Radon Flux Characterization of the Remediated Mill Site at the Grants Uranium Mill

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Prepared for:

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1.0 Introduction

This report presents the results of radon flux and soil moisture content measurements made at the remediated mill site in Grants, New Mexico owned by the Homestake Mining Company of California (HMC). The mill processing facilities have been decommissioned according to the NRC-approved reclamation plan (HMC, 1993). All process facilities were removed and buried on site according to the plan. Contaminated surface soils were removed from the mill area and a minimum of two feet of soil will be placed on the site to achieve the contour as specified in the reclamation plan. Prior to the placement of the soil cover on the mill area, radon flux measurements were made to assess the strength of the radon source term. Accompanying soil moisture content measurements were made at the measurement locations in order to assess the soil conditions under which the radon flux measurements were made.

2.0 Method and Quality Assurance

Thirty evenly-spaced locations throughout the reclaimed mill site were selected for radon flux measurements. Radon flux canisters were deployed on May 21, 1994 for approximately 24 hours. A land survey was made to locate each measurement point according to the site coordinate system. As the canisters were retrieved on May 22, 1994, the on-site geotechnical contractor, Knight Piesold and Co., obtained soil samples at the measurement locations in order to determine the moisture content.

Radon flux measurements were made in full compliance with 40 CFR Part 61, Monitoring for Radon Emissions (Method 115). Method 115 stipulates that radon flux measurements may not be made within 24 hours after a rain or when the temperature falls below 32 degrees Fahrenheit. While Method 115 does not address high wind conditions, care was taken to select a measurement period during which rather calm wind conditions existed. Meteorological data during this measurement period confirm that requirements of Method 115 were met.

ERG procedures call for including trip blanks with the canisters in order to assure that the measured flux arises from the site rather than air leaks in the container or improper baking out of the activated charcoal. Canisters 83 and 10 served as trip blanks with readings of 0.16 ± 0.10 and 0.09 ± 0.10 pCi/m^2s, respectively.

Other QA checks that are required by Method 115 include the use of two independent sources to calibrate the gamma-ray spectrometer. The calibration data are attached and show that the two calibrations using the two sources agree within ten percent of that used for the analysis. Recounting or other QA checks for ten percent of the canisters is also recommended. Nine recounts of canisters were done to check for reproducibility as shown in the table below. The average difference in the two counts was seven percent. The counting time was adjusted so that the calculated errors for all

flux measurements above 1 pCi/m^{2}s was less than 10 percent.

Canister Number	Count 1 (pCi/m^{2}s)	Count 2 (pCi/m^{2}s)
55	7.63	7.63
41	4.49	4.25
47	45.13	44.15
77	21.22	19.59
35	5.87	6.39
90	29.62	29.96
3	43.65	45.78
9	0.97	1.30

3. Results

The radon flux and the soil moisture content data are provided in Table 1. The values correspond to locations shown in the attached figure. All but one of the flux values was below the 20 pCi/m^{2}s limit given in 10 CFR Part 40, Appendix A. Flux values for the 30 locations ranged from essentially zero to 57.8 pCi/m^{2}s, with an average of 5.6 pCi/m^{2}s. The average moisture content was 5.8 percent (dry weight basis) which is representative of local surface soil moisture content during moderate to dry periods.

The Chain of Custody Record, calibration data, and radon flux measurement laboratory report are attached.

Table 1 Mill Site Radon Flux Measurements

Homestake Mining Company
Grants, New Mexico
Mill Site Radon Flux Measurements

Coordinates		Canister	Radon	Moisture
Northing	Easting	Number	Flux (pCi/sq. m s)	% Dry Weight
1,542,059	493,377	24	1.5	5.2
1,542,044	492,986	21	2.0	6.7
1,542,736	493,572	109	8.1	2.8
1,541,888	493,527	33	0.0	6.1
1,542,569	493,325	45	0.4	5.6
1,542,578	493,231	91	3.4	4.1
1,541,828	493,404	74	2.3	8.3
1,542,794	493,248	66	1.3	4.1
1,542,286	492,971	76	0.3	4.3
1,542,291	493,427	65	2.8	2.0
1,543,248	493,448	53	0.8	12.5
1,543,276	493,305	67	1.1	10.8
1,542,531	492,965	86	0.8	10.7
1,543,208	493,830	85	18.2	5.2
1,543,228	493,637	25	57.8	5.2
1,543,018	493,269	55	7.6	7.3
1,542,920	493,802	99	2.6	2.3
1,542,566	493,473	15	1.1	4.9
1,542,971	493,581	22	2.8	4.0
1,542,982	493,383	14	4.4	8.7
1,541,717	493,163	23	2.3	6.9
1,542,070	493,493	93	0.4	4.4
1,542,713	493,014	9	1.1	3.4
1,541,622	493,000	201	0.8	8.6
1,542,713	493,757	31	15.3	5.6
1,542,331	493,547	81	0.9	4.8
1,542,044	493,225	34	0.8	5.0
1,542,759	493,435	75	17.4	6.1
1,542,252	493,320	36	2.1	6.0
1,542,257	493,207	17	7.1	3.8
		Average	5.6	5.8

Radon Flux Measurements

Site: Homestake Mining Company, Mill Site and Test Pads

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Collection Time (sec)	Count Time (sec)	Peak Counts	Percent Error	Bkg counts	Percent Error	Detector Efficiency	Canister Activity(pCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
34	05/22/94	20:05	05/21	15:26	05/22	15:30	86640	1200	1314	12.8	135	123.1	8.91E-03	3.58E+03	0.77	0.08	0.26	OK
24	05/22/94	20:28	05/21	15:28	05/22	15:32	86640	1200	2480	7.8	135	123.1	8.91E-03	7.11E+03	1.53	0.09	0.26	OK
93	05/22/94	20:50	05/21	15:29	05/22	15:34	86700	1200	662	25.3	135	123.1	8.91E-03	1.60E+03	0.35	0.08	0.26	OK
17	05/22/94	21:11	05/21	15:25	05/22	15:28	86580	684	6246	3.6	135	123.1	8.91E-03	1.85E+04	7.06	0.16	0.46	OK
81	05/22/94	21:25	05/21	15:19	05/22	15:24	86700	1200	1418	12.7	135	123.1	8.91E-03	3.89E+03	0.85	0.08	0.26	OK
15	05/22/94	21:52	05/21	15:18	05/22	15:21	86580	1200	1855	10.1	135	123.1	8.91E-03	5.22E+03	1.14	0.08	0.26	OK
36	05/22/94	22:15	05/21	15:24	05/22	15:26	86520	1200	3361	5.8	135	123.1	8.91E-03	9.78E+03	2.14	0.09	0.26	OK
36R	05/22/94	22:37	05/21	15:24	05/22	15:26	86520	1200	3093	6.6	135	123.1	8.91E-03	8.97E+03	1.97	0.09	0.26	OK

Reviewed by: Ernest R. Baker 5/25/94

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Radon Flux Measurements

Site: Homestake Mining Company, Mill Site and Test Pads

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Collection Time (sec)	Count Time (sec)	Peak Counts	Percent Error	Bkg counts	Percent Error	Detector Efficiency	Canister Activity(nCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
40	05/23/94	20:58	05/21	14:09	05/22	14:18	86940	60	8564	2.8	227	78.9	8.77E-03	2.57E+04	134.10	2.44	6.85	OK
89	05/23/94	21:00	05/21	14:10	05/22	14:20	87000	320	7672	3.2	227	78.9	8.77E-03	2.30E+04	21.76	0.46	1.24	OK
84	05/23/94	21:06	05/21	14:11	05/22	14:19	86880	580	7940	3.3	227	78.9	8.77E-03	2.38E+04	12.86	0.27	0.71	OK
94	05/23/94	21:18	05/21	14:12	05/22	14:20	86880	1200	7102	4.0	227	78.9	8.77E-03	2.12E+04	5.55	0.14	0.34	OK
3	05/23/94	21:38	05/21	14:13	05/22	14:18	86700	180	8306	3.1	227	78.9	8.77E-03	2.49E+04	43.65	0.86	2.30	OK
38	05/23/94	21:42	05/21	14:13	05/22	14:18	86700	180	8696	2.7	227	78.9	8.77E-03	2.61E+04	45.78	0.82	2.30	OK
37	05/23/94	21:45	05/21	14:13	05/22	14:17	86640	90	6657	3.1	227	78.9	8.77E-03	1.98E+04	69.59	1.51	4.61	OK
71	05/23/94	21:48	05/21	14:16	05/22	14:17	86460	165	7565	3.3	227	78.9	8.77E-03	2.26E+04	43.42	0.93	2.52	OK
101	05/23/94	21:51	05/21	14:10	05/22	14:16	86760	310	5152	4.0	227	78.9	8.77E-03	1.52E+04	15.47	0.44	1.34	OK
83	05/23/94	21:57	05/21	14:10	05/22	14:16	86760	1200	421	40.4	227	78.9	8.77E-03	5.98E+02	0.16	0.10	0.35	OK
5	05/23/94	22:19	05/21	14:12	05/22	14:16	86640	1200	2200	9.9	227	78.9	8.77E-03	6.08E+03	1.61	0.12	0.35	OK
10	05/23/94	22:40	05/21	14:12	05/22	14:16	86640	1200	339	50.3	227	78.9	8.77E-03	3.45E+02	0.09	0.10	0.35	OK
29	05/23/94	23:03	05/21	14:22	05/22	14:16	86040	240	5160	4.1	227	78.9	8.77E-03	1.52E+04	20.35	0.58	1.76	OK
86	05/23/94	23:09	05/21	15:42	05/22	15:44	86520	1200	1164	16.5	227	78.9	8.77E-03	2.89E+03	0.76	0.11	0.35	OK
76	05/23/94	23:30	05/21	15:41	05/22	15:43	86520	1200	644	29.4	227	78.9	8.77E-03	1.29E+03	0.34	0.11	0.35	OK
9	05/23/94	23:51	05/21	15:44	05/22	15:45	86460	1200	1418	14.1	227	78.9	8.77E-03	3.67E+03	0.97	0.11	0.35	OK
93	05/24/94	00:12	05/21	15:44	05/22	15:45	86460	1200	1812	10.0	227	78.9	8.77E-03	4.89E+03	1.30	0.11	0.35	OK
21	05/24/94	00:35	05/21	15:38	05/22	15:42	86640	1200	2715	7.8	227	78.9	8.77E-03	7.67E+03	2.04	0.12	0.35	OK

Reviewed by Kenneth K. Bahr 5/25/94

Radon Flux Measurements

Site: Homestake Mining Company, Mill Site and Test Pads

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Collection Time (sec)	Count Time (sec)	Peak Counts	Percent Error	Bkg counts	Percent Error	Detector Efficiency	Canister Activity(nCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
35	05/23/94	18:24	05/21	14:28	05/22	14:30	86520	900	5791	4.4	227	78.9	8.77E-03	1.72E+04	5.87	0.17	0.45	OK
35B	05/23/94	18:40	05/21	14:28	05/22	14:30	86520	960	6667	3.8	227	78.9	8.77E-03	1.99E+04	6.39	0.16	0.42	OK
203	05/23/94	18:57	05/21	14:32	05/22	14:30	86280	1200	5690	4.7	227	78.9	8.77E-03	1.68E+04	4.36	0.13	0.34	OK
42	05/23/94	19:18	05/21	14:32	05/22	14:33	86460	300	8293	3.1	227	78.9	8.77E-03	2.49E+04	25.71	0.51	1.36	OK
202	05/23/94	19:24	05/21	14:30	05/22	14:30	86400	900	6295	3.9	227	78.9	8.77E-03	1.87E+04	6.46	0.16	0.45	OK
73	05/23/94	19:40	05/21	14:33	05/22	14:29	86160	540	5566	4.0	227	78.9	8.77E-03	1.65E+04	9.52	0.26	0.76	OK
19	05/23/94	19:50	05/21	14:30	05/22	14:28	86280	240	6392	3.1	227	78.9	8.77E-03	1.90E+04	24.72	0.55	1.71	OK
57	05/23/94	19:55	05/21	14:34	05/22	14:29	86100	150	5561	3.6	227	78.9	8.77E-03	1.64E+04	34.31	0.88	2.74	OK
11	05/23/94	19:59	05/21	14:28	05/22	14:27	86340	180	8483	2.8	227	78.9	8.77E-03	2.55E+04	44.17	0.81	2.28	OK
103	05/23/94	20:02	05/21	14:28	05/22	14:24	86160	180	8014	3.0	227	78.9	8.77E-03	2.40E+04	41.77	0.82	2.28	OK
107	05/23/94	20:07	05/21	14:29	05/22	14:27	86280	255	10049	2.6	227	78.9	8.77E-03	3.03E+04	37.16	0.61	1.61	OK
62	05/23/94	20:12	05/21	14:28	05/22	14:25	86220	420	5239	4.1	227	78.9	8.77E-03	1.55E+04	11.53	0.33	0.98	OK
69	05/23/94	20:20	05/21	14:31	05/22	14:27	86160	240	12895	2.4	227	78.9	8.77E-03	3.91E+04	51.07	0.73	1.72	OK
90	05/23/94	20:25	05/21	14:12	05/22	14:21	86940	180	5776	3.5	227	78.9	8.77E-03	1.71E+04	29.62	0.73	2.27	OK
90B	05/23/94	20:29	05/21	14:12	05/22	14:21	86940	180	5836	3.4	227	78.9	8.77E-03	1.73E+04	29.96	0.73	2.27	OK
51	05/23/94	20:32	05/21	14:14	05/22	14:19	86700	362	5972	3.8	227	78.9	8.77E-03	1.77E+04	15.31	0.39	1.13	OK
70	05/23/94	20:39	05/21	14:29	05/22	14:24	86100	100	7735	2.9	227	78.9	8.77E-03	2.31E+04	72.87	1.41	4.13	OK
8	05/23/94	20:42	05/21	14:29	05/22	14:24	86100	930	6035	4.0	227	78.9	8.77E-03	1.79E+04	6.07	0.16	0.44	OK

Reviewed by Kenneth K Baker 5/25/94

Radon Flux Measurements

Site: Homestake Mining Company, Mill Site and Test Pads

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Collection Time (sec)	Count Time (sec)	Peak Counts	Percent Error	1/kg counts	Percent Error	Detector Efficiency	Canister Activity(nCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
28	05/23/94	17:08	05/21	13:57	05/22	14:08	87060	125	9358	2.7	227	78.9	8.77E-03	2.82E+04	68.49	1.19	3.19	OK
16	05/23/94	17:11	05/21	13:57	05/22	14:05	86880	180	8455	3.0	227	78.9	8.77E-03	2.54E+04	42.97	0.83	2.22	OK
44	05/23/94	17:15	05/21	13:55	05/22	14:05	87000	180	8780	3.1	227	78.9	8.77E-03	2.64E+04	44.64	0.88	2.22	OK
13	05/23/94	17:19	05/21	13:59	05/22	14:06	86820	75	10057	2.7	227	78.9	8.77E-03	3.03E+04	123.39	2.10	5.35	OK
52	05/23/94	17:21	05/21	13:54	05/22	14:06	87120	75	9526	2.6	227	78.9	8.77E-03	2.87E+04	116.39	1.97	5.33	OK
38	05/23/94	17:23	05/21	13:56	05/22	14:03	86820	240	8395	2.9	227	78.9	8.77E-03	2.52E+04	32.07	0.60	1.67	OK
48	05/23/94	17:29	05/21	13:53	05/22	14:03	87000	180	7047	3.2	227	78.9	8.77E-03	2.10E+04	35.67	0.77	2.23	OK
77	05/23/94	17:32	05/21	13:53	05/22	14:03	87000	300	6988	3.0	227	78.9	8.77E-03	2.08E+04	21.22	0.44	1.34	OK
77E	05/23/94	17:38	05/21	13:53	05/22	14:03	87000	300	6464	3.4	227	78.9	8.77E-03	1.92E+04	19.59	0.46	1.34	OK
54	05/23/94	17:44	05/21	13:56	05/22	14:04	86880	60	7610	3.2	227	78.9	8.77E-03	2.28E+04	116.16	2.41	6.70	OK
87	05/23/94	17:46	05/21	13:58	05/22	14:02	86640	60	8561	2.9	227	78.9	8.77E-03	2.57E+04	131.53	2.46	6.72	OK
98	05/23/94	17:48	05/21	13:53	05/22	13:59	86760	144	11659	2.4	227	78.9	8.77E-03	3.52E+04	75.13	1.12	2.80	OK
96	05/23/94	17:53	05/21	13:56	05/22	14:02	86760	180	9961	2.6	227	78.9	8.77E-03	3.00E+04	51.19	0.84	2.24	OK
97	05/23/94	17:57	05/21	13:53	05/22	14:01	86880	40	7929	3.0	227	78.9	8.77E-03	2.37E+04	182.14	3.59	10.07	OK
200	05/23/94	17:59	05/21	13:54	05/22	13:57	86580	180	7992	2.9	227	78.9	8.77E-03	2.39E+04	40.97	0.79	2.25	OK
26	05/23/94	18:03	05/21	13:54	05/22	13:58	86640	600	6003	3.8	227	78.9	8.77E-03	1.78E+04	9.15	0.24	0.67	OK
104	05/23/94	18:14	05/21	13:52	05/22	13:57	86700	120	7647	3.1	227	78.9	8.77E-03	2.29E+04	58.76	1.20	3.37	OK
95	05/23/94	18:17	05/21	13:52	05/22	13:57	86700	120	7070	3.1	227	78.9	8.77E-03	2.11E+04	54.21	1.15	3.37	OK

Reviewed by Kenneth C Baker 5/25/94

Radon Flux Measurements

Site: Homestake Mining Company, Mill Site and Test Pads

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Collection Time (sec)	Count Time (sec)	Peak Counts	Percent Error	Bkg counts	Percent Error	Detector Efficiency	Canister Activity(nCi)	Flux pCi/m^2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
88	05/23/94	13:02	05/21	14:29	05/22	14:37	86880	1200	4085	6.0	166	89.2	8.77E-03	1.21E+04	2.97	0.11	0.27	OK
108	05/23/94	13:25	05/21	14:34	05/22	14:33	86340	900	5579	4.4	166	89.2	8.77E-03	1.67E+04	5.51	0.15	0.36	OK
106	05/23/94	13:41	05/21	14:32	05/22	14:37	86700	1200	2353	9.2	166	89.2	8.77E-03	6.74E+03	1.67	0.10	0.27	OK
41	05/23/94	14:04	05/21	14:32	05/22	14:38	86760	1200	6048	4.4	166	89.2	8.77E-03	1.81E+04	4.49	0.12	0.27	OK
41B	05/23/94	14:25	05/21	14:32	05/22	14:38	86760	1200	5714	4.7	166	89.2	8.77E-03	1.71E+04	4.25	0.12	0.27	OK
50	05/23/94	14:46	05/21	14:32	05/22	14:33	86460	1200	7205	3.7	166	89.2	8.77E-03	2.17E+04	5.43	0.12	0.27	OK
100	05/23/94	15:09	05/21	14:09	05/22	14:13	86640	900	6318	4.2	166	89.2	8.77E-03	1.90E+04	6.34	0.16	0.36	OK
79	05/23/94	15:25	05/21	14:08	05/22	14:14	86760	735	5287	4.4	166	89.2	8.77E-03	1.58E+04	6.47	0.18	0.44	OK
61	05/23/94	16:00	05/21	14:15	05/22	14:13	86280	1200	1739	10.9	227	78.9	8.77E-03	4.66E+03	1.18	0.10	0.33	OK
68	05/23/94	16:21	05/21	14:09	05/22	14:14	86700	300	10748	2.7	227	78.9	8.77E-03	3.24E+04	32.79	0.54	1.33	OK
39	05/23/94	16:27	05/21	14:08	05/22	14:11	86580	300	5323	4.1	227	78.9	8.77E-03	1.57E+04	15.92	0.45	1.33	OK
4	05/23/94	16:34	05/21	14:08	05/22	14:10	86520	400	6183	3.9	227	78.9	8.77E-03	1.84E+04	13.98	0.36	1.00	OK
92	05/23/94	16:41	05/21	14:08	05/22	14:12	86640	330	7747	3.0	227	78.9	8.77E-03	2.32E+04	21.38	0.43	1.21	OK
102	05/23/94	16:48	05/21	14:13	05/22	14:11	86280	180	10131	2.7	227	78.9	8.77E-03	3.05E+04	51.87	0.86	2.23	OK
47	05/23/94	16:54	05/21	13:56	05/22	14:08	87120	242	11903	2.6	227	78.9	8.77E-03	3.60E+04	45.13	0.71	1.65	OK
47B	05/23/94	16:59	05/21	13:56	05/22	14:08	87120	200	9660	2.9	227	78.9	8.77E-03	2.91E+04	44.15	0.80	1.99	OK
2	05/23/94	17:03	05/21	13:56	05/22	14:07	87060	120	8714	2.9	227	78.9	8.77E-03	2.62E+04	66.28	1.24	3.33	OK
7	05/23/94	17:06	05/21	13:57	05/22	14:07	87000	60	10853	2.6	227	78.9	8.77E-03	3.28E+04	166.12	2.69	6.66	OK

Reviewed by Kenneth K Baker 5/25/94

Radon Flux Measurements

Site: Homestake Mining Company, Mill Site and Test Pads

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Collection Time (sec)	Count Time (sec)	Peak Counts	Percent Error	Bkg counts	Percent Error	Detector Efficiency	Canister Activity(nCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
65	05/23/94	07:05	05/21	15:22	05/22	15:25	86580	1200	5459	4.2	166	89.2	8.77E-03	1.63E+04	3.82	0.10	0.25	OK
91	05/23/94	07:26	05/21	15:14	05/22	15:18	86640	1200	4885	4.4	166	89.2	8.77E-03	1.45E+04	3.42	0.10	0.25	OK
66	05/23/94	07:48	05/21	15:11	05/22	15:15	86640	1200	1919	9.4	166	89.2	8.77E-03	5.40E+03	1.27	0.09	0.26	OK
45	05/23/94	08:10	05/21	15:16	05/22	15:20	86640	1200	703	24.1	166	89.2	8.77E-03	1.66E+03	0.39	0.08	0.26	OK
75	05/23/94	08:47	05/21	15:10	05/22	15:14	86640	389	7900	2.8	166	89.2	8.77E-03	2.38E+04	17.44	0.31	0.79	OK
22	05/23/94	08:55	05/21	15:04	05/22	15:04	86400	1200	3940	5.0	166	89.2	8.77E-03	1.16E+04	2.77	0.09	0.26	OK
99	05/23/94	09:20	05/21	15:06	05/22	15:06	86400	1200	3737	5.2	166	89.2	8.77E-03	1.10E+04	2.63	0.09	0.26	OK
14	05/23/94	10:50	05/21	15:02	05/22	15:03	86460	1200	6066	4.5	166	89.2	8.77E-03	1.82E+04	4.40	0.12	0.26	OK
31	05/23/94	11:10	05/21	15:08	05/22	15:10	86520	300	5281	3.8	166	89.2	8.77E-03	1.58E+04	15.25	0.38	1.05	OK
55	05/23/94	11:16	05/21	15:00	05/22	15:01	86460	602	5289	4.3	166	89.2	8.77E-03	1.58E+04	7.63	0.21	0.52	OK
55B	05/23/94	11:27	05/21	15:00	05/22	15:01	86460	602	5278	4.3	166	89.2	8.77E-03	1.58E+04	7.63	0.21	0.53	OK
109	05/23/94	11:39	05/21	15:09	05/22	15:11	86520	600	5553	4.0	166	89.2	8.77E-03	1.66E+04	8.06	0.20	0.53	OK
25	05/23/94	11:50	05/21	14:57	05/22	14:45	85680	80	5248	3.8	166	89.2	8.77E-03	1.57E+04	57.79	1.44	4.00	OK
85	05/23/94	11:52	05/21	14:55	05/22	14:58	86580	300	6222	3.7	166	89.2	8.77E-03	1.87E+04	18.17	0.42	1.06	OK
53	05/23/94	11:59	05/21	14:55	05/22	14:45	85800	1200	1201	16.4	166	89.2	8.77E-03	3.19E+03	0.79	0.10	0.27	OK
67	05/23/94	12:20	05/21	14:58	05/22	14:44	85560	1200	1627	12.3	166	89.2	8.77E-03	4.50E+03	1.11	0.10	0.27	OK
6	05/23/94	12:41	05/21	14:30	05/22	14:38	86880	1200	3242	7.3	166	89.2	8.77E-03	9.48E+03	2.32	0.11	0.27	OK

Reviewed by Kenneth K Bohn 5/25/94

Radon Flux Measurements

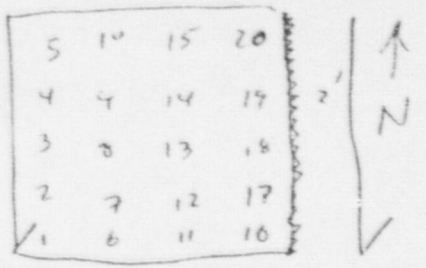
Site: Homestake Mining Company, Mill Site and Test Pads

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Collection Time (sec)	Count Time (sec)	Peak Counts	Percent Error	Bkg counts	Percent Error	Detector Efficiency	Canister Activity(nCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s	Remarks
33	05/24/94	00:56	05/21	15:31	05/22	15:35	86640	1200	208	92.2	227	78.9	8.77E-03	-5.86E+01	-0.02	0.11	0.35	OK
74	05/24/94	01:17	05/21	15:33	05/22	15:37	86640	1200	2951	7.8	227	78.9	8.77E-03	8.40E+03	2.25	0.12	0.35	OK
23	05/24/94	01:38	05/21	15:34	05/22	15:39	86700	1200	2958	8.3	227	78.9	8.77E-03	8.42E+03	2.26	0.13	0.35	OK
201	05/24/94	01:58	05/21	15:35	05/22	15:40	86700	1200	1200	14.8	227	78.9	8.77E-03	3.00E+03	0.81	0.11	0.35	OK

Reviewed by: Kenneth K Baha 5/25/94

Date	Count time	Standard (nCi	Counts	Error %	Bkg Counts	Bkg error %	Efficiency	Error(1.00 SD
05/23	1200	80	32061	1.4	135	123.1	0.00899	0.00007
05/23	1200	78.83	30043	1.44	135	123.1	0.00855	0.00007

Reviewed by: Kenneth R Baker 5/25/84



Radon – 222 Canister Chain of Custody Record

Facility: HOMESTAKE MINING CO.
Pile or Stack Name: N. SLOPE RST PAD'S & MILL YARD
Area of Pile or Stac:
Field Representative: C. FARR & F. CRAFT

	Deployment	Retrival
Date	5/21/14	5/22/14
Rel. Humid.		
Bar. Press		
Temp. (F)	82° F	80° F

Deployment/Retrieval Record

Item	Location ID or Description	Coordinates North	Coordinates East	Canister Number	Deployment Time	Deployment By	Retrieval Time	Retrieval By	Comments
1	10M W			104	13:52	CF	13:57	CF	
2				95	13:52	F.C.	13:57	CF	
3				97	13:53	F.C.	14:01	CF	
4				98	13:53	F.C.	13:59	F.C.	
5				200	13:54	F.C.	13:57	F.C.	
6				46	13:53	CF	14:03	F.C.	
7				38	13:56	CF	14:03	F.C.	
8				87	13:58	CF	14:02	F.C.	
9				96	13:56	F.C.	14:0-	F.C.	
10				26	13:54	F.C.	13:58	F.C.	
11				~~76~~ 77	13:53	C.F.C.	14:03	CF	13:53
12				54	13:56	CF	14:04	CF	13:56 time deployed
13				13	13:54	CF	14:0C	CF	
14				16	13:57	F.C.	14:05	F.C.	
15				44	13:55	F.C.	14:05	F.C.	
16				52	13:54	CF	14:06	CF	
17				7	13:54	C.F.	14:07	CF	
18				28	13:57	F.C.	14:08	CF	
19				47	13:56	F.C.	14:08	F.C.	
20				2	13:56	F.C.	14:07	F.C.	

ITEM # SEE MAP IN UPPER RIGHT CORNER

2' cover

25	30	35	40
24	29	34	39
23	28	33	38
22	27	32	37
21	26	31	36

N ↑

Radon – 222 Canister Chain of Custody Record

Facility: HOMESTAKE MINING CO.
Pile or Stack Name: N. SLOPE TEST PADS
Area of Pile or Stack:
Field Representative: CHAR F. CRAFT

	Deployment	Retrival
Date	5/21/94	5/22/94
Rel. Humid.		
Bar. Press		
Temp. (F)	82°	79°F

Deployment/Retrieval Record

Item	Location ID or Description	Coordinates North	Coordinates East	Canister Number	Deployment Time	Deployment By	Retrieval Time	Retrieval By	Comments
21				102	14:13	cf	14:11	cf	
22				92	14:08	cf	14:12	cf	
23				39	14:05	F.C.	14:11	F.C.	
24				4	14:08	F.C.	14:10	F.C.	
25				100	14:09	F.C.	14:13	cf.	
26				61	14:15	cf	14:13	cf,	
27				79	14:08	cf	14:14	F.C.	
28				5	14:12	F.C.	14:16	cf	
29				29	14:22	F.C.F	14:16	F.C.	
30				65	14:07	F.C.	14:14	F.C.	
31				71	14:16	cf	14:17	cf	
32				40	14:09	cf	14:15	cf	
33				3	14:13	F.C	14:18	F.C.	
34				37	14:13	F.C.	14:17	F.C	
35				101	14:10	F.C.	14:16	F.C.	
36				51	14:14	F.C.	14:19	cf.	
37				89	14:10	cf	14:20	Cf.	
38				90	14:12	F.C	14:21	F.C.	
39				94	14:12	F.C.	14:20	F.C.	
40				84	14:11	F.C.	14:19	F.C.	

3
cover

45	50	55	60
44	49	54	59
43	48	53	58
42	47	52	57
41	46	51	56

N ↑

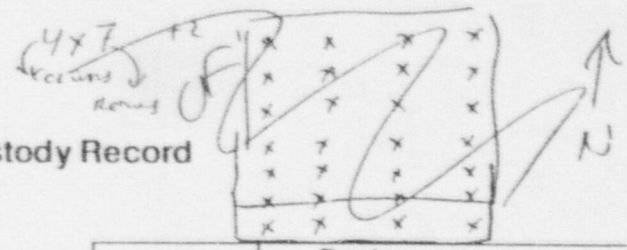
Radon – 222 Canister Chain of Custody Record

Facility: HOMESTAKE MINING CO.
Pile or Stack Name: N. FACE OF TEST PADS
Area of Pile or Stack:
Field Representative: C FARR & F. CRAFT

	Deployment	Retrival
Date	5/21/84	5/22/84
Rel. Humid.		
Bar. Press		
Temp. (F)	82° F	78° F

Deployment/Retrieval Record

Item	Location ID or Description	Coordinates North	Coordinates East	Canister Number	Deployment Time	Deployment By	Retrieval Time	Retrieval By	Comments
41				103	14:28	cf	14:24	cf	
42				62	14:28	cf	14:25	cf	
43				8	14:29	cf	14:24	f.c.	
44				70	14:29	cf	14:24	f.c.	
45				107	14:27	cf	14:27	f.c	
46				11	14:28	f.c.	14:27	cf	
47				19	14:30	c.f	14:28	cf	
48				73	14:33	cf	14:29	f.c.	
49				57	14:34	c.f	14:27	f.c.	
50				69	14:31	f.c	14:27	f.c.	
51				35	14:28	f.c	14:30	cf.	
52				208 [illegible]	14:30	c.f	14:30	f.c.	
53				50	14:32	cf.	14:33	cf	
54				106	14:34	c.f	14:33	f.c.	
55				203	14:32	f.c	14:30	f.c	
56				86	14:29	f.c.	14:37	cf	
57				6	14:30	cf.	14:38	cf	
58				41	14:32	cf	14:38	f.c.	
59				106 10[illegible]	14:32	cf	14:37	f.c.	
60				42	14:32	f.c	14:33	f.c.	



SEE MAP ATTACHED

Radon – 222 Canister Chain of Custody Record

Facility: HOMESTAKE MINING CO.
Pile or Stack Name: MILL YARD
Area of Pile or Stack:
Field Representative: CRAIG F. CRAFT

	Deployment	Retrival
Date	5/21/94	5/22/94
Rel. Humid.		
Bar. Press		
Temp. (F)	52°	77°

Deployment/Retrieval Record

Item	Location ID or Description	Coordinates North	Coordinates East	Canister Number	Deployment Time	Deployment By	Retrieval Time	Retrieval By	Comments
61				85	14:55	F.C.C.F	14:58	C.F.C.	
62				25	14:57		14:45	C.F.C.	
63				5.3	14:55		14:45	C.F.C.	
64				67	14:58		14:44	C.F.C.	
65				55	15:00		15:01		
66				14	15:02		15:03		
67				22	15:04		15:04		
68				99	15:06		15:06		
69				31	15:08		15:10		
70				109	15:09		15:11		
71				75	15:10		15:14		
72				66	15:11		15:15		
73				11	15:14		15:18		
74				115	15:16		15:20		
75				15	15:18		15:21		
76				31	15:19		15:24		
77				65	15:22		15:25		
78				36	15:24		15:26		
79				17	15:25		15:29		
80				~~88~~ 34	15:26		15:30		

Radon – 222 Canister Chain of Custody Record

Facility: HOMESTAKE MINING CO
Pile or Stack Name: MILL YARD
Area of Pile or Stack:
Field Representative: CRAIG & F. CRAFT

	Deployment	Retrival
Date	5/21/94	5/22/94
Rel. Humid.		
Bar. Press		
Temp. (F)	62°F	76°F

Deployment/Retrieval Record

Item	Location ID or Description	Coordinates North	Coordinates East	Canister Number	Deployment Time	Deployment By	Retrieval Time	Retrieval By	Comments
81				24	15:28	CFIC	15:32	F.C	
82				43	15:29		15:34		
83				33	15:31		15:35		
84				74	15:33		15:37		
85				23	15:34		15:39		
86				201	15:35		15:40		
87				21	15:38		15:42		
88				76	15:41		15:43		
89				86	15:42		15:44		
90				9	15:44		15:45		
91									
92	OFFICE			10	16:00				removed in bag
93	OFFICE			83	16:00				removed in bag
94									
95									
96									
97									
98									
99									
100									

Radon – 222 Canister Chain of Custody Record

Facility _____
Pile or Stack Name _____
Area of Pile or Stack _____
Field Representative _____

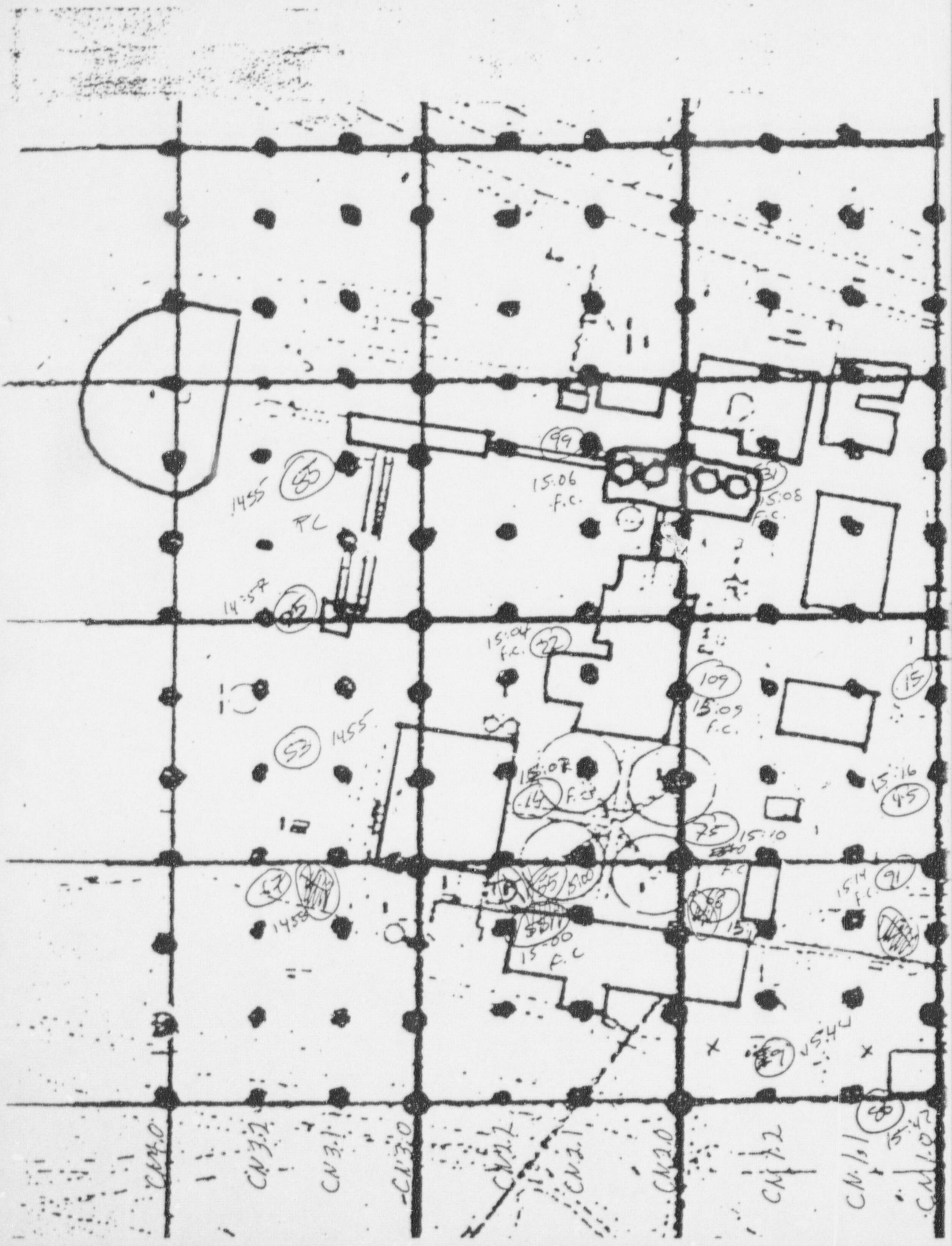
	Deployment	Retrival
Date		
Rel. Humid.		
Bar. Press		
Temp. (F)		

Deployment/Retrieval Record

Item	Location ID or Description	Coordinates North	Coordinates East	Canister Number	Deployment Time	Deployment By	Retrieval Time	Retrieval By	Comments
101									
102									
103									
104									
105									
106									
107									
108									
109									
110									
111									
112									
113									
114									

Custody Transfer Record

Items Nos.	Reliquished By	Date	Time	Accepted By	Date	Time
1-93	[illegible]	5/22/94	15:58	C of AAR	5/22/94	15:58



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CN 3.2
CN 3.1
CN 3.0
CN 2.2
CN 2.1
CN 2.0
CN 1.2
CN 1.1
CN 1.0
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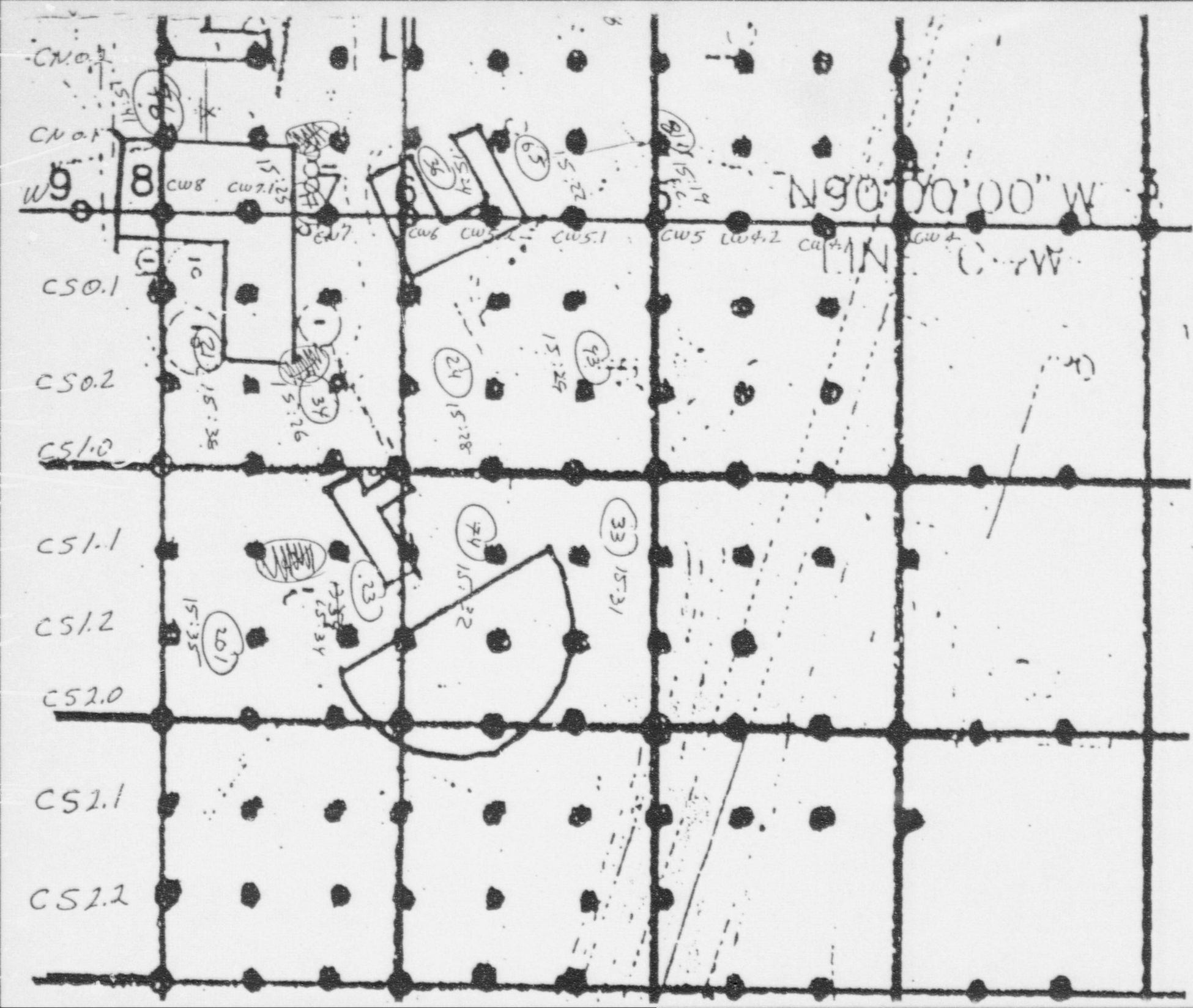
PL
15:06
F.C.
99
15:08
F.C.
15:04
F.C.
22
109
15:09
F.C.
15
53
1455
15:10
15:16
15:14
F.C.
91
15:00
F.C.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W9
8
CW8
CW7.1
CW7
CW6
CW5.2
CW5.1
CW5
CW4.2
CW4.1
CW4
CS0.1
CS0.2
CS1.0
CS1.1
CS1.2
CS2.0
CS2.1
CS2.2
N90°00'00"W

ERG Environmental Restoration Group, Inc.
12809 Arroyo de Vista NE
Albuquerque, New Mexico 87111
(505) 298-4224

July 24, 1995

Mr. Fred Craft
Homestake Mining Company
P. O. Box 98
Grants, NM 87020

Dear Mr. Craft:

Enclosed is the final radon flux measurement report for the 36 radon flux canisters that were deployed on July 10, 1995 on the Aprons, East Side Slope, and Debris Pits. Canisters numbered 35 and 105 were trip blanks used for quality assurance purposes. Our procedures require that ten percent of the canisters be counted twice. Where this was done, the canister number was recorded with a "B" suffix. An arithmetic average of the two values is suggested for use as the best value.

Please advise me if you have any questions.

Sincerely,

Kenneth R. Baker

Kenneth R. Baker, Ph.D.
Principal

Radon Flux Measurements Made at HMC Aprons, East Side Slope, and Debris Pits

Radon flux measurements were made at the HMC Grants Uranium Mill Site on July 10-11, 1995. Environmental Restoration Group, Inc.(ERG) provided the assembled canisters. The canisters were deployed and retrieved by ERG staff. A data table showing the canister number, the flux, and the associated error is attached. Also attached is the chain of custody form which gives the canister number and the placement location.

The quality of the flux measurements was ensured by several means. Trip blanks accompany the canisters and are analyzed to assure that the canisters are sealed while not deployed. Other quality control requirements are imposed on the analysis of the canisters. The gamma-ray spectrometer used in the analysis is calibrated using two independent standard sources. Included in the procedures is the requirement to count ten percent of the canisters a second time. Other requirements relating to EPA Method 115 are incorporated. These data are discussed below.

Two trip blanks accompanied the radon flux canisters and were analyzed to assure that the charcoal was not affected by exposure to the environment. The measured flux of 0.21 and 0.27 pCi/m^2s for the trip blanks indicate near zero exposure, indicating that the canisters remained sealed during transport and the exposure period.

The calibration data for the spectrometers are attached. The average of the 609 keV photopeak efficiency for the two independent sources taken at the beginning of the measurement period was used for calculating the flux. The data indicate that this average is within the 10 percent accuracy range required by Method 115. One calibration standard was run again at the end of the measurement period to assure that the calibration had not changed. The calibration factor determined from the beginning of the measurement period and at the end of the measurement period differed by less than one percent. This indicates that the system was stable and performing properly.

Method 115 indicates that the precision of the measurements should be 10 percent or better for measurements above a flux of 1 pCi/m^2s. This could be interpreted as the counting error, or one could compare duplicate analyses. The counting error at 1 pCi/m^2s is normally in the range of 8-20 percent for a 20-minute count and is highly dependent upon the algorithm used to assess the errors in calculating the photopeak areas. ERG has interpreted that the requirement is met if a recount of the canisters results in a ten percent agreement. The duplicate counts and values were:

Canister Number	Count 1 (pCi/m^2s)	Count 2 (pCi/m^2s)
254	0.42	0.60
27	1.55	1.64
103	1.11	1.02

The average percent difference from the mean of the pairs was calculated to be eight percent. Canister No. 254 failed the individual test of having the error being within ten percent of the value. Since the flux value for Canister 254 is less than 1 pCi/m^2s, the criterion does not apply.

The error, as discussed above, arises from the higher statistical error from the fewer counts in the photopeak and from the curve fitting algorithms. The error can be reduced only through counting the canister for a very long time. The very small impact of the error from the low flux canisters on the mean flux does not justify such extreme measures.

In summary, the quality control data indicate that the analytical data is consistent with what one would expect for good standard operating procedures using a state-of-the-art spectrometer.

Radon Flux Measurements

Site: Homestake Mining Company ESS, Aprons, and Debris Pits

EG&G System

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Collection Time (sec)	Count Time (sec)	Peak Counts	Error	Bkg counts	Error	Detector Efficiency	Canister Activity(nCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s
21	07/12/95	08:30	07/10	17:31	07/11	17:18	85620	1200	1761	234.0	-125	207	7.93E-03	6.43E+03	1.51	0.25	0.77
108	07/12/95	08:58	07/10	17:24	07/11	17:13	85740	1200	4250	285.0	-125	207	7.93E-03	1.49E+04	3.52	0.28	0.78
34	07/12/13	09:22	07/10	17:30	07/11	17:13	85380	1200	14163	377.0	-125	207	7.93E-03	4.87E+04	0.00	0.00	0.00
37	07/12/95	09:48	07/10	17:25	07/11	17:14	85740	1200	3041	244.0	-125	207	7.93E-03	1.08E+04	2.57	0.26	0.78
14	07/12/95	10:22	07/10	17:36	07/11	17:24	85680	1200	12044	362.0	-125	207	7.93E-03	4.15E+04	9.90	0.34	0.78
29	07/12/95	10:45	07/10	17:35	07/11	17:23	85680	1200	15151	379.0	-125	207	7.93E-03	5.20E+04	12.46	0.35	0.79
258	07/12/95	11:06	07/10	17:34	07/11	17:21	85620	1200	1174	218.0	-125	207	7.93E-03	4.43E+03	1.06	0.25	0.79
12	07/12/95	11:29	07/10	17:33	07/11	17:20	85620	1200	10562	365.0	-125	207	7.93E-03	3.64E+04	8.77	0.34	0.79
13	07/12/95	12:32	07/10	17:17	07/11	17:08	85860	1200	847	218.0	-125	207	7.93E-03	3.31E+03	0.80	0.25	0.80
254	07/12/95	12:55	07/10	17:22	07/11	17:12	85800	1200	381	242.0	-125	207	7.93E-03	1.72E+03	0.42	0.26	0.80
254B	07/12/95	13:20	07/10	17:22	07/11	17:12	85800	1200	596	241.0	-125	207	7.93E-03	2.46E+03	0.60	0.26	0.80
91	07/12/95	13:43	07/10	17:15	07/11	17:07	85920	1200	15426	410.0	-125	207	7.93E-03	5.30E+04	12.96	0.38	0.80
83	07/12/95	14:06	07/10	17:20	07/11	17:11	85860	1200	8455	327.0	-125	207	7.93E-03	2.92E+04	7.17	0.32	0.81
110	07/12/95	14:30	07/10	17:08	07/11	17:02	86040	1200	6341	297.0	-125	207	7.93E-03	2.20E+04	5.42	0.30	0.81
18	07/12/95	14:52	07/10	17:12	07/11	17:05	85980	1200	2126	257.0	-125	207	7.93E-03	7.67E+03	1.89	0.28	0.81
9	07/12/95	15:15	07/10	17:10	07/11	17:03	85980	1200	346	232.0	-125	207	7.93E-03	1.60E+03	0.40	0.26	0.81
87	07/12/95	15:38	07/10	17:07	07/11	17:01	86040	1200	620	235.0	-125	207	7.93E-03	2.54E+03	0.63	0.26	0.82
11	07/12/95	16:01	07/10	16:59	07/11	16:51	85920	1200	643	220.0	-125	207	7.93E-03	2.62E+03	0.65	0.26	0.82
252	07/12/95	16:22	07/10	17:03	07/11	16:54	85860	1200	363	222.0	-125	207	7.93E-03	1.66E+03	0.42	0.26	0.82
94	07/12/95	16:45	07/10	16:50	07/11	16:50	86400	1200	903	238.0	-125	207	7.93E-03	3.50E+03	0.87	0.27	0.82

Radon Flux Measurements

Site: Homestake Mining Company ESS, Aprons, and Debris Pits

EG&G System

Canister Number	Lab Date	Start Count Time	Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Collection Time (sec)	Count Time (sec)	Peak Counts	Error	Bkg counts	Error	Detector Efficiency	Canister Activity(nCi)	Flux pCi/m2s	Flux Error 1.00 S.D.	LLD pCi/m2s
27	07/12/95	17:08	07/10	17:05	07/11	16:58	85980	1200	1689	253.0	-125	207	7.93E-03	6.18E+03	1.55	0.28	0.83
27B	07/12/95	17:31	07/10	17:05	07/11	16:58	85980	1200	1789	248.0	-125	207	7.93E-03	6.52E+03	1.64	0.28	0.83
26	07/12/95	18:16	07/10	16:28	07/11	16:28	86400	1200	764	231.0	-141	222	7.93E-03	3.08E+03	0.78	0.28	0.89
250	07/12/95	18:38	07/10	15:55	07/11	15:56	86460	1200	2725	269.0	-141	222	7.93E-03	9.77E+03	2.49	0.30	0.90
95	07/12/95	19:07	07/10	16:25	07/11	16:25	86400	1200	1110	247.0	-141	222	7.93E-03	4.26E+03	1.09	0.29	0.90
201	07/12/95	19:47	07/10	16:23	07/11	16:23	86400	1200	3000	249.0	-141	222	7.93E-03	1.07E+04	2.74	0.29	0.90
50	07/12/95	20:10	07/10	15:44	07/11	15:48	86640	1200	7634	322.0	-141	222	7.93E-03	2.65E+04	6.82	0.34	0.91
203	07/12/95	20:32	07/10	15:47	07/11	15:50	86580	1200	1037	225.0	-141	222	7.93E-03	4.01E+03	1.04	0.28	0.91
40	07/12/95	20:54	07/10	15:42	07/11	15:45	86580	1200	1180	237.0	-141	222	7.93E-03	4.50E+03	1.17	0.29	0.91
19	07/12/95	21:19	07/10	15:52	07/11	15:53	86460	1200	1093	242.0	-141	222	7.93E-03	4.20E+03	1.09	0.29	0.92
10	07/12/95	21:44	07/10	15:38	07/11	15:41	86580	1200	882	218.0	-141	222	7.93E-03	3.49E+03	0.91	0.28	0.92
103	07/12/95	22:07	07/10	15:34	07/11	15:37	86580	1200	1098	241.0	-141	222	7.93E-03	4.22E+03	1.11	0.29	0.92
103B	07/12/95	22:30	07/10	15:34	07/11	15:37	86580	1200	994	237.0	-141	222	7.93E-03	3.87E+03	1.02	0.29	0.93
65	07/12/95	22:52	07/10	15:36	07/11	15:39	86580	1200	2306	240.0	-141	222	7.93E-03	8.34E+03	2.19	0.29	0.93
43	07/12/95	23:14	07/10	15:40	07/11	15:43	86580	1200	1205	229.0	-141	222	7.93E-03	4.59E+03	1.21	0.29	0.93
105	07/12/95	23:35	07/10	15:40	07/11	15:43	86580	1200	153	208.0	-141	222	7.93E-03	1.00E+03	0.27	0.27	0.93
28	07/12/95	23:58	07/10	15:32	07/11	15:35	86580	1200	933	231.0	-141	222	7.93E-03	3.66E+03	0.97	0.29	0.94
259	07/13/95	00:20	07/10	15:30	07/11	15:33:00	86580	1200	801	224.0	-141	222	7.93E-03	3.21E+03	0.85	0.29	0.94
35	07/13/95	00:42	07/10	15:30	07/11	15:33:00	86580	1200	90	207.0	-141	222	7.93E-03	7.87E+02	0.21	0.28	0.94

Date	Count time	Standard (nCi	Counts	Error	Bkg Counts	Bkg error	Efficiency	Error(1.00 SD
07/12	1200	80	29442	495	−125	207	0.00832	0.00015
07/12	1200	78.83	26267	516	−125	207	0.00754	0.00016
07/13	1200	78.83	27659	511	−141	222	0.00794	0.02060

Radon – 222 Canister Chain of Custody Record

HMC

Facility: GRANTS RECLAMATION
Pile or Stack Name: LARGE TAILINGS PILE
Area of Pile or Stack: EAST SIDE, NORTH & SOUTH APRONS, BURIAL PITS
Field Representative: Dave Rocha

	Deployment	Retrival
Date	7/10/95	7/11/95
Rel. Humid.		
Bar. Press		
Temp. (F)		

Deployment/Retrieval Record

Item	Location ID or Description	Coordinates North	Coordinates East	Canister Number	Deployment Time	Deployment By	Retrieval Time	Retrieval By	Comments
1	9561			259	1530	FC/DR	1533	DR	
2	2			28	1532		1535		
3	3			103	1534		1537		
4	4			65	1536		1539		
5	5			10	1538		1541		
6	6			43	1540		1543		
7	7			40	1542		1545		
8	8			50	1544		1548		
9	9			203	1547		1550		
10	10			19	1552		1553		
11	11			250	1555		1556		
12	12			201	1623		1623		
13	13			95	1625		1625		
14	14			26	1628		1628		
15	15			94	1650		1650		
16	16			11	1659		1651		
17	17			252	1703		1654		
18	18			27	1705		1658		
19	19			87	1707		1701		
20	20			110	1700		1702		

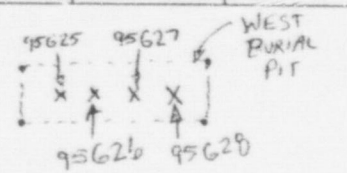
Radon – 222 Canister Chain of Custody Record

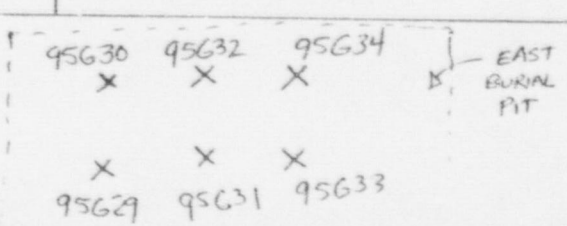
Facility: HMC GRANTS RECLAMATION
Pile or Stack Name: LARGE TAILINGS PILE
Area of Pile or Stack: EAST SIDE, NORTH & SOUTH APRONS, BURIAL PITS
Field Representative: Dave Parker

	Deployment	Retrival
Date	7/10/95	7/11/95
Rel. Humid.		
Bar. Press		
Temp. (F)		

Deployment/Retrieval Record

Item	Location ID or Description	Coordinates North	Coordinates East	Canister Number	Deployment Time	Deployment By	Retrieval Time	Retrieval By	Comments
21	95G21			9	1710	FC/DR	1703	DR	
22	22			18	1712		1705		
23	23			91	1715		1707		
24	24			13	1717		1708		
25	95G25			83	1720		1711		WEST BURIAL PIT
26	95G26			254	1722		1712		
27	95G27			18	1724		1713		
28	95G28			37	1725		1714		
29	95G29			34	1730		1717		EAST BURIAL PIT
30	95G30			21	1731		1718		
31	95G31			12	1733		1720		
32	95G32			258	1734		1721		
33	95G33			29	1735		1723		
34	95G34			14	1736		1724		
35				105					TRIP BLANK
36				35					TRIP BLANK
37									
38									
39									
40									





Radon – 222 Canister Chain of Custody Record

Facility: HMC
Pile or Stack Name: GRANTS RECLAMATION
Area of Pile or Stack: LARGE TAILINGS PILE
Field Representative: E. SIDE N.S. ARROYO Burial Pits

	Deployment	Retrival
Date	7/10/95	7/11/95
Rel. Humid.		
Bar. Press		
Temp. (F)		

Deployment/Retrieval Record

Item	Location ID or Description	Coordinates North	Coordinates East	Canister Number	Deployment Time	Deployment By	Retrieval Time	Retrieval By	Comments
101									
102									
103									
104									
105									
106									
107									
108									
109									
110									
111									
112									
113									
114									

Custody Transfer Record

Items Nos.	Relinquished By	Date	Time	Accepted By	Date	Time
1-36	[illegible]	7-11-95	1804	[illegible]	7/11/95	1804

Attachment 4