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Analytical Results for the Community Environmental Monitoring Program (CEMP) Air Sampling and Dosimeter Network: Second Quarter CY2024

Prepared by

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Submitted to

Nevada Field Office
National Nuclear Security Administration
U.S. Department of Energy
Las Vegas, Nevada

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The Community Environmental Monitoring Program (CEMP) air sampling network is designed to monitor and collect radioactive airborne particles from Nevada National Security Site (NNSS) and non-NNSS activities, as well as background environmental sources. This report compiled by Desert Research Institute (DRI) summarizes the results from the analysis of air samples collected by CEMP station managers.

The CEMP air sampling network is comprised of 24 continuously operating environmental sampling stations. A total of 23 stations are equipped with a low-volume air sampler/totalizer configuration to collect particulate radionuclides on glass-fiber filter paper. Prior to October 1, 2013, all air samples were collected every two weeks with a target collection time of 336 hours. After October 1, 2013, approximately half of the stations were converted to "standby status," which means only one two-week sample was collected and analyzed each quarter during the year.

Beginning on October 1, 2017, all CEMP stations resumed full-time operation with samples being collected every two weeks. Currently, the procedure is to submit one set of samples per quarter for analysis. The remaining samples are archived to be accessed if needed. This protocol will be followed unless an important event were to occur on or off the NNSS (e.g., major fires, a transportation incident, or an unusual result). Archived samples would be used to assess conditions before and after an event. The samplers are calibrated on a quarterly basis by DRI to maintain a collection rate of 1.75 cubic feet per minute at standard temperature and pressure (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) is recorded by the station managers. This allows for proper interpretation of the analytical results.

An accredited commercial laboratory analyzes the air filters for gross alpha/beta activity and uses high-resolution gamma spectrometry to detect the following isotopes:

- Actinium-228 (Ra-228)
- Americium-241
- Antimony-124
- Beryllium-7
- Bismuth-212
- Bismuth-214 (Ra-226)
- Cesium-134
- Cesium-137
- Cobalt-60
- Iridium-192
- Lead-212
- Lead-214
- Potassium-40
- Scandium-46
- Thallium-208
- Thorium-234 (U-238)
- Uranium-235

Table 1 contains the gamma results for the second quarter of calendar year (CY) 2024 for the analytes americium-241, cesium-134, cesium-137, cobalt-60, and uranium-235. The results for americium-241, cesium-134, cesium-137, cobalt-60, and uranium-235 were all below the minimum detectable activity for all samples. Table 2 summarizes the gross alpha/beta results for the second quarter of CY2024. The average annual values for the previous year are provided for comparison. Table 3 shows the environmental dosimeter results for the second quarter of CY2024. The dosimeter results are reported in milliroentgens (mR). The pressurized ion chamber (PIC) exposure rate and dosimeter data from the previous year are also provided for comparison. Dosimeter values are commonly lower than the PIC results because the PIC offers greater sensitivity.

Table 1. Gamma spectrometry results for select analytes for the second quarter of CY2024. Data represent one analysis per quarter.

Station	Americium-241 ($\times 10^{-15}$ µCi/mL)	Cesium-134 ($\times 10^{-15}$ µCi/mL)	Cesium-137 ($\times 10^{-15}$ µCi/mL)	Cobalt-60 ($\times 10^{-15}$ µCi/mL)	Uranium-235 ($\times 10^{-15}$ µCi/mL)
Alamo	below MDA	below MDA	below MDA	below MDA	below MDA
Amargosa Valley	below MDA	below MDA	below MDA	below MDA	below MDA
Beatty	below MDA	below MDA	below MDA	below MDA	below MDA
Boulder City	below MDA	below MDA	below MDA	below MDA	below MDA
Caliente	below MDA	below MDA	below MDA	below MDA	below MDA
Cedar City	below MDA	below MDA	below MDA	below MDA	below MDA
Delta	below MDA	below MDA	below MDA	below MDA	below MDA
Duckwater	below MDA	below MDA	below MDA	below MDA	below MDA
Ely	below MDA	below MDA	below MDA	below MDA	below MDA
Goldfield	below MDA	below MDA	below MDA	below MDA	below MDA
Henderson	below MDA	below MDA	below MDA	below MDA	below MDA
Indian Springs	below MDA	below MDA	below MDA	below MDA	below MDA
Las Vegas	below MDA	below MDA	below MDA	below MDA	below MDA
Mesquite	below MDA	below MDA	below MDA	below MDA	below MDA
Milford	below MDA	below MDA	below MDA	below MDA	below MDA
Overton	below MDA	below MDA	below MDA	below MDA	below MDA
Pahrump	below MDA	below MDA	below MDA	below MDA	below MDA
Pioche	below MDA	below MDA	below MDA	below MDA	below MDA
Rachel	below MDA	below MDA	below MDA	below MDA	below MDA
Sarcobatus Flat	below MDA	below MDA	below MDA	below MDA	below MDA
St. George	below MDA	below MDA	below MDA	below MDA	below MDA
Tecopa	below MDA	below MDA	below MDA	below MDA	below MDA
Tonopah	below MDA	below MDA	below MDA	below MDA	below MDA

MDA = minimum detectable activity

Table 2. Gross alpha/beta results for the second quarter of CY2024. Data represents one analysis per quarter.

Station	Gross Alpha ($\times 10^{-15}$ µCi/mL)	2023 Average ($\times 10^{-15}$ µCi/mL)	Gross Beta ($\times 10^{-14}$ µCi/mL)	2023 Average ($\times 10^{-14}$ µCi/mL)
Alamo	2.26	4.03	0.93	1.16
Amargosa Valley	3.19	5.01	1.16	1.05
Beatty	2.55	4.58	0.86	1.24
Boulder City	3.14	6.60	1.21	1.58
Caliente	2.24	4.76	0.87	1.10
Cedar City	2.25	5.07	0.82	1.23
Delta	2.17	4.14	0.78	1.18
Duckwater	2.27	5.20	0.87	1.25
Ely	2.39	4.64	0.87	1.08
Goldfield	2.45	6.46	0.79	1.20
Henderson	2.14	5.62	0.94	1.27
Indian Springs	3.43	5.46	1.00	1.17
Las Vegas	3.44	8.34	1.05	1.19
Mesquite	2.26	4.95	0.85	1.27
Milford	1.92	4.90	0.89	1.27
Overton	2.80	5.32	0.88	1.39
Pahrump	2.80	5.73	1.01	1.48
Pioche	2.17	7.81	0.91	1.34
Rachel	2.25	4.49	0.79	1.21
Sarcobatus Flat	2.29	5.98	1.01	1.37
St. George	2.68	6.72	0.85	1.57
Tecopa	2.72	5.64	0.92	1.30
Tonopah	1.92	5.07	0.92	1.13

Table 3. Dosimeter results for the second quarter of CY2024.

Station	Second Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2023 Exposure (mR/yr)	2023 PIC Exposure (mR/yr)
Alamo	16	71	66	110
Amargosa Valley	11	56	65	99
Beatty	28	123	102	141
Boulder City	18	67	66	125
Caliente	21	91	84	144
Cedar City	12	54	43	109
Delta	10	39	44	107
Duckwater	20	80	76	132
Ely	11	44	47	99
Goldfield	17	73	81	132
Henderson	21	77	80	124
Indian Springs	9	46	48	96
Las Vegas	22	82	85	99
Mesquite	13	57	61	99
Milford	26	104	97	159
Overton	9	33	28	94
Pahrump	1	5	24	73
Pioche	21	90	73	132
Rachel	21	91	80	133
Sarcobatus Flat	23	101	95	143
St. George	15	66	65	120
Tecopa	7	35	59	114
Tonopah	26	114	104	138