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***Analytical Results for the Community
Environmental Monitoring Program (CEMP)
Air Sampling and Dosimeter Network:
Fourth Quarter CY2023***

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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 fourth quarter of calendar year (CY) 2023 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 fourth quarter of CY2023. The average annual values for the previous year are provided for comparison.

Table 3 shows the environmental dosimeter results for the fourth quarter of CY2023. 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 fourth quarter of CY2023. Data represent one analysis per quarter.

Station	Americium-241 ($\times 10^{-15}$ $\mu\text{Ci/mL}$)	Cesium-134 ($\times 10^{-15}$ $\mu\text{Ci/mL}$)	Cesium-137 ($\times 10^{-15}$ $\mu\text{Ci/mL}$)	Cobalt-60 ($\times 10^{-15}$ $\mu\text{Ci/mL}$)	Uranium-235 ($\times 10^{-15}$ $\mu\text{Ci/mL}$)
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 fourth quarter of CY2023. Data represent one analysis per quarter.

Station	Gross Alpha ($\times 10^{-15}$ $\mu\text{Ci/mL}$)	2022 Average ($\times 10^{-15}$ $\mu\text{Ci/mL}$)	Gross Beta ($\times 10^{-14}$ $\mu\text{Ci/mL}$)	2022 Average ($\times 10^{-14}$ $\mu\text{Ci/mL}$)
Alamo	3.61	6.72	1.32	1.34
Amargosa Valley	5.82	7.79	1.50	1.35
Beatty	4.70	9.09	1.30	1.44
Boulder City	6.80	10.02	1.81	1.55
Caliente	5.01	13.13	1.49	1.69
Cedar City	5.17	8.93	1.63	1.45
Delta	3.89	10.92	1.48	1.77
Duckwater	3.75	8.69	1.20	1.35
Ely	3.60	7.15	1.24	1.11
Goldfield	3.64	8.34	1.26	1.38
Henderson	4.84	10.31	1.38	1.63
Indian Springs	3.90	8.73	1.41	1.40
Las Vegas	3.26	17.40	1.43	1.54
Mesquite	5.36	8.85	1.70	1.66
Milford	4.03	10.95	1.66	1.79
Overton	5.16	8.24	1.66	1.65
Pahrump	4.68	12.38	1.62	1.48
Pioche	6.77	9.04	1.86	1.41
Rachel	4.27	7.30	1.32	1.40
Sarcobatus Flat	4.23	8.90	1.48	1.56
St. George	7.39	9.07	2.13	1.81
Tecopa	4.54	8.88	1.39	1.73
Tonopah	3.00	11.18	0.99	1.50

Table 3. Dosimeter results for the fourth quarter of CY2023.

Station	Fourth Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2022 Exposure (mR/yr)	2022 PIC Exposure (mR/yr)
Alamo	22	82	65	113
Amargosa Valley	12	58	64	102
Beatty	30	109	112	143
Boulder City	15	65	66	131
Caliente	21	83	81	136
Cedar City	12	48	56	117
Delta	12	44	56	113
Duckwater	22	82	80	134
Ely	14	51	53	104
Goldfield	20	75	90	138
Henderson	17	72	76	122
Indian Springs	10	45	52	98
Las Vegas	17	79	62	93
Mesquite	15	61	50	101
Milford	29	107	115	166
Overton	7	32	28	96
Pahrump	7	34	25	74
Pioche	20	80	90	136
Rachel	25	93	102	136
Sarcobatus Flat	24	89	109	146
St. George	17	68	76	122
Tecopa	10	47	64	109
Tonopah	27	97	96	140