Quarterly Report

Calendar Year 2024 – Third Quarter, July 1 – September 30, 2024

Prepared by:

Carlsbad Environmental Monitoring & Research Center
under a financial assistance grant from
U.S. Department of Energy
Carlsbad Field Office (CBFO)
Award No. DE-EM0005195

Submitted to:

U.S. Department of Energy
Carlsbad Field Office

October 2024

Field Programs - Radiation Safety Group

WIPP Underground Effluent Monitoring (Station A and Station B)

From July 1st to September 30th, a total of 129 filters from the primary skid at Station A, of which 105 were sample filters, 12 were trip blanks and 12 were filter blanks, were collected. In addition, 132 filters were collected from the backup skid at Station A (108 sample filters, 12 trip blank filters and 12 filter blanks). 116 filters were collected from the primary skid at Station B, (92 sample filters, 12 trip blanks and 12 filter blanks). 112 filters were collected from Station B backup (88 sample filters, 12 trip blanks and 12 filter blanks), during the same time period.

All 129 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 132 of the Station A backup filters have been processed and transferred to the Environmental Chemistry group (EC). All 116 filters from the primary Station B skid have been processed and transferred to RC. All 112 of the Station B backup filters have been transferred to EC.

Ambient Air Sampling

From July 1st to September 30th 18 ambient air particulate filters 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 filters 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 July 1st to September 30th, from the 2 sampling sites (Near Field and Cactus Flats) using a high-volume sampler. All filters have been processed (total air flow values and notes of any irregularities) by FP and transferred to EC.

Soil sampling

From July 1st to September 30th, 11 soil samples were collected.

Surface Water Monitoring

No activity to report this quarter.

Drinking Water Monitoring

From July 1st to September 30th, 8 drinking water samples were collected, out of those 1 is a Trip blank.

Sediment Monitoring

No activity to report this quarter.

Nuclear Materials Management and Safeguards

From July 1st to September 30th, 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 September 26, 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 second week of October 2024. The complete results for gross alpha and gross beta counts on FAS filters from Station A and Station B through September 2024 were submitted to CBFO on October 11, 2024.

Between July 1st and September 30th, 2024, the following types of environmental samples were processed and analyzed:

- Alpha radiation emitting isotopes (^{241}Am, ^{238}Pu, $^{239+240}$Pu, ^{234}U, ^{235}U, and ^{238}U)
    - Airborne particulate (HiVol) – 24 samples
    - Fixed Air Sampler (FAS) from Station A – 9 samples
    - Fixed Air Sampler (FAS) from Station B – 3 samples
    - Drinking Water – 3 samples
    - Soil – 27 samples
- Beta radiation emitting isotope (^{90}Sr)
    - All ^{90}Sr samples for all environmental samples collected in 2023 have been analyzed (one sample needs to be re-analyzed)
- Gamma radiation emitting isotopes (^{60}Co, ^{137}Cs, and ^{40}K)
    - Soil – 24 samples
    - All environmental samples collected in 2023 have now been analyzed for gamma-radiation-emitting isotopes

Characteristic results are included in the following pages.

Mirion personnel visited CEMRC in July 2024 to conduct preventive maintenance and work on the alpha radiation detectors.

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*****************************************************************************
*                      New Mexico State University                          *
*                       Quality Assurance Report                            *
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Report Date : 9/1/24 2:31:10 PM
QA File : C:\GENIE2K\CAMFILES\Calver3.qaf
Analyst :
Sample ID : Eu-152
Sample Quantity : 1.00 Unit
Sample Date : 8/1/94 12:00:00 PM
Measurement Date : 9/1/24 2:21:03 PM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 605 seconds

Test	Parameter	Low Limit	High Limit	New Value	Flag
LU	015 fwhm-779 ke	1.2800E+00	2.7000E+00	2.2924E+00	< >
LU	015 fwhm-1408 k	1.5800E+00	3.3000E+00	2.7243E+00	< >
SD	015 Act-779 keV	1.0408E+00	4.7590E-01	1.0568E+00	< >
SD	015 Act-1408 ke	1.0292E+00	5.0026E-01	1.1059E+00	< >
LU	015 fwhm-122 ke	1.0200E+00	2.2000E+00	1.8067E+00	< >
SD	015 Act-122 keV	1.0509E+00	4.5309E-01	1.1304E+00	< >
LU	015- 122KeV Pk	1.2078E+02	1.2278E+02	1.2182E+02	< >
LU	015-779 KeV Pk	7.7778E+02	7.7978E+02	7.7877E+02	< >
LU	015-1408 KeV Pk	1.4069E+03	1.4089E+03	1.4082E+03	< >

Flags Key: LU = Boundary Test (Ab = Above , Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

17	1745- 1760	1752.72	427.87	0.24	-3.470E+01	70.12	6.687E+02
18	1798- 1811	1804.27	440.46	0.25	3.130E+01	62.96	5.367E+02
19	1950- 1965	1956.34	477.60	0.24	-4.276E+00	63.62	5.363E+02
20	2029- 2044	2036.10	497.08	0.24	-2.088E+01	64.09	5.529E+02
21	2193- 2213	2200.61	537.26	0.48	4.206E+01	72.37	5.829E+02
22	2381- 2397	2388.66	583.19	0.42	8.263E+01	62.57	4.594E+02
23	2487- 2507	2495.61	609.31	2.70	6.477E+01	92.95	9.622E+02
24	2540- 2555	2547.32	621.94	0.79	4.065E+00	62.41	5.119E+02
25	2697- 2723	2709.95	661.66	0.54	1.533E+02	82.95	6.267E+02
26	2968- 2986	2978.83	727.33	0.47	-2.761E+01	59.56	4.436E+02
27	3091- 3109	3099.20	756.73	0.24	1.447E+01	56.26	3.775E+02
28	3251- 3267	3259.42	795.86	0.24	-3.525E+01	51.55	3.593E+02
29	3310- 3328	3320.42	810.76	0.25	8.565E+00	54.02	3.484E+02
30	3412- 3427	3419.06	834.85	0.24	-6.455E+00	51.68	3.515E+02
31	3663- 3687	3677.78	898.04	0.36	6.081E+01	65.68	4.522E+02
32	3724- 3739	3731.66	911.20	0.26	2.689E+01	42.41	2.341E+02
33	3961- 3977	3968.20	968.97	0.24	-4.358E+01	41.09	2.516E+02
34	4092- 4107	4099.46	1001.03	0.24	-5.217E+00	38.04	2.032E+02
35	4494- 4509	4501.49	1099.22	0.38	4.983E+00	37.13	1.880E+02
36	4558- 4595	4568.35	1115.55	0.24	5.261E+01	74.00	4.504E+02
37	4796- 4812	4804.56	1173.24	0.28	4.712E+00	36.12	1.723E+02
38	5210- 5227	5218.91	1274.44	0.24	-7.525E+00	36.24	1.765E+02
39	5448- 5465	5456.63	1332.50	0.40	-1.958E+01	32.92	1.516E+02
40	5973- 5991	5982.06	1460.83	0.40	3.942E+01	32.59	1.156E+02
41	6627- 6644	6635.81	1620.50	0.46	3.244E+01	29.25	9.956E+01

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Reviewed by: _____

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* NOTE: DAILY QUALITY CONTROL SAMPLES (QC) ARE GIVEN A USER DRIVEN          *
*  N-SIGMA TEST.  INVESTIGATE MEANS THE MEASUREMENT IS BETWEEN              *
*  10% AND 15% OF THE BASELINE.  ACTION MEANS THAT THE MEASUREMENT          *
*  IS ABOVE 15% OF THE BASELINE.                                            *
*  LABORATORY CONTROL SAMPLES ARE GIVEN A BOUNDARY TEST.  THE RESULT        *
*  IS ACCEPTABLE IF IT LIES BETWEEN +/- 25% OF THE TRUE SOURCE              *
*  ACTIVITY.                                                                *
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C E M R C G A M M A S P E C T R U M A N A L Y S I S

Sample ID : STA05WK2-22
Sample Description : St. A May Week 2, 2022
:
Calibration ID :
Background ID :

Sample Collection Date : 5/7/2022 12:00:00 PM
Count Start Date : 9/1/2024 2:32:54 PM

Sample Aliquot : 1.00000E+00
Aliquot Unc. : 0.00000E+00
Aliquot Unit : Unit

Live Time (sec) : 172800
Real Time (sec) : 172814

Energy Calibration Used Done On : 7/16/2024
Efficiency Calibration Used Done On : 11/16/2023
Efficiency ID : DET03_70mlEff_23

%Random Unc. : 0.0
%Systematic Unc. : 0.0

Nuclide	Energy	Eff%	UncEff%	Abun%	UncAbn%	HL(d)	UncHL(d)	Conc(Bq/unit)	Unc2sigma	MDC

K-40	1460.81	0.725	0.009	10.6700	0.1100	4.66412E+11	2.92192E+09	7.32776E-02	1.21610E-01
4.12828E-01									
CO-60	1173.22	0.896	0.010	100.0000	0.0000	1.92518E+03	3.65240E-01	3.39792E-03	1.52087E-02
5.20848E-02									
CO-60	1332.49	0.794	0.009	100.0000	0.0000	1.92518E+03	3.65240E-01	1.41140E-02	1.78020E-02
5.99383E-02									
CS-137	661.65	1.535	0.021	85.1200	0.2300	1.10193E+04	1.09572E+01	-3.16644E-02	1.82502E-02
6.26085E-02									
AM-241	59.54	4.746	0.000	36.3000	0.0000	1.58153E+05	0.00000E+00	2.38916E-01	2.94979E-02
0.00000E+00									

5 nuclide lines identified

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***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET03
Sample Title: STA05WK2-22
Peak Analysis Performed on: 9/3/2024 2:33:13 PM
Peak Analysis From Channel: 50
Peak Analysis To Channel: 8190

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
M	1	65-	85	71.17	17.17	0.45	-6.716E-02	17.10	1.296E+01
m	2	65-	85	79.79	19.28	0.46	-5.343E-02	13.61	5.387E+01
	3	178-	200	191.41	46.54	0.34	5.262E-01	181.46	3.066E+03
	4	233-	256	244.64	59.54	1.68	7.086E-02	173.63	2.513E+03
M	5	339-	394	363.87	88.66	1.85	8.156E+01	62.24	2.537E+03
m	6	339-	394	385.02	93.83	1.86	1.266E+02	62.66	2.108E+03
	7	426-	443	432.04	105.31	2.08	-1.639E+02	114.10	1.593E+03
	8	541-	554	547.54	133.52	0.26	4.679E+01	93.60	1.140E+03
	9	574-	605	596.35	145.44	0.24	-2.172E+02	189.70	3.048E+03
	10	661-	676	669.72	163.36	0.24	-8.274E+01	102.45	1.352E+03
	11	757-	772	763.27	186.21	0.28	2.543E+01	102.29	1.291E+03
	12	835-	850	841.48	205.31	0.24	-5.621E+01	101.44	1.310E+03
	13	971-	986	977.90	238.63	0.24	-1.458E+01	96.27	1.164E+03
M	14	1203-	1236	1209.75	295.26	0.52	-1.009E+01	69.15	4.192E+02
m	15	1203-	1236	1229.79	300.15	0.52	-1.310E+01	89.76	4.145E+02
	16	1290-	1318	1296.77	316.51	0.35	-7.562E+01	135.32	1.650E+03

17	1400- 1503	1410.51	344.29	0.24	-4.492E+02	405.24	5.534E+03
18	1746- 1759	1752.72	427.87	0.36	-1.321E+01	62.10	5.482E+02
19	1797- 1811	1804.27	440.46	0.24	-1.421E+01	64.64	5.752E+02
20	1941- 1963	1956.34	477.60	0.38	-3.493E+01	87.20	8.459E+02
21	2026- 2044	2036.10	497.08	0.24	-4.164E+01	74.02	6.836E+02
22	2193- 2210	2200.61	537.26	0.24	5.611E+00	66.32	5.464E+02
23	2376- 2399	2388.66	583.19	0.48	5.974E+01	82.32	6.993E+02
24	2488- 2509	2495.61	609.31	0.24	5.113E+01	93.49	9.549E+02
25	2538- 2555	2547.32	621.94	0.24	-6.007E+01	70.53	6.491E+02
26	2702- 2720	2709.95	661.66	0.45	5.051E+01	65.58	4.965E+02
27	2971- 2986	2978.83	727.33	0.39	2.368E+01	51.03	3.313E+02
28	3092- 3107	3099.20	756.73	0.24	-2.917E+01	45.95	2.942E+02
29	3252- 3267	3259.42	795.86	0.27	2.725E+01	48.20	2.928E+02
30	3313- 3328	3320.42	810.76	0.24	-1.704E+01	46.42	2.930E+02
31	3408- 3427	3419.06	834.85	0.24	-1.260E+01	60.77	4.376E+02
32	3670- 3690	3677.78	898.04	0.34	7.022E+01	55.30	3.378E+02
33	3720- 3739	3731.66	911.20	0.28	7.402E+01	50.60	2.820E+02
34	3961- 3976	3968.20	968.97	0.25	-1.717E+01	39.57	2.262E+02
35	4092- 4108	4099.46	1001.03	0.24	5.804E+00	40.14	2.112E+02
36	4494- 4509	4501.49	1099.22	0.31	2.873E+01	36.23	1.663E+02
M 37	4561- 4595	4570.25	1116.01	0.61	4.440E+00	20.88	1.053E+02
m 38	4561- 4595	4583.92	1119.35	0.61	1.038E+01	48.72	9.441E+01
39	4797- 4812	4804.56	1173.24	0.41	3.877E+00	34.71	1.641E+02
40	5210- 5227	5218.91	1274.44	0.39	1.716E+01	34.14	1.438E+02
41	5448- 5465	5456.63	1332.50	0.24	1.426E+01	35.98	1.627E+02
42	5974- 5991	5982.06	1460.83	0.24	9.800E+00	32.53	1.332E+02

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	6627-	6644	6635.81	1620.50	0.24	-5.517E+00	26.08	9.652E+01

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

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*************************************************************************
*                      New Mexico State University                      *
*                       Quality Assurance Report                        *
*************************************************************************

Report Date          : 8/30/24  10:30:21 AM
QA File              : C:\GENIE2K\CAMFILES\Calver3.qaf
Analyst              :
Sample ID            : E152
Sample Quantity      :     1.00 Unit
Sample Date          : 8/1/94   12:00:00 PM
Measurement Date     : 8/30/24  10:20:13 AM
Elapsed Live Time    :      600 seconds
Elapsed Real Time    :      605 seconds
```

Test	Parameter	Low Limit	High Limit	New Value	Flag
LU	015 fwhm-779 ke	1.2800E+00	2.7000E+00	2.2375E+00	< >
LU	015 fwhm-1408 k	1.5800E+00	3.3000E+00	2.4305E+00	< >
SD	015 Act-779 keV	1.0407E+00	4.7622E-01	1.1087E+00	< >
SD	015 Act-1408 ke	1.0291E+00	5.0060E-01	1.0895E+00	< >
LU	015 fwhm-122 ke	1.0200E+00	2.2000E+00	1.7965E+00	< >
SD	015 Act-122 keV	1.0508E+00	4.5338E-01	1.1273E+00	< >
LU	015- 122KeV Pk	1.2078E+02	1.2278E+02	1.2182E+02	< >
LU	015-779 KeV Pk	7.7778E+02	7.7978E+02	7.7881E+02	< >
LU	015-1408 KeV Pk	1.4069E+03	1.4089E+03	1.4083E+03	< >

```
Flags Key:   LU = Boundary Test               (Ab = Above      , Be = Below )
             SD = Sample Driven N-Sigma Test  (In = Investigate, Ac = Action)
             UD = User   Driven N-Sigma Test  (In = Investigate, Ac = Action)
             BS = Measurement Bias Test       (In = Investigate, Ac = Action)
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Reviewed by: _____

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**************************************************************************
* NOTE: DAILY QUALITY CONTROL SAMPLES (QC) ARE GIVEN A USER DRIVEN       *
*  N-SIGMA TEST.  INVESTIGATE MEANS THE MEASUREMENT IS BETWEEN           *
*  10% AND 15% OF THE BASELINE.  ACTION MEANS THAT THE MEASUREMENT       *
*  IS ABOVE 15% OF THE BASELINE.                                         *
*  LABORATORY CONTROL SAMPLES ARE GIVEN A BOUNDARY TEST.  THE RESULT     *
*  IS ACCEPTABLE IF IT LIES BETWEEN +/- 25% OF THE TRUE SOURCE           *
*  ACTIVITY.                                                             *
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C E M R C G A M M A S P E C T R U M A N A L Y S I S

Sample ID : SW49623R1
Sample Description : SW49623R1
:
Calibration ID :
Background ID :

Sample Collection Date : 6/14/2022 12:00:00 PM
Count Start Date : 8/30/2024 10:51:05 AM

Sample Aliquot : 1.00000E+00
Aliquot Unc. : 0.00000E+00
Aliquot Unit : Unit

Live Time (sec) : 172800
Real Time (sec) : 172814

Energy Calibration Used Done On : 7/16/2024
Efficiency Calibration Used Done On : 11/16/2023
Efficiency ID : DET03_70mlEff_23

%Random Unc. : 0.0
%Systematic Unc. : 0.0

Nuclide	Energy	Eff%	UncEff%	Abun%	UncAbn%	HL(d)	UncHL(d)	Conc(Bq/unit)	Unc2sigma	MDC

K-40	1460.81	0.725	0.009	10.6700	0.1100	4.66412E+11	2.92192E+09	2.94765E-01	1.21946E-01
3.90171E-01									
CO-60	1173.22	0.896	0.010	100.0000	0.0000	1.92518E+03	3.65240E-01	4.06993E-03	1.55978E-02
5.32820E-02									
CO-60	1332.49	0.794	0.009	100.0000	0.0000	1.92518E+03	3.65240E-01	-1.90980E-02	1.60556E-02
5.73320E-02									
CS-137	661.65	1.535	0.021	85.1200	0.2300	1.10193E+04	1.09572E+01	1.63228E-02	2.17097E-02
7.21030E-02									
AM-241	59.54	4.746	0.000	36.3000	0.0000	1.58153E+05	0.00000E+00	-4.57118E-03	2.20970E-02
0.00000E+00									

5 nuclide lines identified

****
***** PEAK ANALYSIS REPORT *****
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Detector Name: DET03
Sample Title: SW49623R1
Peak Analysis Performed on: 9/1/2024 10:51:25 AM
Peak Analysis From Channel: 50
Peak Analysis To Channel: 8190

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
	1	65-	87	74.97	18.10	0.24	-2.352E+01	35.97	1.155E+02
	2	180-	205	191.41	46.54	0.43	-3.888E+01	186.90	3.043E+03
	3	236-	253	244.64	59.54	0.24	-1.356E+01	131.10	1.883E+03
M	4	339-	386	349.22	85.08	0.58	2.335E+01	108.17	7.083E+02
m	5	339-	386	358.09	87.25	0.59	7.061E+00	33.17	6.881E+02
m	6	339-	386	380.24	92.66	0.60	2.774E+01	128.45	6.425E+02
	7	422-	447	432.04	105.31	0.24	-2.989E+02	156.71	2.428E+03
	8	541-	560	547.54	133.52	0.47	2.355E+01	123.33	1.670E+03
	9	574-	611	589.47	143.76	0.24	-4.454E+02	220.34	3.711E+03
	10	659-	677	669.72	163.36	0.24	-1.463E+02	117.44	1.638E+03
	11	749-	771	763.27	186.21	0.32	5.049E+01	135.52	1.862E+03
	12	835-	848	841.48	205.31	0.24	-5.208E+01	91.41	1.138E+03
	13	968-	986	977.90	238.63	0.37	5.825E+01	109.31	1.335E+03
	14	1201-	1236	1209.60	295.22	0.40	2.156E+00	166.69	2.135E+03
	15	1290-	1321	1311.39	320.08	0.24	-1.234E+02	147.07	1.842E+03
	16	1403-	1502	1458.54	356.02	0.31	-1.948E+02	384.20	5.118E+03

17	1745- 1760	1752.72	427.87	0.24	-3.470E+01	70.12	6.687E+02
18	1798- 1811	1804.27	440.46	0.25	3.130E+01	62.96	5.367E+02
19	1950- 1965	1956.34	477.60	0.24	-4.276E+00	63.62	5.363E+02
20	2029- 2044	2036.10	497.08	0.24	-2.088E+01	64.09	5.529E+02
21	2193- 2213	2200.61	537.26	0.48	4.206E+01	72.37	5.829E+02
22	2381- 2397	2388.66	583.19	0.42	8.263E+01	62.57	4.594E+02
23	2487- 2507	2495.61	609.31	2.70	6.477E+01	92.95	9.622E+02
24	2540- 2555	2547.32	621.94	0.79	4.065E+00	62.41	5.119E+02
25	2697- 2723	2709.95	661.66	0.54	1.533E+02	82.95	6.267E+02
26	2968- 2986	2978.83	727.33	0.47	-2.761E+01	59.56	4.436E+02
27	3091- 3109	3099.20	756.73	0.24	1.447E+01	56.26	3.775E+02
28	3251- 3267	3259.42	795.86	0.24	-3.525E+01	51.55	3.593E+02
29	3310- 3328	3320.42	810.76	0.25	8.565E+00	54.02	3.484E+02
30	3412- 3427	3419.06	834.85	0.24	-6.455E+00	51.68	3.515E+02
31	3663- 3687	3677.78	898.04	0.36	6.081E+01	65.68	4.522E+02
32	3724- 3739	3731.66	911.20	0.26	2.689E+01	42.41	2.341E+02
33	3961- 3977	3968.20	968.97	0.24	-4.358E+01	41.09	2.516E+02
34	4092- 4107	4099.46	1001.03	0.24	-5.217E+00	38.04	2.032E+02
35	4494- 4509	4501.49	1099.22	0.38	4.983E+00	37.13	1.880E+02
36	4558- 4595	4568.35	1115.55	0.24	5.261E+01	74.00	4.504E+02
37	4796- 4812	4804.56	1173.24	0.28	4.712E+00	36.12	1.723E+02
38	5210- 5227	5218.91	1274.44	0.24	-7.525E+00	36.24	1.765E+02
39	5448- 5465	5456.63	1332.50	0.40	-1.958E+01	32.92	1.516E+02
40	5973- 5991	5982.06	1460.83	0.40	3.942E+01	32.59	1.156E+02
41	6627- 6644	6635.81	1620.50	0.46	3.244E+01	29.25	9.956E+01

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

****
* New Mexico State University *
* Quality Assurance Report *
****

Report Date : 8/30/24 10:34:49 AM
QA File : C:\Genie2k\CAMFILES\Calver4a.qaf
Analyst :
Sample ID : E152
Sample Quantity : 1.00 ea
Sample Date : 8/1/94 12:00:00 AM
Measurement Date : 8/30/24 10:21:31 AM
Elapsed Live Time : 780 seconds
Elapsed Real Time : 797 seconds

Test	Parameter	Low Limit	High Limit	New Value	Flag
LU	016_fwhm-779 ke	1.3000E+00	1.8000E+00	1.7388E+00	< >
LU	016_fwhm-1408 k	1.6000E+00	2.4000E+00	2.5317E+00	<Ab >
SD	016_Act-779 keV	9.7127E-01	3.4521E-01	9.9540E-01	< >
SD	016_ Act-1408 k	9.4407E-01	4.4374E-01	9.9934E-01	< >
LU	016_fwhm-122 ke	8.0000E-01	1.4000E+00	9.5668E-01	< >
SD	016_ Act-122 ke	9.6038E-01	3.4196E-01	9.9799E-01	< >
LU	016_Pk122Kev	1.2100E+02	1.2250E+02	1.2176E+02	< >
LU	016_Pk 779kev	7.7820E+02	7.7960E+02	7.7901E+02	< >
LU	016_Pk1408kev	1.4073E+03	1.4087E+03	1.4082E+03	< >

Flags Key: LU = Boundary Test (Ab = Above , Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

C E M R C G A M M A S P E C T R U M A N A L Y S I S

Sample ID : SW49624R1
Sample Description : SW49624R1
:
Calibration ID :
Background ID :

Sample Collection Date : 6/14/2022 12:00:00 AM
Count Start Date : 8/30/2024 10:52:01 AM

Sample Aliquot : 1.00000E+00
Aliquot Unc. : 0.00000E+00
Aliquot Unit : ea

Live Time (sec) : 172800
Real Time (sec) : 173170

Energy Calibration Used Done On : 7/16/2024
Efficiency Calibration Used Done On : 11/15/2023
Efficiency ID : DET4A_70mlEff_23

%Random Unc. : 0.0
%Systematic Unc. : 0.0

Nuclide	Energy	Eff%	UncEff%	Abun%	UncAbn%	HL(d)	UncHL(d)	Conc(Bq/unit)	Unc2sigma	MDC
K-40	1460.81	1.838	0.026	10.6700	0.1100	4.66412E+11	2.92192E+09	8.98292E-02	1.30801E-01	4.34939E-01
CO-60	1173.22	2.232	0.024	100.0000	0.0000	1.92518E+03	3.65240E-01	3.38887E-02	1.22332E-02	3.95547E-02
CO-60	1332.49	1.992	0.026	100.0000	0.0000	1.92518E+03	3.65240E-01	1.88868E-02	9.00188E-03	2.92829E-02
CS-137	661.65	3.656	0.046	85.1200	0.2300	1.10193E+04	1.09572E+01	-6.05909E-03	1.23336E-02	4.12638E-02
AM-241	59.54	5.824	0.000	36.3000	0.0000	1.58153E+05	0.00000E+00	2.10982E-02	2.94823E-02	0.00000E+00

5 nuclide lines identified

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET04A
Sample Title: SW49624R1
Peak Analysis Performed on: 9/1/2024 10:58:15 AM
Peak Analysis From Channel: 50
Peak Analysis To Channel: 8190

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
	1	64-	84	70.01	17.10	0.82	-2.858E+02	317.08	2.220E+04
	2	187-	193	190.63	46.54	0.24	1.319E+01	53.95	1.322E+03
	3	235-	248	243.89	59.54	0.75	1.649E+02	86.25	2.180E+03
M	4	339-	361	345.55	84.35	0.23	1.073E+02	62.20	3.761E+02
m	5	339-	361	356.43	87.01	0.23	7.381E+01	43.05	3.420E+02
	6	371-	386	379.34	92.60	1.08	2.021E+02	76.86	1.899E+03
	7	428-	436	431.41	105.31	0.24	1.134E+01	46.68	1.013E+03
	8	541-	553	546.99	133.52	0.24	-5.419E+01	61.85	1.473E+03
M	9	584-	603	589.20	143.82	0.87	1.271E+01	26.09	1.261E+03
m	10	584-	603	595.25	145.30	0.87	8.303E+01	30.25	1.488E+03
	11	664-	673	669.25	163.36	0.24	2.414E+01	49.47	1.071E+03
	12	757-	768	762.87	186.21	0.38	1.004E+02	60.27	1.407E+03
	13	838-	845	841.12	205.31	0.29	-6.887E+01	41.03	9.649E+02
	14	974-	987	977.63	238.63	0.55	-1.493E+01	59.46	1.472E+03
M	15	1204-	1238	1207.53	294.74	0.32	9.609E+00	73.69	4.234E+02
m	16	1204-	1238	1232.50	300.84	0.33	5.429E+00	41.64	4.198E+02
	17	1288-	1321	1296.71	316.51	0.25	-7.701E+01	107.82	2.659E+03
	18	1403-	1421	1410.53	344.29	0.43	9.516E+01	61.79	1.281E+03
M	19	1436-	1465	1441.56	351.86	0.88	8.806E+01	36.27	8.091E+02
m	20	1436-	1465	1461.52	356.73	0.88	1.974E+01	20.16	8.607E+02
	21	1486-	1502	1493.29	364.49	0.24	-9.203E+00	56.39	1.178E+03
	22	1747-	1763	1752.96	427.87	0.27	-3.521E+01	49.84	1.040E+03
	23	1796-	1815	1804.54	440.46	0.24	2.397E+01	53.87	1.077E+03
	24	1948-	1961	1956.71	477.60	0.24	4.802E+01	38.77	6.710E+02
	25	2025-	2043	2036.52	497.08	0.24	-1.782E+01	49.42	9.478E+02
	26	2197-	2212	2201.14	537.26	0.26	5.656E+01	40.51	6.764E+02
	27	2384-	2400	2389.32	583.19	1.87	1.320E+02	41.36	6.510E+02
	28	2483-	2506	2496.33	609.31	0.38	1.442E+02	70.66	1.612E+03
	29	2535-	2558	2548.08	621.94	0.30	-3.192E+01	62.68	1.316E+03

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
	30	2698-	2720	2710.62	661.66	0.33	1.463E+02	48.44	8.307E+02
	31	2971-	2988	2979.67	727.33	0.24	-8.877E+00	38.73	6.589E+02
	32	3086-	3107	3100.32	756.73	0.26	2.954E+01	41.11	6.435E+02
	33	3255-	3266	3260.64	795.86	0.24	6.992E+00	25.05	3.330E+02
	34	3314-	3335	3321.69	810.76	0.47	5.315E+01	40.15	6.049E+02
	35	3415-	3434	3420.39	834.85	0.78	6.082E+01	41.54	6.802E+02
	36	3668-	3690	3679.28	898.04	0.98	1.660E+02	41.64	5.930E+02
	37	3727-	3744	3733.20	911.20	0.29	3.806E+01	31.51	4.159E+02
	38	3961-	3984	3969.88	968.97	0.38	4.004E+01	35.79	4.960E+02
	39	4095-	4108	4101.24	1001.03	0.74	2.100E+01	23.66	2.860E+02
	40	4497-	4512	4503.53	1099.22	0.24	1.877E+01	24.68	2.932E+02
M	41	4564-	4598	4572.15	1115.97	2.05	7.673E+01	20.85	4.025E+02
m	42	4564-	4598	4593.75	1121.24	2.05	1.423E+01	16.14	3.652E+02
	43	4795-	4820	4806.79	1173.24	0.34	9.770E+01	35.25	4.353E+02
	44	5213-	5228	5221.41	1274.44	0.32	-1.318E+01	21.62	2.382E+02
	45	5453-	5469	5459.29	1332.50	0.32	4.860E+01	23.15	2.354E+02
	46	5973-	5999	5985.07	1460.83	0.35	8.568E+01	29.81	3.203E+02
	47	6632-	6647	6639.25	1620.50	0.39	3.899E-01	17.55	1.626E+02

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

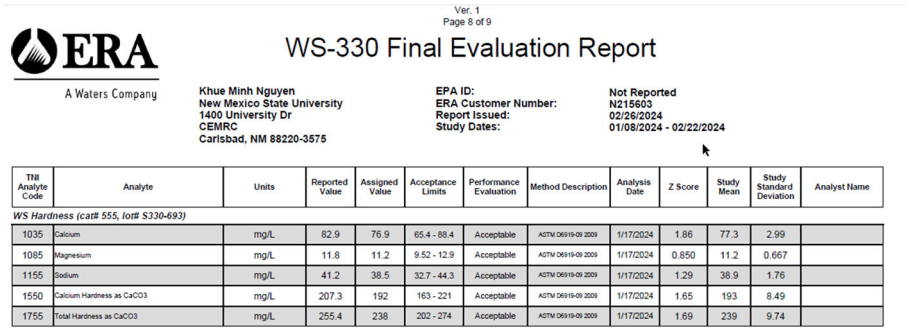
Environmental Chemistry Group

From July 1st to September 30th, 2024, the Environmental Chemistry group (EC) processed anion and cation analyses for the Fixed Air Sampler (FAS) filters and the ambient air (HiVol) filters and finished the complete analyses for drinking water samples, including anions, cations, pH, total organic carbon, conductivity, specific gravity, TDS/TSS, and metals analyses, collected in 2024.

The following Tables and Figures represent characteristic results.

Proficiency Test Results

Sample Type: Proficiency Test
Year: 2024
Analysis Performed: Cations (Hardness)



Ver. 1
Page 8 of 9

ERA
A Waters Company

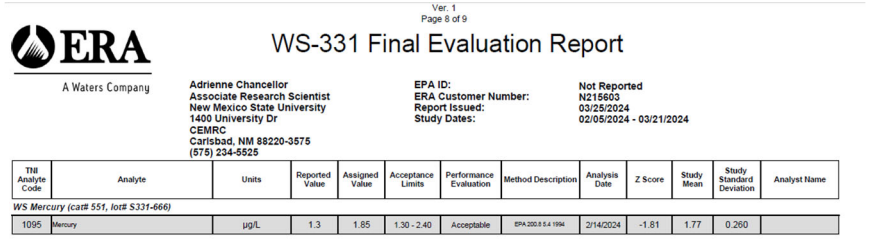
WS-330 Final Evaluation Report

Khue Minh Nguyen
New Mexico State University
1400 University Dr
CEMRC
Carlsbad, NM 88220-3575

EPA ID: Not Reported
ERA Customer Number: N215603
Report Issued: 02/26/2024
Study Dates: 01/08/2024 - 02/22/2024

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 Hardness (cat# 555, lot# S330-693)												
1035	Calcium	mg/L	82.9	76.9	65.4 - 88.4	Acceptable	ASTM D6919-09 2009	1/17/2024	1.86	77.3	2.99	
1085	Magnesium	mg/L	11.8	11.2	9.52 - 12.9	Acceptable	ASTM D6919-09 2009	1/17/2024	0.850	11.2	0.667	
1155	Sodium	mg/L	41.2	38.5	32.7 - 44.3	Acceptable	ASTM D6919-09 2009	1/17/2024	1.29	38.9	1.76	
1550	Calcium Hardness as CaCO3	mg/L	207.3	192	163 - 221	Acceptable	ASTM D6919-09 2009	1/17/2024	1.65	193	8.49	
1755	Total Hardness as CaCO3	mg/L	255.4	238	202 - 274	Acceptable	ASTM D6919-09 2009	1/17/2024	1.69	239	9.74	

Sample Type: Proficiency Test
Year: 2024
Analysis Performed: Mercury



Ver. 1
Page 8 of 9

ERA
A Waters Company

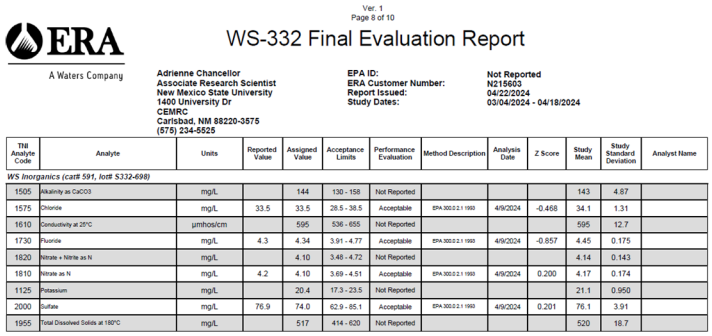
WS-331 Final Evaluation Report

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
Report Issued: 03/25/2024
Study Dates: 02/05/2024 - 03/21/2024

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 Mercury (cat# 551, lot# S331-666)												
1095	Mercury	µg/L	1.3	1.85	1.30 - 2.40	Acceptable	EPA 200.8 5.4 1994	2/14/2024	-1.81	1.77	0.260	

Sample Type: Proficiency Test
Year: 2024
Analysis Performed: Anions (Inorganic)



Ver. 1
Page 8 of 10

ERA
A Waters Company

WS-332 Final Evaluation Report

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

EPA ID: Not Reported
ERA Customer Number: N215603
Report Issued: 04/22/2024
Study Dates: 03/04/2024 - 04/18/2024

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 Inorganics (cat# 591, lot# S332-698)												
1505	Alkalinity as CaCO3	mg/L		144	130 - 158	Not Reported				143	4.87	
1575	Chloride	mg/L	33.5	33.5	28.5 - 38.5	Acceptable	EPA 300.0 2.1 1993	4/9/2024	-0.468	34.1	1.31	
1610	Conductivity at 25°C	µmhos/cm		595	536 - 655	Not Reported				595	12.7	
1730	Fluoride	mg/L	4.3	4.34	3.91 - 4.77	Acceptable	EPA 300.0 2.1 1993	4/9/2024	-0.857	4.45	0.175	
1820	Nitrate + Nitrite as N	mg/L		4.10	3.48 - 4.72	Not Reported				4.14	0.143	
1810	Nitrate as N	mg/L	4.2	4.10	3.69 - 4.51	Acceptable	EPA 300.0 2.1 1993	4/9/2024	0.200	4.17	0.174	
1125	Potassium	mg/L		20.4	17.3 - 23.5	Not Reported				21.1	0.950	
2000	Sulfate	mg/L	76.9	74.0	62.9 - 85.1	Acceptable	EPA 300.0 2.1 1993	4/9/2024	0.201	76.1	3.91	
1955	Total Dissolved Solids at 180°C	mg/L		517	414 - 620	Not Reported				520	18.7	

Sample Type: Proficiency Test
Year: 2024
Analysis Performed: Metals

ERA
A Waters Company

WS-332 Final Evaluation Report

Adrienne Chancellor
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1400 University Dr
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(575) 234-5525

EPA ID: Not Reported
ERA Customer Number: N215603
Report Issued: 04/22/2024
Study Dates: 03/04/2024 - 04/18/2024

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# 590, lot# S332-697)												
1000	Aluminum	µg/L	334.6	306	245 - 367	Acceptable	EPA 200.8 5.4 1994	3/26/2024	1.00	315	19.3	
1005	Antimony	µg/L	27.1	28.0	19.6 - 36.4	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.655	28.0	1.39	
1010	Arsenic	µg/L	31.1	32.7	22.9 - 42.5	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.764	33.2	2.69	
1015	Barium	µg/L	624.8	623	530 - 716	Acceptable	EPA 200.8 5.4 1994	3/26/2024	0.0454	624	26.9	
1020	Beryllium	µg/L	11.2	10.8	9.18 - 12.4	Acceptable	EPA 200.8 5.4 1994	3/26/2024	0.817	10.7	0.626	
1025	Boron	µg/L		1430	1220 - 1640	Not Reported				1420	58.3	
1030	Cadmium	µg/L	44.5	48.1	38.5 - 57.7	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.953	46.4	1.99	
1040	Chromium	µg/L	67.9	72.5	61.6 - 83.4	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-1.53	72.4	2.98	
1055	Copper	µg/L	1457.9	1490	1340 - 1640	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.614	1500	62.9	
1070	Iron	µg/L	984.6	1040	884 - 1200	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-1.21	1050	54.0	
1075	Lead	µg/L	31.6	32.3	22.6 - 42.0	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.414	32.2	1.53	
1090	Manganese	µg/L	595.8	628	534 - 722	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-1.69	633	21.9	
1100	Molybdenum	µg/L	106.6	117	99.4 - 135	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.981	114	7.54	
1105	Nickel	µg/L	349.9	354	301 - 407	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.687	359	13.9	
1140	Selenium	µg/L	80.6	88.5	70.8 - 106	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-1.39	88.7	5.78	
1150	Silver	µg/L	20.68	22.5	15.8 - 29.2	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-1.23	22.8	1.71	
1165	Thallium	µg/L	3.3	3.46	2.42 - 4.50	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.547	3.40	0.187	
1185	Vanadium	µg/L	183.2	190	162 - 218	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.685	189	8.16	
1190	Zinc	µg/L	910.9	929	790 - 1070	Acceptable	EPA 200.8 5.4 1994	3/26/2024	-0.778	940	37.9	

FAS Filters – Station A

Sample Type: FAS, Station A
Year: 2024
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
01/01/24							
01/08/24							
01/15/24							
01/22/24							
02/01/24							
02/08/24							
02/15/24							
02/22/24							
03/01/24							
03/08/24							
03/15/24							
03/22/24							
04/01/24							
04/08/24							
04/15/24							
04/22/24							
05/01/24							
05/08/24							
05/15/24							
05/22/24							
06/01/24							
06/08/24							
06/15/24							
06/22/24							
07/01/24							
07/08/24							
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10/15/24							
10/22/24							
11/01/24							
11/08/24							
11/15/24							
11/22/24							
12/01/24							
12/08/24							
12/15/24							
12/22/24							

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

Sample Type: FAS, Station A
Year: 2024
Analysis Performed: Anions in weekly composites

Week	Chloride ng/m^3	Nitrate ng/m^3	Phosphate ng/m^3	Sulfate ng/m^3
01/01/24	1.83E+05	4.44E+02	<MDL	2.53E+04
01/08/24	2.60E+05	3.47E+02	<MDL	2.56E+04
01/15/24	2.78E+05	4.75E+02	<MDL	2.01E+04
01/22/24	3.74E+05	3.01E+02	<MDL	5.18E+04
02/01/24	2.13E+05	<MDL	<MDL	3.62E+04
02/08/24	3.43E+05	4.03E+01	<MDL	3.06E+04
02/15/24	#VALUE!	8.64E+01	<MDL	1.00E+05
02/22/24	1.16E+06	1.90E+02	<MDL	5.62E+04
03/01/24	2.63E+05	2.47E+02	<MDL	3.15E+04
03/08/24	4.15E+05	3.29E+02	<MDL	2.61E+04
03/15/24	2.27E+05	2.08E+02	<MDL	3.75E+04
03/22/24	1.86E+05	3.80E+02	<MDL	3.98E+04
04/01/24	5.13E+05	2.30E+02	<MDL	5.93E+04
04/08/24	5.03E+05	2.47E+02	<MDL	7.11E+04
04/15/24	4.48E+05	2.33E+02	<MDL	4.07E+04
04/22/24	4.54E+05	2.64E+02	<MDL	2.63E+04
05/01/24	4.59E+05	3.24E+02	<MDL	2.85E+04
05/08/24	4.12E+05	3.90E+02	<MDL	2.37E+04
05/15/24	3.93E+05	2.13E+02	<MDL	2.40E+04
05/22/24	1.45E+06	2.64E+02	<MDL	2.76E+04
06/01/24	1.62E+05	3.39E+02	<MDL	1.53E+04
06/08/24	3.01E+05	<MDL	<MDL	2.20E+04
06/15/24	1.42E+05	2.27E+02	<MDL	1.58E+04
06/22/24	1.48E+05	2.88E+02	<MDL	1.95E+04
07/01/24	1.50E+05	1.22E+02	1.10E+02	1.84E+04
07/08/24	2.46E+05	5.65E+01	<MDL	2.00E+04
07/15/24	5.62E+04	5.11E+01	7.07E+01	1.18E+04
07/22/24	4.32E+04	<MDL	<MDL	1.05E+04
08/01/24				
08/08/24				
08/15/24				
08/22/24				
09/01/24				
09/08/24				
09/15/24				
09/22/24				
10/01/24				
10/08/24				
10/15/24				
10/22/24				
11/01/24				
11/08/24				
11/15/24				
11/22/24				
12/01/24				
12/08/24				
12/15/24				
12/22/24				

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

Sample Type: FAS, Station A
Year: 2024
Analysis Performed: Cations in weekly composites

Week	Sodium ng/m³	Ammonium ng/m³	Magnesium ng/m³	Potassium ng/m³	Calcium ng/m³
01/01/24	1.26E+06	<MDL	2.44E+03	2.42E+03	1.14E+04
01/08/24	1.71E+06	<MDL	5.94E+02	2.21E+03	1.07E+04
01/15/24	1.85E+06	<MDL	1.82E+03	1.88E+03	8.75E+03
01/22/24	2.49E+06	<MDL	5.36E+02	2.40E+03	2.20E+04
02/01/24	1.38E+06	<MDL	9.01E+02	3.12E+03	1.49E+04
02/08/24	2.27E+06	<MDL	7.21E+02	3.63E+03	1.14E+04
02/15/24	#VALUE!	<MDL	5.85E+03	1.01E+04	3.64E+04
02/22/24	3.12E+06	<MDL	4.12E+03	6.45E+03	2.14E+04
03/01/24	1.75E+06	<MDL	5.51E+02	2.38E+03	1.24E+04
03/08/24	2.81E+06	<MDL	9.99E+02	2.80E+03	1.08E+04
03/15/24	1.49E+06	<MDL	3.52E+03	4.07E+03	1.68E+04
03/22/24	1.21E+06	<MDL	4.96E+02	2.13E+03	1.80E+04
04/01/24	3.40E+06	<MDL	9.82E+02	3.99E+03	2.33E+04
04/08/24	3.35E+06	<MDL	1.02E+03	4.07E+03	2.63E+04
04/15/24	3.04E+06	<MDL	8.30E+02	2.99E+03	1.52E+04
04/22/24	3.09E+06	<MDL	7.87E+02	2.87E+03	8.45E+03
05/01/24	3.11E+06	<MDL	1.87E+03	3.17E+03	8.98E+03
05/08/24	2.76E+06	<MDL	1.75E+03	3.07E+03	7.73E+03
05/15/24	2.62E+06	<MDL	4.01E+03	<MDL	8.32E+03
05/22/24	3.82E+06	<MDL	1.99E+03	3.42E+03	8.50E+03
06/01/24	1.11E+06	<MDL	5.38E+02	2.10E+03	4.96E+03
06/08/24	2.01E+06	<MDL	2.66E+02	2.49E+03	6.58E+03
06/15/24	9.45E+05	<MDL	1.46E+03	<MDL	6.26E+03
06/22/24	9.94E+05	<MDL	4.71E+02	<MDL	7.79E+03
07/01/24	9.91E+05	<MDL	1.37E+03	1.74E+03	7.83E+03
07/08/24	1.65E+06	<MDL	1.72E+03	3.10E+03	6.61E+03
07/15/24	3.61E+04	<MDL	9.82E+02	1.68E+03	4.93E+03
07/22/24	2.78E+04	<MDL	8.22E+02	1.75E+03	4.02E+03
08/01/24					
08/08/24					
08/15/24					
08/22/24					
09/01/24					
09/08/24					
09/15/24					
09/22/24					
10/01/24					
10/08/24					
10/15/24					
10/22/24					
11/01/24					
11/08/24					
11/15/24					
11/22/24					
12/01/24					
12/08/24					
12/15/24					
12/22/24					

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

FAS Filters – Station B

Sample Type: FAS, Station B
Year: 2024
Analysis Performed: Metals in monthly composites

Month	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							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							

Sample Type: FAS, Station B
Year: 2024
Analysis Performed: Anions in monthly composites

Month	Chloride ng/m^3	Nitrate ng/m^3	Phosphate ng/m^3	Sulfate ng/m^3
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

Sample Type: FAS, Station B
Year: 2024
Analysis Performed: Cations in monthly composites

Month	Sodium ng/m^3	Ammonium ng/m^3	Magnesium ng/m^3	Potassium ng/m^3	Calcium ng/m^3
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					

Whatman Filters

Sample Type: Near Field (107), ambient air
Year: 2024
Analysis Performed: Metals

Start Date	Aluminum µg/m^3	Cadmium µg/m^3	Lead µg/m^3	Silica µg/m^3	Thorium µg/m^3	Uranium µg/m^3

Sample Type: Cactus Flats (108), ambient air
Year: 2024
Analysis Performed: Metals

Start Date	Aluminum µg/m^3	Cadmium µg/m^3	Lead µg/m^3	Silica µg/m^3	Thorium µg/m^3	Uranium µg/m^3

Sample Type: Near Field (107), ambient air
Year: 2024
Analysis Performed: Anions

Start Date	Chloride µg/m³	Nitrate µg/m³	Phosphate µg/m³	Sulfate µg/m³
01/19/24	4.17E-01	1.45E+00	9.63E-04	1.02E+00
03/01/24	3.01E-01	1.78E+00	2.77E-03	1.31E+00
03/27/24	3.12E-01	1.90E+00	2.72E-03	1.78E+00
04/26/24	3.14E-01	1.98E+00	3.94E-03	1.92E+00
05/24/24	1.54E-01	1.76E+00	3.22E-03	2.59E+00
06/19/24	1.27E-01	1.92E+00	<MDL	1.87E+00

Sample Type: Cactus Flats (108), ambient air
Year: 2024
Analysis Performed: Anions

Start Date	Chloride µg/m³	Nitrate µg/m³	Phosphate µg/m³	Sulfate µg/m³
01/19/24	2.97E-01	1.58E+00	<MDL	1.20E+00
03/01/24	2.16E-01	1.45E+00	1.49E-03	1.31E+00
03/27/24	3.11E-01	1.77E+00	1.33E-03	1.75E+00
04/26/24	2.74E-01	2.09E-03	2.07E+00	2.63E-03
05/24/24	1.52E-01	1.87E+00	2.40E-03	2.76E+00
06/19/24	1.01E-01	1.58E+00	<MDL	1.46E+00

Sample Type: Near Field (107), ambient air
Year: 2024
Analysis Performed: Cations

Start Date	Calcium µg/m³	Magnesium µg/m³	Potassium µg/m³	Sodium µg/m³
01/19/24	7.24E-01	6.65E-02	9.17E-02	2.84E-01
03/01/24	9.90E-01	6.54E-02	8.23E-02	2.43E-01
03/27/24	1.12E+00	9.49E-02	1.10E-01	3.08E-01
04/26/24	3.04E-01	2.48E-01	2.33E-02	5.45E-02
05/24/24	1.71E+00	1.96E-02	5.31E-02	4.12E-01
06/19/24	1.24E+00	2.33E-02	5.46E-02	3.04E-01

Sample Type: Cactus Flats (108), ambient air
Year: 2024
Analysis Performed: Cations

Start Date	Calcium µg/m³	Magnesium µg/m³	Potassium µg/m³	Sodium µg/m³
01/19/24	8.96E-01	4.57E-02	5.38E-02	2.24E-01
03/01/24	1.01E+00	9.52E-03	2.55E-02	1.90E-01
03/27/24	1.24E+00	7.87E-02	8.55E-02	2.83E-01
04/26/24	2.78E-01	1.93E-01	2.11E-02	4.18E-02
05/24/24	1.84E+00	9.65E-02	1.05E-01	3.79E-01
06/19/24	1.89E+00	2.61E-02	5.16E-02	3.43E-01

Drinking Water

Sample Type: Drinking Water
Year: 2024
Analysis Performed: Anions

Sample Location	Chloride µg/L	Nitrate µg/L	Phosphate µg/L	Sulfate µg/L
Carlsbad (Sheep draw)	3.73E+04	4.60E+03	<MDL	9.26E+04
Hobbs	1.19E+05	2.17E+04	<MDL	1.47E+05
Double Eagle PRV4	3.39E+04	1.35E+04	<MDL	3.94E+04
Loving	4.02E+04	2.03E+04	<MDL	1.25E+05
Otis	2.31E+05	1.80E+04	<MDL	5.55E+05
Malaga	6.46E+05	1.57E+04	<MDL	9.92E+05

Sample Type: Drinking Water
Year: 2024
Analysis Performed: Cations

Sample Location	Calcium µg/L	Magnesium µg/L	Potassium µg/L	Sodium µg/L
Carlsbad (Sheep draw)	7.42E+04	3.00E+04	<MDL	2.64E+04
Hobbs	1.11E+05	2.13E+04	<MDL	5.73E+04
Double Eagle PRV4	5.22E+04	9.85E+03	3.65E+03	3.51E+04
Loving	9.01E+04	3.43E+04	<MDL	2.62E+04
Otis	2.40E+05	6.22E+04	<MDL	8.79E+04
Malaga	4.58E+05	1.16E+05	<MDL	2.06E+05

Sample Type: Drinking Water
Year: 2024
Analysis Performed: pH

Sample Location	pH @ 20.6°C
Carlsbad (Sheep draw)	7.99
Hobbs	7.95
Double Eagle PRV4	8.47
Loving	8.19
Otis	8.26
Malaga	8.01

Sample Type: Drinking Water
Year: 2024
Analysis Performed: Total Organic Carbon

Sample Location	TOC mg/L
Sheep Draw	1.231
Hobbs	1.114
Double Eagle PRV-4	0.5095
Loving	0.7142
Otis	0.5344
Malaga	0.7121

Sample Type: Drinking Water
Year: 2024
Analysis Performed: Conductivity

Sample Location	Conductivity mS/cm	Temperature °C
Sheep Draw (Carlsbad)	0.697	21.0
Loving	0.807	21.0
Otis	1.93	21.0
Malaga	3.81	21.0
Hobbs	0.995	21.0
PRV4 (Double Eagle)	0.496	21.0

Sample Type: Drinking Water
Year: 2024
Analysis Performed: Specific gravity

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

Sample Type: Drinking Water
Year: 2024
Analysis Performed: TDS/TSS

Sample Location	TDS mg/L	TSS mg/L
Sheep Draw (Carlsbad)	220.0	N.D.
Loving	400.0	N.D.
Otis	1440.0	N.D.
Malaga	3020.0	N.D.
Hobbs	620.0	N.D.
PRV4 (Double Eagle)	120.0	N.D.
N.D. = non-detect.		

Sample Type: Drinking Water
Year: 2024
Analysis Performed: Metals

Metal	Carlsbad Conc µg/L	Loving Conc µg/L	Otis Conc µg/L	Malaga Conc µg/L	Hobbs Conc µg/L	Double Eagle (PRV4) Conc µg/L
Ag	7.19E-02	<MDC	<MDC	<MDC	<MDC	2.00E-01
Al	3.43E+00	2.04E+00	4.18E+00	6.74E+00	2.11E+00	3.55E+00
As	7.69E-01	1.72E+00	1.87E+00	2.62E+00	8.42E+00	7.82E+00
Ba	7.25E+01	3.39E+01	1.66E+01	1.34E+01	5.64E+01	1.02E+02
Be	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ca	7.44E+04	8.80E+04	2.34E+05	4.43E+05	1.13E+05	5.44E+04
Cd	5.42E-03	<MDC	<MDC	<MDC	1.31E-02	<MDC
Ce	3.10E-03	<MDC	<MDC	<MDC	<MDC	<MDC
Co	1.35E-01	1.64E-01	4.03E-01	7.01E-01	2.01E-01	9.89E-02
Cr	1.41E+00	2.40E+00	2.12E+00	1.81E+00	1.79E+00	1.31E+00
Cu	2.63E+00	3.10E+00	5.03E+00	3.57E+00	4.72E+00	1.64E+00

Dy	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Er	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Eu	1.86E-02	8.17E-03	<MDC	<MDC	<MDC	2.51E-02
Fe	2.80E+02	3.32E+02	1.02E+03	1.73E+03	1.05E+03	2.34E+02
Gd	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Hg	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
K	1.30E+03	1.90E+03	2.86E+03	3.99E+03	2.74E+03	2.96E+03
La	4.46E-03	<MDC	<MDC	<MDC	<MDC	<MDC
Li	7.43E+00	2.13E+01	4.32E+01	6.44E+01	3.72E+01	2.06E+01
Mg	3.47E+04	3.91E+04	7.69E+04	1.32E+05	2.71E+04	1.13E+04
Mn	4.99E-01	3.01E-02	6.79E-02	4.45E-01	1.24E+00	1.08E+00
Mo	1.36E+00	1.67E+00	3.47E+00	4.00E+00	2.72E+00	1.93E+00
Na	2.60E+04	2.58E+04	8.73E+04	1.94E+05	5.59E+04	3.48E+04
Nd	3.23E-03	<MDC	<MDC	<MDC	<MDC	<MDC
Ni	3.38E+00	3.88E+00	1.12E+01	1.85E+01	5.45E+00	2.43E+00
P	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Pb	3.14E-01	2.26E-01	<MDC	2.36E-01	1.24E+00	4.70E-01
Pr	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Sb	3.22E-02	3.41E-02	4.56E-02	4.34E-02	6.71E-02	3.43E-02
Sc	1.84E+00	2.92E+00	3.26E+00	3.17E+00	7.42E+00	4.82E+00
Se	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Si	6.29E+03	9.89E+03	1.04E+04	1.05E+04	2.60E+04	1.65E+04
Sr	3.49E+02	8.33E+02	2.91E+03	5.80E+03	1.28E+03	5.93E+02
Th	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Tl	1.09E-01	<MDC	<MDC	<MDC	2.13E-02	1.23E-02
U	8.22E-01	1.94E+00	3.83E+00	5.67E+00	3.77E+00	1.71E+00
V	3.79E+00	1.16E+01	1.04E+01	7.93E+00	3.16E+01	3.17E+01
Zn	8.28E+00	4.95E+00	2.66E+01	8.69E+00	3.81E+01	6.81E+00

Surface Water

Sample Type: Surface Water
Year: 2024
Analysis Performed: Anions

Sample Location	Chloride µg/L	Nitrate µg/L	Phosphate µg/L	Sulfate µg/L
Hill Tank	4.54E+03	5.60E+02	5.09E+02	1.38E+04
Noya Tank	4.46E+04	<MDL	<MDL	6.44E+03
Pierce Canyon	1.69E+06	4.06E+03	<MDL	1.77E+06
Lake Carlsbad (Shallow)				
Lake Carlsbad (Deep)				
Brantley Lake (Shallow)				
Brantley (Deep)				
Red Bluff (Shallow)				
Red Bluff (Deep)				

Sample Type: Surface Water
Year: 2024
Analysis Performed: Cations

Sample Location	Calcium µg/L	Magnesium µg/L	Potassium µg/L	Sodium µg/L
Hill Tank	6.75E+04	8.91E+03	2.44E+04	2.41E+03
Noya Tank	2.13E+05	1.55E+04	4.25E+04	1.28E+04
Pierce Canyon	5.68E+05	2.12E+05	4.16E+04	9.76E+05
Lake Carlsbad (Shallow)				
Lake Carlsbad (Deep)				
Brantley Lake (Shallow)				
Brantley Lake (Deep)				
Red Bluff (Shallow)				
Red Bluff (Deep)				

Sample Type: Surface Water
Year: 2024
Analysis Performed: pH

Sample Location	pH @ 24°C
Hill Tank	8.782
Noya Tank	8.180
Pierce Canyon	8.338
Lake Carlsbad (Shallow)	
Lake Carlsbad (Deep)	
Brantley Lake (Shallow)	
Brantley Lake (Deep)	
Red Bluff (Shallow)	
Red Bluff (Deep)	

Sample Type: Surface Water
Year: 2024
Analysis Performed: Conductivity

Sample Location	Conductivity mS/cm	Temperature °C
Hill Tank	0.456	20.0
Noya Tank	0.533	20.3
Pierce Canyon	9.83	19.9
Lake Carlsbad (Shallow)		
Lake Carlsbad (Deep)		
Brantley Lake (Shallow)		
Brantley Lake (Deep)		

Red Bluff (Shallow)		
Red Bluff (Deep)		

Sample Type: Surface Water
Year: 2024
Analysis Performed: Specific gravity

Sample Location	SG $_{T/4°C}$
Hill Tank	0.987
Noya Tank	0.980
Pierce Canyon	0.983
Lake Carlsbad (Shallow)	
Lake Carlsbad (Deep)	
Brantley Lake (Shallow)	
Brantley (Deep)	
Red Bluff (Shallow)	
Red Bluff (Deep)	

Sample Type: Surface Water
Year: 2024
Analysis Performed: TOC

Sample Location	TOC mg/L
Hill Tank	14.66
Noya Tank	115.0
Pierce Canyon	5.665
Lake Carlsbad (Shallow)	
Lake Carlsbad (Deep)	
Brantley Lake (Shallow)	
Brantley (Deep)	
Red Bluff (Shallow)	
Red Bluff (Deep)	

Sample Type: Surface Water
Year: 2024
Analysis Performed: TDS/TSS

Sample Location	TDS mg/L	TSS mg/L
Hill Tank	160.00	140.00
Noya Tank	460.00	520.00
Pierce Canyon	5620.00	220.00
Lake Carlsbad (Shallow)		
Lake Carlsbad (Deep)		
Brantley Lake (Shallow)		
Brantley (Deep)		
Red Bluff (Shallow)		
Red Bluff (Deep)		

Sample Type: Surface Water
Year: 2024
Analysis Performed: Metals

Metal	Hill Tank Conc µg/L	Noya Tank Conc µg/L	Pierce Canyon Conc µg/L
Ag	<MDC	4.32E-01	<MDC
Al	4.56E+02	1.68E+04	1.14E+02
As	7.34E+00	2.86E+01	<MDC
Ba	2.11E+02	3.04E+03	4.09E+01
Be	<MDC	3.21E+00	<MDC
Ca	6.39E+04	4.46E+05	5.39E+05
Cd	<MDC	1.45E+00	<MDC
Ce	1.93E+00	1.13E+02	5.51E-01
Co	1.17E+00	3.08E+01	1.54E+00
Cr	1.58E+00	1.35E+01	<MDC
Cu	1.18E+01	4.30E+01	3.05E+00
Dy	1.67E-01	1.04E+01	<MDC
Er	7.77E-02	4.72E+00	3.78E-02
Eu	<MDC	4.26E+00	<MDC
Fe	4.32E+02	1.19E+04	1.78E+03
Gd	2.47E-01	1.63E+01	<MDC
Hg	<MDL	<MDL	<MDL
K	2.15E+04	4.58E+04	1.66E+04
La	8.98E-01	4.98E+01	<MDC
Li	4.43E+00	2.40E+01	8.34E+01
Mg	9.69E+03	3.77E+04	2.15E+05
Mn	9.24E+01	4.88E+03	2.14E+01
Mo	9.23E-01	1.43E+00	4.02E+00
Na	2.26E+03	1.24E+04	9.31E+05
Nd	1.03E+00	6.30E+01	<MDC
Ni	4.79E+00	5.48E+01	2.44E+01
P	2.76E+02	5.85E+03	<MDC
Pb	<MDC	7.41E+01	<MDC
Pr	2.39E-01	1.38E+01	<MDC
Sb	6.35E-01	8.23E-01	<MDC
Sc	1.73E+00	9.05E+00	1.08E+00
Se	<MDC	<MDC	<MDC
Si	6.56E+03	2.91E+04	4.67E+03
Sr	3.13E+02	9.98E+02	8.50E+03
~~Th~~			
Tl	<MDC	<MDC	<MDC
U	7.27E-01	1.49E+00	8.19E+00
V	1.77E+01	1.16E+02	5.13E+00
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						
Al						
As						
Ba						
Be						
Ca						
Cd						
Ce						
Co						
Cr						
Cu						
Dy						
Er						
Eu						
Fe						
Gd						
Hg						
K						
La						
Li						
Mg						
Mn						
Mo						
Na						
Nd						
Ni						
P						
Pb						
Pr						
Sb						
Sc						
Se						
Si						
Sr						
Th						
Tl						
U						
V						
Zn						

Internal Dosimetry Group

Number of *in vivo* radiobioassay measurements performed during the reporting period: None for WIPP, 16 for the contract radiological personnel and those working in the laboratories located at CEMRC, and 2 for the public participants.

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 July 1st to September 30th, 2024:

7/16/2024: LANL Interns

Explained about in-vivo radiobioassay concepts using Lung and Whole-Body gamma spectroscopy and handed out the flyers about the Lie down and Be Counted program to around 15 visitors who are all in engineering fields.

7/18/2024

Interacted and spoke with middle-school-aged students of Boys and Girls Club of Carlsbad at Southeast New Mexico College at a "College Readiness" event. Unable to provide LDBC brochures due to the students being underage, however, recommended and encouraged students to stop by CEMRC with a guardian to sign up for the LDBC program.

8/22/2024

Informal visit by two WIPP contractors seeking to gain a better understanding of CEMRC. They spent almost an hour with the Lung and Whole-Body gamma spectroscopy system in the ID lab, to understand radioactivity measurements. They both signed up for LDBC counting. One visitor participated and was counted. Waiting on the other person to be counted.