Quarterly Report

Calendar Year 2023 – Third Quarter, July 1 – September 30, 2023

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 July 1st to September 30th, a total of 133 filters from the primary skid at Station A, of which 109 were sample filters, 12 were trip blanks and 12 were filter blanks, were collected. In addition, 156 filters were collected from the backup skid at Station A (132 sample filters, 12 trip blank filters and 12 filter blanks). One hundred and seventeen filters were collected from the primary skid at Station B, (93 sample filters, 12 trip blanks and 12 filter blanks). One hundred and eighteen filters were collected from Station B backup (94 sample filters, 12 trip blanks and 12 filter blanks), during the same time period. Station B was down due to the running of Station H. A total of 19 filters were collected from Station H, (13 sample filters, 3 trip blanks and 3 filter blanks).

All 133 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 156 of the Station A backup filters have been processed and transferred to the Environmental Chemistry group (EC). All 235 filters from each skid (primary and backup) at Station B have been processed and transferred to RC and EC, respectively.

Ambient Air Sampling

From July 1st to September 30th, 24 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

Eight Whatman-41 filters and 4 trip blank filters were collected from July 1st to September 30th, 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

No soil samples were collected in the 3rd quarter, processing will begin once all 36 samples are collected.

Surface Water Monitoring

From July 1st to September 30th, no surface water samples were collected. FP is planning on collecting surface water samples in October 2023.

Drinking Water Monitoring

From July 1st to September 30th, no drinking water samples were collected. FP is planning on collecting drinking water samples in October 2023.

Sediment Monitoring

No sediment sampling was performed from July 1st to September 30th. FP is planning on collecting sediment samples in October 2023.

Nuclear Materials Management and Safeguards

From July 1st to September 30th the Radiation Safety group (RS) has collected and bulked Rad waste from NMSU, LANL and the WIPP Labs groups working in this facility. RS has performed monthly surveys of all Rad laboratories in the building, including smears and dose rate measurements. All fume hoods are face velocity checked quarterly. All fume hoods are face-velocity checked quarterly. The date of the last inspection was September 21, 2023. 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 October 2023. The complete results for gross alpha and gross beta counts on FAS filters from Station A and Station B through October 2023 were submitted to CBFO on November 13, 2023.

Between July 1st and September 30th 2023 the total number of samples processed includes the following:

- 20 HiVol samples were analyzed for gamma-radiation-emitting radionuclides (^{137}Cs, ^{60}Co, and ^{40}K).
- 45 FAS Station A samples were analyzed for gamma-radiation-emitting radionuclides (^{137}Cs, ^{60}Co, and ^{40}K).
- 48 FAS Station A samples were analyzed for alpha-radiation-emitting radionuclides (isotopes of U, Pu, and Am).
- 12 FAS Station B samples were analyzed for alpha-radiation-emitting radionuclides (isotopes of U, Pu, and Am).
- 6 water samples were analyzed for alpha-radiation-emitting radionuclides (isotopes of U, Pu, and Am).
- 2 soil samples were analyzed for alpha-radiation-emitting radionuclides (isotopes of U, Pu, and Am).
- 48 FAS Station A samples were analyzed for the betta-radiation-emitting radionuclide ^{90}Sr.
- 12 FAS Station B samples were analyzed for the betta-radiation-emitting radionuclide ^{90}Sr.
- 6 water samples were analyzed for the beta-radiation-emitting radionuclide ^{90}Sr.
- 6 soil samples were analyzed for the betta-radiation-emitting radionuclide ^{90}Sr.

Characteristic results are shown in the following tables.

As of September 30, 2023 the annual service contract with Mirion Technologies was still not in place and alpha and beta radiation detectors could not be serviced.

FAS Station A Filter Analysis – ^{40}K

2022	WEEK	SID	flow(M3)	wt(mg)	wt(g)	aliquot	Act/unit	Unc	MDC	Bq/m3	Unc	MDC	Status	Bq/g	Unc	MDC	Status
January	1st	47852	572.0074	24.55999756	0.02456	0.5	2.89E-01	1.33E-01	4.27E-01	1.01E-03	4.63E-04	1.49E-03	Not detected	2.35E+01	1.08E+01	3.48E+01	Not detected
	2nd	48323	560.7926	69.13001251	0.06913001	0.5	-2.13E-01	1.39E-01	4.74E-01	-7.59E-04	4.95E-04	1.69E-03	Not detected	-6.16E+00	4.02E+00	1.37E+01	Not detected
	3rd	48324	568.7222	98.16001129	0.09816001	0.5	1.64E-01	1.31E-01	4.35E-01	5.75E-04	4.59E-04	1.53E-03	Not detected	3.33E+00	2.66E+00	8.85E+00	Not detected
	4th	48325	806.72	109.9199982	0.10992	0.5	-3.77E-01	1.44E-01	4.97E-01	-9.35E-04	3.57E-04	1.23E-03	Not detected	-6.86E+00	2.62E+00	9.04E+00	Not detected
February	1st	48326	569.855	152.9400101	0.15294001	0.5	2.82E-02	1.28E-01	4.39E-01	9.89E-05	4.48E-04	1.54E-03	Not detected	3.68E-01	1.67E+00	5.74E+00	Not detected
	2nd	48327	572.1206	142.8799973	0.14288	0.5	2.85E-01	1.34E-01	4.33E-01	9.96E-04	4.69E-04	1.51E-03	Not detected	3.99E+00	1.88E+00	6.06E+00	Not detected
	3rd	48328	567.3062	184.609993	0.18460999	0.5	-3.79E-01	1.40E-01	4.85E-01	-1.34E-03	4.94E-04	1.71E-03	Not detected	-4.10E+00	1.52E+00	5.25E+00	Not detected
	4th	48329	570.8179	192.3700027	0.19237	0.5	1.00E-01	1.51E-01	5.03E-01	3.52E-04	5.30E-04	1.76E-03	Not detected	1.04E+00	1.57E+00	5.23E+00	Not detected
March	1st	48330	571.6109	65.92999268	0.06592999	0.5	7.46E-02	1.35E-01	4.58E-01	2.61E-04	4.71E-04	1.60E-03	Not detected	2.26E+00	4.08E+00	1.39E+01	Not detected
	2nd	48331	569.4019	264.9500046	0.26495	0.5	-1.63E-01	1.53E-01	5.17E-01	-5.72E-04	5.36E-04	1.82E-03	Not detected	-1.23E+00	1.15E+00	3.91E+00	Not detected
	3rd	48332	571.6109	544.9500122	0.54495001	0.5	-4.42E-02	1.52E-01	5.11E-01	-1.55E-04	5.32E-04	1.79E-03	Not detected	-1.62E-01	5.58E-01	1.88E+00	Not detected
	4th	48933	809.7972	763.4400482	0.76344005	0.5	-2.71E-01	1.40E-01	4.80E-01	-6.69E-04	3.46E-04	1.19E-03	Not detected	-7.10E-01	3.67E-01	1.26E+00	Not detected
April	1st	48934	571.3277	101.1700058	0.10117001	0.5	1.17E-01	1.31E-01	4.40E-01	4.11E-04	4.58E-04	1.54E-03	Not detected	2.32E+00	2.59E+00	8.71E+00	Not detected
	2nd	48935	543.2857	291.5800095	0.29158001	0.5	2.27E-01	1.38E-01	4.55E-01	8.36E-04	5.09E-04	1.67E-03	Not detected	1.56E+00	9.49E-01	3.12E+00	Not detected
	3rd	48936	595.0101	245.1100006	0.24511	0.5	-2.11E-01	1.40E-01	4.78E-01	-7.08E-04	4.71E-04	1.61E-03	Not detected	-1.72E+00	1.14E+00	3.90E+00	Not detected
	4th	48937	735.8216	178.3800049	0.17838	0.5	-1.11E-01	1.24E-01	4.41E-01	-3.01E-04	3.36E-04	1.20E-03	Not detected	-1.24E+00	1.39E+00	4.94E+00	Not detected
May	1st	48938	571.7671	136.25	0.13625	0.5	1.59E-01	1.36E-01	4.53E-01	5.54E-04	4.75E-04	1.58E-03	Not detected	2.33E+00	1.99E+00	6.64E+00	Not detected
	2nd	48939	561.1988	196.4000015	0.1964	0.5	-9.92E-02	1.44E-01	4.88E-01	-3.54E-04	5.14E-04	1.74E-03	Not detected	-1.01E+00	1.47E+00	4.97E+00	Not detected
	3rd	48940	567.1969	239.9599915	0.23995999	0.5	2.75E-01	1.31E-01	4.23E-01	9.69E-04	4.61E-04	1.49E-03	Not detected	2.29E+00	1.09E+00	3.53E+00	Not detected
	4th	48941	706.0923	158.8200073	0.15882001	0.5	-1.30E-01	1.44E-01	4.86E-01	-3.68E-04	4.07E-04	1.38E-03	Not detected	-1.63E+00	1.81E+00	6.12E+00	Not detected
June	1st	48942	561.3884	120.2000046	0.1202	0.5	-2.93E-01	1.38E-01	4.75E-01	-1.04E-03	4.92E-04	1.69E-03	Not detected	-4.87E+00	2.30E+00	7.90E+00	Not detected
	2nd	49453	528.6353	182.0400085	0.18204001	0.5	-2.15E-01	1.47E-01	5.02E-01	-8.14E-04	5.57E-04	1.90E-03	Not detected	-2.36E+00	1.62E+00	5.51E+00	Not detected
	3rd	49454	581.5995	208.1299896	0.20812999	0.5	2.31E-01	1.40E-01	4.59E-01	7.95E-04	4.81E-04	1.58E-03	Not detected	2.22E+00	1.34E+00	4.41E+00	Not detected
	4th	49455	733.1698	195.2299881	0.19522999	0.5	-1.05E-01	1.35E-01	4.76E-01	-2.87E-04	3.68E-04	1.30E-03	Not detected	-1.08E+00	1.38E+00	4.88E+00	Not detected
July	1st	49456	570.2515	116.4300003	0.11643	0.5	-3.05E-01	1.40E-01	4.81E-01	-1.07E-03	4.90E-04	1.69E-03	Not detected	-5.24E+00	2.40E+00	8.26E+00	Not detected
	2nd	49457	565.4601	155.9000015	0.1559	0.5	2.11E-01	1.38E-01	4.56E-01	7.45E-04	4.89E-04	1.61E-03	Not detected	2.70E+00	1.77E+00	5.85E+00	Not detected
	3rd	49458	571.5542	243.9799881	0.24397999	0.5	-2.99E-02	1.49E-01	4.99E-01	-1.05E-04	5.20E-04	1.75E-03	Not detected	-2.45E-01	1.22E+00	4.09E+00	Not detected
	4th	49459	814.3283	200.5500031	0.20055	0.5	-1.94E-01	1.46E-01	4.98E-01	-4.75E-04	3.59E-04	1.22E-03	Not detected	-1.93E+00	1.46E+00	4.96E+00	Not detected
August	1st	49460	570.8746	230.3499908	0.23034999	0.5	-1.99E-01	1.49E-01	5.06E-01	-6.96E-04	5.21E-04	1.77E-03	Not detected	-1.72E+00	1.29E+00	4.39E+00	Not detected
	2nd	49461	570.5914	243.1200104	0.24312001	0.5	1.57E-01	1.32E-01	4.40E-01	5.49E-04	4.62E-04	1.54E-03	Not detected	1.29E+00	1.09E+00	3.62E+00	Not detected
	3rd	49462	567.3935	121.7600174	0.12176002	0.5	1.78E-01	1.35E-01	4.47E-01	6.27E-04	4.75E-04	1.58E-03	Not detected	2.92E+00	2.21E+00	7.34E+00	Not detected
	4th	50163	804.4227	127.0400009	0.12704	0.5	1.90E-01	1.25E-01	4.12E-01	4.71E-04	3.11E-04	1.03E-03	Not detected	2.98E+00	1.97E+00	6.49E+00	Not detected
September	1st	50164	570.4214	50.18999481	0.05018999	0.5	-2.38E-02	1.31E-01	4.54E-01	-8.34E-05	4.58E-04	1.59E-03	Not detected	-9.48E-01	5.21E+00	1.81E+01	Not detected
	2nd	50165	566.1769	59.64000702	0.05964001	0.5	-2.80E-01	1.36E-01	4.68E-01	-9.87E-04	4.80E-04	1.65E-03	Not detected	-9.37E+00	4.56E+00	1.57E+01	Not detected
	3rd	50166	562.9558	105.7699966	0.10577	0.5	-2.27E-01	1.30E-01	4.73E-01	-8.06E-04	4.62E-04	1.68E-03	Not detected	-4.29E+00	2.46E+00	8.94E+00	Not detected
	4th	50167	735.9235	224.0500031	0.22405	0.5	-6.98E-02	1.34E-01	4.69E-01	-1.90E-04	3.64E-04	1.28E-03	Not detected	-6.23E-01	1.19E+00	4.19E+00	Not detected
October	1st	50168	566.5389	164.3499985	0.16435	0.5	3.13E-01	1.31E-01	4.21E-01	1.10E-03	4.64E-04	1.48E-03	Not detected	3.81E+00	1.60E+00	5.12E+00	Not detected
	2nd	50169	570.5664	182.8800125	0.18288001	0.5	-1.82E-01	1.41E-01	4.79E-01	-6.38E-04	4.93E-04	1.68E-03	Not detected	-1.99E+00	1.54E+00	5.24E+00	Not detected
	3rd	50170	568.3824	130.6100006	0.13061	0.5	-3.55E-01	1.20E-01	4.20E-01	-1.25E-03	4.23E-04	1.48E-03	Not detected	-5.44E+00	1.84E+00	6.44E+00	Not detected
	4th	50171	815.1171	123.8599854	0.12385999	0.5	-1.83E-01	1.40E-01	4.76E-01	-4.50E-04	3.43E-04	1.17E-03	Not detected	-2.96E+00	2.26E+00	7.69E+00	Not detected
November	1st	50172	570.5914	130.5899963	0.13059	0.5	1.50E-01	1.29E-01	4.31E-01	5.25E-04	4.52E-04	1.51E-03	Not detected	2.29E+00	1.98E+00	6.60E+00	Not detected
	2nd	50363	563.9078	97.15000153	0.09715	0.5	-1.98E-01	1.41E-01	4.81E-01	-7.03E-04	5.00E-04	1.71E-03	Not detected	-4.08E+00	2.90E+00	9.90E+00	Not detected
	3rd	50364	569.7984	132.9900055	0.13299001	0.5	2.33E-01	1.31E-01	4.29E-01	8.17E-04	4.60E-04	1.50E-03	Not detected	3.50E+00	1.97E+00	6.44E+00	Not detected
	4th	50365	735.4704	125.5500031	0.12555	0.5	-3.85E-01	1.17E-01	4.12E-01	-1.05E-03	3.19E-04	1.12E-03	Not detected	-6.13E+00	1.87E+00	6.57E+00	Not detected
December	1st	50366	570.2515	101.4900208	0.10149002	0.5	1.72E-01	1.23E-01	4.07E-01	6.03E-04	4.31E-04	1.43E-03	Not detected	3.39E+00	2.42E+00	8.02E+00	Not detected
	2nd	50367	566.8661	118.8399887	0.11883999	0.5	-1.75E-01	1.35E-01	4.83E-01	-6.18E-04	4.76E-04	1.70E-03	Not detected	-2.95E+00	2.27E+00	8.13E+00	Not detected
	3rd	50368	568.5869	145.5599976	0.14556	0.5	9.17E-03	1.49E-01	4.99E-01	3.23E-05	5.24E-04	1.76E-03	Not detected	1.26E-01	2.05E+00	6.86E+00	Not detected
	4th	50369	811.0848	247.7899704	0.24778997	0.5	-1.36E-01	1.47E-01	4.99E-01	-3.35E-04	3.63E-04	1.23E-03	Not detected	-1.10E+00	1.19E+00	4.03E+00	Not detected

FAS Station B Filter Analysis – Uranium Isotopes

		Bq/unit	Unc, 2 sigma	MDC		Bq/total	Unc, 2 sigma	MDC	Flow vol, m3	wt(mg)	wt(g)	Bq/m3	Unc, 2 sigma	MDC (Bq/m3)	Bq/g	Unc, 2 sigma	MDC (Bq/g)	Status
U234	BM122	1.45E-03	2.76E-04	1.52E-04		5.78E-03	1.10E-03	6.06E-04	2356.5072	6.65000916	0.006650009	2.45E-06	4.68E-07	2.57E-07	8.69E-01	1.66E-01	9.12E-02	Detected
	BM222	3.51E-04	1.47E-04	2.34E-04		1.40E-03	5.87E-04	9.34E-04	2186.24736	10.7500153	0.010750015	6.41E-07	2.68E-07	4.27E-07	1.30E-01	5.46E-02	8.69E-02	Detected
	BM322	4.14E-04	1.49E-04	1.81E-04		1.65E-03	5.96E-04	7.24E-04	2230.36992	9.49003601	0.009490036	7.42E-07	2.67E-07	3.25E-07	1.74E-01	6.28E-02	7.63E-02	Detected
	BM422	9.06E-04	2.38E-04	2.55E-04		3.62E-03	9.50E-04	1.02E-03	2003.80992	14.6899796	0.01468998	1.81E-06	4.74E-07	5.10E-07	2.47E-01	6.47E-02	6.95E-02	Detected
	BM522	1.76E-03	3.76E-04	3.57E-04		7.04E-03	1.50E-03	1.43E-03	2514.98592	38.2200089	0.038220009	2.80E-06	5.97E-07	5.68E-07	1.84E-01	3.93E-02	3.74E-02	Detected
	BM622	9.46E-05	9.33E-05	1.90E-04		3.79E-04	3.73E-04	7.61E-04	2445.1488	43.4799957	0.043479996	1.55E-07	1.53E-07	3.11E-07	8.71E-03	8.58E-03	1.75E-02	NotDetected
	BM722	1.77E-03	3.71E-04	3.04E-04		7.08E-03	1.48E-03	1.21E-03	2529.48576	42.1899872	0.042189987	2.80E-06	5.86E-07	4.80E-07	1.68E-01	3.51E-02	2.88E-02	Detected
	BM822	6.05E-04	1.91E-04	2.30E-04		2.42E-03	7.64E-04	9.20E-04	2524.95456	38.5200043	0.038520004	9.58E-07	3.02E-07	3.64E-07	6.28E-02	1.98E-02	2.39E-02	Detected
	BM922	3.20E-04	1.52E-04	2.57E-04		1.28E-03	6.09E-04	1.03E-03	2449.45344	34.2999954	0.034299995	5.23E-07	2.49E-07	4.20E-07	3.74E-02	1.77E-02	3.00E-02	Detected
	BM1022	5.69E-04	1.91E-04	2.59E-04		2.27E-03	7.65E-04	1.04E-03	2518.83744	3.72000122	0.003720001	9.03E-07	3.04E-07	4.11E-07	6.12E-01	2.06E-01	2.78E-01	Detected
	BM1122	1.25E-03	2.72E-04	2.46E-04		4.98E-03	1.09E-03	9.84E-04	2446.33824	13.0299835	0.013029984	2.04E-06	4.44E-07	4.02E-07	3.82E-01	8.34E-02	7.55E-02	Detected
	BM1222	1.18E-04	8.35E-05	1.47E-04		4.72E-04	3.34E-04	5.87E-04	2525.35104	10.5900116	0.010590012	1.87E-07	1.32E-07	2.33E-07	4.46E-02	3.15E-02	5.54E-02	NotDetected

						Bq/total	Unc, 2 sigma	MDC	Flow vol, m3	wt(mg)	wt(g)	Bq/m3	Unc, 2 sigma	MDC (Bq/m3)	Bq/g	Unc, 2 sigma	MDC (Bq/g)	Status
U235	BM122	1.07E-05	4.80E-05	1.29E-04		1.40E-03	5.87E-04	9.34E-04	2356.5072	6.65000916	0.006650009	5.95E-07	2.49E-07	3.97E-07	2.11E-01	8.82E-02	1.41E-01	Detected
	BM222	1.69E-04	1.09E-04	1.84E-04		6.75E-04	4.36E-04	7.35E-04	2186.24736	10.7500153	0.010750015	3.09E-07	1.99E-07	3.36E-07	6.28E-02	4.06E-02	6.84E-02	NotDetected
	BM322	3.44E-04	1.49E-04	1.88E-04		1.38E-03	5.95E-04	7.53E-04	2230.36992	9.49003601	0.009490036	6.17E-07	2.67E-07	3.38E-07	1.45E-01	6.27E-02	7.93E-02	Detected
	BM422	7.45E-04	2.20E-04	1.81E-04		2.98E-03	8.80E-04	7.25E-04	2003.80992	14.6899796	0.01468998	1.49E-06	4.39E-07	3.62E-07	2.03E-01	5.99E-02	4.93E-02	Detected
	BM522	1.32E-03	3.22E-04	1.82E-04		5.28E-03	1.29E-03	7.30E-04	2514.98592	38.2200089	0.038220009	2.10E-06	5.12E-07	2.90E-07	1.38E-01	3.37E-02	1.91E-02	Detected
	BM622	2.34E-05	5.73E-05	1.40E-04		9.34E-05	2.29E-04	5.61E-04	2445.1488	43.4799957	0.043479996	3.82E-08	9.37E-08	2.29E-07	2.15E-03	5.27E-03	1.29E-02	NotDetected
	BM722	1.33E-03	3.33E-04	2.66E-04		5.32E-03	1.33E-03	1.06E-03	2529.48576	42.1899872	0.042189987	2.10E-06	5.27E-07	4.21E-07	1.26E-01	3.16E-02	2.52E-02	Detected
	BM822	2.78E-04	1.27E-04	1.17E-04		1.11E-03	5.09E-04	4.70E-04	2524.95456	38.5200043	0.038520004	4.41E-07	2.02E-07	1.86E-07	2.89E-02	1.32E-02	1.22E-02	Detected
	BM922	2.21E-04	1.40E-04	2.48E-04		8.84E-04	5.58E-04	9.91E-04	2449.45344	34.2999954	0.034299995	3.61E-07	2.28E-07	4.05E-07	2.58E-02	1.63E-02	2.89E-02	NotDetected
	BM1022	2.00E-04	1.19E-04	1.77E-04	0	8.02E-04	4.78E-04	7.06E-04	2518.83744	3.72000122	0.003720001	3.18E-07	1.90E-07	2.80E-07	2.15E-01	1.28E-01	1.90E-01	Detected
	BM1122	5.00E-04	1.83E-04	2.24E-04		2.00E-03	7.30E-04	8.96E-04	2446.33824	13.0299835	0.013029984	8.18E-07	2.99E-07	3.66E-07	1.54E-01	5.61E-02	6.88E-02	Detected
	BM1222	4.16E-05	5.90E-05	1.25E-04		1.66E-04	2.36E-04	5.00E-04	2525.35104	10.5900116	0.010590012	6.59E-08	9.34E-08	1.98E-07	1.57E-02	2.23E-02	4.72E-02	NotDetected

						Bq/total	Unc, 2 sigma	MDC	Flow vol, m3	wt(mg)	wt(g)	Bq/m3	Unc, 2 sigma	MDC (Bq/m3)	Bq/g	Unc, 2 sigma	MDC (Bq/g)	Status
U238	BM122	1.47E-04	1.07E-04	2.04E-04		5.89E-04	4.26E-04	8.15E-04	2356.5072	6.65000916	0.006650009	2.50E-07	1.81E-07	3.46E-07	8.86E-02	6.41E-02	1.23E-01	NotDetected
	BM222	1.70E-05	1.30E-04	3.19E-04		6.81E-05	5.19E-04	1.28E-03	2186.24736	10.7500153	0.010750015	3.12E-08	2.37E-07	5.84E-07	6.34E-03	4.83E-02	1.19E-01	NotDetected
	BM322	1.92E-04	1.37E-04	2.70E-04		7.66E-04	5.48E-04	1.08E-03	2230.36992	9.49003601	0.009490036	3.43E-07	2.46E-07	4.84E-07	8.07E-02	5.77E-02	1.14E-01	NotDetected
	BM422	6.02E-04	2.23E-04	3.62E-04		2.41E-03	8.91E-04	1.45E-03	2003.80992	14.6899796	0.01468998	1.20E-06	4.45E-07	7.23E-07	1.64E-01	6.06E-02	9.86E-02	Detected
	BM522	1.31E-03	3.15E-04	3.24E-04		5.24E-03	1.26E-03	1.30E-03	2514.98592	38.2200089	0.038220009	2.09E-06	5.01E-07	5.15E-07	1.37E-01	3.30E-02	3.39E-02	Detected
	BM622	-2.83E-05	9.04E-05	2.49E-04		-1.13E-04	3.62E-04	9.96E-04	2445.1488	43.4799957	0.043479996	-4.62E-08	1.48E-07	4.07E-07	-2.60E-03	8.32E-03	2.29E-02	NotDetected
	BM722	1.37E-03	3.20E-04	3.02E-04		5.48E-03	1.28E-03	1.21E-03	2529.48576	42.1899872	0.042189987	2.16E-06	5.06E-07	4.78E-07	1.30E-01	3.03E-02	2.87E-02	Detected
	BM822	3.98E-04	1.16E-04	2.18E-04		1.59E-03	4.63E-04	8.70E-04	2524.95456	38.5200043	0.038520004	6.31E-07	1.83E-07	3.45E-07	4.13E-02	1.20E-02	2.26E-02	Detected
	BM922	1.88E-04	1.37E-04	2.72E-04		7.51E-04	5.47E-04	1.09E-03	2449.45344	34.2999954	0.034299995	3.07E-07	2.23E-07	4.45E-07	2.19E-02	1.60E-02	3.18E-02	NotDetected
	BM1022	3.54E-04	1.62E-04	2.67E-04		1.42E-03	6.49E-04	1.07E-03	2518.83744	3.72000122	0.003720001	5.62E-07	2.58E-07	4.24E-07	3.81E-01	1.75E-01	2.87E-01	Detected
	BM1122	7.69E-04	2.08E-04	2.26E-04		3.08E-03	8.33E-04	9.04E-04	2446.33824	13.0299835	0.013029984	1.26E-06	3.40E-07	3.69E-07	2.36E-01	6.39E-02	6.93E-02	Detected
	BM1222	4.20E-05	9.05E-05	2.14E-04		1.68E-04	3.62E-04	8.56E-04	2525.35104	10.5900116	0.010590012	6.65E-08	1.43E-07	3.39E-07	1.59E-02	3.42E-02	8.08E-02	NotDetected

HiVol Filter Analysis – ^{60}Co

Batch	Date	Location	site	SID	flow(ft^3)	flow(M^3)	weight(g)	Act Bq/unit	unc 2 sigma	MDA	Bq/m3	Unc	MDC	Status	Bq/g	Unc	MDC	Status
Co-60																		
2381	1/14/2021	Onsite	106	45475	984763	27888.49	1.407	7.10E-03	1.42E-02	4.81E-02	2.54E-07	5.09E-07	1.72E-06	not detected	5.04E-03	1.01E-02	3.42E-02	not detected
2387	2/2/2021	Onsite	106	45481	2.00E+06	56640.00	1.738	1.21E-02	9.64E-03	3.19E-02	2.13E-07	1.70E-07	5.64E-07	not detected	6.94E-03	5.55E-03	1.84E-02	not detected
2388	3/2/2021	Onsite	106	45807	956154	27078.28	2.269	4.33E-03	1.16E-02	3.86E-02	1.60E-07	4.27E-07	1.43E-06	not detected	1.91E-03	5.10E-03	1.70E-02	not detected
2395	3/23/2021	Onsite	106	45813	1.00E+06	28320.00	2.832	4.16E-02	9.64E-03	3.03E-02	1.47E-06	3.40E-07	1.07E-06	detected	1.47E-02	3.40E-03	1.07E-02	detected
2396	4/20/2021	Onsite	106	46683	1.00E+06	28320.00	1.720	1.29E-02	1.89E-02	6.33E-02	4.57E-07	6.66E-07	2.24E-06	not detected	7.52E-03	1.10E-02	3.68E-02	not detected
2407	5/18/2021	Onsite	106	46690	186030	5268.37	4.725	2.79E-02	1.55E-02	5.07E-02	5.30E-06	2.94E-06	9.62E-06	not detected	5.91E-03	3.28E-03	1.07E-02	not detected
2408	6/30/2021	Onsite	106	46696	2.00E+06	56640.00	2.953	2.40E-02	1.47E-02	4.84E-02	4.24E-07	2.60E-07	8.54E-07	not detected	8.13E-03	4.98E-03	1.64E-02	not detected
2422	8/10/2021	Onsite	106	46702	1.00E+06	28320.00	1.353	-6.12E-03	6.84E-03	2.38E-02	-2.16E-07	2.42E-07	8.40E-07	not detected	-4.52E-03	5.06E-03	1.76E-02	not detected
2423	9/2/2022	Onsite	106	46708	2.00E+06	56640.00	2.782	4.56E-03	6.66E-03	2.24E-02	8.05E-08	1.18E-07	3.95E-07	not detected	1.64E-03	2.39E-03	8.05E-03	not detected
2438	10/8/2021	Onsite	106	46714	1056825.1	29929.29	1.344	7.51E-03	6.48E-03	2.15E-02	2.51E-07	2.17E-07	7.18E-07	not detected	5.59E-03	4.82E-03	1.60E-02	not detected
2439	10/26/2021	Onsite	106	47823	384395	10886.07	0.581	6.79E-03	1.92E-02	6.50E-02	6.24E-07	1.76E-06	5.97E-06	not detected	1.17E-02	3.30E-02	1.12E-01	not detected
2440	11/2/2021	Onsite	106	47687	1.72E+06	48623.52	2.608	1.26E-02	1.23E-02	4.10E-02	2.59E-07	2.54E-07	8.42E-07	not detected	4.82E-03	4.73E-03	1.57E-02	not detected
	12/3/2021	Onsite	106	47692	1.15E+06	32675.55	2.293	5.10E-03	9.89E-03	3.33E-02	1.56E-07	3.03E-07	1.02E-06	not detected	2.22E-03	4.31E-03	1.45E-02	not detected
	12/23/2021	Onsite	106	47701	2.29E+06	64839.76	2.605	1.60E-02	7.78E-03	2.53E-02	2.47E-07	1.20E-07	3.90E-07	not detected	6.16E-03	2.99E-03	9.72E-03	not detected
				Max	2000000	56640	4.725	4.16E-02	1.92E-02	6.50E-02	5.30E-06	2.94E-06	9.62E-06		1.47E-02	3.30E-02	1.12E-01	
				Min	186030	5268	0.581	-6.12E-03	6.48E-03	2.15E-02	-2.16E-07	1.18E-07	3.95E-07		-4.52E-03	2.39E-03	8.05E-03	
				Avg.	1190424.9	33713	2.193	1.29E-02	1.21E-02	4.04E-02	7.73E-07	6.58E-07	2.19E-06		5.78E-03	7.78E-03	2.61E-02	
2381	1/14/2021	Near Field	107	45476	801771	22706.2	0.994	-1.91E-02	1.38E-02	4.90E-02	-8.43E-07	6.07E-07	2.16E-06	not detected	-1.93E-02	1.39E-02	4.93E-02	not detected
2387	2/2/2021	Near Field	107	45482	1.00E+06	28320.0	1.306	-2.21E-02	1.69E-02	5.89E-02	-7.79E-07	5.96E-07	2.08E-06	not detected	-1.69E-02	1.29E-02	4.51E-02	not detected
2388	3/2/2021	Near Field	107	45808	938984	26592.0	2.198	4.34E-02	1.78E-02	5.78E-02	1.63E-06	6.70E-07	2.17E-06	not detected	1.97E-02	8.10E-03	2.63E-02	not detected
2395	3/23/2021	Near Field	107	45814	1.00E+06	28320.0	1.703	1.53E-04	6.79E-03	2.32E-02	5.40E-09	2.40E-07	8.20E-07	not detected	8.98E-05	3.99E-03	1.36E-02	not detected
2396	4/20/2021	Near Field	107	46684	1.00E+06	28320.0	2.051	-1.61E-02	1.74E-02	6.07E-02	-5.70E-07	6.15E-07	2.14E-06	not detected	-7.87E-03	8.50E-03	2.96E-02	not detected
2407	5/18/2021	Near Field	107	46691	2.00E+06	56640.0	3.259	3.03E-02	1.41E-02	4.58E-02	5.34E-07	2.49E-07	8.08E-07	not detected	9.28E-03	4.33E-03	1.40E-02	not detected
2408	6/30/2021	Near Field	107	46697	2.00E+06	56640.0	2.238	-5.50E-04	1.36E-02	4.62E-02	-9.72E-09	2.40E-07	8.15E-07	not detected	-2.46E-04	6.08E-03	2.06E-02	not detected
2422	8/10/2021	Near Field	107	46703	1.00E+06	28320.0	1.205	1.15E-02	1.55E-02	5.23E-02	4.06E-07	5.47E-07	1.85E-06	not detected	9.54E-03	1.29E-02	4.34E-02	not detected
2423	9/2/2022	Near Field	107	46709	9.43E+05	26715.1	1.277	1.26E-02	1.52E-02	5.13E-02	4.72E-07	5.69E-07	1.92E-06	not detected	9.87E-03	1.19E-02	4.02E-02	not detected
2438	10/8/2021	Near Field	107	46716	9.92E+05	28088.2	1.203	6.60E-04	1.48E-02	5.09E-02	2.35E-08	5.27E-07	1.81E-06	not detected	5.49E-04	1.23E-02	4.23E-02	not detected
2439	10/26/2021	Near Field	107	47824	384745.6	10896.0	0.612	1.31E-02	2.03E-02	6.81E-02	1.20E-06	1.86E-06	6.25E-06	not detected	2.14E-02	3.31E-02	1.11E-01	not detected
2440	11/2/2021	Near Field	107	47688	1.54E+06	43748.2	2.054	-5.05E-03	1.74E-02	6.00E-02	-1.15E-07	3.97E-07	1.37E-06	not detected	-2.46E-03	8.45E-03	2.92E-02	not detected
	12/3/2321	Near Field	107	47694	8.71E+05	24679.6	1.339	2.30E-02	1.65E-02	5.47E-02	9.31E-07	6.70E-07	2.22E-06	not detected	1.72E-02	1.23E-02	4.09E-02	not detected
	12/23/2021	Near Field	107	46332	2.08E+06	58781.9	2.057	2.40E-02	1.69E-02	5.59E-02	4.08E-07	2.88E-07	9.52E-07	not detected	1.16E-02	8.22E-03	2.72E-02	not detected
				Max	2000000	56640	3.259	4.34E-02	2.03E-02	6.81E-02	1.63E-06	1.86E-06	6.25E-06		2.14E-02	3.31E-02	1.11E-01	
				Min	384745.6	10896	0.612	-2.21E-02	6.79E-03	2.32E-02	-8.43E-07	2.40E-07	8.08E-07		-1.93E-02	3.99E-03	1.36E-02	
				Avg.	1133785.5	32109	1.675	4.06E-03	1.53E-02	5.20E-02	1.63E-07	5.93E-07	2.02E-06		1.98E-03	1.14E-02	3.87E-02	
2381	1/14/2021	Cactus Flats	108	45477	826632	23410.2	1.174	3.21E-03	7.14E-03	2.41E-02	1.37E-07	3.05E-07	1.03E-06	not detected	2.74E-03	6.08E-03	2.05E-02	not detected
2387	2/2/2021	Cactus Flats	108	45803	1.00E+06	28320.0	1.393	-6.96E-04	8.97E-03	3.03E-02	-2.46E-08	3.17E-07	1.07E-06	not detected	-5.00E-04	6.44E-03	2.18E-02	not detected
2388	3/2/2021	Cactus Flats	108	45809	699603	19812.8	2.104	9.59E-03	8.28E-03	2.75E-02	4.84E-07	4.18E-07	1.39E-06	not detected	4.56E-03	3.94E-03	1.31E-02	not detected
2395	3/23/2021	Cactus Flats	108	45815	1.00E+06	28320.0	1.84	1.35E-02	1.46E-02	4.89E-02	4.78E-07	5.16E-07	1.73E-06	not detected	7.36E-03	7.94E-03	2.66E-02	not detected
2396	4/20/2021	Cactus Flats	108	46685	969475	27455.5	2.057	2.20E-02	1.35E-02	4.45E-02	8.00E-07	4.93E-07	1.62E-06	not detected	1.07E-02	6.58E-03	2.16E-02	not detected
2407	5/18/2021	Cactus Flats	108	46692	2.00E+06	56640.0	3.341	-1.05E-03	1.44E-02	4.95E-02	-1.86E-08	2.54E-07	8.74E-07	not detected	-3.15E-04	4.31E-03	1.48E-02	not detected
2408	6/30/2021	Cactus Flats	108	46698	2.00E+06	56640.0	2.094	2.07E-02	1.94E-02	6.45E-02	3.65E-07	3.42E-07	1.14E-06	not detected	9.89E-03	9.25E-03	3.08E-02	not detected
2422	8/10/2021	Cactus Flats	108	46704	1.00E+06	28320.0	1.106	5.44E-03	2.05E-02	6.94E-02	1.92E-07	7.24E-07	2.45E-06	not detected	4.92E-03	1.85E-02	6.27E-02	not detected
2423	9/2/2022	Cactus Flats	108	46710	2.00E+06	56640.0	2.246	3.67E-02	2.71E-02	8.97E-02	6.48E-07	4.78E-07	1.58E-06	not detected	1.63E-02	1.21E-02	3.99E-02	not detected
2438	10/8/2021	Cactus Flats	108	46717	1.05E+06	29659.7	1.145	3.14E-02	2.82E-02	9.37E-02	1.06E-06	9.51E-07	3.16E-06	not detected	2.74E-02	2.46E-02	8.18E-02	not detected
2439	10/26/2021	Cactus Flats	108	47684	388482.2	11001.8	0.614	1.06E-02	7.52E-03	2.49E-02	9.63E-07	6.84E-07	2.26E-06	not detected	1.72E-02	1.22E-02	4.05E-02	not detected
2440	11/2/2021	Cactus Flats	108	47689	1.77E+06	50249.0	1.995	8.58E-03	8.86E-03	2.96E-02	1.71E-07	1.76E-07	5.88E-07	not detected	4.30E-03	4.44E-03	1.48E-02	not detected
	12/3/2021	Cactus Flats	108	47695	1005306.3	28470.3	1.830	1.94E-02	1.72E-02	5.76E-02	6.81E-07	6.06E-07	2.02E-06	not detected	1.06E-02	9.43E-03	3.15E-02	not detected
	12/23/2021	Cactus Flats	108	47699	2.02E+06	57165.6	2.649	1.35E-02	8.90E-03	2.93E-02	2.36E-07	1.56E-07	5.13E-07	not detected	5.09E-03	3.36E-03	1.11E-02	not detected
				Max	2018558.3	57166	3.341	3.67E-02	2.82E-02	9.37E-02	1.06E-06	9.51E-07	3.16E-06		2.74E-02	2.46E-02	8.18E-02	
				Min	388482.2	11002	0.614	-1.05E-03	7.14E-03	2.41E-02	-2.46E-08	1.56E-07	5.13E-07		-5.00E-04	3.36E-03	1.11E-02	
				Avg.	1266406.6	35865	1.828	1.38E-02	1.46E-02	4.88E-02	4.41E-07	4.59E-07	1.53E-06		8.60E-03	9.23E-03	3.08E-02	

Drinking Water Analysis for Actinides and Gamma-Radiation-Emitting Radionuclides

Am241							Am241					
	SID	Location	collection date	aliquot (mL)	aliquot (L)	Act. Bq	Unc. 2 sig	MDA	Act. (Bq/L)	Unc. 2 sig (Bq/L)	MDA (Bq/L)	STATUS
Am241	49803	Sheep Draw	7/6/2022									
Am241	49804	Sheep Draw-Dup	7/6/2022	1000	1	2.27E-04	1.76E-04	3.28E-04	2.27E-04	1.76E-04	3.28E-04	not detected
Am241	49805	Malaga	7/7/2022	1000	1	-7.21E-05	1.98E-04	5.65E-01	-7.21E-05	1.98E-04	5.65E-01	not detected
Am241	49806	Loving	7/7/2022	1000	1	9.28E-05	8.36E-05	1.62E-04	9.28E-05	8.36E-05	1.62E-04	not detected
Am241	49807	Otis	7/7/2022	1000	1	1.55E-04	5.36E-04	1.32E-03	1.55E-04	5.36E-04	1.32E-03	not detected
Am241	49808	Trip Blank	7/7/2022	1000	1	9.45E-05	7.63E-05	1.33E-04	9.45E-05	7.63E-05	1.33E-04	not detected
Am241	49809	Hobbs	6/14/2022									
Am241	49810	PRV-4	6/14/2022	1000	1	7.34E-05	8.24E-05	1.73E-04	7.34E-05	8.24E-05	1.73E-04	not detected
Am241				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected
Am241				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected

Note: PRV-4 = Double Eagle

Pu238							Pu238					
	SID	Location	collection date	aliquot (mL)	aliquot (L)	Act. Bq	Unc. 2 sig	MDA	Act. (Bq/L)	Unc. 2 sig (Bq/L)	MDA (Bq/L)	
Pu238	49803	Sheep Draw	7/6/2022									
Pu238	49804	Sheep Draw-Dup	7/6/2022	1000	1	1.69E-04	1.27E-04	2.23E-04	1.69E-04	1.27E-04	2.23E-04	not detected
Pu238	49805	Malaga	7/7/2022	1000	1	1.49E-04	1.10E-04	2.01E-04	1.49E-04	1.10E-04	2.01E-04	not detected
Pu238	49806	Loving	7/7/2022	1000	1	1.02E-04	1.15E-04	2.49E-04	1.02E-04	1.15E-04	2.49E-04	not detected
Pu238	49807	Otis	7/7/2022	1000	1	8.57E-05	1.25E-04	2.84E-04	8.57E-05	1.25E-04	2.84E-04	not detected
Pu238	49808	Trip Blank	7/7/2022	1000	1	8.62E-05	9.23E-05	1.93E-04	8.62E-05	9.23E-05	1.93E-04	not detected
Pu238	49809	Hobbs	6/14/2022									
Pu238	49810	PRV-4	6/14/2022	1000	1	5.44E-05	8.90E-05	2.03E-04	5.44E-05	8.90E-05	2.03E-04	not detected
Pu238				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected
Pu238				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected

Pu239							Pu239					
	SID	Location	collection date	aliquot (mL)	aliquot (L)	Act. Bq	Unc. 2 sig	MDA	Act. (Bq/L)	Unc. 2 sig (Bq/L)	MDA (Bq/L)	
Pu239	49803	Sheep Draw	7/6/2022									
Pu239	49804	Sheep Draw-Dup	7/6/2022	1000	1	1.12E-04	8.96E-05	1.30E-04	1.12E-04	8.96E-05	1.30E-04	not detected
Pu239	49805	Malaga	7/7/2022	1000	1	9.60E-05	9.35E-05	1.86E-04	9.60E-05	9.35E-05	1.86E-04	not detected
Pu239	49806	Loving	7/7/2022	1000	1	5.08E-05	7.89E-05	1.77E-04	5.08E-05	7.89E-05	1.77E-04	not detected
Pu239	49807	Otis	7/7/2022	1000	1	-9.08E-12	9.32E-05	2.43E-04	-9.08E-12	9.32E-05	2.43E-04	not detected
Pu239	49808	Trip Blank	7/7/2022	1000	1	7.67E-05	7.71E-05	1.52E-04	7.67E-05	7.71E-05	1.52E-04	not detected
Pu239	49809	Hobbs	6/14/2022									
Pu239	49810	PRV-4	6/14/2022	1000	1	1.27E-04	1.00E-04	1.93E-04	1.27E-04	1.00E-04	1.93E-04	not detected
Pu239				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected
Pu239				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected

U234												
	SID	Location	collection date	aliquot (mL)	aliquot (L)	Act. Bq	Unc. 2 sig	MDA	Act. (Bq/L)	Unc. 2 sig (Bq/L)	MDA (Bq/L)	
U234	49803	Sheep Draw	7/6/2022									
U234	49804	Sheep Draw-Dup	7/6/2022	1000	1	1.22E-01	1.29E-02	1.47E-04	3.64E-02	3.87E-03	1.56E-04	detected
U234	49805	Malaga	7/7/2022	1000	1	2.23E-02	2.53E-03	2.73E-04	2.23E-02	2.53E-03	2.73E-04	detected
U234	49806	Loving	7/7/2022	1000	1	5.62E-02	6.00E-03	2.21E-04	5.62E-02	6.00E-03	2.21E-04	detected
U234	49807	Otis	7/7/2022	1000	1	9.67E-02	1.03E-02	1.62E-04	9.67E-02	1.03E-02	1.62E-04	detected
U234	49808	Trip Blank	7/7/2022	1000	1	2.95E-04	1.54E-04	2.51E-04	2.95E-04	1.54E-04	2.51E-04	detected
U234	49809	Hobbs	6/14/2022									
U234	49810	PRV-4	6/14/2022	1000	1	3.64E-02	3.87E-03	1.56E-04	3.64E-02	3.87E-03	1.56E-04	detected
U234				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected
U234				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected

U235												
	SID	Location	collection date	aliquot (mL)	aliquot (L)	Act. Bq	Unc. 2 sig	MDA	Act. (Bq/L)	Unc. 2 sig (Bq/L)	MDA (Bq/L)	
U235	49803	Sheep Draw	7/6/2022									
U235	49804	Sheep Draw-Dup	7/6/2022	1000	1	2.36E-03	3.94E-04	1.53E-04	6.97E-04	1.69E-04	7.62E-05	detected
U235	49805	Malaga	7/7/2022	1000	1	5.06E-04	1.94E-04	2.63E-04	5.06E-04	1.94E-04	2.63E-04	detected
U235	49806	Loving	7/7/2022	1000	1	9.07E-04	2.30E-04	2.01E-04	9.07E-04	2.30E-04	2.01E-04	detected
U235	49807	Otis	7/7/2022	1000	1	2.92E-03	4.78E-04	1.38E-04	2.92E-03	4.78E-04	1.38E-04	detected
U235	49808	Trip Blank	7/7/2022	1000	1	2.91E-05	9.20E-05	2.31E-04	2.91E-05	9.20E-05	2.31E-04	not detected
U235	49809	Hobbs	6/14/2022									
U235	49810	PRV-4	6/14/2022	1000	1	6.97E-04	1.69E-04	7.62E-05	6.97E-04	1.69E-04	7.62E-05	detected
U235				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected
U235				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected

U238												
	SID	Location	collection date	aliquot (mL)	aliquot (L)	Act. Bq	Unc. 2 sig	MDA	Act. (Bq/L)	Unc. 2 sig (Bq/L)	MDA (Bq/L)	
U238	49803	Sheep Draw	7/6/2022									
U238	49804	Sheep Draw-Dup	7/6/2022	1000	1	4.67E-02	5.02E-03	2.19E-04	1.30E-02	1.46E-03	1.97E-04	detected
U238	49805	Malaga	7/7/2022	1000	1	8.48E-03	1.07E-03	2.89E-04	8.48E-03	1.07E-03	2.89E-04	detected
U238	49806	Loving	7/7/2022	1000	1	1.72E-02	1.95E-03	2.03E-04	1.72E-02	1.95E-03	2.03E-04	detected
U238	49807	Otis	7/7/2022	1000	1	3.69E-02	4.04E-03	2.36E-04	3.69E-02	4.04E-03	2.36E-04	detected
U238	49808	Trip Blank	7/7/2022	1000	1	8.21E-05	1.35E-04	3.10E-04	8.21E-05	1.35E-04	3.10E-04	not detected
U238	49809	Hobbs	6/14/2022									
U238	49810	PRV-4	6/14/2022	1000	1	1.30E-02	1.46E-03	1.97E-04	1.30E-02	1.46E-03	1.97E-04	detected
U238				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected
U238				1000	1				0.00E+00	0.00E+00	0.00E+00	not detected

K40												
	SID	Location	collection date	aliquot (mL)	aliquot (L)	Act. (Bq)	Unc. 2 sig (Bq)	MDA (Bq)	Act. (Bq/L)	Unc. 2 sig (Bq/L)	MDA (Bq/L)	
K40				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
K40				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
K40				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
K40				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
K40				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
K40				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
K40				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
K40				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected

Co60												
	SID	Location	collection date	aliquot (mL)	aliquot (L)	Act. (Bq)	Unc. 2 sig (Bq)	MDA (Bq)	Act. (Bq/L)	Unc. 2 sig (Bq/L)	MDA (Bq/L)	
Co60				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Co60				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Co60				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Co60				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Co60				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Co60				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Co60				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Co60				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected

Cs137												
	SID	Location	collection date	aliquot (mL)	aliquot (L)	Act. (Bq)	Unc. 2 sig (Bq)	MDA (Bq)	Act. (Bq/L)	Unc. 2 sig (Bq/L)	MDA (Bq/L)	
Cs137				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Cs137				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Cs137				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Cs137				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Cs137				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Cs137				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Cs137				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected
Cs137				1600	1.6				0.00E+00	0.00E+00	0.00E+00	not detected

Environmental Chemistry Group

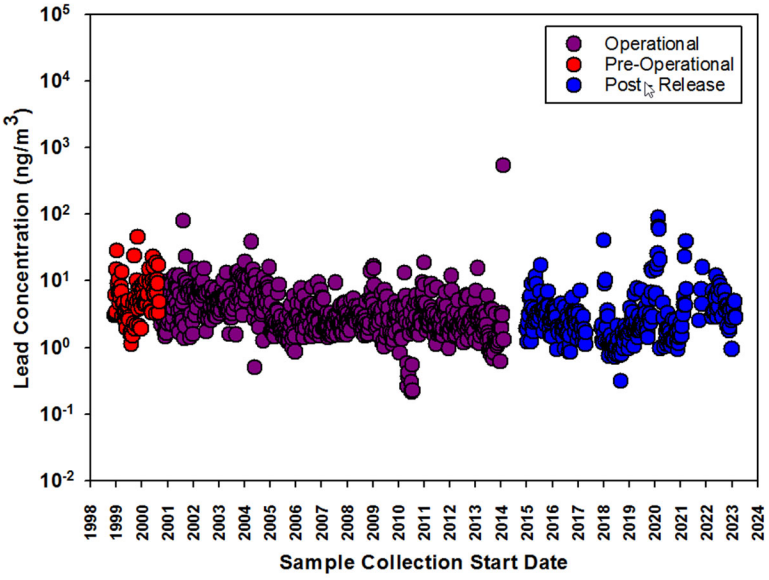
From July 1 through September 30, 2023, the Environmental Chemistry group (EC) worked on processing Fixed Air Sampler (FAS) filters, ambient air (HiVol) filters, completing proficiency tests, and analyzing surface water samples collected in 2023.

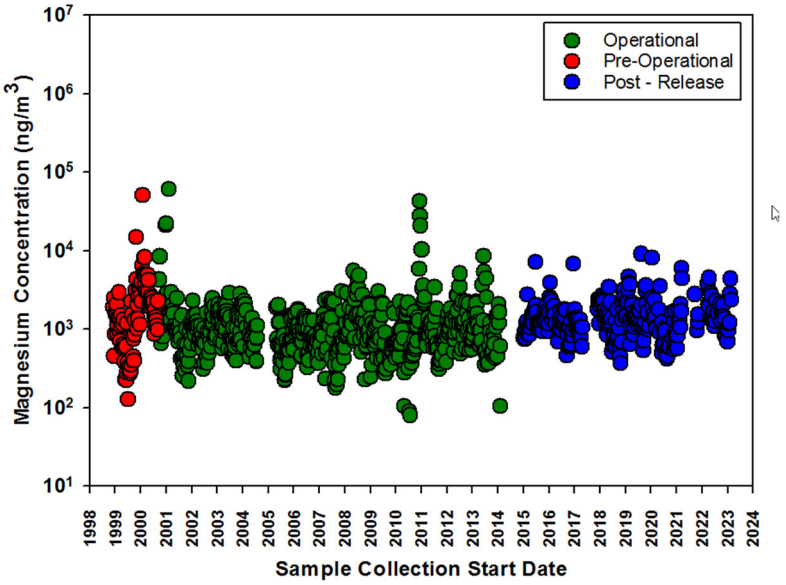
The following Tables and Figures represent characteristic results.

Sample Type: FAS, Station A
Year: 2022
Analysis Performed: Metals in weekly composites

Week	Aluminum ng/m³	Cadmium ng/m³	Lead ng/m³	Magnesium ng/m³	Silicon ng/m³	Thorium ng/m³	Uranium ng/m³
01/01/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
01/08/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
01/15/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
01/22/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
02/01/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
02/08/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
02/15/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
02/22/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
03/01/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
03/08/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
03/15/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
03/22/22	1.087E+03	6.314E-01	2.874E+00	1.909E+04	1.438E+04	1.394E-01	9.830E-02
04/01/22	8.750E+02	6.864E-01	6.958E+00	1.032E+04	2.573E+03	1.603E-01	7.171E-02
04/08/22	9.194E+02	4.033E-01	3.400E+00	2.245E+04	1.444E+04	1.262E-01	7.280E-02
04/15/22	5.459E+02	5.250E-01	3.517E+00	9.622E+03	1.677E+03	7.960E-02	3.798E-02
04/22/22	5.466E+02	4.887E-01	4.573E+00	8.790E+03	1.720E+03	8.589E-02	4.267E-02
05/01/22	4.261E+02	3.749E-01	3.459E+00	1.397E+03	1.306E+03	6.290E-02	3.521E-02
05/08/22	7.024E+02	6.443E-01	6.011E+00	2.863E+03	2.253E+03	1.025E-01	7.215E-02
05/15/22	6.950E+02	4.721E-01	5.399E+00	2.692E+03	2.118E+03	9.325E-02	5.393E-02
05/22/22	4.631E+02	3.921E-01	1.189E+01	1.447E+03	1.483E+03	7.412E-02	2.947E-01
06/01/22	2.826E+02	4.818E-01	2.843E+00	1.253E+03	9.301E+02	<MDL	2.684E-02
06/08/22	6.657E+02	4.096E-01	3.810E+00	1.221E+03	1.913E+03	9.953E-02	4.111E-02
06/15/22	5.280E+02	4.057E-01	7.106E+00	1.716E+03	1.524E+03	7.078E-02	3.541E-02
06/22/22	3.403E+02	3.728E-01	4.135E+00	1.287E+03	1.213E+03	4.684E-02	3.002E-02
07/01/22	1.707E+02	4.023E-01	5.738E+00	1.085E+03	7.141E+02	<MDL	3.315E-02
07/08/22	2.722E+02	6.184E-01	9.460E+00	1.252E+03	1.041E+03	<MDL	3.138E-02
07/15/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
07/22/22	3.007E+02	3.796E-01	8.452E+00	2.282E+03	9.674E+02	4.275E-02	3.170E-02
08/01/22	4.885E+02	3.592E-01	7.048E+00	1.800E+03	1.466E+03	6.331E-02	3.215E-02
08/08/22	2.981E+02	3.835E-01	7.043E+00	1.716E+03	1.094E+03	4.046E-02	2.590E-02
08/15/22	2.665E+02	6.804E-01	2.887E+00	1.552E+03	1.383E+03	<MDL	<MDL
08/22/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
09/01/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
09/08/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
09/15/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
09/22/22	4.349E+02	4.175E-01	7.021E+00	1.058E+04	1.296E+03	4.971E-02	3.704E-02
10/01/22	2.770E+02	3.870E-01	5.030E+00	1.581E+03	1.088E+03	<MDL	2.305E-02
10/08/22	4.735E+02	3.814E-01	3.569E+00	1.278E+03	9.402E+02	<MDL	1.890E-02
10/15/22	2.525E+02	4.012E-01	4.230E+00	1.649E+03	9.579E+02	<MDL	2.632E-02
10/22/22	2.349E+02	3.754E-01	2.086E+00	1.537E+03	8.583E+02	<MDL	2.568E-02
11/01/22	3.212E+02	3.977E-01	4.216E+00	2.041E+03	1.154E+03	<MDL	4.100E-02
11/08/22	2.132E+02	3.792E-01	4.238E+00	1.466E+03	7.800E+02	<MDL	2.696E-02
11/15/22	1.975E+02	3.652E-01	3.674E+00	1.342E+03	7.810E+02	<MDL	3.162E-02
11/22/22	1.424E+02	3.578E-01	1.801E+00	8.436E+02	6.260E+02	<MDL	1.706E-02
12/01/22	2.115E+02	3.683E-01	2.035E+00	9.302E+02	8.362E+02	<MDL	2.457E-02
12/08/22	1.195E+02	4.005E-01	2.979E+00	8.208E+02	5.917E+02	<MDL	1.803E-02
12/15/22	1.703E+02	3.673E-01	3.653E+00	1.009E+03	7.392E+02	<MDL	3.228E-02
12/22/22	2.011E+02	4.193E-01	2.564E+00	9.849E+02	8.187E+02	<MDL	1.965E-02

NOTE: Filters were not received for the following time frames: January, February, the 1st three weeks of March, one week in July, one week in August, and the 1st three weeks of September for 2022.

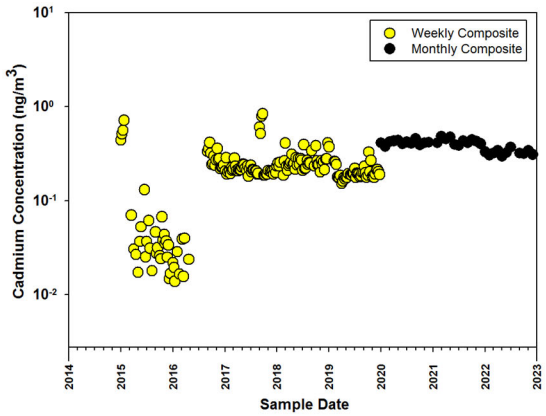

Operational
Pre-Operational
Post - Release
Lead Concentration (ng/m3)
Sample Collection Start Date

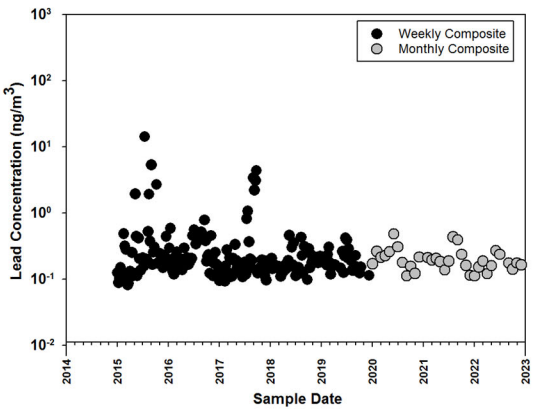

Operational
Pre-Operational
Post - Release
Magnesium Concentration (ng/m3)
Sample Collection Start Date

Sample Type: FAS, Station B
Year: 2022
Analysis Performed: Metals in monthly composites

Sample Date	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
January	<MDC	0.33	0.11	<MDC	237.4	<MDC	<MDC
February	<MDC	0.31	0.15	<MDC	297.6	<MDC	<MDC
March	<MDC	0.32	0.19	<MDC	359.6	<MDC	<MDC
April	<MDC	0.34	0.12	<MDC	363.3	<MDC	<MDC
May	81.11	0.30	0.16	<MDC	373.4	<MDC	<MDC
June	<MDC	0.33	0.27	<MDC	409.4	<MDC	<MDC
July	<MDC	0.37	0.24	<MDC	<MDC	<MDC	<MDC
August	N/A	N/A	N/A	N/A	N/A	N/A	N/A
September	<MDC	0.32	0.17	<MDC	<MDC	<MDC	<MDC
October	<MDC	0.32	0.14	<MDC	271.4	<MDC	<MDC
November	<MDC	0.34	0.17	<MDC	293.9	<MDC	<MDC
December	<MDC	0.31	0.16	<MDC	297.1	<MDC	<MDC

NOTE: Filters were not received in August.





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							
03/08/23							
03/15/23							
03/22/23							
04/01/23							
04/08/23							
04/15/23							
04/22/23							
05/01/23							
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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: Proficiency Test
Year: 2023
Analysis Performed: Follow-up Metals for Mo

ERA
A Waters Company

071323H Final Evaluation Report

Adrienne Chancellor
Associate Research Scientist
New Mexico State University
1400 University Dr
CEMRC
Carlsbad, NM 88220-3575
(575) 234-5525

EPA ID: Not Reported
ERA Customer Number: N215603

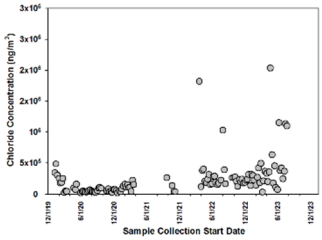
TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Z Score	Study Mean	Study Standard Deviation	Analyst Name
WS Metals (cat# 697, lot# 071323H) Study Dates: 07/13/2023 - 07/25/2023												
1000	Aluminum	µg/L		555	472 - 638	Not Reported				555	46.4	
1005	Antimony	µg/L		37.5	26.2 - 48.8	Not Reported				37.6	3.18	
1010	Arsenic	µg/L		33.7	23.6 - 43.8	Not Reported				32.7	2.82	
1015	Barium	µg/L		2460	2090 - 2830	Not Reported				2470	113	
1020	Beryllium	µg/L		12.9	11.0 - 14.8	Not Reported				13.0	0.713	
1025	Boron	µg/L		1210	1030 - 1390	Not Reported				1210	67.1	
1030	Cadmium	µg/L		6.13	4.90 - 7.36	Not Reported				5.96	0.522	
1040	Chromium	µg/L		166	141 - 191	Not Reported				167	10.1	
1055	Copper	µg/L		399	359 - 439	Not Reported				394	22.4	
1070	Iron	µg/L		795	676 - 914	Not Reported				803	33.2	
1075	Lead	µg/L		31.1	21.8 - 40.4	Not Reported				31.3	2.33	
1090	Manganese	µg/L		808	687 - 929	Not Reported				826	37.2	
1100	Molybdenum	µg/L	113.01	105	89.2 - 121	Acceptable	EPA 200.8 5.4 1994	7/24/2023	1.99	105	4.16	
1105	Nickel	µg/L		317	269 - 365	Not Reported				314	13.3	
1140	Selenium	µg/L		95.7	76.6 - 115	Not Reported				94.6	5.66	
1150	Silver	µg/L		271	190 - 352	Not Reported				269	17.3	
1165	Thallium	µg/L		6.12	4.28 - 7.96	Not Reported				6.09	0.522	
1185	Vanadium	µg/L		531	451 - 611	Not Reported				513	29.0	
1190	Zinc	µg/L		272	231 - 313	Not Reported				273	17.9	

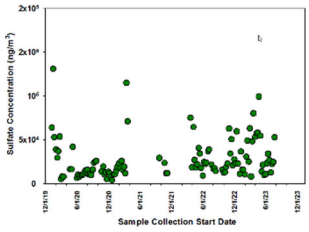
Sample Type:

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

Week	Chloride ng/m³	Nitrate ng/m³	Phosphate ng/m³	Sulfate ng/m³
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				
08/08/23				
08/15/23				
08/22/23				
09/01/23				
09/08/23				
09/15/23				
09/22/23				
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				

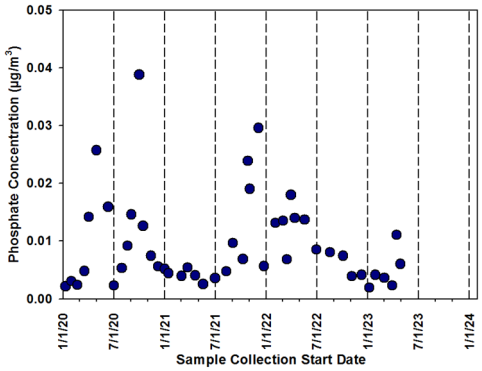
NOTE: Filters were not received for the following time frames: N/A

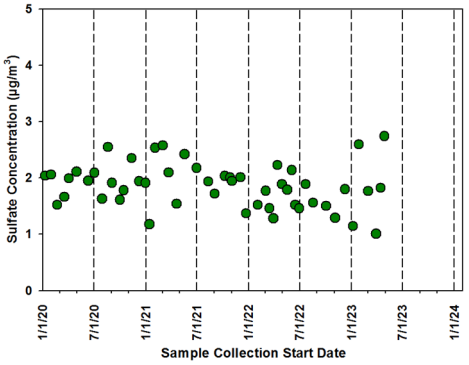




Sample Type: Near Field (107), ambient air
Year: 2023
Analysis Performed: Anions

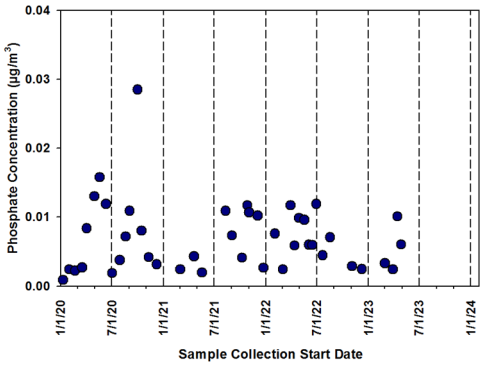
Start Date	Chloride µg/m³	Nitrate µg/m³	Phosphate µg/m³	Sulfate µg/m³
01/06/23	2.92E-01	1.47E+00	1.95E-03	1.15E+00
01/27/23	6.44E-01	3.79E+00	4.13E-03	2.60E+00
03/01/23	3.52E-01	2.17E+00	3.63E-03	1.76E+00
03/29/23	3.59E-01	1.13E+00	2.32E-03	1.01E+00
04/14/23	3.53E-01	1.80E+00	1.11E-02	1.82E+00
04/28/23	4.60E-01	3.23E+00	6.03E-03	2.74E+00

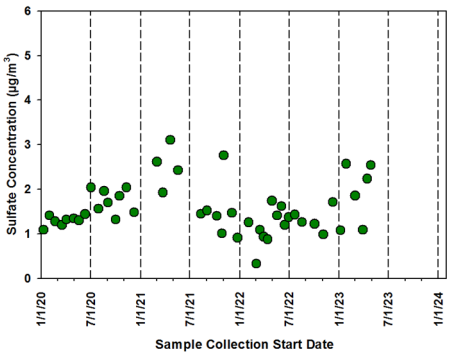




Sample Type: Cactus Flats (108), ambient air
Year: 2023
Analysis Performed: Anions

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


Phosphate Concentration (µg/m3)
0.04
0.03
0.02
0.01
0.00
1/1/20
7/1/20
1/1/21
7/1/21
1/1/22
7/1/22
1/1/23
7/1/23
1/1/24
Sample Collection Start Date


Sulfate Concentration (µg/m3)
6
5
4
3
2
1
0
1/1/20
7/1/20
1/1/21
7/1/21
1/1/22
7/1/22
1/1/23
7/1/23
1/1/24
Sample Collection Start Date

Internal Dosimetry Group

Number of *in vivo* radiobioassay measurements performed during the reporting period: 2 for WIPP, 14 for the contract radiological personnel and those working in the laboratories located at CEMRC, none for the public participants.

Outreach activities:
The Internal Dosimetry group continues to interact with the general 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 general public.

The following activities took place during the reporting period of July 1 to September 30, 2023:

> September 14, 2023: Artesia Public Library, 205 W Quay St, Artesia, NM 88210. Talked to the front desk clerk Mr. Andrew. He was not familiar with WIPP or CEMRC. The LDBC brochures were distributed and information was provided about WIPP and the LDBC program at CEMRC and the fact that the program is freely available to citizens living in the area. He was quite interested and listened to the information about LDBC and the importance of participation.
>
> Contacted the supervisor and worked with him to arrange a presentation at the library on October 21, 2023 from 11 am to 12 pm to discuss environmental monitoring and the contributions of CEMRC.