

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 26 continuously operating environmental sampling stations. A total of 24 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/m³ (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/m³ are used.

A summary of the fourth quarter CY2005 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 (CY2004) for comparison purposes. Overall the gross alpha results for the fourth quarter of CY2005 reflect similar values to the previous quarters. These data remain consistent with the average CY2004 analyses used for comparison, especially when analytical error is considered. The fourth quarter CY2005 beta results are also consistent with previous results.

The fourth quarter gamma results for CY2005 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, 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 CY2005 are shown in Table 4. Overall, the results display similar values to the previous quarters of this calendar year. The 2004 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 CY2004.

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 2005
(Average analytical error, +/- 0.0007)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2004 Average (pCi/m ³)
Las Vegas	0.0008	0.0063	0.0037	0.0022
Henderson	0.0012	0.0031	0.0020	0.0016
Boulder City	0.0025	0.0076	0.0045	0.0030
Overton	0.0015	0.0030	0.0021	0.0019
St. George	0.0013	0.0033	0.0022	0.0015
Cedar City	0.0005	0.0029	0.0018	0.0025
Milford	0.0010	0.0047	0.0022	0.0017
Delta	0.0010	0.0052	0.0022	0.0015
Pioche	0.0006	0.0020	0.0014	0.0013
Caliente	0.0016	0.0060	0.0031	0.0022
Alamo	0.0012	0.0056	0.00325	0.0022
Rachel	0.0010	0.0061	0.0023	0.0017
Tonopah	0.0006	0.0039	0.0024	0.0015
Goldfield	0.0013	0.0039	0.0024	0.0014
Beatty	0.0010	0.0042	0.0022	0.0018
Indian Springs	0.0006	0.0034	0.0019	0.0014
Amargosa	0.0011	0.0038	0.0020	0.0023
Pahrump	0.0010	0.0027	0.0016	0.0017

Garden Valley	0.0012	0.0036	0.0019	0.0013
Nyala	0.0006	0.0019	0.0013	0.0011
Twin Springs	0.0009	0.0029	0.0017	0.0014
Stone Cabin	0.0011	0.0024	0.0018	0.0014
Ely	0.0002	0.0026	0.0016	0.0012
Sarcobatus	0.0010	0.0057	0.0031	0.0022

Table 2. Gross Beta Analytical Results for the Fourth Quarter of Calendar Year 2005.
(Average analytical error, +/- 0.003)

Station	Minimum (pCi/m ³)	Maximum (pCi/m ³)	Average (pCi/m ³)	2004 Average (pCi/m ³)
Las Vegas	0.017	0.043	0.029	0.022
Henderson	0.016	0.047	0.028	0.023
Boulder City	0.019	0.053	0.034	0.025
Overton	0.019	0.044	0.030	0.024
St. George	0.019	0.047	0.030	0.024
Cedar City	0.012	0.038	0.024	0.022
Milford	0.013	0.048	0.029	0.023
Delta	0.013	0.050	0.028	0.023
Pioche	0.013	0.029	0.022	0.019
Caliente	0.018	0.043	0.030	0.022
Alamo	0.018	0.048	0.029	0.021
Rachel	0.022	0.041	0.029	0.022
Tonopah	0.012	0.043	0.025	0.020
Goldfield	0.014	0.053	0.028	0.021
Beatty	0.020	0.048	0.028	0.022
Indian Springs	0.016	0.040	0.025	0.021
Amargosa	0.014	0.046	0.027	0.024
Pahrump	0.013	0.046	0.026	0.022

Garden Valley	0.016	0.037	0.025	0.020
Nyala	0.012	0.031	0.023	0.019
Twin Springs	0.016	0.039	0.027	0.022
Stone Cabin	0.014	0.030	0.022	0.020
Ely	0.012	0.029	0.022	0.019
Sarcobatus	0.021	0.054	0.032	0.025

Table 3. Gamma Spectroscopy Results for the Fourth Quarter of Calendar Year 2005.

Station	Cs-137 (pCi/sample)	Cs-137 (MDC)	Be-7 (pCi/m ³)	Pb-210 (pCi/m ³)
Las Vegas	1.8	14.0	0.081	N.D.
Henderson	1.5	13.0	0.090	N.D.
Boulder City	-3.8	15.0	0.085	N.D.
Overton	3.5	14.0	0.091	N.D.
St. George	3.5	20.0	0.077	N.D.
Cedar City	0.1	17.0	0.119	N.D.
Milford	2.1	20.0	0.095	N.D.
Delta	3.7	19.0	0.063	N.D.
Pioche	-1.5	14.0	0.073	N.D.
Caliente	2.1	20.0	0.072	N.D.
Alamo	-6.4	18.0	0.108	N.D.
Rachel	-2.8	12.0	0.113	N.D.
Tonopah	-4.0	20.0	0.096	N.D.
Goldfield	2.0	19.0	0.089	N.D.
Beatty	1.4	18.0	0.067	N.D.
Indian Springs	4.8	15.0	0.083	N.D.
Amargosa	1.2	15.0	0.090	N.D.
Pahrump	2.4	17.0	0.088	N.D.

Garden Valley	-4.8	17.0	0.070	N.D.
Nyala	1.7	19.0	0.041	N.D.
Twin Springs	5.6	15.0	0.057	N.D.
Stone Cabin	1.8	16.0	0.060	N.D.
Ely	0.3	16.0	0.083	N.D.
Sarcobatus	1.4	20.0	0.088	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 2005

Station	Fourth Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2004 TLD Exposure (mR/yr)	2004 PIC Exposure (mR/yr)
Las Vegas	23	85	100	95
Henderson	28	111	113	139
Boulder City	25	99	106	141
Overton	21	84	93	87
St. George	21	84	88	83
Cedar City	22	88	93	95
Milford	35	141	141	178
Delta	22	88	100	95
Pioche	26	104	114	133
Caliente	30	120	125	134
Alamo	27	108	115	115
Rachel	30	120	140	130
Tonopah	30	122	136	137
Goldfield	29	116	135	130
Beatty	34	157	145	148
Indian Springs	24	99	98	100
Amargosa	25	103	107	110
Pahrump	18	74	81	67
Medlins	31	133	141	146
Sarcobatus	35	141	155	151

Garden Valley	35	154	135	140
Nyala	25	107	114	113
Twin Springs	37	161	157	168
Stone Cabin	33	142	142	146
Ely	25	100	106	102
