Quarterly Report

Calendar Year 2024 – First Quarter, January 1 – March 31, 2024

Prepared by:

Carlsbad Environmental Monitoring & Research Center
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Field Programs - Radiation Safety Group

WIPP Underground Effluent Monitoring (Station A and Station B)

From January 1st to March 31st, a total of 130 filters from the primary skid at Station A, of which 106 were sample filters, 12 were trip blanks and 12 were filter blanks, were collected. In addition, 131 filters were collected from the backup skid at Station A (107 sample filters, 12 trip blank filters and 12 filter blanks). One hundred and fourteen filters were collected from the primary skid at Station B, (90 sample filters, 12 trip blanks and 12 filter blanks). One hundred and thirteen filters were collected from Station B backup (89 sample filters, 12 trip blanks and 12 filter blanks), during the same time period.

All 130 filters from the primary skid at Station A have been processed (gravimetrics, sample flow volume, and mass concentration have been calculated in the Field Programs (FP) data package) and transferred to the Radiochemistry group (RC). All except for the last two weeks of the Station A backup filters have been processed and transferred to the Environmental Chemistry group (EC). All 114 filters from the primary Station B skid have been processed and transferred to RC. The last 2 weeks of Station B backup filters have not been transferred to EC yet.

Ambient Air Sampling

From January 1st to March 31st, 18 ambient air samples were collected from the six perimeter and regional continuous sampling stations (On-Site, Near Field, Cactus Flats, WIPP East, Carlsbad, and Loving) using a high-volume sampler (HiVol). All filter samples have been processed (gravimetrics, total air flow values, and notes of any irregularities) by FP and transferred to RC.

Subtask - Non-Radiological analyses

Six Whatman-41 filters and 3 trip blank filters were collected from January 1st to March 31st, from the 2 sampling sites (Near Field, Cactus Flats) using a high-volume sampler. All filter samples have been processed (total air flow values and notes of any irregularities) by FP and transferred to EC.

Soil sampling

The remaining 2023 soil samples were processed and transferred to RC.

Surface Water Monitoring

No activity to report this quarter.

Drinking Water Monitoring

No activity to report this quarter.

Sediment Monitoring

The 2023 sediment samples are currently being dried and will be transferred to the RC group shortly.

Nuclear Materials Management and Safeguards

From January 1st to March 31st the Radiation Safety group (RS) has collected and bulked radioactive waste from NMSU, LANL, and the WIPP Labs groups working in the CEMRC facility. Radiation Safety (RS) has performed monthly surveys of all laboratories where radioactive materials are present, including smears and dose rate measurements. All fume hoods are face-velocity checked quarterly. The date of the last inspection was March 21, 2024. Several survey instruments have been sent to Ludlum Corporation for calibration.

Radiochemistry Group

WIPP Underground Effluent Monitoring (Station A and Station B)

Gross alpha and beta activities on individual filters collected from station A, taken immediately before, and Station B, taken after the high-efficiency particulate air (HEPA) filtration, were counted using a low-background gas proportional counter (Protean Instruments) for 1200 minutes (20 hours). The analysis of all filters from Station A and Station B has been completed through the third week of April 2024. The complete results for gross alpha and gross beta counts on FAS filters from Station A and Station B through April 2024 will be submitted to CBFO by May 14, 2024.

Between January 1st and March 31st, 2024, the total number of radiochemical samples processed includes the following:

- Alpha radiation emitting isotopes (^{241}Am, ^{238}Pu, $^{239+240}$Pu, ^{234}U, ^{235}U, and ^{238}U)
    - Airborne particulate (HiVol) – 16 samples
- Beta radiation emitting isotope (^{90}Sr)
    - Airborne particulate (HiVol) – 84 samples
    - MAPEP – 3 samples
- Gamma radiation emitting isotopes (^{60}Co, ^{137}Cs, and ^{40}K)
    - Airborne particulate (HiVol) – 68 samples

The analysis of all Year 2022 samples was completed, and the results were incorporated into the 2022 CEMRC Annual Report Draft.

Characteristic results are included in the following tables.

Mirion personnel visited CEMRC on March 19-21, 2024, to address the main issues with the alpha radiation detectors. Currently, only Rack 1 of the alpha radiation detectors is available (36 detectors). Most likely, the multichannel analyzer (MCA) of Rack 2 is causing the problem. A replacement MCA was shipped and will be installed during the next Mirion personnel visit to CEMRC that will hopefully resolve the equipment problems. Issues related to both the alpha and gamma detector controlling computers and software controlling the alpha and gamma radiation detectors persist and will have to be addressed. We have received quotes for updating the software controlling the gamma radiation detectors. Ideally, the older gamma radiation detectors 1 and 2 should be replaced as well.

Activity concentrations of $^{239+240}$Pu at Onsite Station

Radionuclide	Sample Date 2022	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
$^{239+240}$Pu	Feb. 2 – Mar. 2	1.31E-10	7.85E-10	2.08E-09	Not Detected
	Mar. 2 – Mar. 16	-9.10E-10	3.86E-09	1.07E-08	Not Detected
	Mar. 16 – Mar. 30	1.80E-09	2.02E-09	4.23E-09	Not Detected
	Mar. 30 - Apr. 13	4.14E-09	2.17E-09	3.39E-09	Detected
	Apr. 13 - Apr. 29	2.43E-09	1.51E-09	2.49E-09	Not Detected
	Apr. 29 – May 18	5.48E-09	3.40E-09	5.61E-09	Not Detected
	May 18 – Jun. 3	3.91E-09	2.05E-09	2.96E-09	Detected
	Jun. 3 – Jun. 15	6.08E-09	3.28E-09	5.20E-09	Detected
	Jun. 15 – Jun. 29	2.92E-09	1.95E-09	3.43E-09	Not Detected
	Jun. 29 – July 22	4.88E-09	2.57E-09	2.24E-09	Detected
	July 22 -Aug. 17	1.55E-09	9.13E-10	1.24E-09	Detected
	Aug. 17 – Oct. 3	1.10E-09	5.61E-10	4.77E-10	Detected
	Oct. 3 – Nov. 4	1.55E-09	1.00E-09	1.63E-09	Not Detected
	Nov. 4 – Dec. 9	8.45E-10	5.19E-10	7.25E-10	Detected
	Dec. 9 – Jan. 6	8.87E-10	9.10E-10	1.89E-09	Not Detected

Activity concentrations of ^{238}Pu at Onsite Station

Radionuclide	Sample Date 2022	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}Pu	Feb. 2 – Mar. 2	6.54E-10	8.71E-10	1.85E-09	Not Detected
	Mar. 2 – Mar. 16	-1.37E-09	3.29E-09	9.70E-09	Not Detected
	Mar. 16 – Mar. 30	2.02E-09	2.26E-09	4.78E-09	Not Detected
	Mar. 30 - Apr. 13	7.20E-10	1.61E-09	3.84E-09	Not Detected
	Apr. 13 - Apr. 29	2.29E-09	1.48E-09	2.49E-09	Not Detected
	Apr. 29 – May 18	6.45E-10	1.82E-09	4.55E-09	Not Detected
	May 18 – Jun. 3	9.32E-10	1.79E-09	4.18E-09	Not Detected
	Jun. 3 – Jun. 15	4.97E-09	3.86E-09	7.78E-09	Not Detected
	Jun. 15 – Jun. 29	1.09E-09	1.72E-09	3.89E-09	Not Detected
	Jun. 29 – July 22	4.27E-09	2.41E-09	2.24E-09	Detected
	July 22 -Aug. 17	1.55E-09	1.04E-09	1.80E-09	Not Detected
	Aug. 17 – Oct. 3	1.10E-09	5.76E-10	6.02E-10	Detected
	Oct. 3 – Nov. 4	2.06E-10	9.67E-10	2.42E-09	Not Detected
	Nov. 4 – Dec. 9	2.11E-09	8.21E-10	9.57E-10	Detected
	Dec. 9 – Jan. 6	1.42E-09	9.17E-10	1.55E-09	Not Detected

Activity concentrations of $^{239+240}$Pu at Near Field Station

Radionuclides	Sample Date 2022	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
$^{239+240}$Pu	Feb. 2 – Mar. 2	4.83E-10	1.47E-09	3.61E-09	Not Detected
	Mar. 2 – Mar. 16	1.20E-09	3.83E-09	9.38E-09	Not Detected
	Mar. 16 – Mar. 30	3.41E-09	2.73E-09	4.92E-09	Not Detected
	Mar. 30 - Apr. 13	8.66E-09	4.66E-09	7.69E-09	Detected
	Apr. 13 - Apr. 29	3.30E-09	2.16E-09	3.90E-09	Not Detected
	Apr. 29 – May 18	2.87E-09	1.65E-09	2.63E-09	Detected
	May 18 – Jun. 3	4.89E-09	2.20E-09	2.87E-09	Detected
	Jun. 3 – Jun. 15	4.87E-09	3.10E-09	5.44E-09	Not Detected
	Jun. 15 – Jun. 29	1.71E-09	1.67E-09	3.32E-09	Not Detected
	Jun. 29 – July 22	1.19E-09	9.00E-10	1.09E-09	Detected
	July 22 -Aug. 17	2.44E-09	1.30E-09	1.63E-09	Detected
	Aug. 17 – Oct. 3	1.18E-09	6.58E-10	9.87E-10	Detected
	Oct. 3 – Nov. 4	4.05E-10	9.50E-10	2.27E-09	Not Detected
	Nov. 4 – Dec. 9	6.03E-10	6.45E-10	1.35E-09	Not Detected
	Dec. 9 – Jan. 6	1.69E-09	9.09E-10	1.26E-09	Detected

Activity concentrations of ^{238}Pu at Near Field Station

Radionuclide	Sample Date 2022	Activity Bq/m^3	Unc. (2σ) Bq/m3	MDC Bq/m^3	Status
^{238}Pu	Feb. 2 – Mar. 2	-3.22E-10	1.02E-09	3.03E-09	Not Detected
	Mar. 2 – Mar. 16	-3.99E-10	4.30E-09	1.12E-08	Not Detected
	Mar. 16 – Mar. 30	1.55E-09	2.98E-09	6.96E-09	Not Detected
	Mar. 30 - Apr. 13	4.33E-09	3.42E-09	6.29E-09	Not Detected
	Apr. 13 - Apr. 29	1.83E-09	1.95E-09	4.11E-09	Not Detected
	Apr. 29 – May 18	1.96E-09	1.64E-09	3.22E-09	Not Detected
	May 18 – Jun. 3	2.17E-09	1.79E-09	3.41E-09	Not Detected
	Jun. 3 – Jun. 15	2.98E-09	2.61E-09	5.09E-09	Not Detected
	Jun. 15 – Jun. 29	1.91E-09	1.72E-09	3.32E-09	Not Detected
	Jun. 29 – July 22	1.34E-09	9.96E-10	1.38E-09	Not Detected
	July 22 -Aug. 17	1.76E-09	1.37E-09	2.55E-06	Not Detected
	Aug. 17 – Oct. 3	4.35E-10	6.23E-10	1.40E-09	Not Detected
	Oct. 3 – Nov. 4	0.00E+00	1.03E-09	2.67E-09	Not Detected
	Nov. 4 – Dec. 9	7.37E-10	6.74E-10	1.35E-09	Not Detected
	Dec. 9 – Jan. 6	8.03E-10	1.03E-09	2.27E-09	Not Detected

Activity concentrations of ^{241}Am, $^{239+240}Pu$, and ^{238}Pu in the filter samples collected from Carlsbad Station

Radionuclide	Sample Date 2022	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{241}Am	Feb. 2 – Mar. 2	2.02E-09	4.16E-09	9.78E-09	Not Detected
	Mar. 2 – Mar. 16	-1.09E-08	7.68E-09	2.68E-08	Not Detected
	Mar. 16 – Mar. 30	-7.08E-09	5.65E-09	1.99E-08	Not Detected
	Mar. 30 - Apr. 13	0.00E+00	3.30E-09	8.86E-09	Not Detected
	Apr. 13 - Apr. 29	-1.46E-09	6.52E-09	2.05E-08	Not Detected
	Apr. 29 – May 18	-8.65E-10	8.14E-10	2.65E-09	Not Detected
	May 18 – Jun. 3	2.88E-09	5.29E-09	1.23E-08	Not Detected
	Jun. 3 – Jun. 15	0.00E+00	2.90E-09	8.13E-09	Not Detected
	Jun. 15 – Jun. 29	-5.15E-09	5.08E-09	1.79E-08	Not Detected
	Jun. 29 – July 22	0.00E+00	1.23E-09	3.28E-09	Not Detected
	July 22 -Aug. 17	-2.48E-09	1.77E-09	5.96E-09	Not Detected
	Aug. 17 – Oct. 3	9.46E-10	7.94E-10	1.61E-09	Not Detected
	Oct. 3 – Nov. 4	6.78E-09	5.14E-09	6.24E-09	Detected
	Nov. 4 – Dec. 9	1.85E-09	9.70E-10	1.51E-09	Detected
	Dec. 9 – Jan. 6	5.61E-10	1.03E-09	2.39E-09	Not Detected
$^{239+240}Pu$	Feb. 2 – Mar. 2	1.22E-09	1.63E-09	3.54E-09	Not Detected
	Mar. 2 – Mar. 16	-1.75E-09	5.35E-09	1.49E-08	Not Detected
	Mar. 16 – Mar. 30	4.55E-09	3.53E-09	6.58E-09	Not Detected
	Mar. 30 - Apr. 13	9.83E-09	4.14E-09	4.78E-09	Detected
	Apr. 13 - Apr. 29	2.45E-09	2.49E-09	5.22E-09	Not Detected
	Apr. 29 – May 18	5.63E-09	4.29E-09	8.08E-09	Not Detected
	May 18 – Jun. 3	3.19E-09	1.54E-09	2.11E-09	Detected
	Jun. 3 – Jun. 15	1.60E-09	2.32E-09	5.08E-09	Not Detected
	Jun. 15 – Jun. 29	4.73E-09	2.44E-09	2.99E-09	Detected
	Jun. 29 – July 22	1.48E-09	2.84E-09	6.63E-09	Not Detected
	July 22 -Aug. 17	1.26E-09	8.88E-10	1.56E-09	Not Detected
	Aug. 17 – Oct. 3	3.00E-10	5.24E-10	1.21E-09	Not Detected
	Oct. 3 – Nov. 4	1.84E-09	1.38E-09	2.61E-09	Not Detected
	Nov. 4 – Dec. 9	1.19E-09	9.38E-10	1.81E-09	Not Detected
	Dec. 9 – Jan. 6	1.58E-09	1.07E-09	1.83E-09	Not Detected

Activity concentrations of ^{241}Am, $^{239+240}Pu$, and ^{238}Pu in the filter samples collected from Carlsbad Station (continued)

Radionuclide	Sample Date 2022	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}Pu	Feb. 2 – Mar. 2	-1.62E-09	2.00E-09	5.89E-09	Not Detected
	Mar. 2 – Mar. 16	-4.08E-09	6.08E-09	1.74E-08	Not Detected
	Mar. 16 – Mar. 30	-1.05E-09	3.64E-09	9.86E-09	Not Detected
	Mar. 30 - Apr. 13	1.36E-09	2.35E-09	5.38E-06	Not Detected
	Apr. 13 - Apr. 29	2.00E-09	2.23E-09	4.74E-09	Not Detected
	Apr. 29 – May 18	3.21E-09	3.78E-09	8.08E-09	Not Detected
	May 18 – Jun. 3	1.06E-09	1.36E-09	2.99E-09	Not Detected
	Jun. 3 – Jun. 15	1.89E-08	5.98E-09	7.19E-09	Detected
	Jun. 15 – Jun. 29	2.74E-09	2.19E-09	3.95E-09	Not Detected
	Jun. 29 – July 22	-2.96E-10	2.96E-09	7.81E-09	Not Detected
	July 22 -Aug. 17	1.17E-09	8.68E-10	1.56E-09	Not Detected
	Aug. 17 – Oct. 3	9.01E-10	6.53E-10	1.21E-09	Not Detected
	Oct. 3 – Nov. 4	1.47E-09	1.21E-09	2.30E-09	Not Detected
	Nov. 4 – Dec. 9	5.09E-10	7.22E-10	1.60E-09	Not Detected
	Dec. 9 – Jan. 6	2.21E-09	1.23E-09	1.98E-09	Detected

Activity concentrations of U isotopes (^{234}U, ^{235}U, and ^{238}U) at Onsite Station

Radionuclide	Sample Date 2022	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{234}U	Feb. 2 – Mar. 2	1.70E-07	2.12E-08	3.95E-09	Detected
	Mar. 2 – Mar. 16	2.91E-07	3.49E-08	6.69E-09	Detected
	Mar. 16 – Mar. 30	3.78E-07	4.39E-08	6.23E-09	Detected
	Mar. 30 - Apr. 13	3.20E-07	3.77E-08	5.13E-09	Detected
	Apr. 13 - Apr. 29	3.46E-07	3.99E-08	3.68E-09	Detected
	Apr. 29 – May 18	3.35E-07	4.02E-08	5.91E-09	Detected
	May 18 – Jun. 3	3.18E-07	3.64E-08	3.15E-09	Detected
	Jun. 3 – Jun. 15	2.96E-07	3.33E-08	3.79E-09	Detected
	Jun. 15 – Jun. 29	3.00E-07	3.62E-08	5.93E-09	Detected
	Jun. 29 – July 22	2.16E-07	2.59E-08	3.85E-09	Detected
	July 22 -Aug. 17	1.07E-07	1.33E-08	2.03E-09	Detected
	Aug. 17 – Oct. 3	6.42E-08	7.85E-09	1.30E-09	Detected
	Oct. 3 – Nov. 4	6.13E-08	8.49E-09	2.81E-09	Detected
	Nov. 4 – Dec. 9	6.95E-08	8.76E-09	1.93E-09	Detected
	Dec. 9 – Jan. 6	1.33E-07	1.59E-08	2.55E-09	Detected
^{235}U	Feb. 2 – Mar. 2	6.17E-09	2.63E-09	3.46E-09	Detected
	Mar. 2 – Mar. 16	1.21E-08	4.45E-09	5.26E-09	Detected
	Mar. 16 – Mar. 30	1.63E-08	5.14E-09	6.00E-09	Detected
	Mar. 30 - Apr. 13	1.70E-08	4.80E-09	4.10E-09	Detected
	Apr. 13 - Apr. 29	1.94E-08	4.83E-09	3.58E-09	Detected
	Apr. 29 – May 18	1.72E-08	5.18E-09	4.71E-09	Detected
	May 18 – Jun. 3	1.42E-08	3.91E-09	3.27E-09	Detected
	Jun. 3 – Jun. 15	1.52E-08	3.87E-09	3.19E-09	Detected
	Jun. 15 – Jun. 29	1.46E-08	4.84E-09	5.20E-09	Detected
	Jun. 29 – July 22	7.37E-09	2.74E-09	3.07E-09	Detected
	July 22 -Aug. 17	4.75E-09	1.82E-09	1.73E-09	Detected
	Aug. 17 – Oct. 3	2.96E-09	1.12E-09	1.27E-09	Detected
	Oct. 3 – Nov. 4	2.12E-09	1.43E-09	2.46E-09	Not Detected
	Nov. 4 – Dec. 9	3.44E-09	1.27E-09	9.38E-10	Detected
	Dec. 9 – Jan. 6	4.75E-09	1.75E-09	1.81E-09	Detected

Activity concentrations of U isotopes (^{234}U, ^{235}U, and ^{238}U) at Onsite Station (continued)

Radionuclides	Sample Date 2022	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}U	Feb. 2 – Mar. 2	1.45E-07	1.84E-08	3.94E-09	Detected
	Mar. 2 – Mar. 16	2.62E-07	3.19E-08	9.15E-09	Detected
	Mar. 16 – Mar. 30	3.37E-07	3.96E-08	6.59E-09	Detected
	Mar. 30 - Apr. 13	2.94E-07	3.49E-08	6.38E-09	Detected
	Apr. 13 - Apr. 29	3.09E-07	3.61E-08	5.28E-09	Detected
	Apr. 29 – May 18	2.83E-07	3.48E-08	7.16E-09	Detected
	May 18 – Jun. 3	2.94E-07	3.39E-08	4.69E-09	Detected
	Jun. 3 – Jun. 15	2.63E-07	3.00E-08	4.75E-09	Detected
	Jun. 15 – Jun. 29	2.77E-07	3.37E-08	7.56E-09	Detected
	Jun. 29 – July 22	2.09E-07	2.51E-08	4.67E-09	Detected
	July 22 -Aug. 17	1.03E-07	1.29E-08	2.73E-09	Detected
	Aug. 17 – Oct. 3	5.88E-08	7.30E-09	1.87E-09	Detected
	Oct. 3 – Nov. 4	5.99E-08	8.37E-09	3.58E-09	Detected
	Nov. 4 – Dec. 9	6.12E-08	7.90E-09	2.43E-09	Detected
	Dec. 9 – Jan. 6	1.20E-07	1.45E-08	3.62E-09	Detected

Environmental Chemistry Group

From January 1st to March 31st, 2024, the Environmental Chemistry group (EC) worked on processing Fixed Air Sampler (FAS) filters, ambient air (HiVol) filters, surface water samples, and drinking water samples collected in 2023.

The following Tables and Figures represent characteristic results.

Sample Type: FAS, Station A
Year: 2023
Analysis Performed: Metals in weekly composites

Week	Aluminum ng/m^3	Cadmium ng/m^3	Lead ng/m^3	Magnesium ng/m^3	Silicon ng/m^3	Thorium ng/m^3	Uranium ng/m^3
01/01/23	1.347E+02	4.004E-01	9.461E-01	6.954E+02	5.331E+02	<MDL	1.610E-02
01/08/23	2.229E+02	4.963E-01	2.744E+00	9.495E+02	9.079E+02	<MDL	3.238E-02
01/15/23	2.339E+02	4.926E-01	4.736E+00	9.654E+02	9.024E+02	<MDL	2.702E-02
01/22/23	2.556E+02	6.202E-01	3.796E+00	1.177E+03	9.348E+02	<MDL	2.779E-02
02/01/23	2.742E+02	5.433E-01	4.956E+00	1.212E+03	1.039E+03	<MDL	2.404E-02
02/08/23	6.047E+02	1.921E+00	4.896E+00	2.807E+03	2.301E+03	<MDL	<MDL
02/15/23	8.367E+02	6.982E-01	2.922E+00	4.370E+03	2.511E+03	9.697E-02	7.775E-02
02/22/23	6.330E+02	5.306E-01	2.816E+00	2.379E+03	1.919E+03	8.888E-02	7.272E-02
03/01/23	1.488E+03	6.511E-01	1.084E+01	6.572E+03	4.065E+03	1.889E-01	1.407E-01
03/08/23	3.197E+02	5.911E-01	1.405E+00	7.903E+02	1.150E+03	<MDL	2.750E-02
03/15/23	4.240E+02	4.666E-01	3.466E+00	2.064E+03	1.407E+03	5.566E-02	4.748E-02
03/22/23	6.809E+02	5.387E-01	3.322E+00	3.376E+03	2.153E+03	9.664E-02	7.480E-02
04/01/23							
04/08/23							
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12/22/23							

NOTE: Filters were not received for the following time frames: N/A.

Sample Type: FAS, Station A
Year: 2023
Analysis Performed: Anions in weekly composites

Week	Chloride ng/m^3	Nitrate ng/m^3	Phosphate ng/m^3	Sulfate ng/m^3
01/01/23	1.35E+05	<MDL	<MDL	1.10E+04
01/08/23	3.18E+05	2.55E+01	<MDL	3.67E+04
01/15/23	2.98E+05	<MDL	<MDL	1.64E+04
01/22/23	2.25E+05	<MDL	<MDL	1.59E+04
02/01/23	1.43E+05	<MDL	<MDL	1.04E+04
02/08/23	2.69E+05	<MDL	<MDL	3.07E+04
02/15/23	4.19E+05	<MDL	<MDL	4.92E+04
02/22/23	1.83E+05	1.92E+02	6.20E+02	2.50E+04
03/01/23	4.94E+05	1.42E+02	<MDL	6.32E+04
03/08/23	3.41E+04	<MDL	<MDL	8.21E+03
03/15/23	2.11E+05	8.52E+01	<MDL	4.83E+04
03/22/23	3.67E+05	2.71E+02	<MDL	8.03E+04
04/01/23	3.32E+05	2.39E+02	<MDL	5.34E+04
04/08/23	1.98E+05	1.61E+02	<MDL	5.73E+04
04/15/23	3.58E+05	3.06E+02	<MDL	5.82E+04
04/22/23	2.03E+06	2.42E+03	<MDL	9.94E+04
05/01/23	6.34E+05	1.08E+02	<MDL	5.45E+04
05/08/23	1.78E+05	4.32E+01	<MDL	1.40E+04
05/15/23	4.55E+05	<MDL	<MDL	2.13E+04
05/22/23	1.09E+05	<MDL	<MDL	9.73E+03
06/01/23	7.36E+04	3.60E+01	<MDL	1.07E+04
06/08/23	1.15E+06	9.43E+01	<MDL	2.33E+04
06/15/23	3.77E+05	5.10E+01	<MDL	3.41E+04
06/22/23	4.22E+05	3.47E+01	<MDL	2.69E+04
07/01/23	2.45E+05	6.28E+01	<MDL	1.26E+04
07/08/23	3.68E+05	3.74E+01	<MDL	2.24E+04
07/15/23	1.13E+06	1.81E+02	<MDL	2.47E+04
07/22/23	1.10E+06	2.35E+02	<MDL	5.28E+04
08/01/23	3.91E+05	3.89E+02	<MDL	3.62E+04
08/08/23	3.77E+05	<MDL	<MDL	2.43E+04
08/15/23	3.18E+05	<MDL	<MDL	2.39E+04
08/22/23	4.31E+05	<MDL	<MDL	3.82E+04
09/01/23	3.81E+05	<MDL	<MDL	3.63E+04
09/08/23	2.13E+05	<MDL	4.88E+03	2.11E+04
09/15/23	4.14E+05	3.63E+02	1.12E+03	4.56E+04
09/22/23	2.77E+05	3.19E+02	<MDL	2.66E+04
10/01/23				
10/08/23				
10/15/23				
10/22/23				
11/01/23				
11/08/23				
11/15/23				
11/22/23				
12/01/23				
12/08/23				
12/15/23				
12/22/23				

NOTE: Filters were not received for the following time frames: N/A

Sample Type: FAS, Station A
Year: 2023
Analysis Performed: Cations in weekly composites

Week	Sodium ng/m³	Ammonium ng/m³	Magnesium ng/m³	Potassium ng/m³	Calcium ng/m³
01/01/23	8.87E+05	<MDL	5.38E+02	7.34E+02	5.10E+03
01/08/23	2.05E+06	<MDL	7.80E+02	1.45E+03	1.79E+04
01/15/23	1.91E+06	<MDL	7.16E+02	1.36E+03	7.25E+03
01/22/23	1.46E+06	<MDL	8.33E+02	1.57E+03	5.98E+03
02/01/23	9.52E+05	<MDL	1.03E+03	2.27E+03	4.22E+03
02/08/23	1.86E+06	<MDL	2.35E+03	5.02E+03	1.03E+04
02/15/23	2.72E+06	<MDL	5.91E+03	7.33E+03	1.76E+04
02/22/23	1.20E+06	<MDL	2.58E+03	3.08E+03	9.34E+03
03/01/23	5.85E+05	<MDL	1.32E+03	1.32E+03	3.96E+03
03/08/23	1.34E+04	<MDL	2.27E+02	8.14E+02	2.23E+03
03/15/23	1.64E+06	<MDL	2.75E+03	3.50E+03	2.28E+04
03/22/23	3.40E+06	<MDL	5.89E+03	8.88E+03	4.54E+04
04/01/23	<MDL	2.19E+06	<MDL	4.70E+03	5.04E+03
04/08/23	<MDL	1.25E+06	<MDL	2.32E+03	2.82E+03
04/15/23	<MDL	2.39E+06	<MDL	2.96E+03	4.03E+03
04/22/23	<MDL	1.37E+07	<MDL	5.27E+03	8.74E+03
05/01/23	<MDL	4.24E+06	<MDL	3.03E+03	5.42E+03
05/08/23	<MDL	1.15E+06	<MDL	1.48E+03	2.08E+03
05/15/23	<MDL	2.97E+06	<MDL	1.77E+03	<MDL
05/22/23	<MDL	7.04E+04	<MDL	1.04E+03	1.68E+03
06/01/23	<MDL	4.90E+05	<MDL	1.74E+03	1.17E+03
06/08/23	<MDL	3.07E+06	<MDL	2.43E+03	3.47E+03
06/15/23	<MDL	2.54E+06	<MDL	2.60E+03	3.44E+03
06/22/23	<MDL	2.93E+06	<MDL	2.39E+03	3.50E+03
07/01/23	1.66E+06	<MDL	1.17E+03	1.82E+03	3.71E+03
07/08/23	2.45E+06	<MDL	2.06E+03	3.30E+03	6.98E+03
07/15/23	3.02E+06	<MDL	2.34E+03	3.69E+03	7.63E+03
07/22/23	2.93E+06	<MDL	2.30E+03	4.12E+03	1.88E+04
08/01/23	2.57E+06	<MDL	2.18E+03	3.73E+03	1.19E+04
08/08/23	2.48E+06	<MDL	2.06E+03	2.88E+03	7.94E+03
08/15/23	2.04E+06	<MDL	1.85E+03	3.52E+03	8.35E+03
08/22/23	2.81E+06	<MDL	2.22E+03	4.32E+03	1.28E+04
09/01/23	2.51E+06	<MDL	1.83E+03	3.78E+03	1.21E+04
09/08/23	1.40E+06	<MDL	1.67E+03	2.68E+03	5.68E+03
09/15/23	2.75E+06	<MDL	3.19E+03	4.32E+03	1.59E+04
09/22/23	1.80E+06	<MDL	2.01E+03	2.67E+03	9.25E+03
10/01/23	1.01E+06	<MDL	1.65E+03	<MDL	6.90E+03
10/08/23	1.03E+06	<MDL	1.76E+03	1.67E+03	8.07E+03
10/15/23	1.92E+06	<MDL	2.47E+03	3.09E+03	8.80E+03
10/22/23	1.73E+06	<MDL	1.97E+03	3.05E+03	6.57E+03
11/01/23	1.08E+06	<MDL	2.02E+03	2.25E+03	1.39E+04
11/08/23	2.05E+06	<MDL	2.67E+03	3.48E+03	1.51E+04
11/15/23	1.23E+06	<MDL	1.99E+03	1.78E+03	7.83E+03
11/22/23	1.14E+06	<MDL	1.84E+03	2.03E+03	6.98E+03
12/01/23	1.02E+06	<MDL	2.44E+03	1.87E+03	2.09E+04
12/08/23	1.15E+06	<MDL	1.31E+03	1.17E+03	7.62E+03
12/15/23	1.62E+06	<MDL	1.65E+03	1.81E+03	6.59E+03
12/22/23	6.86E+05	<MDL	1.01E+03	6.48E+02	3.14E+03

NOTE: Filters were not received for the following time frames: N/A

Sample Type: FAS, Station B
Year: 2023
Analysis Performed: Metals in monthly composites

Month	Chloride ng/m³	Nitrate ng/m³	Phosphate ng/m³	Sulfate ng/m³	Chloride ng/m³	Nitrate ng/m³	Phosphate ng/m³
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							

Sample Type: FAS, Station B
Year: 2023
Analysis Performed: Anions in monthly composites

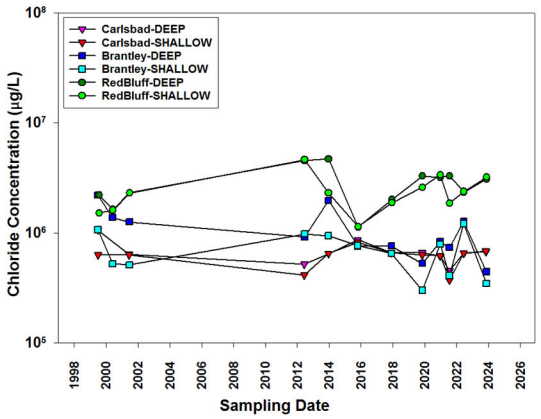
Month	Chloride ng/m³	Nitrate ng/m³	Phosphate ng/m³	Sulfate ng/m³
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

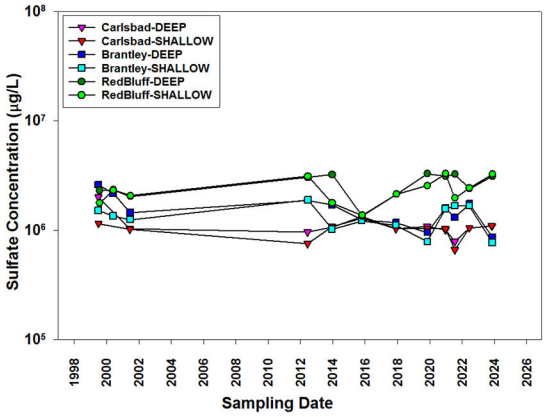
Sample Type: FAS, Station B
Year: 2023
Analysis Performed: Cations in monthly composites

Month	Sodium ng/m³	Ammonium ng/m³	Magnesium ng/m³	Potassium ng/m³	Calcium ng/m³
January	<MDL	<MDL	<MDL	<MDL	6.80E+01
February	<MDL	<MDL	<MDL	<MDL	1.05E+02
March	<MDL	<MDL	<MDL	<MDL	8.18E+01
April	<MDL	<MDL	<MDL	<MDL	1.13E+02
May	<MDL	<MDL	<MDL	<MDL	1.27E+02
June	<MDL	<MDL	<MDL	<MDL	1.05E+02
July	1.14E+02	<MDL	<MDL	<MDL	9.74E+01
August	1.31E+02	<MDL	<MDL	<MDL	1.82E+02
September	1.18E+02	<MDL	<MDL	<MDL	4.84E+01
October	2.06E+02	<MDL	<MDL	<MDL	6.63E+01
November	<MDL	<MDL	<MDL	<MDL	7.56E+01
December	<MDL	<MDL	<MDL	<MDL	2.65E+01

Sample Type: Surface Water
Year: 2023
Analysis Performed: Anions

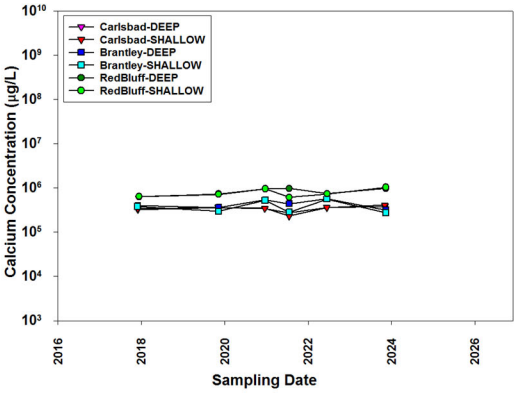
Sample Location	Chloride µg/L	Nitrate µg/L	Phosphate µg/L	Sulfate µg/L
Hill Tank	2.64E+04	1.84E+03	<MDC	4.08E+04
Noya Tank	1.63E+04	1.77E+04	<MDC	1.81E+04
Red Tank	5.33E+03	2.75E+03	<MDC	9.19E+03
Lake Carlsbad (Shallow)	6.84E+05	4.20E+03	<MDC	1.10E+06
Lake Carlsbad (Deep)	6.75E+05	4.03E+03	<MDC	1.09E+06
Brantley Lake (Shallow)	3.48E+05	<MDC	<MDC	7.71E+05
Brantley (Deep)	4.44E+05	<MDC	<MDC	8.65E+05
Red Bluff (Shallow)	3.21E+06	<MDC	<MDC	3.24E+06
Red Bluff (Deep)	3.08E+06	<MDC	<MDC	3.11E+06

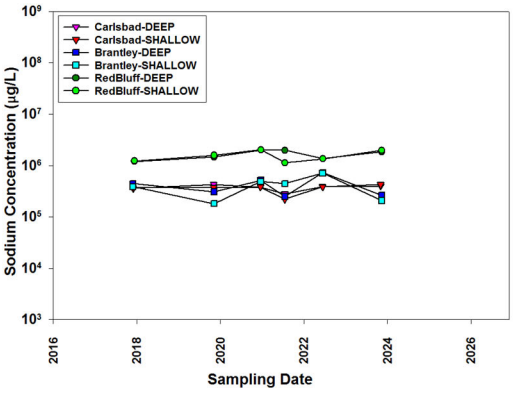




Sample Type: Surface Water
Year: 2023
Analysis Performed: Cations

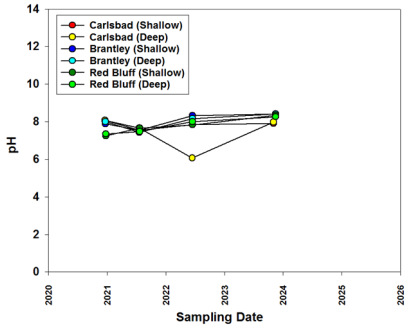
Sample Location	Calcium µg/L	Magnesium µg/L	Potassium µg/L	Sodium µg/L
Hill Tank	9.17E+04	1.61E+04	7.37E+04	9.61E+03
Noya Tank	1.00E+05	1.03E+04	3.31E+04	4.84E+03
Red Tank	2.84E+04	1.20E+04	2.33E+04	3.15E+03
Lake Carlsbad (Shallow)	4.05E+05	1.07E+05	2.76E+03	4.27E+05
Lake Carlsbad (Deep)	3.82E+05	1.51E+05	3.86E+03	4.02E+05
Brantley Lake (Shallow)	2.73E+05	5.32E+04	3.80E+03	2.07E+05
Brantley Lake (Deep)	3.16E+05	6.41E+04	3.78E+03	2.62E+05
Red Bluff (Shallow)	1.03E+06	3.73E+05	2.97E+04	1.97E+06
Red Bluff (Deep)	9.63E+05	3.59E+05	3.08E+04	1.84E+06





Sample Type: Surface Water
Year: 2023
Analysis Performed: pH

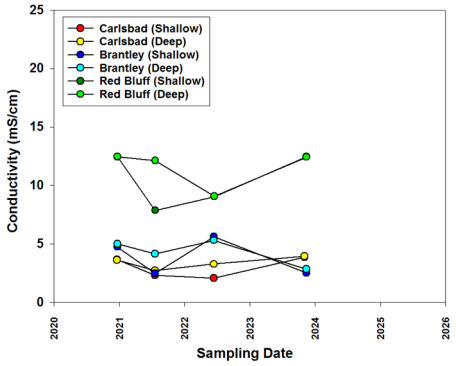
Sample Location	pH @ 23°C
Hill Tank	7.78
Noya Tank	7.87
Red Tank	8.01
Lake Carlsbad (Shallow)	7.905
Lake Carlsbad (Deep)	7.988
Brantley Lake (Shallow)	8.402
Brantley Lake (Deep)	8.406
Red Bluff (Shallow)	8.347
Red Bluff (Deep)	8.262



Sample Type: Surface Water
Year: 2023
Analysis Performed: Conductivity

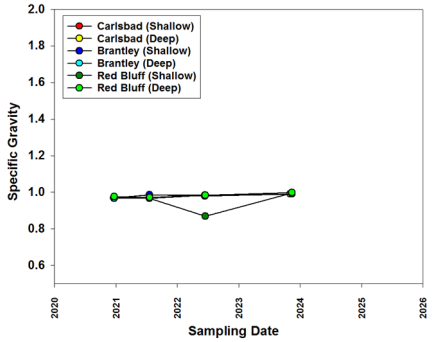
Sample Location	Conductivity mS/cm	Temperature °C
Hill Tank	0.758	22.5
Noya Tank	0.483	22.7
Red Tank	0.280	22.7
Lake Carlsbad (Shallow)	3.87	19.6
Lake Carlsbad (Deep)	3.94	19.6
Brantley Lake (Shallow)	2.52	19.6
Brantley Lake (Deep)	2.86	19.6
Red Bluff (Shallow)	12.47	19.7

Red Bluff (Deep)	12.44	19.7



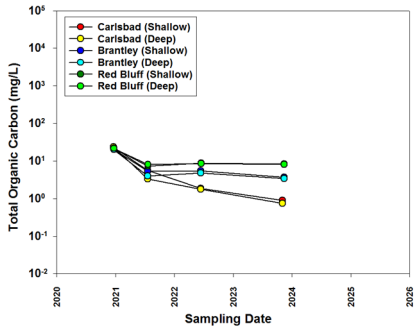
Sample Type: Surface Water
Year: 2023
Analysis Performed: Specific gravity

Sample Location	SG T/4°C
Hill Tank	1.000
Noya Tank	1.001
Red Tank	1.000
Lake Carlsbad (Shallow)	0.992
Lake Carlsbad (Deep)	0.990
Brantley Lake (Shallow)	0.990
Brantley (Deep)	0.991
Red Bluff (Shallow)	0.997
Red Bluff (Deep)	0.998



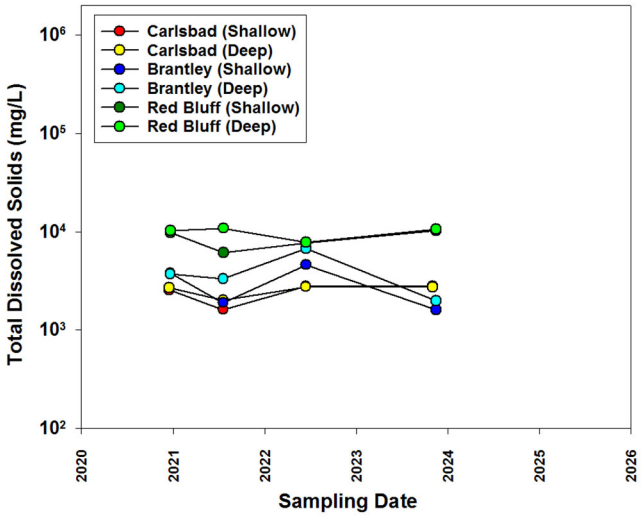
Sample Type: Surface Water
Year: 2023
Analysis Performed: TOC/TN/TIC

Sample Location	TOC mg/L
Hill Tank	32.70
Noya Tank	20.20
Red Tank	9.13
Lake Carlsbad (Shallow)	0.883
Lake Carlsbad (Deep)	0.745
Brantley Lake (Shallow)	3.67
Brantley (Deep)	3.42
Red Bluff (Shallow)	8.26
Red Bluff (Deep)	7.99



Sample Type: Surface Water
Year: 2023
Analysis Performed: TDS/TSS

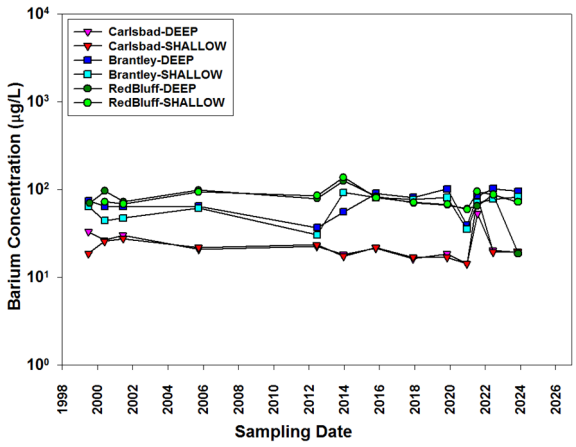
Sample Location	TDS mg/L	TSS mg/L
Hill Tank	520	320
Noya Tank	420	960
Red Tank	380	120
Lake Carlsbad (Shallow)	2800	60
Lake Carlsbad (Deep)	2720	20
Brantley Lake (Shallow)	1600	N.D.
Brantley (Deep)	1980	N.D.
Red Bluff (Shallow)	10260	140
Red Bluff (Deep)	10240	60

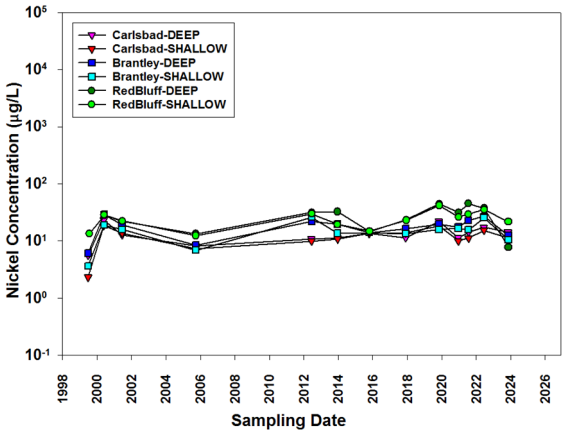


Sample Type: Surface Water
Year: 2023
Analysis Performed: Metals

Metal	Hill Tank Conc µg/L	Noya Tank Conc µg/L	Red Tank Conc µg/L
Ag	2.88E-01	<MDC	<MDC
Al	1.84E+03	4.81E+03	2.03E+03
As	9.66E+00	6.89E+00	3.52E+00
Ba	5.07E+02	7.32E+02	2.22E+02
Be	2.64E-01	7.01E-01	2.26E-01
Ca	8.23E+04	9.73E+04	2.66E+04
Cd	9.80E-02	2.77E-01	4.57E-02
Ce	8.44E+00	2.44E+01	6.15E+00
Co	3.67E+00	6.88E+00	1.57E+00
Cr	3.03E+00	2.87E+00	<MDC
Cu	9.97E+00	1.51E+01	6.58E+00
Dy	7.96E-01	2.28E+00	8.36E-01
Er	3.63E-01	1.02E+00	3.14E-01
Eu	3.81E-01	9.57E-01	3.90E-01
Fe	1.23E+03	2.79E+03	5.71E+02
Gd	1.18E+00	3.61E+00	1.41E+00
Hg	<MDC	<MDC	<MDC
K	6.11E+04	3.26E+04	7.62E+03
La	3.76E+00	1.06E+01	2.37E+00
Li	1.04E+01	1.16E+01	7.95E+00
Mg	1.74E+04	1.28E+04	1.01E+04
Mn	3.48E+02	8.93E+02	1.68E+02
Mo	2.77E+00	1.78E+00	7.35E-01
Na	8.59E+03	4.30E+03	2.71E+03
Nd	4.81E+00	1.40E+01	4.92E+00
Ni	1.14E+01	1.49E+01	4.15E+00
P	6.18E+02	1.07E+03	3.34E+02
Pb	6.12E+00	1.70E+01	3.15E+00
Pr	1.13E+00	3.22E+00	9.75E-01
Sb	7.72E-01	7.07E-01	1.56E-01
Sc	2.81E+00	5.28E+00	2.35E+00
Se	<MDC	<MDC	<MDC
Si	8.37E+03	1.21E+04	5.26E+03
Sr	4.67E+02	3.64E+02	1.69E+02
Th	2.56E-01	2.68E-01	<MDC
Tl	<MDC	2.74E-02	<MDC
U	1.58E+00	6.02E-01	5.14E-01
V	2.18E+01	2.95E+01	2.60E+01
Zn	<MDC	<MDC	<MDC

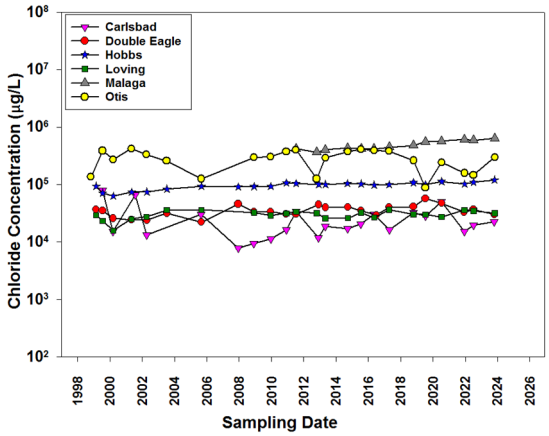
	Brantley Lake		Lake Carlsbad		Red Bluff	
Metal	Shallow Conc µg/L	Deep Conc µg/L	Shallow Conc µg/L	Deep Conc µg/L	Shallow Conc µg/L	Deep Conc µg/L
Ag	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Al	8.06E+01	1.96E+02	5.95E+01	4.74E+01	<MDC	<MDC
As	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ba	8.23E+01	9.53E+01	1.96E+01	1.93E+01	7.18E+01	7.44E+01
Be	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ca	2.19E+05	2.34E+05	2.81E+05	2.89E+05	7.62E+05	7.73E+05
Cd	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ce	1.63E-01	3.35E-01	<MDC	<MDC	<MDC	<MDC
Co	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Cr	1.47E+01	1.36E+01	<MDC	1.35E+01	<MDC	5.65E+01
Cu	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Dy	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Er	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Eu	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Fe	2.62E+03	2.83E+03	1.10E+03	2.58E+03	3.54E+03	8.43E+03
Gd	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Hg	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
K	4.28E+03	4.61E+03	4.36E+03	4.48E+03	3.27E+04	3.21E+04
La	<MDC	1.25E-01	<MDC	<MDC	<MDC	<MDC
Li	2.48E+01	2.95E+01	4.53E+01	4.09E+01	1.36E+02	1.47E+02
Mg	5.41E+04	6.88E+04	1.11E+05	1.07E+05	3.61E+05	3.83E+05
Mn	2.00E+01	4.28E+01	1.01E+01	9.27E+00	3.39E+01	3.61E+01
Mo	2.73E+00	2.47E+00	2.99E+00	2.38E+00	7.48E+00	6.34E+00
Na	1.90E+05	2.53E+05	3.66E+05	3.67E+05	1.75E+06	1.75E+06
Nd	<MDC	1.85E-01	<MDC	<MDC	<MDC	<MDC
Ni	1.05E+01	1.24E+01	1.13E+01	1.44E+01	2.16E+01	3.12E+01
P	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Pb	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Pr	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Sb	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Sc	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Se	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Si	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Sr	3.49E+03	3.99E+03	4.96E+03	4.34E+03	1.36E+04	1.32E+04
Th	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Tl	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
U	3.62E+00	3.96E+00	3.63E+00	3.41E+00	8.90E+00	9.08E+00
V	8.94E+00	8.41E+00	4.71E+00	8.08E+00	<MDC	2.03E+01
Zn	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC





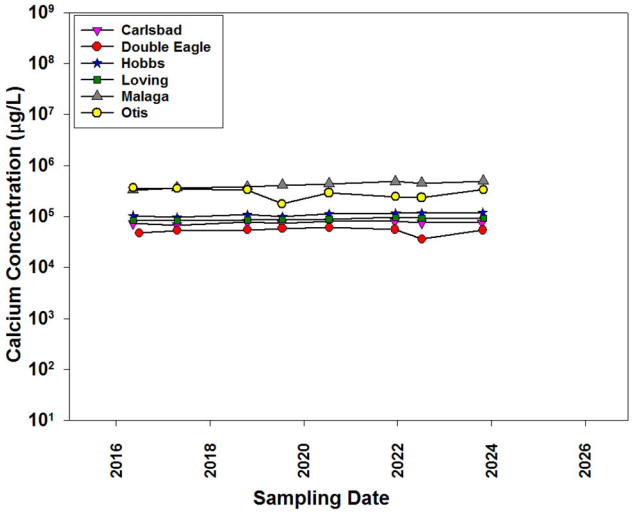
Sample Type: Drinking Water
Year: 2023
Analysis Performed: Anions

Sample Location	Chloride µg/L	Nitrate µg/L	Phosphate µg/L	Sulfate µg/L
Carlsbad (Sheep draw)	2.261E+04	4.597E+03	<MDC	8.566E+04
Hobbs	1.205E+05	2.157E+04	<MDC	<MDC
Double Eagle PRV4	3.002E+04	1.300E+04	<MDC	4.225E+04
Loving	3.185E+04	2.009E+04	<MDC	1.141E+05
Otis	2.980E+05	1.581E+04	<MDC	6.929E+05
Malaga	6.352E+05	1.694E+04	<MDC	9.723E+05



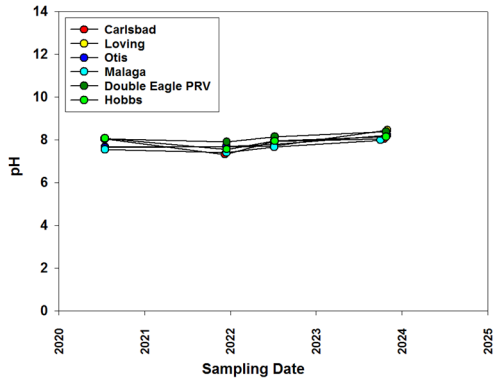
Sample Type: Drinking Water
Year: 2023
Analysis Performed: Cations

Sample Location	Calcium µg/L	Magnesium µg/L	Potassium µg/L	Sodium µg/L
Carlsbad (Sheep draw)	7.700E+04	3.366E+04	1.705E+03	1.700E+04
Hobbs	1.187E+05	2.532E+04	2.220E+03	5.673E+04
Double Eagle PRV4	5.437E+04	1.007E+04	2.392E+03	3.412E+04
Loving	9.263E+04	3.757E+04	2.385E+03	2.237E+04
Otis	3.372E+05	7.994E+04	3.440E+03	7.982E+04
Malaga	4.944E+05	1.324E+05	2.100E+03	2.017E+05



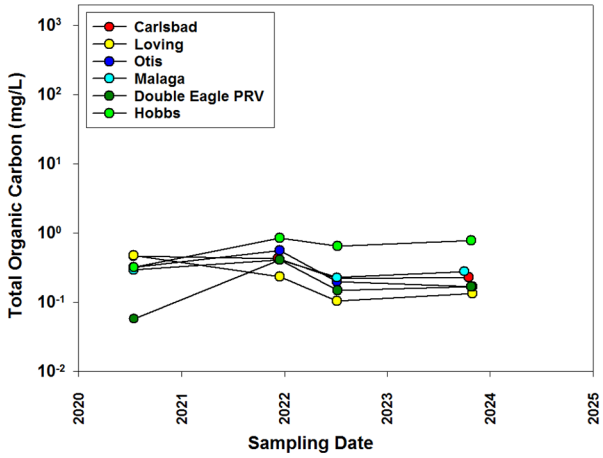
Sample Type: Drinking Water
Year: 2023
Analysis Performed: pH

Sample Location	pH @ 17.9°C
Carlsbad (Sheep draw)	8.054
Hobbs	8.134
Double Eagle PRV4	8.385
Loving	8.441
Otis	8.203
Malaga	7.987



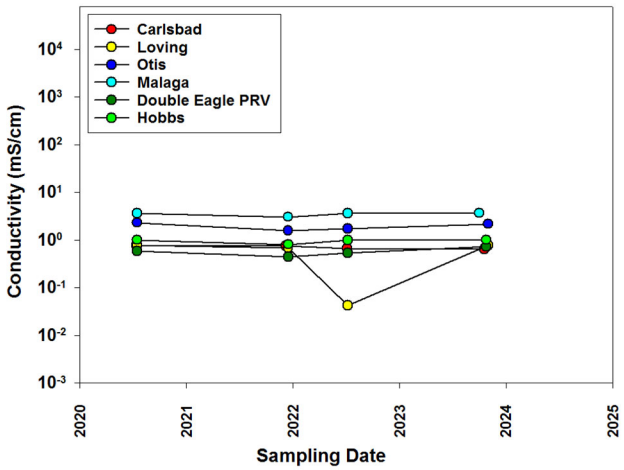
Sample Type: Drinking Water
Year: 2023
Analysis Performed: Total Organic Carbon

Sample Location	TOC mg/L
Sheep Draw	0.232
Hobbs	0.776
Double Eagle PRV-4	0.168
Loving	0.135
Otis	0.170
Malaga	0.280



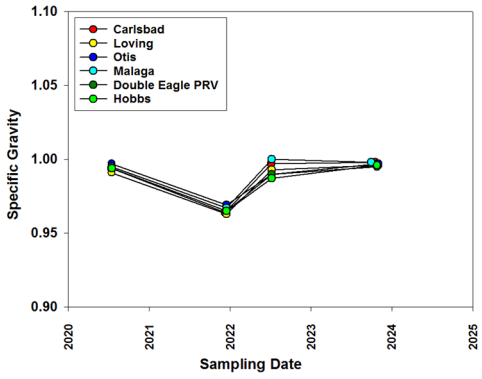
Sample Type: Drinking Water
Year: 2023
Analysis Performed: Conductivity

Sample Location	Conductivity mS/cm	Temperature °C
Sheep Draw (Carlsbad)	0.638	19.8
Loving	0.772	19.6
Otis	2.19	19.5
Malaga	3.70	19.6
Hobbs	1.01	19.4
PRV4 (Double Eagle)	0.726	19.4



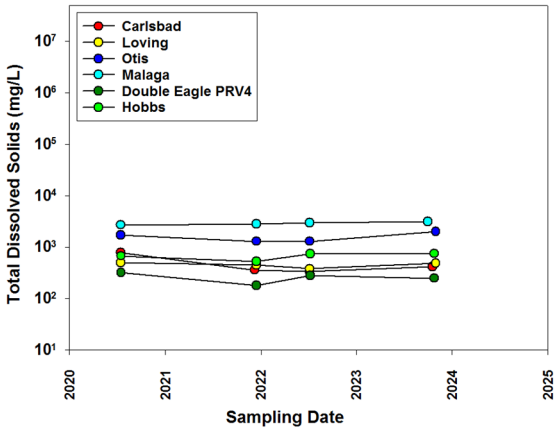
Sample Type: Drinking Water
Year: 2023
Analysis Performed: Specific gravity

Sample Location	Specific Gravity
Sheep Draw (Carlsbad)	0.998
Loving	0.996
Otis	0.997
Malaga	0.998
Hobbs	0.996
PRV4 (Double Eagle)	0.995



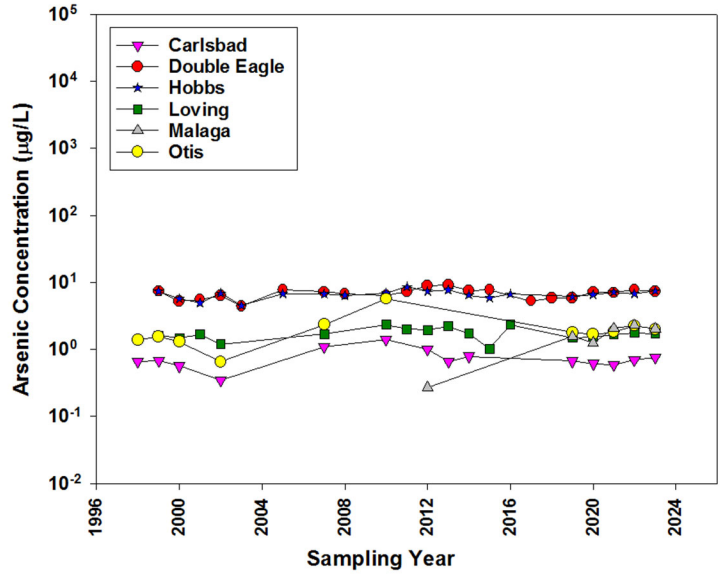
Sample Type: Drinking Water
Year: 2023
Analysis Performed: TDS/TSS

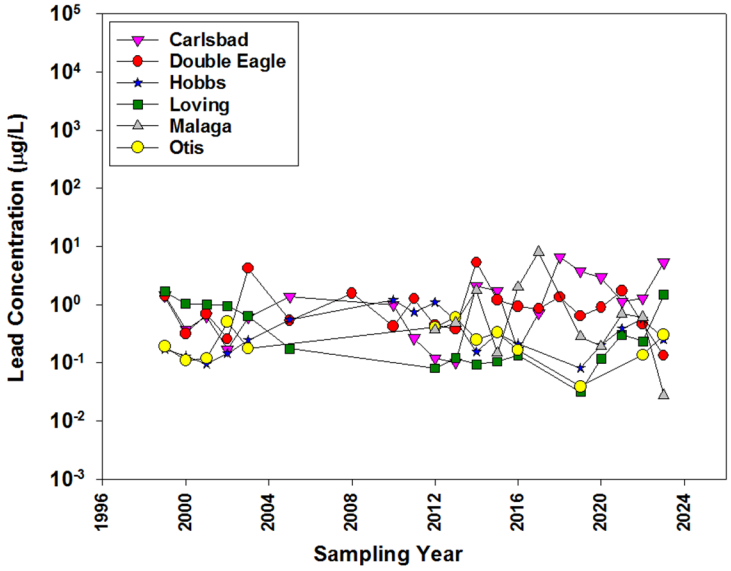
Sample Location	TDS mg/L	TSS mg/L
Sheep Draw (Carlsbad)	420.0	N.D.
Loving	490.0	N.D.
Otis	2010.0	10.0
Malaga	3140.0	40.0
Hobbs	750.0	N.D.
PRV4 (Double Eagle)	250.0	N.D.
N.D. = non-detect.		



Sample Type: Drinking Water
Year: 2023
Analysis Performed: Metals

Metal	Carlsbad (Sheeps Draw) Conc µg/L	Loving Conc µg/L	Otis Conc µg/L	Double Eagle (PRV4) Conc µg/L	Hobbs Conc µg/L	Malaga Conc µg/L
Ag	5.34E-02	7.76E-02	2.05E-01	<MDC	1.66E-01	4.52E-01
Al	1.93E+00	1.99E+00	1.04E+01	4.67E+00	1.30E+00	2.57E+00
As	7.68E-01	1.73E+00	2.00E+00	7.37E+00	7.46E+00	2.02E+00
B	N/A	N/A	N/A	N/A	N/A	N/A
Ba	6.96E+01	3.36E+01	1.27E+01	9.23E+01	5.54E+01	1.29E+01
Be	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ca	6.43E+04	8.24E+04	2.94E+05	4.89E+04	1.03E+05	4.17E+05
Cd	1.95E-02	1.89E-02	<MDC	<MDC	<MDC	<MDC
Ce	<MDC	<MDC	<MDC	6.20E-03	<MDC	<MDC
Co	1.61E-01	1.65E-01	6.53E-01	<MDC	<MDC	8.54E-01
Cr	1.73E+00	2.25E+00	<MDC	<MDC	<MDC	<MDC
Cu	1.03E+01	1.46E+01	1.99E+01	<MDC	<MDC	<MDC
Dy	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Er	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Eu	1.64E-02	8.14E-03	<MDC	1.87E-02	<MDC	<MDC
Fe	N/A	N/A	N/A	N/A	N/A	N/A
Ga	N/A	N/A	N/A	N/A	N/A	N/A
Gd	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Hg	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
K	1.10E+03	1.86E+03	2.94E+03	2.81E+03	2.71E+03	4.04E+03
La	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Li	6.44E+00	1.97E+01	5.38E+01	2.09E+01	3.53E+01	6.52E+01
Mg	3.35E+04	3.76E+04	8.34E+04	1.04E+04	2.62E+04	1.38E+05
Mn	7.50E-01	8.03E-02	4.85E-01	5.74E-01	1.22E+00	1.31E+00
Mo	1.22E+00	1.70E+00	4.83E+00	1.59E+00	2.45E+00	3.81E+00
Na	1.62E+04	2.17E+04	8.05E+04	3.17E+04	5.27E+04	2.07E+05
Nd	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ni	3.76E+00	4.00E+00	1.75E+01	2.07E+00	4.49E+00	2.08E+01
P	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Pb	5.30E+00	1.48E+00	3.02E-01	1.33E-01	2.48E-01	2.75E-02
Pr	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Sb	4.48E-02	4.80E-02	5.40E-02	2.94E-02	6.86E-02	5.10E-02
Sc	2.38E+00	4.02E+00	4.71E+00	6.18E+00	9.52E+00	4.63E+00
Se	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Si	5.85E+03	9.62E+03	1.09E+04	1.55E+04	2.49E+04	1.08E+04
Sr	3.17E+02	7.20E+02	3.56E+03	5.00E+02	1.11E+03	4.55E+03
Th	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Tl	7.45E-02	<MDC	<MDC	<MDC	<MDC	<MDC
U	7.86E-01	1.83E+00	4.86E+00	1.90E+00	3.53E+00	5.56E+00
V	3.63E+00	1.18E+01	7.40E+00	2.85E+01	2.96E+01	7.74E+00
Zn	3.75E+01	1.99E+01	<MDC	<MDC	<MDC	<MDC


Carlsbad
Double Eagle
Hobbs
Loving
Malaga
Otis
Arsenic Concentration (µg/L)
Sampling Year


Carlsbad
Double Eagle
Hobbs
Loving
Malaga
Otis
Lead Concentration (µg/L)
Sampling Year

Sample Type: Near Field (107), ambient air
Year: 2023
Analysis Performed: Anions

Start Date	Chloride µg/m³	Nitrate µg/m³	Phosphate µg/m³	Sulfate µg/m³
01/06/23	2.92E-01	1.47E+00	1.95E-03	1.15E+00
01/27/23	6.44E-01	3.79E+00	4.13E-03	2.60E+00
03/01/23	3.52E-01	2.17E+00	3.63E-03	1.76E+00
03/29/23	3.59E-01	1.13E+00	2.32E-03	1.01E+00
04/14/23	3.53E-01	1.80E+00	1.11E-02	1.82E+00
04/28/23	4.60E-01	3.23E+00	6.03E-03	2.74E+00
05/19/23	1.59E-01	1.65E+00	5.24E-03	2.04E+00
06/21/23	1.24E-01	1.15E+00	2.43E-03	2.00E+00
08/02/23	1.86E-01	2.01E+00	2.82E-03	1.71E+00
08/30/23	1.54E-01	2.41E+00	<MDL	2.15E+00

Sample Type: Cactus Flats (108), ambient air
Year: 2023
Analysis Performed: Anions

Start Date	Chloride µg/m³	Nitrate µg/m³	Phosphate µg/m³	Sulfate µg/m³
01/06/23	3.50E-01	1.55E+00	<MDL	1.08E+00
01/27/23	4.04E-01	3.56E+00	<MDL	2.57E+00
03/01/23	2.51E-01	2.23E+00	3.32E-03	1.86E+00
03/29/23	1.59E-01	1.11E+00	2.43E-03	1.09E+00
04/14/23	3.50E-01	2.01E+00	1.01E-02	2.23E+00
04/28/23	3.79E-01	2.70E+00	6.03E-03	2.54E+00
05/19/23	1.14E-01	1.70E+00	4.15E-03	2.05E+00
06/21/23	6.98E-02	1.07E+00	<MDL	2.24E+00
08/02/23	1.16E-01	2.34E+00	3.72E-03	2.55E+00
08/30/23	9.56E-02	2.52E+00	8.14E-03	2.56E+00

Sample Type: Near Field (107), ambient air
Year: 2023
Analysis Performed: Cations

Start Date	Sodium ng/m³	Ammonium ng/m³	Magnesium ng/m³	Potassium ng/m³	Calcium ng/m³
01/06/23	1.90E-01	7.71E-02	7.68E-02	1.51E-01	6.71E-01
01/27/23	3.34E-01	3.02E-01	7.55E-02	1.08E-01	9.68E-01
03/01/23	3.13E-01	3.69E-01	8.27E-02	3.40E-01	8.76E-01
03/29/23	3.78E-01	3.52E-01	8.95E-02	2.35E-01	9.06E-01
04/14/23					
04/28/23					
05/19/23					
06/21/23					
08/02/23					
08/30/23					

Sample Type: Cactus Flats (108), ambient air
Year: 2023
Analysis Performed: Cations

Start Date	Sodium ng/m³	Ammonium ng/m³	Magnesium ng/m³	Potassium ng/m³	Calcium ng/m³
01/06/23	2.37E-01	1.47E-01	5.36E-02	6.74E-02	8.82E-01
01/27/23	2.40E-01	2.82E-01	5.33E-02	6.90E-02	1.14E+00
03/01/23	1.96E-01	2.73E-01	5.74E-02	2.10E-01	9.85E-01
03/29/23	2.07E-01	3.52E-01	6.73E-02	2.33E-01	1.11E+00
04/14/23					
04/28/23					
05/19/23					
06/21/23					
08/02/23					
08/30/23					

Internal Dosimetry Group

Number of *in vivo* radiobioassay measurements performed during the reporting period:
Three for WIPP, 56 for the contract radiological personnel and those working in the laboratories located at CEMRC, and 2 for the public participants.

CEMRC Lung and Whole-Body APEX In-Vivo radiobioassay measurement system annual energy and efficiency calibrations for the 2024-2025 period:
Performed successfully the annual energy and efficiency calibrations of CEMRC Lung and Whole-Body APEX *In-vivo* radiobioassay measurement system during January-March 2024.

Outreach activities:
The Internal Dosimetry group continues to interact with the public to encourage citizens to participate in the Lie Down and Be Counted (LDBC) project's lung and whole body in-vivo radiobioassay measurements at CEMRC. CEMRC also promotes awareness of environmental monitoring and research to the public.

The following activities took place during the reporting period of January 1st to March 31st, 2024:

2/1/2024: Explained and handed out the flyers about Lie down and Be Counted program to two public transit employees.

2/12/2024: Explained and handed out the flyers about Lie down and Be Counted program and demonstrated the lung and whole-body radiobioassay measurement to the WIPP visitors.