



## CARLSBAD ENVIRONMENTAL MONITORING & RESEARCH CENTER

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### An Update on CEMRC radiological results from air and surface water sampling activities following the February 14<sup>th</sup>, 2014 radiation detection event

The Carlsbad Environmental Monitoring and Research Center (CEMRC), an entity of New Mexico State University, continues to conduct radiological separation and analyses on a variety of samples including ambient air, WIPP exhaust air, and surface water following the underground radiation detection event that occurred at approximately 11:30pm on Friday, February 14, 2014. A general summary of the levels of activity by sample type listed below are presented in Becquerels (Bq), also known as disintegrations per second, and are reported as Bq per sample for air samples and Bq per liter (Bq/L) for surface water samples.

#### Surface Water Samples

On March 20<sup>th</sup> and on March 28<sup>th</sup>, CEMRC technicians collected surface water samples from the three public reservoirs in the area including Brantley Lake, Lake Carlsbad (lower tansil), and Red Bluff Lake. These samples included both shallow and deep water samples as well as sediment samples from the bottom of the reservoirs. Once the actinide separation process was completed, the samples were counted initially for 24 hours and again for a total of five days. For quality control purposes, a duplicate sample was randomly selected from one of the three reservoirs and was analyzed along with the primary samples. As can be seen in the table below, there were no detectable levels of Americium (<sup>241</sup>Am) or Plutonium (<sup>239+240</sup>Pu, <sup>238</sup>Pu) for any of the surface water samples collected. CEMRC is still processing and analyzing the sediment samples and will report those results at a future date.

Reservoir - Sample Type	Am241 Bq/Liter	Pu239+240 Bq/Liter	Pu238 Bq/Liter
Red Bluff - Shallow	n/d	n/d	n/d
Red Bluff - Deep	n/d	n/d	n/d
Brantley - Shallow	n/d	n/d	n/d
Brantley - Deep	n/d	n/d	n/d
Brantley - Shallow Duplicate	n/d	n/d	n/d
Brantley - Deep Duplicate	n/d	n/d	n/d
Lower Tansil - Shallow	n/d	n/d	n/d
Lower Tansil - Duplicate	n/d	n/d	n/d
n/d = no detection (activity below minimum detectable concentrations)			

## WIPP Exhaust Shaft Pre and Post-HEPA Filtration Results:

In addition to surface water samples, CEMRC scientists continue to perform radiological analyses of exhaust air filter samples from the WIPP repository exhaust shaft at **Station A** (before air goes through HEPA filtration) and at **Station B** (after air goes through HEPA filtration). These filters are collected three times per day on eight-hour intervals, seven days per week, from each sampling station and were analyzed individually through February 21<sup>st</sup>. Since February 21<sup>st</sup>, CEMRC has been analyzing and reporting station A and station B filters in daily composites (i.e. three filters per day are analyzed as one sample). Below is a table showing the weekly average of activity, per isotope, following the February 14, 2014 event for both station A (pre-HEPA) and station B (post-HEPA) samples analyzed to date.

<b>Sampling Station A - Pre-HEPA</b>			
<b>Week</b>	<b>Am241 Bq/Sample</b>	<b>Pu239+240 Bq/Sample</b>	<b>Pu238 Bq/Sample</b>
2/15 - 2/21	46,614.18	7,103.16	322.54
2/22 - 2/28	9.24	1.02	0.092
3/1 - 3/7	1.51	0.16	0.007
3/8 - 3/14	1.90	0.17	0.008
3/15 - 3/21	0.81	0.09	0.004
3/22 - 3/28	1.12	0.12	0.005
3/29 - 4/1	0.88	0.10	0.005
<b>Sampling Station B - Post-HEPA</b>			
<b>Week</b>	<b>Am241 Bq/Sample</b>	<b>Pu239+240 Bq/Sample</b>	<b>Pu238 Bq/Sample</b>
2/15 - 2/21	213.08	20.94	3.00
2/22 - 2/28	0.94	0.09	0.010
3/1 - 3/7	0.69	0.08	0.004
3/8 - 3/14	0.40	0.05	0.002
3/15 - 3/21	0.16	0.02	0.001
3/22 - 3/28	0.05	0.004	0.0003
3/29 - 4/1	0.03	0.003	0.001

While it is evident that a moderate amount of radioactive isotopes were released within the WIPP repository as well as into the outside air from the WIPP exhaust shaft immediately following the underground radiation detection event, it is important to note that the amounts detected at station A are reflective of the level of radioactivity within the WIPP repository exhaust system prior to going through a high efficiency particulate absorption (HEPA) filtration system. The levels detected at station B represent the amount of radioactivity that got through or somehow bypassed the HEPA filtration system and therefore were ultimately released into the atmosphere. The levels of activity measured at sampling station B were significantly lower than those measured at sampling station A

and were deemed to be minor in terms of having a negative impact on public health and/or the environment. Additionally, as can be seen in the table above, currently minor amounts of radioactivity continue to be detected in the air within the WIPP repository (Station A) while only trace amounts of radioactivity continue to be detected in the air exiting the WIPP exhaust shaft (Station B). Lastly, in looking at the difference in activity between the two sampling stations, it is evident that the HEPA filtration system was successful in preventing a majority of the radioactive particles from escaping into the outside air.

### Ambient air sampling results

In addition to WIPP exhaust shaft air sampling, the CEMRC continues to collect filters weekly from ambient air sampling stations located on the WIPP property as well as outside of the WIPP property protection area. These ambient air sampling stations are located on platforms approximately 15 feet above the ground and continuously sample the air in the environment at or near the WIPP repository. The table below shows the results obtained from ambient air samples taken since the February 14, 2014 underground radiation event.

Sampling Site	Sample Period	Am241 Bq/Sample	Pu239+240 Bq/Sample	Pu238 Bq/Sample
<b>On Site #106</b>				
109 Yards NW of WIPP Exh. Shaft (32, 22', 22.75"N; 103, 47', 30.26"W; elev. 3,419')	2/11/14 - 2/18/14	1.300	0.115	0.004
	2/18/14 - 2/25/14	0.020	0.004	0.004
	2/25/14 - 3/4/14	0.007		
	3/4/14 - 3/11/14	n/d	n/d	n/d
	3/11/14 - 3/21/14	0.013	n/d	n/d
<b>Near Field #107</b>				
0.6 Miles NW of WIPP Exh. Shaft (32, 22', 39.69"N; 103, 47', 56.24"W; elev. 3,632')	2/11/14 - 2/16/14	0.645	0.046	n/d
	2/16/14 - 2/18/14	0.007	n/d	n/d
	2/18/14 - 2/25/14	0.017	0.005	n/d
	2/25/14 - 3/4/14	0.004	0.001	n/d
	3/4/14 - 3/11/14	n/d	n/d	n/d
	3/11/14 - 3/21/14	0.002	n/d	n/d
<b>Cactus Flats #108</b>				
11.8 Miles SE of WIPP Exh. Shaft (32, 13', 5.54"N; 103, 41', 42.5"W; elev. 3,579')	2/11/14 - 2/16/14	n/d	n/d	n/d
	2/16/14 - 2/18/14	0.005	n/d	n/d
	2/18/14 - 2/25/14	0.007	0.001	n/d
	2/25/14 - 3/4/14	n/d	n/d	n/d
	3/4/14 - 3/11/14	0.001	n/d	n/d
	3/11/14 - 3/21/14	0.002	0.002	n/d
n/d = no detection				
Pre-event highest detection		0.0005 Bq/sample 241Am		0.004 Bq/sample 239+240Pu

The most recent activity detected at these ambient air sampling stations (3/11 – 3/21) indicate that the trace amounts of radioactive particles that were ultimately released from the WIPP exhaust shaft following the event appear to have dispersed into the atmosphere and are detectable only in minute concentrations. While the results for Americium ( $^{241}\text{Am}$ ) continue to be slightly elevated above previous background levels, the levels of Plutonium ( $^{239+240}\text{Pu}$  and  $^{238}\text{Pu}$ ) currently being measured are at or below historic background levels.

The CEMRC is funded by the U.S. Department of Energy, Carlsbad Field Office (DOE/CBFO) to conduct an independent environmental monitoring program of the WIPP site for the citizens of Carlsbad and southeast New Mexico. For more information about CEMRC and its independent environmental monitoring program or to see data specific to the radiological event, visit the CEMRC website at [www.cemrc.org](http://www.cemrc.org) or contact Dr. Russell Hardy, Director at (575) 234-5555.