Analytical Results for the Community Environmental Monitoring Program (CEMP) Air Sampling Network–Second Quarter CY2010

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). 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 only 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/m^3 (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/m^3 for the ease in comparison of data. The data for the environmental thermoluminescent dosimeter (TLD) is reported in milliroentgens (mR).

A summary of the second quarter CY2010 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 (CY2009) for comparison purposes. Overall the gross alpha results for the second quarter of CY2010 reflect similar values to previous quarters. These data remain consistent with the average CY2009 analyses used for comparison, especially when analytical error is considered. The second quarter CY2010 beta results are also consistent with previous results.

The second quarter gamma results for CY2010 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 and occasionally Lead (Pb)-210, both naturally occurring elements of the atmospheric and geologic environment, respectively. Overall, these data are consistent with previous analytical results.

The TLD results for the second quarter of CY2010 are shown in Table 4. Overall, the results display similar values to the previous quarters of the last calendar year. The 2009 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 second quarter shows consistent agreement with CY2009.

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 Second Quarter of Calendar Year 2010
(Average analytical error, +/– 0.0007)

Station	Minimum (pCi/m^3)	Maximum (pCi/m^3)	Average (pCi/m^3)	2009 Average (pCi/m^3)
Alamo	0.0006	0.0026	0.0014	0.0015
Amargosa	0.0004	0.0016	0.0010	0.0011
Beatty	0.0008	0.0023	0.0014	0.0012
Boulder City	0.0006	0.0017	0.0011	0.0011
Caliente	0.0008	0.0019	0.0014	0.0015
Cedar City	0.0005	0.0009	0.0007	0.0009
Delta	0.0005	0.0009	0.0007	0.0010
Duckwater	0.0005	0.0013	0.0009	0.0011
Ely	0.0007	0.0011	0.0009	0.0009
Garden Valley	0.0003	0.0015	0.0008	0.0009
Goldfield	0.0005	0.0016	0.0011	0.0010
Henderson	0.0007	0.0017	0.0011	0.0011
Indian Springs	0.0005	0.0017	0.0011	0.0009
Las Vegas	0.0007	0.0013	0.0010	0.0013
Mesquite	0.0008	0.0020	0.0012	0.0012
Milford	0.0007	0.0014	0.0011	0.0011
Nyala	0.0005	0.0012	0.0008	0.0007
Overton	0.0005	0.0017	0.0009	0.0014
Pahrump	0.0007	0.0034	0.0016	0.0009

Pioche	0.0004	0.0010	0.0009	0.0008
Rachel	0.0006	0.0011	0.0009	0.0009
Sarcobatus	0.0008	0.0040	0.0018	0.0016
St. George	0.0007	0.0012	0.0009	0.0010
Stone Cabin	0.0006	0.0014	0.0009	0.0008
Tecopa	0.0007	0.0016	0.0010	0.0011
Tonopah	0.0006	0.0012	0.0008	0.0011
Twin Springs	0.0005	0.0010	0.0007	0.0009

Table 2. Gross Beta Analytical Results for the Second Quarter of Calendar Year 2010.
(Average analytical error, +/– 0.003)

Station	Minimum (pCi/m^3)	Maximum (pCi/m^3)	Average (pCi/m^3)	2009 Average (pCi/m^3)
Alamo	0.012	0.020	0.014	0.021
Amargosa	0.014	0.019	0.015	0.021
Beatty	0.012	0.018	0.015	0.019
Boulder City	0.015	0.025	0.019	0.022
Caliente	0.013	0.021	0.016	0.022
Cedar City	0.012	0.019	0.014	0.018
Delta	0.010	0.018	0.013	0.021
Duckwater	0.011	0.018	0.014	0.019
Ely	0.011	0.020	0.014	0.018
Garden Valley	0.010	0.020	0.014	0.019
Goldfield	0.012	0.016	0.015	0.019
Henderson	0.014	0.019	0.016	0.021
Indian Springs	0.013	0.018	0.015	0.019
Las Vegas	0.012	0.018	0.014	0.021
Mesquite	0.013	0.020	0.016	0.023
Milford	0.012	0.018	0.015	0.022
Nyala	0.011	0.016	0.013	0.017
Overton	0.013	0.019	0.016	0.022
Pahrump	0.012	0.018	0.015	0.020

Pioche	0.010	0.015	0.012	0.018
Rachel	0.011	0.020	0.015	0.019
Sarcobatus	0.013	0.023	0.016	0.020
St. George	0.011	0.021	0.015	0.022
Stone Cabin	0.010	0.017	0.014	0.017
Tecopa	0.011	0.021	0.015	0.022
Tonopah	0.010	0.019	0.013	0.018
Twin Springs	0.010	0.017	0.013	0.019

Table 3. Gamma Spectroscopy Results for the Second Quarter of Calendar Year 2010.

Station	Cs-137 (pCi/sample)	Cs-137 (MDC)	Be-7 (pCi/m^3)	Pb-210 (pCi/m^3)
Alamo	0.0	8.2	0.111	0.017
Amargosa	3.0	11.0	0.117	N.D.
Beatty	-0.8	11.0	0.098	0.028
Boulder City	0.0	11.0	0.124	N.D.
Caliente	6.0	12.0	0.129	0.033
Cedar City	1.2	12.0	0.099	0.018
Delta	0.3	9.6	0.095	0.016
Duckwater	3.8	13.0	0.115	0.019
Ely	-0.5	8.3	0.104	0.017
Garden Valley	1.3	13.0	0.088	0.017
Goldfield	0.1	14.0	0.124	N.D.
Henderson	1.0	10.0	0.132	N.D.
Indian Springs	0.1	8.7	0.111	N.D.
Las Vegas	0.0	14.0	0.133	N.D.
Mesquite	3.6	11.0	0.134	0.029
Milford	5.9	8.5	0.082	0.027
Nyala	0.0	9.0	0.068	N.D.
Overton	-1.6	11.0	0.108	0.022
Pahrump	0.0	12.0	0.119	N.D.

Pioche	-2.0	10.0	0.074	N.D.
Rachel	2.1	11.0	0.131	N.D.
Sarcobatus	-1.6	12.0	0.123	N.D.
St. George	3.3	10.0	0.128	0.029
Stone Cabin	-0.1	6.5	0.117	N.D.
Tecopa	-0.1	8.9	0.139	0.021
Tonopah	-1.2	11.0	0.111	N.D.
Twin Springs	0.0	10.0	0.111	N.D.

MDC (minimum detectable concentration)
MDC Be-7 = 0.022 pCi/m^3 Pb-210 = 0.006 pCi/m^3 N.D. = not detected

Table 4. TLD Analytical Results for the Second Quarter of Calendar Year 2010

Station	Second Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2009 TLD Exposure (mR/yr)	2009 PIC Exposure (mR/yr)
Alamo	30	120	114	121
Amargosa	22	96	109	109
Beatty	31	124	140	150
Boulder City	23	86	101	134
Caliente	26	104	120	138
Cedar City	21	84	97	98
Delta	21	84	99	106
Duckwater	23	100	115	136
Ely	21	91	106	110
Garden Valley	34	148	149	158
Goldfield	27	108	124	133
Henderson	26	97	115	122
Indian Springs	20	87	101	100
Las Vegas	22	80	98	92
Medlins Ranch	30	120	136	151
Mesquite	23	86	101	103
Milford	33	133	145	154
Nyala	22	96	105	124
Overton	21	78	90	89
Pahrump	16	70	77	73

Pioche	25	100	114	122
Rachel	25	100	143	135
Sarcobatus	34	137	153	171
St. George	17	68	78	84
Stone Cabin	30	130	144	148
Tecopa	22	96	108	133
Tonopah	31	124	128	143
Twin Springs	32	141	160	171