

Analytical Results for the Community Environmental Monitoring Program (CEMP) Air Sampling and TLD Network—First Quarter CY2013

The CEMP air-sampling network is designed to monitor and collect radioactive airborne particles from NNSS and non-NNSS related activities, as well as background environmental sources. This report is compiled by the Desert Research Institute (DRI) and summarizes the results from the analysis of the air samples collected by CEMP station managers as part of the community environmental monitoring program.

In general, the CEMP air-sampling network is comprised of 28 continuously operating environmental sampling stations. A total of 23 stations are equipped with a low volume air sampler/totalizer configuration to collect particulate radionuclides on glass fiber filter paper. Ideally, the samples are collected on a bi-weekly basis with a target collection time of 336 hours (two weeks). The samplers are calibrated on a monthly basis by DRI to maintain a collection rate of 1.75 cfm (@ STP). All relevant information such as collection times, variations in flow rate, actual flow volumes, power outages, and other information documenting the integrity of the sample are recorded by the station managers. This allows for the proper interpretation of the analytical results. The air filters are analyzed by a commercial laboratory for gross alpha/beta activity as well as by high-resolution gamma spectrometry. The filters are composited on a quarterly basis for gamma spectroscopy analysis after the gross alpha/beta analyses have been completed.

In the U.S., the principle reporting unit for the measurement of radioactivity in the atmospheric environment is pCi/m³ (picocuries per cubic meter). DRI receives its data from the lab as microcuries per filter. DRI converts the laboratory data unit of measurement to pCi/m³ for the ease in comparison of data.

A summary of the first quarter CY2013 analytical results for gross alpha and beta analyses are found in Tables 1 and 2. These tables document the minimum, maximum, and average values for each of the 23 air-sampling network stations. The last column shows the average annual value from the previous year (CY2012) for comparison purposes. Overall the gross alpha results for the first quarter of CY2013 reflect similar values to previous quarters. These data remain consistent with the average CY2012 analyses used for comparison, especially when analytical error is considered. The first quarter CY2013 beta results are also consistent with previous results.

The first quarter gamma results for CY2013 are shown in Table 3. All of the samples were gamma spectrum negligible (i.e. gamma emitting radionuclides were not detected) with the exception of beryllium (Be)-7, a naturally occurring element of the atmospheric environment. Overall, these data are consistent with previous analytical results.

The TLD results for the first quarter of CY2013 are shown in Table 4. Data for the environmental thermoluminescent dosimeter (TLD) is reported in milliroentgens (mR). Overall, the results display similar values to the previous quarters of the last calendar year. The 2012 pressurized ion chamber, or PIC exposure rate and TLD data are also provided for comparison. As with historical data, TLD values are commonly lower than

the PIC results. The overall estimated annual exposure based on the first quarter shows consistent agreement with CY2012.

DRI welcomes and encourages input from the station managers regarding the content of the CEMP quarterly reports. If there is anything you feel we could provide to help you interpret the data or enable you to explain the information to someone in your community not familiar with the program, please let us know.

Table 1. Gross Alpha Analytical Results for the First Quarter of Calendar Year 2013
(Average analytical error, +/- 0.0007)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2012 Average (pCi/m ³)
Alamo	0.0004	0.0043	0.0014	0.0018
Amargosa	0.0005	0.0014	0.0009	0.0011
Beatty	0.0004	0.0016	0.0008	0.0011
Boulder City	0.0003	0.0031	0.0015	0.0013
Caliente	0.0007	0.0041	0.0019	0.0016
Cedar City	0.0003	0.0014	0.0007	0.0006
Delta	0.0004	0.0043	0.0015	0.0008
Duckwater	0.0005	0.0021	0.0012	0.0010
Ely	0.0005	0.0016	0.0009	0.0009
Goldfield	0.0005	0.0021	0.0009	0.0011
Henderson	0.0008	0.0019	0.0012	0.0011
Indian Springs	0.0006	0.0020	0.0012	0.0008
Las Vegas	0.0007	0.0035	0.0016	0.0010
Mesquite	0.0005	0.0025	0.0015	0.0013
Milford	0.0007	0.0033	0.0015	0.0009
Overton	0.0004	0.0022	0.0011	0.0014
Pahrump	0.0005	0.0013	0.0010	0.0011
Pioche	0.0005	0.0016	0.0009	0.0009
Rachel	0.0007	0.0020	0.0010	0.0008
Sarcobatus	0.0007	0.0040	0.0017	0.0016

St. George	0.0004	0.0024	0.0011	0.0009
Tecopa	0.0006	0.0020	0.0011	0.0010
Tonopah	0.0005	0.0016	0.0009	0.0008

Table 2. Gross Beta Analytical Results for the First Quarter of Calendar Year 2013.
(Average analytical error, +/- 0.005)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2012 Average (pCi/m ³)
Alamo	0.014	0.032	0.019	0.023
Amargosa	0.015	0.026	0.020	0.021
Beatty	0.012	0.024	0.017	0.019
Boulder City	0.013	0.029	0.020	0.022
Caliente	0.011	0.036	0.020	0.021
Cedar City	0.010	0.028	0.016	0.015
Delta	0.011	0.065	0.029	0.020
Duckwater	0.007	0.030	0.018	0.019
Ely	0.006	0.022	0.015	0.018
Goldfield	0.010	0.028	0.015	0.019
Henderson	0.010	0.028	0.018	0.021
Indian Springs	0.012	0.024	0.018	0.020
Las Vegas	0.015	0.031	0.021	0.021
Mesquite	0.015	0.035	0.023	0.023
Milford	0.013	0.069	0.028	0.021
Overton	0.013	0.032	0.022	0.024
Pahrump	0.005	0.025	0.016	0.020
Pioche	0.012	0.022	0.015	0.018
Rachel	0.011	0.035	0.019	0.019
Sarcobatus	0.012	0.030	0.018	0.021

St. George	0.013	0.037	0.021	0.022
Tecopa	0.014	0.031	0.019	0.021
Tonopah	0.011	0.025	0.016	0.018

Table 3. Gamma Spectroscopy Results for the First Quarter of Calendar Year 2013.

Station	Cs-137 (pCi/sample)	Cs-137 (MDC)	Be-7 (pCi/m ³)	Pb-210 (pCi/m ³)
Alamo	-2.6	15.8	0.038	N.D.
Amargosa	0.0	14.9	N.D.	N.D.
Beatty	-1.2	11.7	0.032	N.D.
Boulder City	9.3	12.4	0.040	N.D.
Caliente	5.6	15.8	N.D.	N.D.
Cedar City	-0.5	14.0	N.D.	N.D.
Delta	-3.3	15.0	0.026	N.D.
Duckwater	-0.1	9.3	0.033	N.D.
Ely	8.8	12.4	N.D.	N.D.
Goldfield	0.6	9.2	0.038	N.D.
Henderson	6.5	15.7	0.040	N.D.
Indian Springs	-0.4	9.3	0.050	N.D.
Las Vegas	-5.5	14.6	N.D.	N.D.
Mesquite	2.7	9.2	0.039	N.D.
Milford	-2.2	11.9	0.030	N.D.
Overton	0.7	7.3	0.034	N.D.
Pahrump	-6.2	16.6	0.035	N.D.
Pioche	0.0	7.0	0.039	N.D.
Rachel	-0.2	8.3	0.035	N.D.
Sarcobatus	0.4	8.9	0.038	N.D.

St. George	-0.5	11.8	0.031	N.D.
Tecopa	0.0	9.4	0.040	N.D.
Tonopah	0.0	9.5	0.044	N.D.

MDC (minimum detectable concentration)

MDC Be-7 = 0.022 pCi/m³ Pb-210 = 0.006 pCi/m³ N.D. = not detected

Table 4. TLD Analytical Results for the First Quarter of Calendar Year 2013

Station	First Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2012 TLD Exposure (mR/yr)	2012 PIC Exposure (mR/yr)
Alamo	26	113	114	118
Amargosa	25	100	103	100
Beatty	32	139	139	148
Boulder City	28	109	105	133
Caliente	27	106	112	139
Cedar City	21	92	94	97
Delta	21	91	96	93
Duckwater	27	107	117	107
Ely	25	99	107	107
Goldfield	28	122	121	132
Henderson	25	119	110	123
Indian Springs	23	92	97	98
Las Vegas	21	101	100	99
Mesquite	23	109	108	102
Milford	31	135	140	154
Overton	21	100	100	106
Pahrump	18	72	78	72
Pioche	28	110	116	131
Rachel	30	130	127	134
Sarcobatus	33	144	147	145

St. George	19	85	86	88
Tecopa	26	104	108	132
Tonopah	31	135	132	141
