

# 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 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 environmental monitoring program.

In general, the CEMP air sampling network is comprised of 24 continuously operating sampling stations. A total of 22 stations are equipped with a low volume air sampler/totalizer configuration to collect particulate radionuclides on glass fiber filter papers. Ideally, the samples are collected on a weekly basis with a target collection time of 168 hours. 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 at 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 the gamma analysis only after the gross alpha/beta analyses have been completed. As a result of the lag time, the gamma results are for the second quarter of CY2002, while the rest of the results are for the third quarter.

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 data bases and annual reports to DOE. For the ease in constructing the tables contained in this report, as well as hopefully the ease of comparison among stations and previous results, the units of pCi/m<sup>3</sup> are used.

A summary of the second quarter CY2002 analytical results for gross alpha and beta 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 an average annual value from previous years (in this case CY2000) for comparison purposes. Overall the gross alpha results for the second quarter of CY2002 appear to reflect similar values to the previous quarter. These data remain consistent with the average CY2000 analyses used for comparison, especially when analytical error is considered. The second quarter CY2002 beta results are also consistent with the previous quarter.

The first quarter gamma results for CY2002 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 radiological elements of our atmospheric and geologic environment. Overall, these data are consistent with previous analytical results.

The TLD results for the second quarter of CY2002 are shown in Table 4. Overall, the past results have revealed a steady decrease each quarter since CY2000. This quarter reflects values which are mostly indistinguishable from the previous quarter. The 2001 PIC exposure rate is also shown for comparison. As with historical data, the TLD's are lower than the PIC results. As previously noted, this is due to the differences in the two techniques of gamma detection.

Finally, as station managers, your input on 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 Second Quarter of Calendar Year 2002  
(Average analytical error, +/- 0.0007)

Station	Minimum (pCi/m <sup>3</sup> )	Maximum (pCi/m <sup>3</sup> )	Average (pCi/m <sup>3</sup> )	2000 Average (pCi/m <sup>3</sup> )
Las Vegas	0.0010	0.0035	0.0020	0.0028
Henderson	0.0012	0.0032	0.0017	0.0027
Boulder City	0.0015	0.0048	0.0024	0.0036
Overton	0.0010	0.0044	0.0016	0.0029
St. George	0.0012	0.0025	0.0023	0.0026
Cedar City	0.0011	0.0042	0.0015	0.0038
Milford	0.0010	0.0030	0.0024	0.0023
Delta	0.0006	0.0014	0.0011	0.0022
Pioche	0.0007	0.0018	0.0013	0.0022
Caliente	0.0010	0.0028	0.0016	0.0025
Alamo	0.0010	0.0041	0.0022	0.0032
Rachel	0.0009	0.0027	0.0015	0.0029
Tonopah	0.0008	0.0019	0.0013	0.0023
Goldfield	0.0009	0.0022	0.0015	0.0026
Beatty	0.0008	0.0035	0.0018	0.0028
Indian Springs	0.0009	0.0031	0.0017	0.0021
Amargosa	0.0010	0.0061	0.0031	0.0031
Pahrump	0.0011	0.0024	0.0017	0.0022

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Garden Valley	0.0009	0.0016	0.0013	---
Nyala	0.0009	0.0022	0.0013	---
Twin Springs	0.0009	0.0031	0.0015	---
Stone Cabin	0.0016	0.0042	0.0030	---

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Table 2. Gross Beta Analytical Results for the Second Quarter of Calendar Year 2002.  
(Average analytical error, +/- 0.003)

Station	Minimum (pCi/m <sup>3</sup> )	Maximum (pCi/m <sup>3</sup> )	Average (pCi/m <sup>3</sup> )	2000 Average (pCi/m <sup>3</sup> )
Las Vegas	0.017	0.028	0.022	0.025
Henderson	0.016	0.033	0.023	0.024
Boulder City	0.018	0.034	0.024	0.027
Overton	0.017	0.032	0.024	0.026
St. George	0.018	0.029	0.023	0.025
Cedar City	0.015	0.028	0.021	0.024
Milford	0.014	0.028	0.020	0.024
Delta	0.015	0.023	0.020	0.025
Pioche	0.014	0.027	0.020	0.022
Caliente	0.016	0.032	0.023	0.025
Alamo	0.014	0.031	0.021	0.025
Rachel	0.016	0.033	0.021	0.025
Tonopah	0.014	0.025	0.019	0.024
Goldfield	0.014	0.030	0.020	0.024
Beatty	0.016	0.034	0.022	0.024
Indian Springs	0.018	0.031	0.023	0.022
Amargosa	0.016	0.039	0.024	0.025
Pahrump	0.017	0.033	0.023	0.023

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Garden Valley	0.018	0.024	0.020	---
Nyala	0.014	0.024	0.019	---
Twin Springs	0.016	0.029	0.021	---
Stone Cabin	0.018	0.031	0.023	---

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Table 3. Gamma Spectroscopy Results for the First Quarter of Calendar Year 2002.

Station	Cs-137 (pCi/sample)	Cs-137 (MDC)	Be-7 (pCi/m <sup>3</sup> )	Pb-210 (pCi/m <sup>3</sup> )
Las Vegas	3.1	8.7	0.086	0.031
Henderson	2.1	9.4	0.082	0.032
Boulder City	0.7	8.3	0.065	0.031
Overton	-0.7	7.6	0.055	N.D.
St. George	0.0	8.4	0.079	0.033
Cedar City	-4.9	13.0	0.083	0.022
Milford	-1.6	7.5	0.065	0.032
Delta	3.4	8.9	0.060	N.D.
Pioche	1.6	8.3	0.084	0.019
Caliente	-8.5	12.0	0.068	0.030
Alamo	-1.6	8.6	0.074	0.027
Rachel	-2.3	8.0	0.092	N.D.
Tonopah	1.1	9.0	0.076	0.022
Goldfield	-4.3	8.0	0.060	0.036
Beatty	3.4	10.0	0.086	0.033
Indian Springs	-11.0	10.0	0.067	0.026
Amargosa	2.5	9.5	0.075	0.020
Pahrump	1.2	7.9	0.061	0.020

Garden Valley	-1.5	13.0	0.065	0.029
Nyala	-1.2	9.1	0.049	N.D.
Twin Springs	3.6	8.9	0.071	N.D.
Stone Cabin	0.2	8.3	0.061	N.D.

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 Second Quarter of Calendar Year 2002.

Station	Second Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2000 TLD Exposure (mR/yr)	2001 PIC Exposure (mR/yr)
Las Vegas	19	71	55	97
Henderson	25	92	82	131
Boulder City	23	85	73	121
Overton	20	74	60	88
St. George	19	76	51	75
Cedar City	23	92	63	86
Milford	33	133	112	153
Delta	24	96	75	103
Pioche	26	104	72	104
Caliente	31	125	82	145
Alamo	23	92	71	109
Rachel	33	133	98	133
Tonopah	34	138	102	147
Goldfield	34	137	83	129
Beatty	38	153	111	153
Indian Springs	21	75	66	90
Amargosa	25	89	71	108
Pahrump	18	64	45	71
Medlins	35	141	103	135
Sarcobatus	37	149	106	148

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Garden Valley	30	112	---
Nyala	25	94	---
Twin Springs	35	129	---
Stone Cabin	33	123	---

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