

Analytical Results for the Community Environmental Monitoring Program (CEMP) Air Sampling and TLD Network—Fourth Quarter CY2012

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 29 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 fourth quarter CY2012 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 (CY2011) for comparison purposes. Overall the gross alpha results for the fourth quarter of CY2012 reflect similar values to previous quarters. These data remain consistent with the average CY2011 analyses used for comparison, especially when analytical error is considered. The fourth quarter CY2012 beta results are also consistent with previous results.

The fourth quarter gamma results for CY2012 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 fourth quarter of CY2012 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 2011 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 fourth quarter shows consistent agreement with CY2011.

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 Fourth Quarter of Calendar Year 2012
(Average analytical error, +/- 0.0007)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2011 Average (pCi/m ³)
Alamo	0.0008	0.0034	0.0015	0.0015
Amargosa	0.0005	0.0023	0.0011	0.0010
Beatty	0.0006	0.0015	0.0009	0.0012
Boulder City	0.0008	0.0023	0.0018	0.0014
Caliente	0.0008	0.0033	0.0013	0.0017
Cedar City	0.0005	0.0014	0.0008	0.0008
Delta	0.0005	0.0013	0.0008	0.0010
Duckwater	0.0004	0.0014	0.0009	0.0011
Ely	0.0005	0.0015	0.0010	0.0010
Goldfield	0.0003	0.0026	0.0011	0.0011
Henderson	0.0005	0.0016	0.0012	0.0011
Indian Springs	0.0003	0.0015	0.0009	0.0009
Las Vegas	0.0006	0.0016	0.0011	0.0012
Mesquite	0.0009	0.0044	0.0016	0.0013
Milford	0.0007	0.0016	0.0011	0.0010
Overton	0.0009	0.0025	0.0014	0.0018
Pahrump	0.0003	0.0024	0.0011	0.0011
Pioche	0.0005	0.0015	0.0008	0.0009
Rachel	0.0006	0.0011	0.0007	0.0010
Sarcobatus	0.0005	0.0021	0.0015	0.0018

St. George	0.0009	0.0018	0.0011	0.0011
Tecopa	0.0007	0.0013	0.0009	0.0011
Tonopah	0.0004	0.0011	0.0008	0.0011

Table 2. Gross Beta Analytical Results for the Fourth Quarter of Calendar Year 2012.
(Average analytical error, +/- 0.005)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2011 Average (pCi/m ³)
Alamo	0.021	0.034	0.025	0.024
Amargosa	0.014	0.038	0.022	0.022
Beatty	0.014	0.034	0.020	0.021
Boulder City	0.018	0.036	0.025	0.025
Caliente	0.019	0.030	0.023	0.023
Cedar City	0.012	0.027	0.016	0.019
Delta	0.015	0.027	0.020	0.022
Duckwater	0.015	0.033	0.020	0.020
Ely	0.013	0.031	0.019	0.019
Goldfield	0.012	0.031	0.020	0.021
Henderson	0.016	0.027	0.021	0.022
Indian Springs	0.019	0.035	0.023	0.022
Las Vegas	0.018	0.034	0.023	0.024
Mesquite	0.021	0.035	0.026	0.024
Milford	0.016	0.031	0.024	0.023
Overton	0.023	0.036	0.028	0.026
Pahrump	0.013	0.034	0.022	0.022
Pioche	0.013	0.031	0.019	0.019
Rachel	0.014	0.024	0.019	0.022
Sarcobatus	0.016	0.039	0.024	0.023

St. George	0.021	0.033	0.026	0.024
Tecopa	0.015	0.029	0.023	0.024
Tonopah	0.014	0.034	0.019	0.021

Table 3. Gamma Spectroscopy Results for the Fourth Quarter of Calendar Year 2012.

Station	Cs-137 (pCi/sample)	Cs-137 (MDC)	Be-7 (pCi/m ³)	Pb-210 (pCi/m ³)
Alamo	4.3	9.7	0.029	N.D.
Amargosa	0.0	11.0	0.029	N.D.
Beatty	1.8	9.9	0.028	N.D.
Boulder City	0.2	10.7	0.035	N.D.
Caliente	0.3	11.3	0.028	N.D.
Cedar City	-9.9	15.8	0.031	N.D.
Delta	-1.6	13.0	0.019	N.D.
Duckwater	-2.0	10.8	0.025	N.D.
Ely	-1.1	10.9	0.029	N.D.
Goldfield	-2.0	15.7	0.027	0.025
Henderson	-0.6	16.4	0.027	N.D.
Indian Springs	1.4	10.0	0.025	N.D.
Las Vegas	2.6	10.0	0.033	N.D.
Mesquite	0.0	12.0	0.038	N.D.
Milford	-1.5	14.3	0.031	N.D.
Overton	-4.1	13.4	0.030	N.D.
Pahrump	-8.5	16.6	0.028	N.D.
Pioche	0.4	12.4	0.030	N.D.
Rachel	-0.1	11.4	0.023	N.D.
Sarcobatus	0.1	8.0	0.024	N.D.

St. George	-2.7	12.0	0.032	N.D.
Tecopa	1.3	11.0	0.033	N.D.
Tonopah	-0.2	8.9	0.027	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 Fourth Quarter of Calendar Year 2012

Station	Fourth Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2011 TLD Exposure (mR/yr)	2011 PIC Exposure (mR/yr)
Alamo	34	112	103	120
Amargosa	33	97	100	100
Beatty	41	138	135	148
Boulder City	32	99	99	138
Caliente	34	104	107	141
Cedar City	28	83	87	98
Delta	29	86	95	102
Duckwater	33	113	111	106
Ely	32	109	98	106
Goldfield	35	116	112	131
Henderson	32	99	106	125
Indian Springs	32	93	95	99
Las Vegas	33	102	92	101
Mesquite	35	110	97	103
Milford	40	127	132	155
Overton	31	96	89	105
Pahrump	27	75	78	72
Pioche	33	101	104	126
Rachel	36	108	120	131
Sarcobatus	41	138	139	144

St. George	25	71	81	91
Tecopa	36	108	105	137
Tonopah	37	123	128	142
