4-3	S4-5	S4-6	S4-8
Am-241	pCi/g	<3.30 E+1	<1.60 E+1	<1.50 E+1	<1.10 E+1	<1.70 E+1
Pu-238		<1.00 E0	<1.00 E0	<1.00 E0	<1.00 E0	<1.00 E0
Pu-239/240		<1.00 E0	3.72 E0	1.13 E0	<1.00 E0	<1.00 E0
Tc-99		1.05 E+3	1.52 E+3	1.76 E+3	1.62 E+3	1.91 E+3
Cs-137		<4.00 E0	<3.00 E0	<2.00 E0	<2.00 E0	<3.00 E0