

Quarterly Report of Analytical Results for the CEMP Air Sampling Network

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 provided to the station managers as a summary of the results from the analysis of the air samples they have collected 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 weekly basis with a target collection time of 168 hours (one week). The samplers are calibrated on a monthly basis by DRI to maintain a collection rate of 2.0 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.

The principle reporting unit used in the U.S. 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, which is then recalculated to microcuries per milliliter based on the information provided by the station managers as well as monthly calibration results. This is the notation used for DRI internal databases and annual reports to DOE/NNSA. For the ease in constructing the tables contained in this report, as well as to hopefully the ease of comparison among stations and previous results, the units of pCi/m^3 are used. The data for the environmental TLD is reported in milliroentgens (mR).

A summary of the fourth quarter CY2007 analytical results for gross alpha and beta analyses are found in Tables 1 and 2. These tables show the minimum, maximum, and average values for each of the stations of the air-sampling network. The last column shows the average annual value from the previous year (CY2006) for comparison purposes. Overall the gross alpha results for the fourth quarter of CY2007 reflect similar values to the previous quarters. These data remain consistent with the average CY2006 analyses used for comparison, especially when analytical error is considered. The fourth quarter CY2007 beta results are also consistent with previous results.

The fourth quarter gamma results for CY2007 are shown in Table 3. All of the samples are again 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 geological environment. Overall, these data are consistent with previous analytical results.

The TLD results for the fourth quarter of CY2007 are shown in Table 4. Overall, the results display similar values to the previous quarters of this calendar year. The 2006 PIC exposure rate and TLD data are also shown 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 CY2006.

Finally, as station managers, your input concerning the contents of these reports is welcome and encouraged. We are interested in anything you feel would be helpful for you to interpret the data or to enable you to explain the information to someone in your community not familiar with the program.

Table 1. Gross Alpha Analytical Results for the Fourth Quarter of Calendar Year 2007
(Average analytical error, +/- 0.0007)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2006 Average (pCi/m ³)
Alamo	0.0008	0.0051	0.0024	0.0016
Amargosa	0.0008	0.0024	0.0015	0.0012
Beatty	0.0007	0.0035	0.0017	0.0013
Boulder City	0.0014	0.0052	0.0028	0.0023
Caliente	0.0010	0.0039	0.0021	0.0017
Cedar City	0.0005	0.0027	0.0013	0.0011
Delta	0.0007	0.0022	0.0014	0.0011
Duckwater	0.0004	0.0016	0.0011	0.0028
Ely	0.0003	0.0021	0.0012	0.0009
Garden Valley	0.0007	0.0016	0.0012	0.0011
Goldfield	0.0003	0.0019	0.0012	0.0013
Henderson	0.0011	0.0039	0.0017	0.0011
Indian Springs	0.0003	0.0028	0.0012	0.0010
Las Vegas	0.0008	0.0057	0.0031	0.0025
Mesquite	0.0007	0.0053	0.0021	0.0012
Milford	0.0006	0.0033	0.0016	0.0012
Nyala	0.0005	0.0020	0.0011	0.0009
Overton	0.0003	0.0029	0.0015	0.0015
Pahrump	0.0008	0.0030	0.0016	0.0014

Pioche	0.0003	0.0026	0.0012	0.0010
Rachel	0.0006	0.0037	0.0016	0.0011
Sarcobatus	0.0007	0.0066	0.0025	0.0017
Tecopa	0.0005	0.0066	0.0017	0.0013
St. George	0.0009	0.0036	0.0018	0.0012
Stone Cabin	0.0005	0.0019	0.0011	0.0010
Tonopah	0.0006	0.0027	0.0014	0.0011
Twin Springs	0.0006	0.0023	0.0012	0.0010

Table 2. Gross Beta Analytical Results for the Fourth Quarter of Calendar Year 2007.
(Average analytical error, +/- 0.003)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2006 Average (pCi/m ³)
Alamo	0.013	0.035	0.025	0.022
Amargosa	0.016	0.032	0.028	0.022
Beatty	0.016	0.034	0.026	0.022
Boulder City	0.017	0.057	0.032	0.025
Caliente	0.017	0.037	0.027	0.024
Cedar City	0.010	0.033	0.022	0.020
Delta	0.013	0.044	0.028	0.022
Duckwater	0.012	0.036	0.023	0.028
Ely	0.013	0.028	0.021	0.020
Garden Valley	0.016	0.037	0.024	0.022
Goldfield	0.015	0.032	0.022	0.020
Henderson	0.015	0.045	0.028	0.022
Indian Springs	0.017	0.031	0.024	0.020
Las Vegas	0.014	0.046	0.030	0.025
Mesquite	0.014	0.053	0.032	0.024
Milford	0.013	0.042	0.030	0.024
Nyala	0.024	0.032	0.022	0.020
Overton	0.014	0.049	0.030	0.024
Pahrump	0.016	0.031	0.023	0.022

Pioche	0.011	0.032	0.022	0.020
Rachel	0.017	0.034	0.027	0.022
Sarcobatus	0.017	0.041	0.026	0.023
Tecopa	0.018	0.033	0.027	0.024
St. George	0.018	0.045	0.032	0.024
Stone Cabin	0.013	0.029	0.023	0.020
Tonopah	0.013	0.034	0.021	0.020
Twin Springs	0.014	0.038	0.025	0.021

Table 3. Gamma Spectroscopy Results for the Fourth Quarter of Calendar Year 2007.

Station	Cs-137 (pCi/sample)	Cs-137 (MDC)	Be-7 (pCi/m ³)	Pb-210 (pCi/m ³)
Alamo	0.4	10.0	0.076	0.023
Amargosa	0.8	11.0	0.113	0.020
Beatty	3.2	9.2	0.077	0.023
Boulder City	1.4	14.0	0.092	0.016
Caliente	1.9	7.2	0.072	N.D.
Cedar City	1.4	6.2	0.102	N.D.
Delta	0.6	8.6	0.075	0.019
Duckwater	-1.2	10.0	0.108	0.024
Ely	-0.5	13.0	0.057	0.018
Garden Valley	1.3	14.0	0.095	0.017
Goldfield	0.6	15.0	0.086	N.D.
Henderson	0.0	6.2	0.071	0.028
Indian Springs	-0.4	12.0	0.093	0.022
Las Vegas	-0.9	8.7	0.093	0.014
Mesquite	1.4	11.0	0.075	0.032
Milford	-1.6	10.0	0.086	0.025
Nyala	1.6	9.5	0.077	0.023
Overton	-0.1	6.7	0.081	N.D.
Pahrump	-0.9	10.0	0.081	0.019

Pioche	0.0	9.8	0.083	0.012
Rachel	1.4	6.1	0.095	N.D.
Sarcobatus	1.0	13.0	0.098	0.020
Tecopa	0.9	6.9	0.083	N.D.
St. George	1.4	10.0	0.078	0.025
Stone Cabin	0.8	8.6	0.067	0.022
Tonopah	1.4	11.0	0.100	0.020
Twin Springs	-0.5	6.5	0.075	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 2007

Station	Fourth Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2006 TLD Exposure (mR/yr)	2006 PIC Exposure (mR/yr)
Alamo	28	104	121	117
Amargosa	26	96	109	111
Beatty	34	127	142	137
Boulder City	24	89	108	132
Caliente	32	119	123	137
Cedar City	23	86	96	99
Delta	24	89	101	94
Duckwater	29	116	N.A.	126
Ely	23	87	115	98
Garden Valley	39	145	152	162
Goldfield	31	116	125	133
Henderson	29	107	145	132
Indian Springs	25	92	98	102
Las Vegas	23	86	103	93
Medlins Ranch	31	116	142	146
Mesquite	25	92	107	103
Milford	34	127	144	183
Nyala	26	98	112	117
Overton	21	77	95	89
Pahrump	18	66	78	72

Pioche	27	101	113	130
Rachel	33	123	134	137
Sarcobatus	38	140	154	154
Tecopa	28	103	113	132
St. George	20	74	89	82
Stone Cabin	33	133	140	151
Tonopah	31	116	132	140
Twin Springs	39	145	153	171
