

Analytical Results for the Community Environmental Monitoring Program (CEMP) Air Sampling Network—Fourth Quarter CY2008

The CEMP air-sampling network is designed to monitor and collect radioactive airborne particles from NTS and non-NTS 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 27 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). This two week sampling interval was adopted during the fourth quarter of CY2008. 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 (13 weeks) for gamma spectroscopy analysis only after the gross alpha/beta analyses have been completed.

In the U.S., the principle reporting unit 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. The data for the environmental thermoluminescent dosimeter (TLD) is reported in milliroentgens (mR).

A summary of the fourth quarter CY2008 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 27 air-sampling network stations. The last column shows the average annual value from the previous year (CY2007) for comparison purposes. Overall the gross alpha results for the fourth quarter of CY2008 reflect similar values to previous quarters. These data remain consistent with the average CY2007 analyses used for comparison, especially when analytical error is considered. The fourth quarter CY2008 beta results are also consistent with previous results.

The fourth quarter gamma results for CY2008 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 which is 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 CY2008 are shown in Table 4. Overall, the results display similar values to the previous quarters of the last calendar year. The 2007

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 CY2007.

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 2008
(Average analytical error, +/- 0.0007)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2007 Average (pCi/m ³)
Alamo	0.0008	0.0022	0.0017	0.0020
Amargosa	0.0011	0.0022	0.0016	0.0013
Beatty	0.0007	0.0031	0.0018	0.0017
Boulder City	0.0007	0.0025	0.0016	0.0026
Caliente	0.0011	0.0039	0.0024	0.0019
Cedar City	0.0005	0.0015	0.0011	0.0011
Delta	0.0006	0.0019	0.0015	0.0012
Duckwater	0.0005	0.0027	0.0016	0.0011
Ely	0.0003	0.0015	0.0010	0.0011
Garden Valley	0.0004	0.0019	0.0013	0.0011
Goldfield	0.0009	0.0020	0.0014	0.0012
Henderson	0.0006	0.0018	0.0013	0.0014
Indian Springs	0.0006	0.0018	0.0012	0.0012
Las Vegas	0.0007	0.0041	0.0022	0.0028
Mesquite	0.0009	0.0027	0.0015	0.0017
Milford	0.0008	0.0028	0.0016	0.0014
Nyala	0.0006	0.0012	0.0010	0.0010
Overton	0.0008	0.0044	0.0020	0.0017
Pahrump	0.0005	0.0034	0.0016	0.0015

Pioche	0.0007	0.0019	0.0013	0.0012
Rachel	0.0008	0.0036	0.0018	0.0015
Sarcobatus	0.0011	0.0047	0.0022	0.0021
St. George	0.0008	0.0019	0.0014	0.0014
Stone Cabin	0.0007	0.0019	0.0013	0.0010
Tecopa	0.0005	0.0027	0.0014	0.0015
Tonopah	0.0008	0.0020	0.0013	0.0013
Twin Springs	0.0010	0.0018	0.0014	0.0012

Table 2. Gross Beta Analytical Results for the Fourth Quarter of Calendar Year 2008.
(Average analytical error, +/- 0.003)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2007 Average (pCi/m ³)
Alamo	0.016	0.045	0.026	0.022
Amargosa	0.018	0.027	0.022	0.023
Beatty	0.016	0.028	0.023	0.024
Boulder City	0.018	0.036	0.024	0.026
Caliente	0.020	0.031	0.027	0.024
Cedar City	0.011	0.024	0.019	0.021
Delta	0.017	0.034	0.025	0.025
Duckwater	0.014	0.027	0.022	0.021
Ely	0.011	0.024	0.018	0.021
Garden Valley	0.019	0.029	0.024	0.022
Goldfield	0.018	0.029	0.022	0.021
Henderson	0.017	0.033	0.023	0.023
Indian Springs	0.015	0.028	0.021	0.022
Las Vegas	0.020	0.034	0.024	0.026
Mesquite	0.018	0.036	0.026	0.027
Milford	0.018	0.037	0.025	0.026
Nyala	0.014	0.032	0.020	0.020
Overton	0.021	0.038	0.025	0.025
Pahrump	0.014	0.028	0.022	0.023

Pioche	0.013	0.025	0.020	0.021
Rachel	0.016	0.046	0.026	0.023
Sarcobatus	0.018	0.031	0.025	0.024
St. George	0.019	0.042	0.027	0.025
Stone Cabin	0.014	0.024	0.019	0.021
Tecopa	0.020	0.040	0.027	0.025
Tonopah	0.013	0.027	0.020	0.020
Twin Springs	0.019	0.042	0.029	0.022

Table 3. Gamma Spectroscopy Results for the Fourth Quarter of Calendar Year 2008.

Station	Cs-137 (pCi/sample)	Cs-137 (MDC)	Be-7 (pCi/m ³)	Pb-210 (pCi/m ³)
Alamo	0.0	9.6	0.115	N.D.
Amargosa	-0.7	12.0	0.094	N.D.
Beatty	1.7	12.0	0.078	N.D.
Boulder City	3.2	8.3	0.083	N.D.
Caliente	-1.7	13.0	0.085	N.D.
Cedar City	2.9	9.8	0.088	N.D.
Delta	-4.0	18.0	0.068	N.D.
Duckwater	-2.8	9.7	0.085	N.D.
Ely	3.2	10.0	0.083	N.D.
Garden Valley	1.8	18.0	0.084	N.D.
Goldfield	-2.9	11.0	0.103	N.D.
Henderson	-5.0	17.0	0.110	N.D.
Indian Springs	-10.0	20.0	0.097	N.D.
Las Vegas	1.0	12.0	0.062	N.D.
Mesquite	1.9	15.0	0.093	N.D.
Milford	0.0	13.0	0.074	N.D.
Nyala	-8.0	18.0	0.055	N.D.
Overton	2.1	9.8	0.071	N.D.
Pahrump	-0.6	14.0	0.067	N.D.

Pioche	1.7	8.9	0.085	N.D.
Rachel	1.3	11.0	0.073	N.D.
Sarcobatus	-0.2	12.0	0.096	N.D.
St. George	-0.1	14.0	0.109	N.D.
Stone Cabin	-2.1	8.3	0.083	N.D.
Tecopa	1.1	8.9	0.134	N.D.
Tonopah	1.2	11.0	0.087	N.D.
Twin Springs	1.9	9.9	0.070	N.D.

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 2008

Station	Fourth Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2007 TLD Exposure (mR/yr)	2007 PIC Exposure (mR/yr)
Alamo	29	109	109	120
Amargosa	25	101	102	109
Beatty	38	153	142	148
Boulder City	25	99	97	135
Caliente	31	124	118	143
Cedar City	23	92	94	96
Delta	26	104	92	102
Duckwater	29	108	110	104
Ely	26	96	93	104
Garden Valley	33	143	145	163
Goldfield	30	120	113	134
Henderson	32	127	110	138
Indian Springs	24	97	100	101
Las Vegas	23	99	87	92
Medlins Ranch	32	139	127	150
Mesquite	24	97	97	105
Milford	38	153	136	168
Nyala	30	129	106	119
Overton	22	91	82	92
Pahrump	19	77	74	72

Pioche	29	116	103	123
Rachel	34	136	123	137
Sarcobatus	34	136	143	153
St. George	22	88	83	81
Stone Cabin	33	143	131	155
Tecopa	27	110	113	130
Tonopah	32	128	125	143
Twin Springs	36	155	148	170
