

# 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 units used in the U.S. for the measurement of radioactivity in the atmospheric environment is pCi/m<sup>3</sup> (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<sup>3</sup> are used. The data for the environmental TLD is reported in milliroentgens (mR).

A summary of the fourth quarter CY2006 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 (CY2005) for comparison purposes. Overall the gross alpha results for the fourth quarter of CY2006 reflect similar values to the previous quarters. These data remain consistent with the average CY2005 analyses used for comparison, especially when analytical error is considered. The fourth quarter CY2006 beta results are also consistent with previous results.

The fourth quarter gamma results for CY2006 are shown in Tables 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 CY2006 are shown in Table 4. Overall, the results display similar values to the previous quarters of this calendar year. The 2005 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 CY2005.

Finally, as station managers, your input concerning the contents of these reports are 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 2006  
(Average analytical error, +/- 0.0007)

Station	Minimum (pCi/m <sup>3</sup> )	Maximum (pCi/m <sup>3</sup> )	Average (pCi/m <sup>3</sup> )	2005 Average (pCi/m <sup>3</sup> )
Alamo	0.0007	0.0025	0.0013	0.0026
Amargosa	0.0005	0.0020	0.0010	0.0017
Beatty	0.0005	0.0030	0.0014	0.0018
Boulder City	0.0011	0.0044	0.0024	0.0032
Caliente	0.0006	0.0032	0.0017	0.0024
Cedar City	0.0006	0.0023	0.0019	0.0021
Delta	0.0006	0.0025	0.0012	0.0016
Duckwater	0.0005	0.0014	0.0010	N.A.
Ely	0.0004	0.0016	0.0009	0.0014
Garden Valley	0.0006	0.0014	0.0010	0.0015
Goldfield	0.0004	0.0019	0.0009	0.0017
Henderson	0.0004	0.0018	0.0011	0.0016
Indian Springs	0.0007	0.0014	0.0009	0.0014
Las Vegas	0.0009	0.0041	0.0024	0.0026
Mesquite	0.0006	0.0017	0.0011	N.A.
Milford	0.0004	0.0020	0.0011	0.0016
Nyala	0.0005	0.0017	0.0009	0.0011
Overton	0.0005	0.0026	0.0013	0.0020
Pahrump	0.0006	0.0024	0.0013	0.0016

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Pioche	0.0006	0.0017	0.0009	0.0013
Rachel	0.0007	0.0014	0.0010	0.0016
Sarcobatus	0.0003	0.0030	0.0015	0.0028
Shoshone	0.0009	0.0014	0.0011	N.A.
St. George	0.0009	0.0022	0.0013	0.0016
Stone Cabin	0.0005	0.0013	0.0009	0.0014
Tonopah	0.0003	0.0013	0.0009	0.0015
Twin Springs	0.0005	0.0015	0.0010	0.0013

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Table 2. Gross Beta Analytical Results for the Fourth Quarter of Calendar Year 2006.  
(Average analytical error, +/- 0.003)

Station	Minimum (pCi/m <sup>3</sup> )	Maximum (pCi/m <sup>3</sup> )	Average (pCi/m <sup>3</sup> )	2005 Average (pCi/m <sup>3</sup> )
Alamo	0.015	0.045	0.025	0.022
Amargosa	0.019	0.040	0.025	0.022
Beatty	0.020	0.040	0.026	0.022
Boulder City	0.020	0.055	0.031	0.024
Caliente	0.019	0.045	0.028	0.022
Cedar City	0.013	0.034	0.022	0.020
Delta	0.014	0.058	0.028	0.022
Duckwater	0.018	0.035	0.028	N.A.
Ely	0.014	0.032	0.022	0.019
Garden Valley	0.016	0.034	0.025	0.020
Goldfield	0.015	0.033	0.022	0.021
Henderson	0.017	0.048	0.027	0.021
Indian Springs	0.017	0.033	0.023	0.020
Las Vegas	0.022	0.053	0.030	0.022
Mesquite	0.017	0.047	0.029	N.A.
Milford	0.012	0.050	0.029	0.022
Nyala	0.013	0.051	0.024	0.017
Overton	0.020	0.057	0.029	0.023
Pahrump	0.020	0.039	0.025	0.021

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Pioche	0.015	0.038	0.022	0.018
Rachel	0.019	0.038	0.026	0.021
Sarcobatus	0.017	0.038	0.025	0.023
Shoshone	0.022	0.061	0.031	N.A.
St. George	0.018	0.051	0.032	0.022
Stone Cabin	0.013	0.028	0.022	0.019
Tonopah	0.015	0.027	0.022	0.020
Twin Springs	0.013	0.051	0.027	0.020

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Table 3. Gamma Spectroscopy Results for the Fourth Quarter of Calendar Year 2006.

Station	Cs-137 (pCi/sample)	Cs-137 (MDC)	Be-7 (pCi/m <sup>3</sup> )	Pb-210 (pCi/m <sup>3</sup> )
Alamo	-5.9	15.0	0.079	0.023
Amargosa	5.4	17.0	0.079	0.021
Beatty	2.4	13.0	0.084	0.015
Boulder City	-3.6	14.0	0.042	N.D.
Caliente	1.4	14.0	0.067	0.023
Cedar City	2.6	20.0	0.059	0.017
Delta	-0.8	19.0	0.058	0.027
Duckwater	7.4	19.0	0.156	N.D.
Ely	3.0	19.0	0.082	0.017
Garden Valley	-2.6	13.0	0.082	0.013
Goldfield	-0.5	18.0	0.086	0.021
Henderson	-3.9	17.0	0.077	0.019
Indian Springs	-11.2	12.0	0.090	N.D.
Las Vegas	4.0	15.0	0.080	0.022
Mesquite	3.7	15.0	0.075	0.027
Milford	-1.3	15.0	0.043	N.D.
Nyala	-1.9	14.0	0.039	0.014
Overton	0.5	15.0	0.067	0.023
Pahrump	0.2	18.0	0.086	0.031

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Pioche	-7.2	16.0	0.079	N.D.
Rachel	6.1	20.0	0.096	0.015
Sarcobatus	-2.6	15.0	0.073	0.024
Shoshone	9.4	18.0	0.096	0.021
St. George	-0.4	18.0	0.085	N.D.
Stone Cabin	1.6	18.0	0.064	0.014
Tonopah	8.7	20.0	0.073	0.015
Twin Springs	0.2	18.0	0.069	0.024

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MDC Be-7 = 0.022 pCi/m<sup>3</sup> Pb-210 = 0.006 pCi/m<sup>3</sup> N.D. = not detected



Table 4. TLD Analytical Results for the Fourth Quarter of Calendar Year 2006

Station	Fourth Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2005 TLD Exposure (mR/yr)	2005 PIC Exposure (mR/yr)
Alamo	32	136	114	117
Amargosa	27	102	109	110
Beatty	35	144	143	147
Boulder City	26	114	111	130
Caliente	29	116	128	135
Cedar City	24	96	97	96
Delta	26	104	99	91
Ely	26	113	105	105
Garden Valley	40	159	149	148
Goldfield	31	127	126	126
Henderson	27	119	121	133
Indian Springs	25	94	106	100
Las Vegas	23	105	97	94
Medlins Ranch	38	154	137	145
Mesquite	26	116	N.A.	102
Milford	36	145	147	184
Nyala	28	114	116	114
Overton	24	107	93	87
Pahrump	21	79	82	59
Pioche	28	112	118	131

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Rachel	33	144	133	130
Sarcobatus	38	156	147	140
Shoshone	30	130	N.A.	N.A.
St. George	22	88	91	80
Stone Cabin	38	153	139	150
Tonopah	28	122	134	135
Twin Springs	42	169	155	168

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