



SACRAMENTO MUNICIPAL UTILITY DISTRICT P. O. Box 15830, Sacramento CA 95852-1830, (916) 452-3211
 AN ELECTRIC SYSTEM SERVING THE HEART OF CALIFORNIA

CCF 89-601

December 7, 1989

U. S. Nuclear Regulatory Commission
 Attn: Warren Tenbrook
 Region V
 1450 Maria Lane, Suite 210
 Walnut Creek, CA 94596

89 DEC 12 AID: 44
 RECEIVED
 NRC
 REGION V

Docket No. 50-312
 Rancho Seco Nuclear Generating Station
 License No. DPR-54
RANCHO SECO COOLING TOWER BASIN SLUDGE SAMPLE

Dear Mr. Tenbrook:

Enclosed is the sludge sample you requested from the cooling tower basin at Rancho Seco. Based on gamma spectroscopy and tritium analysis performed on site (copies enclosed) the activity has been determined to be confined to natural isotopes and Cs-137 at a level of $2.058E-7$ $\mu\text{Ci/gm}$.

It has been determined through various studies that the average background soil Cs-137 values in the northern California area are approximately $3E-7$ to $5E-7$ $\mu\text{Ci/gm}$. It would be expected that Cs-137 levels in the cooling tower sediment would be equivalent to or greater than these levels due to the concentrating effects of the cooling tower system.

Members of your staff with questions requiring additional information or clarification may contact Bruce Woodward at (209) 333-2935, extension 4944.

Sincerely,

Jim Clark
 Nuclear Chemistry Manager

Enclosure

cc w/o encl: J. B. Martin, NRC, Walnut Creek
 A. D'Angelo, NRC, Rancho Seco
 Document Control Desk, Washington DC

9001020129 891207
 PDR ADOCK 05000312
 P FDC

IE-25

MAX/VMS Peak Search Report V1.5 Generated 29-NOV-1989 16:52:07

Configuration : GAM4DISK:IDCONF015651_27NOV891330.CNF;1
 Analyses by : PEAK V15.8
 Sample title : EAST CIRC BASIN TECH: RKM *Zw*
 Sample date : 27-NOV-1989 13:30:00 Acquisition date : 29-NOV-1989 12:41:55
 Sample ID : 5651_27NOV891330 Sample quantity : 1099.0 GM
 Sample type : SOIL Sample geometry : SOIL_MARI_IL
 Detector name : PGT_SNI627 Detector geometry: SOIL_MARI_IL
 Elapsed live time: 0 01:06:40.00 Elapsed real time: 0 01:06:41.13 0.02
 Start energy : 0.45 End energy : 2049.79
 Sensitivity : 5.00 Gaussian : 10.00

PK	It	Energy	Area	Bkgn	FWHM	Channel	Left	Pw	Cts/Sec	XErr	Fit
1	0	64.20 <i>TH-234</i>	50	188	0.98	128.44	123	11	1.26E-02	53.2	
2	4	74.84 <i>Pb-212</i>	84	66	0.74	149.72	145	19	2.11E-02	16.6	9.41E-01
3	4	77.00 <i>Pb-212</i>	110	78	0.87	154.04	145	19	2.76E-02	15.3	
4	0	93.29 <i>TH-234</i>	116	125	2.70	186.60	182	9	2.91E-02	22.5	
5	0	185.79 <i>Ra-226</i>	109	99	1.49	371.53	366	13	2.73E-02	21.6	
6	0	209.57 <i>TH-232</i>	34	66	1.32	419.05	416	8	8.42E-03	48.6	
7	0	238.92 <i>Ra-226</i>	176	83	1.04	477.78	475	7	4.39E-02	11.9	
8	0	295.02 <i>Ra-226</i>	90	49	1.37	589.87	588	15	2.25E-02	21.6	
9	0	338.93 <i>TH-232</i>	42	39	1.00	677.65	674	9	1.06E-02	30.5	
10	0	352.16 <i>Ra-226</i>	92	34	0.79	704.10	700	9	2.29E-02	15.3	
11	0	477.84 <i>U-238</i>	36	13	1.06	955.30	951	9	8.99E-03	28.5	
12	0	583.33 <i>TH-232</i>	87	8	1.15	1166.15	1161	10	2.19E-02	12.8	
13	0	609.35 <i>Ra-226</i>	80	21	1.15	1218.16	1211	14	2.01E-02	14.6	
→ 14	0	661.72 <i>Ce-137</i>	186	24	1.41	1322.83	1317	12	4.65E-02	9.5	
15	0	910.84 <i>TH-232</i>	51	0	1.25	1820.69	1815	12	1.27E-02	15.2	
16	0	969.57 <i>TH-232</i>	16	14	1.61	1938.05	1931	11	3.98E-03	51.8	
17	0	1460.76 <i>K-40</i>	112	0	2.39	2919.46	2913	16	2.80E-02	10.7	

VAX/VMS Nuclide Identification Report V2.2 Generated 29-NOV-1989 16:52:25

Configuration : GAM4DISK:ICONFIG5651_27NOV891330.CNF;1
 Analyses by : PEAK V15.8,PEAKEFF V2.1,NID V2.1
 Sample title : EAST CIRC BASIN TECH: RKM
 Sample date : 27-NOV-1989 15:30:00 Acquisition date : 29-NOV-1989 12:41:55
 Sample ID : 5651_27NOV891330 Sample quantity : 1099.0 GM
 Sample type : SOIL Sample geometry : SOIL_MARI_1L
 Detector name : PGT_SNI627 Detector geometry: SOIL_MARI_1L
 Elapsed live time: 0 01:06:40.00 Elapsed real time: 0 01:06:41.13 0.0%
 Energy tolerance : 1.00 Half life ratio : 10.00
 Errors propagated: No Systematic Error : 0.00 %
 Efficiency type : Empirical Efficiencies at : Peak Energy
 Abundance limit : 75.00

Nuclide Line Activity Report

Nuclide Type: activation

Nuclide	Energy	Area	XAbn	XEff	Uncorrected uCi/GM	Decay Corr uCi/GM	2-Sigma XError
U-238 <i>U-238</i> <i>natural</i>	477.59	35	10.42*	8.914E-01	2.380E-07	2.442E-07	56.91

Nuclide Type: natural

Nuclide	Energy	Area	XAbn	XEff	Uncorrected uCi/GM	Decay Corr uCi/GM	2-Sigma XError
K-40	1460.81	112	10.67*	3.295E-01	1.959E-06	1.959E-06	21.48
TH-232	238.59	175	43.00	1.679E+00	1.495E-07	1.495E-07	23.72
	583.14	87	91.10*	7.350E-01	2.353E-07	2.353E-07	25.69
	911.20	51	27.00	4.891E-01	2.374E-07	2.374E-07	30.38
	964.40	-----	4.70	4.655E-01	-----	Line Not Found	-----
	968.80	15	16.30	4.634E-01	1.295E-07	1.295E-07	103.51

Nuclide Type: fission

Nuclide	Energy	Area	XAbn	XEff	Uncorrected uCi/GM	Decay Corr uCi/GM	2-Sigma XError
CS-137	661.65	185	85.12*	6.524E-01	2.058E-07	2.058E-07	18.91

E365 < 1.75E-6

CIRC BASIN < 1.68E-6

Sludge
Water
Phase

H³ (µCi/ml)

USER: 1 ID:5801 H3 + GB PRESET TIME: 20.00 WED 06 DEC 1989 12:33
 SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N
 H#: 1 AQC:N QCF:N RCM:Y 2 PHASE MONITOR:N
 RCM-TIME: 0.10 INT: 2.00
 CHANNEL 1-LL: 0 UL: 350 2SIGMA: 0.20 BKG SUB: 0.00 BKG 2SIG: 0.00 LSR: 0
 CHANNEL 2-LL:350 UL:1000 2SIGMA: 0.20 BKG SUB: 0.00 BKG 2SIG: 0.00 LSR: 0
 DATA CALC: CPM, UNKNOWN REPLICATES: 1 NORM FACTOR:Q 1.00000
 HALF LIFE(DAYS):N

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
BLK	1	1	11.10	13.42	20.00	20.87	79.0	0.14	
		2	35.10	7.55					
RCM: 0.18, 0.09, 0.59, 0.08, 0.28, 0.55, 0.26, 0.07, 0.08, 0.1									
E365	2	1	13.75	12.06	20.00	41.93	78.0	1.51	
		2	32.05	7.90					
RCM: 0.88, 1.18, 0.67, 0.42, 0.84, *****, 1.66, 0.55, 1.57, 1.51									
CIRC BASIN	3	1	11.80	13.02	20.00	63.02	92.0	1.04	
		2	33.05	7.78					
RCM: 2.60, 0.77, 0.80, 0.74, 4.44, 1.07, 1.10, 0.74, 1.01, 1.04									

e = 0.471

Nuclide	Half-life	Half-Life Ratio	Energy	%Abund	Activity	2-Sigma XError	Rejected by
RU-103	39.35D	0.05	497.08*	89.50	---	Not found	Abun.
			610.33	5.60	1.294E-06	29.25	
% Abundances Found = 5.89							
TE-134	41.80M	68.55	79.44	21.00	---	Not found	Decay, Abun.
			180.89	18.00	---	No. found	
			210.46	21.90	2.108E+13	97.18	
			277.95	21.30	---	Not found	
			435.06	18.60	---	Not found	
			461.00	10.90	---	Not found	
			565.99*	18.90	---	Not found	
			742.59	14.70	---	Not found	
767.20	30.00	---	Not found				
% Abundances Found = 12.50							
RA-226	1600.00Y	0.00	186.21	3.28	1.039E-06	43.16	Abun.
			241.92	7.60	---	Not found	
			295.22	18.90	2.076E-07	43.21	
			351.99	36.50	1.297E-07	30.58	
			609.31*	42.80	1.635E-07	29.25	
			1120.29	14.00	---	Not found	
			1338.11	5.52	---	Not found	
			1764.50	14.70	---	Not found	
% Abundances Found = 70.78							
TH-234	24.10D	0.08	87.01	2.78	---	Not found	Abun.
			92.30	2.72	1.523E-06	45.03	
			92.80*	2.69	1.540E-06	45.03	
% Abundances Found = 66.06							
NP-239	2.36D	0.84	106.73	22.70	---	Not found	Abun.
			209.75	3.24	6.240E-07	97.18	
			228.18	10.70	---	Not found	
			277.60*	14.10	---	Not found	
			315.88	1.59	---	Not found	
334.30	2.08	---	Not found				
% Abundances Found = 5.96							

Unidentified Energy Lines

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Pk	It	Energy	Area	Bkgn	FWHM	Channel	Left	Pw	Cts/Sec	XErr	XEff
1	0	64.20	50	188	0.98	128.44	123	11	1.26E-02	57.2	1.03E+00
2	4	74.84	84	66	0.74	149.72	145	19	2.11E-02	16.6	1.38E+00
3	4	77.00	110	78	0.87	154.04	145	19	2.76E-02	15.3	1.45E+00
9	0	338.93	42	39	1.00	677.65	674	9	1.06E-02	30.5	1.24E+00

Summary of Nuclide Activity

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Total number of lines in spectrum 17
 Number of unidentified lines 4
 Number of lines tentatively identified by NID 13 76.47%

Nuclide Type : activation

Nuclide	Hlife	Decay	Uncorrected uCi/GM	Decay Corr uCi/GM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
U-235 U-235	53.44D	1.026	2.380E-07	2.442E-07	1.390E-07	56.91	

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected uCi/GM	Decay Corr uCi/GM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.000	1.959E-06	1.959E-06	0.420E-06	21.43	
Th-232	1.41E+10Y	1.000	2.353E-07	2.353E-07	0.604E-07	25.69	

Nuclide Type : fission

Nuclide	Hlife	Decay	Uncorrected uCi/GM	Decay Corr uCi/GM	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.17Y	1.000	2.058E-07	2.058E-07	0.389E-07	18.91	

Flags: *K* = Keyline not found; *M* = Manually accepted; *E* = Manually edited