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

Prepared by
John Goreham

Division of Hydrologic Sciences
Desert Research Institute
Las Vegas, Nevada

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

At approximately 3:00 p.m. on Thursday, August 22, 2024, smoke was reported in a remote area of the NNSS. NNSS Fire & Rescue responded and confirmed that a wildland fire was burning in the northern section of the site.

The fire (dubbed the “Ribbon Fire”) burned through two contaminated areas. Radiological exposure from the fire was determined to be well within acceptable bounds and no immediate threat to public health or safety was identified.

The fire was 100% contained on August 25, 2024. Approximately 7,970 acres burned. NNSS stated that no structures were damaged by the fire and no injuries were sustained by any NNSS personnel. Surveys conducted by Radiological Control Technicians of the two burned contaminated areas revealed no negative findings.

At the beginning of every calendar year, the CEMP Quality Assurance (QA) Officer generates an air filter collection schedule for the entire forthcoming year based on a two-week collection schedule. This schedule is then disseminated to the Community Environmental Monitors (CEMs) responsible for installing and collecting the air filters at their stations. The collection dates for August were slated for the 11th and 25th. After discussion with DOE regarding the Ribbon Fire, it was decided that both the August 11th and 25th “batches” would be submitted for radiological analysis (rather than one batch for the quarter) in the interest of capturing radiological results both preceding and during the fire.

Tables 1 and 2 contain the gamma results for the August 11th and 25th collection dates, respectively, for the analytes americium-241, cesium-134, cesium-137, cobalt-60, and uranium-235. The results for these radionuclides were all below the minimum detectable activity for all samples from both the August 11th and 25th collection dates.

Tables 3 and 4 summarize the gross alpha/beta results for the August 11th and 25th collection dates, respectively. The average annual values for the previous year are provided for comparison. Gross alpha/beta results for all samples from both the August 11th and 25th collection dates are consistent with previous results; none of the results from the August 25th collection date were elevated with respect to previously analyzed samples.

Table 5 shows the environmental dosimeter results for the third 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 from filters collected on or near August 11th of CY2024. These filters were in use and collected prior to the Ribbon Fire.

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. Gamma spectrometry results for select analytes from filters collected on or near August 25th of CY2024. These filters were in use at CEMP stations during the Ribbon Fire.

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 3. Gross alpha/beta results from filters collected on or near August 11th of CY2024. These filters were in use and collected prior to the Ribbon Fire.

Station	Gross Alpha ($\times 10^{-15}$ $\mu\text{Ci}/\text{mL}$)	2023 Average ($\times 10^{-15}$ $\mu\text{Ci}/\text{mL}$)	Gross Beta ($\times 10^{-14}$ $\mu\text{Ci}/\text{mL}$)	2023 Average ($\times 10^{-14}$ $\mu\text{Ci}/\text{mL}$)
Alamo	4.24	4.03	1.53	1.16
Amargosa Valley	4.56	5.01	1.69	1.05
Beatty	4.09	4.58	1.53	1.24
Boulder City	4.35	6.60	1.75	1.58
Caliente	3.00	4.76	1.26	1.10
Cedar City	2.45	5.07	1.15	1.23
Delta	3.59	4.14	1.47	1.18
Duckwater	4.06	5.20	1.35	1.25
Ely	4.77	4.64	1.45	1.08
Goldfield	4.73	6.46	1.44	1.20
Henderson	3.62	5.62	1.52	1.27
Indian Springs	5.02	5.46	1.75	1.17
Las Vegas	3.49	8.34	1.51	1.19
Mesquite	3.34	4.95	1.37	1.27
Milford	4.30	4.90	1.43	1.27
Overton	3.96	5.32	1.24	1.39
Pahrump	5.10	5.73	1.56	1.48
Pioche	4.00	7.81	1.60	1.34
Rachel	3.52	4.49	1.42	1.21
Sarcobatus Flat	5.24	5.98	1.55	1.37
St. George	3.37	6.72	1.64	1.57
Tecopa	4.48	5.64	1.64	1.30
Tonopah	3.86	5.07	1.32	1.13

Table 4. Gross alpha/beta results from filters collected on or near August 25th of the third quarter of CY2024. These filters were in use at CEMP stations during the Ribbon Fire.

Station	Gross Alpha ($\times 10^{-15}$ $\mu\text{Ci}/\text{mL}$)	2023 Average ($\times 10^{-15}$ $\mu\text{Ci}/\text{mL}$)	Gross Beta ($\times 10^{-14}$ $\mu\text{Ci}/\text{mL}$)	2023 Average ($\times 10^{-14}$ $\mu\text{Ci}/\text{mL}$)
Alamo	2.80	4.03	1.17	1.16
Amargosa Valley	1.92	5.01	0.98	1.05
Beatty	2.03	4.58	0.90	1.24
Boulder City	2.39	6.60	1.24	1.58
Caliente	2.17	4.76	1.10	1.10
Cedar City	2.01	5.07	0.99	1.23
Delta	1.80	4.14	1.04	1.18
Duckwater	1.38	5.20	0.83	1.25
Ely	2.17	4.64	1.08	1.08
Goldfield	2.64	6.46	1.00	1.20
Henderson	1.47	5.62	1.01	1.27
Indian Springs	2.02	5.46	1.03	1.17
Las Vegas	2.53	8.34	1.15	1.19
Mesquite	2.05	4.95	0.99	1.27
Milford	2.57	4.90	1.10	1.27
Overton	2.30	5.32	1.09	1.39
Pahrump	2.27	5.73	1.09	1.48
Pioche	2.34	7.81	1.08	1.34
Rachel	2.39	4.49	0.88	1.21
Sarcobatus Flat	1.73	5.98	0.99	1.37
St. George	2.66	6.72	1.17	1.57
Tecopa	2.83	5.64	1.20	1.30
Tonopah	2.14	5.07	0.88	1.13

Table 5. Dosimeter results for the third quarter of CY2024.

Station	Third Quarter Exposure (mR)	Est. Annual Exposure (mR/yr)	2023 Exposure (mR/yr)	2023 PIC Exposure (mR/yr)
Alamo	17	56	66	110
Amargosa Valley	19	72	65	99
Beatty	31	104	102	141
Boulder City	13	62	66	125
Caliente	24	73	84	144
Cedar City	7	22	43	109
Delta	6	21	44	107
Duckwater	15	55	76	132
Ely	13	48	47	99
Goldfield	23	76	81	132
Henderson	19	87	80	124
Indian Springs	14	53	48	96
Las Vegas	15	70	85	99
Mesquite	16	49	61	99
Milford	26	94	97	159
Overton	8	36	28	94
Pahrump	7	27	24	73
Pioche	18	55	73	132
Rachel	32	105	80	133
Sarcobatus Flat	31	101	95	143
St. George	19	58	65	120
Tecopa	21	81	59	114
Tonopah	32	105	104	138