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CARLSBAD ENVIRONMENTAL MONITORING & RESEARCH CENTER

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EXECUTIVE SUMMARY

The Carlsbad Environmental Monitoring & Research Center (CEMRC) is dedicated to constantly monitoring the environment surrounding a unique underground radioactive waste storage facility in southeast New Mexico, the Waste Isolation Pilot Plant (WIPP). Funded through the U.S. Department of Energy (DOE), CEMRC is a component of the College of Engineering of New Mexico State University (NMSU) and acts as a crucial watchdog for the environment near WIPP.

The WIPP facility can be thought of as a special underground vault designed for the permanent storage and disposal of specific types of radioactive waste generated from defense activities. This waste, known as transuranic (TRU) waste, contains elements beyond uranium, mostly plutonium and americium, and sometimes includes hazardous chemicals mixed with radioactive materials.

The mission of CEMRC is to monitor all the possible routes, or pathways, that these materials could potentially take to reach the environment surrounding WIPP. The scientists at CEMRC monitor the air we breathe (air in the vicinity and air released from WIPP), the water we drink, the surface water in the area, the soil, the sediment at the bottom of bodies of water, the local plant life, and even the people who live and work nearby, through a special program called whole-body counting for radioisotopes.

The ultimate objective is to determine if WIPP's operations are having any negative effects on the local environment and the health of the people who live in the surrounding area. If any impacts are detected, CEMRC scientists try to understand how serious these impacts are, how far they spread, and what the implications are for the environment.

The good news is that after years of careful monitoring, the data consistently show that WIPP's operations have not had a harmful impact on either human health or the environment. In addition, all findings are readily available to the public. This open access to data, along with the opportunity for the public to participate in the whole-body counting program, builds trust and ensures transparency that is necessary for the successful operation of the repository.

Key Highlights of the Monitoring Results

The main findings from the monitoring activities in 2024 are as follows:

- Overall radioactivity levels (gross alpha and gross beta activities) remained at or very near normal background levels.
- Very small amounts of americium-241 (^{241}Am), plutonium-238 (^{238}Pu), and plutonium-239+240 ($^{239+240}$Pu) were found in most weekly air filter samples from Station A, where unfiltered air is sampled. However, these amounts were so small they were barely detectable and do not pose any health risks.
- The levels of radioactivity in airborne particles in the area surrounding WIPP are similar to what has been measured in previous years.
- Very small amounts of ^{238}Pu were detected in two soil samples, at levels comparable to historical data.
- The isotopes ^{241}Am, $^{239+240}$Pu, or ^{238}Pu were not found in any drinking water samples.
- The isotopes ^{241}Am, $^{239+240}$Pu, or ^{238}Pu were not found in any surface water samples.
- The isotopes ^{241}Am and ^{238}Pu were not found in the sediment of all three regional reservoirs. The isotope $^{239+240}$Pu was found in the sediments of one reservoir, at a level consistent with normal background levels for these reservoirs.
- The isotopes ^{241}Am, $^{239+240}$Pu, or ^{238}Pu were not found in any vegetation samples.

Monitoring air released from the facility, drinking water, and surface water for non-radioactive contaminants showed no environmental impacts that could be linked to WIPP operations.

CHAPTER 1 - INTRODUCTION

The Carlsbad Environmental Monitoring & Research Center (CEMRC) is dedicated to constantly monitoring the environment surrounding a unique underground radioactive waste storage facility in southeast New Mexico, the Waste Isolation Pilot Plant (WIPP). Funded through the U.S. Department of Energy (DOE), CEMRC is a component of the College of Engineering of New Mexico State University (NMSU) and acts as a crucial watchdog for the environment near WIPP.

The WIPP facility is a deep underground repository operated by the DOE, designed for the permanent disposal of defense-related transuranic (TRU) waste. TRU waste is a specific type of radioactive waste. To be classified as TRU waste, the waste needs to have a certain level of radioactivity (at least 100 nanocuries per gram) from elements heavier than uranium, and these isotopes need to have a long half-life (over 20 years). The TRU waste stored at WIPP is mostly radioactive industrial trash, along with solidified liquids, glass, metal, construction debris, and other materials.

The mission of CEMRC is to track the "radiological fingerprint" of the WIPP facility throughout its operational life by comparing current radiation levels to a baseline established before WIPP even started operating. The CEMRC scientists have been independently monitoring the area since 1998, and they make all their findings easily available to the public. This openness helps build trust and transparency between DOE, WIPP contractors, and the surrounding community.

There are limits to what WIPP can accept. The waste must have a total radioactivity level below a certain threshold, and the radiation dose rate on the surface of the waste containers must also be below a specific limit. Two types of TRU waste are stored at WIPP: regular TRU waste, which contains only radioactive elements, and mixed transuranic waste (MTRU), which contains both radioactive elements and hazardous chemical components.

WIPP received its first waste shipment on March 26, 1999. The facility operated without any major incidents until February 2014. At that time, a fire on February 5 and an unrelated accidental release of radioactive material on February 14 led to a temporary halt in waste shipments. The facility resumed accepting waste shipments on April 10, 2017.

Where is WIPP? A Look at the Landscape

The WIPP facility is not just any storage site; it is currently the only licensed deep underground repository in the U.S. specifically permitted to permanently dispose of transuranic waste from defense operations. WIPP is located in Eddy County, in the southeastern corner of New Mexico, about 26 miles (42 kilometers) east of the city of Carlsbad (Figure 1.1).

Nearby, are some interesting natural features, including Livingston Ridge and Nash Draw, located about 5 miles (8 kilometers) west of the facility. Nash Draw is a shallow, winding valley, that is between 8.5 and 11 miles (14 to 18 kilometers) wide. It is known for its surface pools of salty water, or brine. Livingston Ridge is a bluff that marks the eastern edge of Nash Draw.

Other notable landmarks in the region include the Pecos River, which flows about 14 miles (22 kilometers) west of WIPP, and the famous Carlsbad Caverns National Park, located about 42 miles (68 kilometers) west-southwest of the facility.

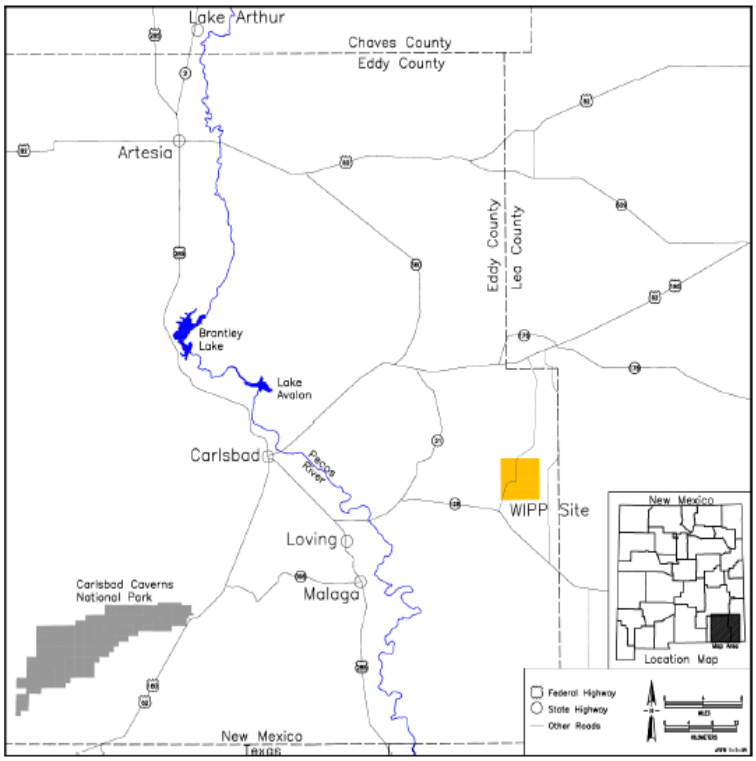


Figure 1.1. Location of the WIPP Site Identified by the Orange Box (DOE/WIPP-99-2194, Rev.14)

The climate around WIPP is considered semi-arid, meaning it is fairly dry. The area typically receives between 11 and 13 inches (280 to 300 millimeters) of rain each year, much of which falls during intense thunderstorms in the spring and summer. The wind usually blows from the southeast, with an average speed of about 8.8 miles per hour (14 kilometers per hour).

Most of the people who live within 50 miles (80 kilometers) of WIPP are concentrated in and around the New Mexico communities of Carlsbad, Hobbs, Eunice, Loving, Jal, Lovington, and Artesia. According to the latest census data, the estimated population within this radius is about 88,952. The closest community is the village of Loving, with a population of around 1,400, located about 18 miles (29 kilometers) west-southwest of WIPP. The closest major city is Carlsbad, about 26 miles (42 kilometers) west of the facility. The 2020 census reported Carlsbad's population as 32,238. The census does not account for a large fraction of the population residing in these communities due to their temporary employment in industries such as oil and gas exploration and extraction.

The area within 10 miles of WIPP has also a small population involved in ranching, oil and gas exploration, and potash mining. Three ranches – Mills, Smith, and Mobley – are located near the facility. The Mills ranch headquarters is about 3.5 miles (5.6 kilometers) south-southwest of WIPP, the Smith headquarters is about 5.5 miles (8.8 kilometers) west-

northwest, and the Mobley ranch is about 6 miles (9.6 kilometers) southwest. While there are no dairy farms close to WIPP, the area produces a lot of alfalfa, which is used to feed cattle, mainly in New Mexico and Texas. Besides alfalfa, cotton and pecans are also major crops grown in the Pecos Valley region.

The WIPP site was chosen for its unique geology. Deep beneath the surface, thick beds of salt formed over 250 million years ago lie undisturbed. These ancient salt deposits are especially important because salt naturally seals itself over time, closing any cracks or gaps. This makes it an ideal barrier for isolating radioactive waste, as it helps prevent any movement of contaminants and keeps the repository stable for thousands of years.

Understanding the landscape, geology, and local communities helps CEMRC scientists tailor the monitoring to the unique features of the region. By considering everything from the dry climate and local agriculture to the ancient salt beds below ground, CEMRC scientists designed the monitoring program to best protect both people and the environment.

Inside WIPP: How it's Built and How Air is Monitored

Because air can carry fine particles of radioactive material, monitoring and filtering is a key part of keeping the environment safe. As can be seen in Figure 1.2, the WIPP site has both surface facilities and an underground repository. The underground part is where the waste is stored. Currently, the repository is made up of eight waste-disposal panels. Additional panels will be added in the future to store additional waste, as needed. Each panel has seven waste disposal rooms that are about 300 feet (91 meters) long, 33 feet (10 meters) wide, and 15 feet (4.5 meters) high. As of 2024, all eight of these panels have been dug out, and mining was underway in panels 11 and 12. The first seven panels have been closed off and sealed from the ventilation air. Panel 8 is currently used for storage of incoming waste shipments. The repository also has tunnels for access and ventilation, as well as four shafts that connect the surface facilities to the underground activities. These shafts are used for moving waste and people, and for bringing air into the repository.

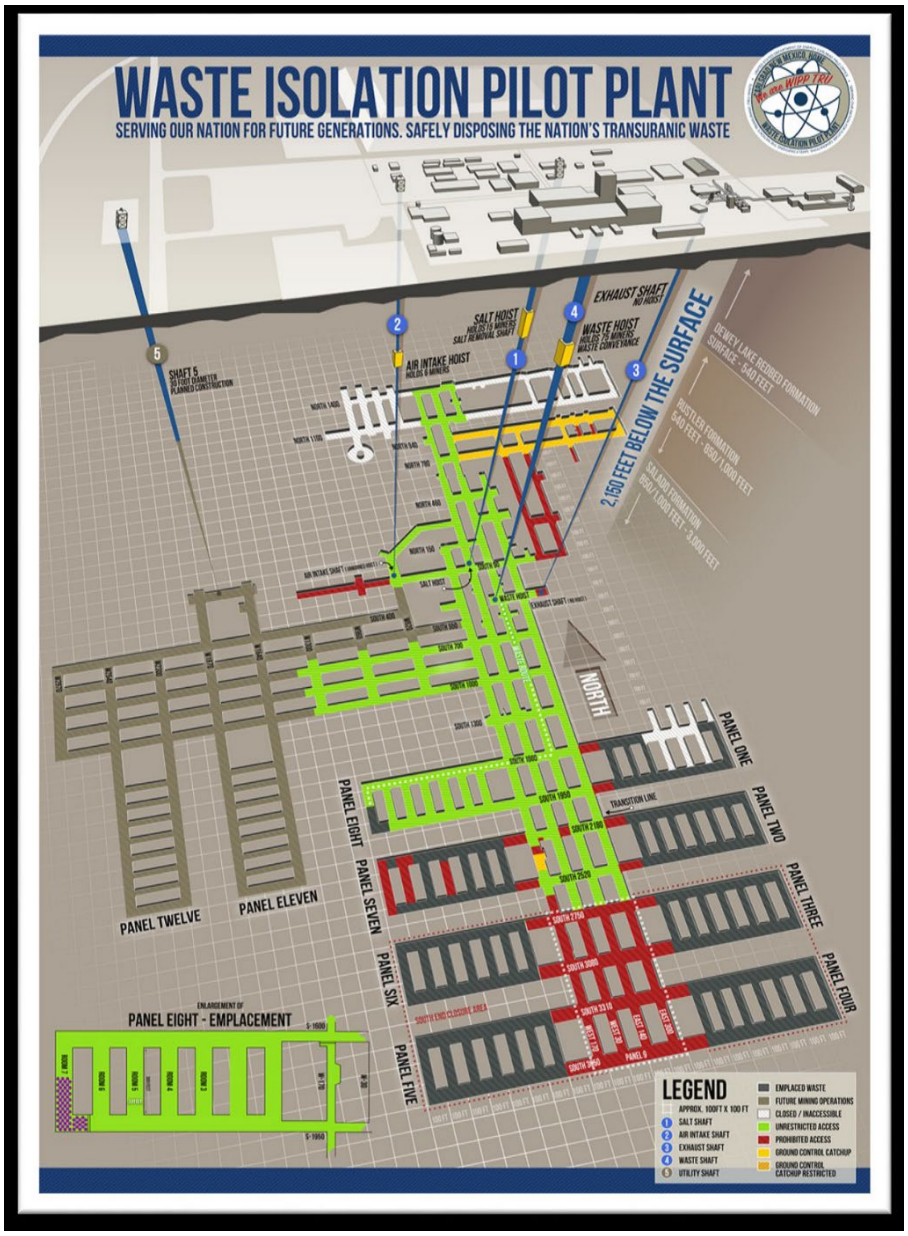


Figure 1.2. WIPP Layout (from WIPP website)

Ventilation is important to keep the air clean and safe for workers. Air is drawn from the surface into the underground. Because the air eventually exits through an exhaust shaft, this shaft is the only potential way for any contaminants to be released from the repository during normal operations. To prevent this, the exhaust air passes through High-Efficiency Particulate Air (HEPA) filters located on the surface. These filters are designed to trap even very fine particles that potentially could be harmful. In addition, continuous air monitors (CAM) in the underground areas check the air quality, as an extra precaution. In the past, if contamination were detected, the system would automatically switch to "filtration mode," and the exhaust air would be routed through the HEPA filters before being released into the environment.

Currently, however, all exhaust air must pass through a bank of HEPA filters before it is released to the environment.

Figure 1.3 shows a diagram of the WIPP ventilation system and how the air normally flows underground, as of 2024. The sampling systems are designed to collect at least 50% of the very fine particles (10 micrometers in diameter) in the exhaust air. Before the 2014 incident, the ventilation system normally discharged unfiltered air. One or two large fans were typically used to move about 475,000 cubic feet of unfiltered air per minute underground. Since the incident, the ventilation system has been kept in filtration mode. In this mode, one of three filtration fans operates to deliver 60,000 cubic feet of air per minute to the underground.

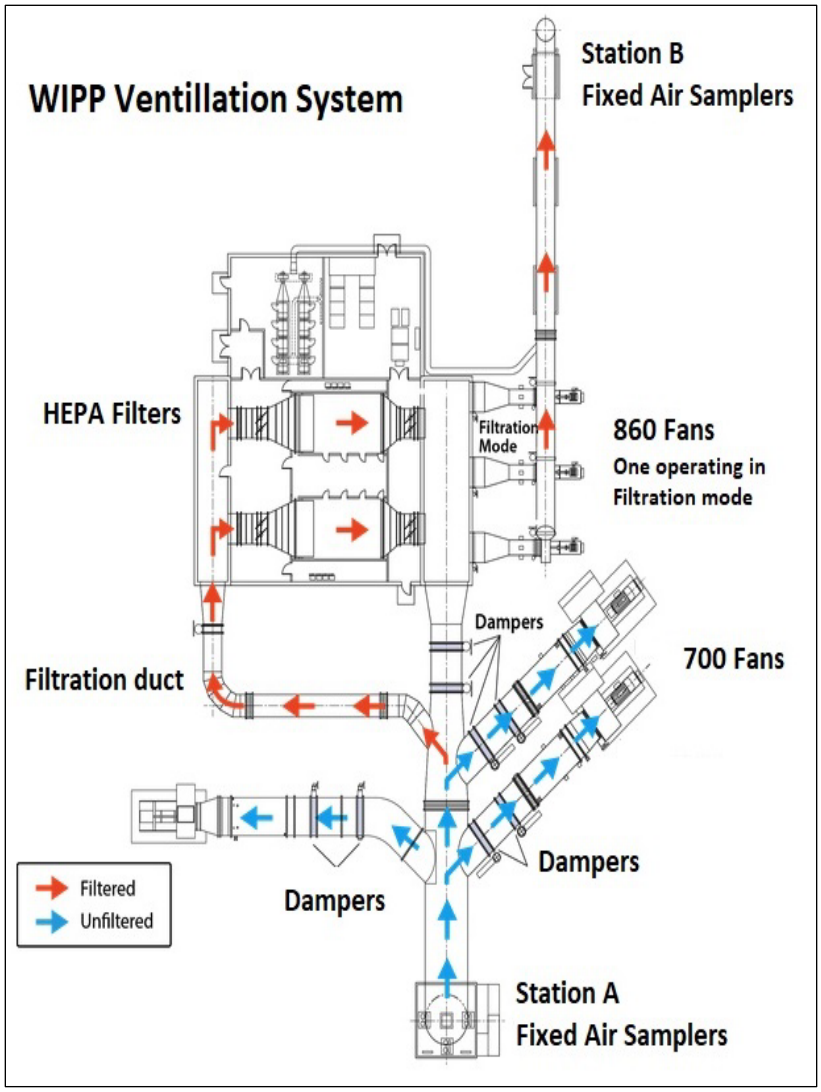


Figure 1.3. Schematic of WIPP Ventilation System

The air that exits the repository, both filtered and unfiltered, is carefully monitored at effluent air monitoring stations. Each station has at least one fixed air sampler (FAS) that collects samples of the air. Under normal conditions, unfiltered air is drawn through the repository and released directly to the environment after passing by a sampling point called Station A. So,

the measurements at Station A show the levels of radioactive materials in the air inside the repository, which would reflect the level of contamination released directly to the environment. However, if contamination is detected underground, the system would switch to filtration mode, and the exhaust air would be routed through the HEPA filters. The measurements at Station B show the level of contamination that is actually released into the environment when the filtration system is operating.

Three different organizations independently analyze the air filters collected at Stations A and B: CEMRC, the New Mexico Environment Department DOE Oversight Bureau (NMED-DOE-OB), and the WIPP Management and Operating (M&O) contractor.

In the fall of 2016, the ventilation flow capacity of the Station B exhaust duct increased from 60,000 cubic feet per minute to 114,000 cubic feet per minute by adding two more HEPA filter trains. During 2024, the ventilation system associated with Station B operated normally at a flow rate of 114,000 cubic feet per minute.

Health and Environmental Monitoring

CEMRC's mission of monitoring the environment around WIPP is comprehensive and covers a wide range of activities. These activities can be grouped into three main categories:

1. **Collecting and Analyzing Samples:** This involves gathering environmental samples and testing them for both radioactive and hazardous contaminants.
2. **Radiological Screening:** This includes screening workers and local residents for any signs of radioactive materials in their bodies.
3. **Evaluating Environmental Impacts:** This means assessing any potential environmental impacts that might be related to WIPP's operations.

The environmental samples that CEMRC analyzes include filters collecting airborne particles in the air we breathe (ambient air), surface water and drinking water, soil, sediment from bodies of water, and vegetation. Monitoring the ambient air helps establish a baseline, which is then compared to data collected during WIPP's operations. This comparison helps identify any potential releases of contaminants. CEMRC operates four ambient air samplers in and around the WIPP site, as well as two air samplers in the nearby communities of Loving and Carlsbad.

Public drinking water sources are also sampled and analyzed to establish a baseline. This is important because drinking water is a primary way that contaminants could potentially enter the human body. Soil, sediment, and surface water samples are collected and analyzed to determine the levels of contaminants and to understand the natural variability of background radioactivity. This allows CEMRC scientists to detect any potential releases from WIPP.

CEMRC scientists also conduct routine monitoring of workers and residents living within a 100-mile radius of WIPP. This monitoring checks for the presence of radioisotopes through a program called "Lie Down and Be Counted" (LDBC). The LDBC program is named for the way participants lie down under a radiation scanner to measure radioactivity in their bodies.

As with other parts of CEMRC's monitoring program, this testing was used to establish a baseline profile of radioactive materials already present in the bodies of local residents before WIPP's disposal operations began. This testing has continued throughout the disposal phase and is still ongoing today.

CEMRC Capabilities

To effectively monitor the environment around WIPP, CEMRC scientists use a variety of advanced instruments to detect and measure even the smallest traces of radioactive materials and metals in the environment and in people. This allows them to quickly and accurately detect and quantify radioactive materials and other contaminants, even in the event of an accidental release from WIPP or from nuclear facilities anywhere in the world. In fact, CEMRC can provide results within hours of a potential release. CEMRC provides DOE with a monthly summary of radioactivity measurements from airborne effluent monitoring within fourteen days of the end of each month. Any anomalies in airborne effluent radioactivity measurements, for example due to rock falls or investigative and clean-up efforts by underground personnel, are immediately reported to DOE verbally and in writing within eight hours of discovery.

The following are some of the key features of the CEMRC monitoring program:

- **Advanced Radiation Detection Instrumentation:** CEMRC has a range of sophisticated detectors, including the following:
    - Sixteen gas proportional chambers for detecting gross alpha and beta radiation
    - Seventy-two detectors for alpha spectrometry (analyzing alpha particles)
    - Four High Purity Germanium (HPGe) detectors for gamma spectroscopy
- **Whole-Body Counting:** CEMRC has a whole-body counting system that can measure even extremely low levels of radioactive elements in a person's body. This is part of the "Lie Down and Be Counted" program.
- **Low-Level Monitoring:** CEMRC can monitor the environment for radioactive materials at levels below normal background levels. This is achieved by using specialized low-background instruments and by counting samples for extended periods of time.
- **Elemental Analysis:** CEMRC can analyze samples for trace metals using inductively coupled plasma mass spectrometry (ICP-MS) and major anions and cations using ion chromatography (IC) techniques.
- **Quality Assurance:** CEMRC has a quality assurance program to ensure that all procedures are followed correctly and that the data collected is of the highest quality.

CEMRC radiochemists can analyze environmental samples for the following radioactive constituents:

- **Gross Alpha and Gross Beta Analyses:** These analyses provide a general measurement of the number of alpha and beta particles in a sample.

- **Americium-241 (^{241}Am), Plutonium-239/240 ($^{239+240}$Pu), Plutonium-238 (^{238}Pu):** These alpha-radiation-emitting isotopes are artificially produced and are the most abundant radioactive isotopes in the TRU waste stored underground at WIPP.
- **Uranium-234 (^{234}U), Uranium-235 (^{235}U), Uranium-238 (^{238}U):** These alpha-radiation-emitting isotopes occur naturally and are present in both TRU waste and the environment.
- **Strontium-90 (^{90}Sr):** This beta-radiation-emitting isotope is a major fission product that may be found in TRU waste from reactor sites and in the environment due to fallout from nuclear testing.
- **Cesium-137 (^{137}Cs):** This gamma-radiation-emitting isotope is another major fission product.
- **Cobalt-60 (^{60}Co):** This isotope is a strong gamma radiation emitter produced artificially in nuclear reactors.
- **Potassium-40 (^{40}K):** This is a naturally occurring gamma-radiation-emitting isotope.

This report describes the collection and analysis of samples from January 2024 through December 2024, along with historical data for the past twenty years. It evaluates the environmental monitoring data and identifies any trends that are important for demonstrating any impact that WIPP's operations might have on the local environment. In summary, the results from this year's monitoring show that WIPP's operations did not have an adverse effect on human health or the environment.

CHAPTER 2 - AIRBORNE EFFLUENT MONITORING

The air that moves through the WIPP repository is carefully managed and monitored to protect both people and the environment. Fresh air is drawn down into the underground facility through three main shafts, and then, after circulating through the repository, it is pushed back up to the surface through an exhaust shaft. Along the way, this air is sampled at two key points: Station A, where unfiltered air is sampled, and Station B, where air after it passes through powerful High Efficiency Particulate Air (HEPA) filters designed to trap even very small particles, is sampled.

Federal agencies like the U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) set strict limits on the amount of radioactive material that can be present in the air. These limits are designed to protect both workers and the public from potential health risks. For the WIPP facility, this means carefully tracking specific radioactive isotopes of plutonium, americium, uranium, strontium, and various gamma-radiation-emitting isotopes.

Effluent air monitoring at these stations is a cornerstone of both the WIPP Environmental Monitoring program and CEMRC's independent oversight. CEMRC has been tracking and analyzing WIPP's exhaust air since 1998, providing a long-term record of the quality of the air leaving the facility. Before the 2014 radiation release event, Station A was the main checkpoint for compliance. Since then, Station B has become the primary point for official emissions monitoring.

Stations A and B are above-ground platforms where air samples are collected from the exhaust air coming from the repository (Figure 2.1). Station A collects samples before the air is filtered, and Station B collects samples after the air is filtered. The air stream sampled by each sampler is split into three legs, allowing three samples to be collected at the same time. This allows CEMRC, the WIPP site contractor, and the New Mexico Environment Department (NMED) to each collect a sample concurrently (Figure 2.2).



Figure 2.1. Sampling Station A (left) and Sampling Station B (right)

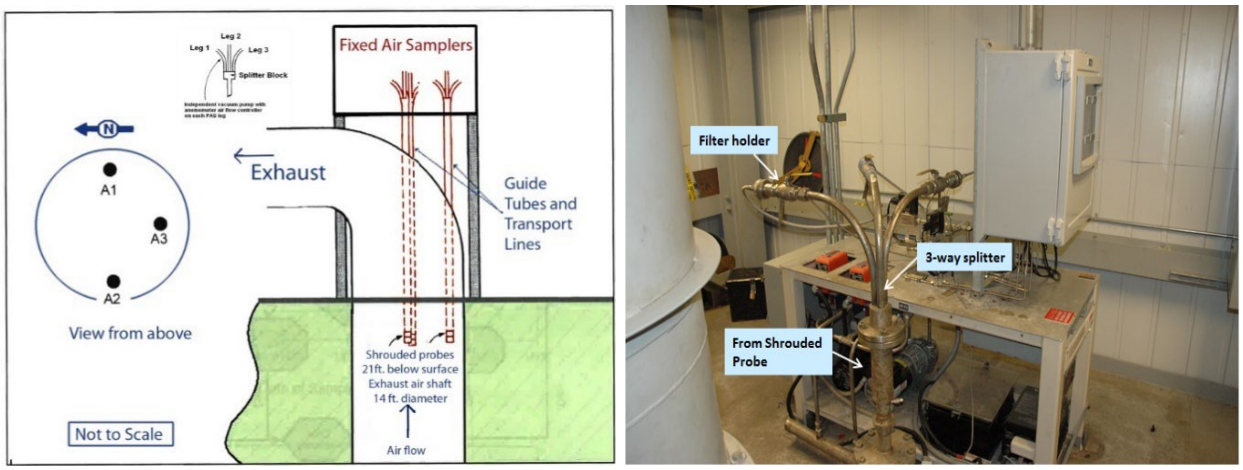


Figure 2.2. Schematic of Station A (left) and Fixed Air Samplers at Station A (right)

Every day, samples are collected at both stations using high-efficiency filters. These filters capture small airborne particles and are then brought back to the laboratory for analysis. Scientists look for two main things: the total mass of particles in the amount of air filtered and the levels of radioactivity, specifically, alpha and beta radiation.

To get a clear picture of trends over time, CEMRC combines daily filters from Station A and Station B into weekly and monthly composites, respectively. This approach helps reveal trends and makes it easier to spot any unusual changes in air quality.

What Do the Results Show?

Over more than twenty years of monitoring, the levels of alpha and beta radiation associated with airborne particulates at Station A have remained low and stable, with only a few brief increases. These small spikes are usually linked to routine underground activities, such as clean-up or investigative work, which can stir up dust and particles. Importantly, the average levels of radioactivity have stayed within the normal background range, similar to what was measured before WIPP began accepting waste.

Baseline vs. Limits: A Breath of Fresh Air?

This report includes all radioactivity data collected from WIPP's air monitoring stations. It is important to discuss how the measured levels of specific radionuclides crucial to WIPP operations compare to established EPA limits, as shown in the table below.

Table 2.1 EPA Annual Airborne Concentration Limits for Key Radionuclides (Bq/m³)

Radionuclide	EPA Annual Limit (DAC)	What This Means for WIPP Monitoring
Plutonium-239/240	7.4×10^{-2} Bq/m³	WIPP activities are far below this limit
Americium-241	7.4×10^{-2} Bq/m³	Same as Pu-239/240; WIPP activities are well below this limit
Uranium (total)	2.96×10^{-1} Bq/m³	WIPP values are much lower than this limit
Strontium-90	2.96×10^{-2} Bq/m³	WIPP values are well below this threshold
Cesium-137	2.22×10^{-1} Bq/m³	Not detected at WIPP
Cobalt-60	3.70 Bq/m³	Not detected at WIPP
Potassium-40	2.22×10^{2} Bq/m³	Naturally occurring; detected at WIPP at background levels

The EPA's Derived Air Concentration (DAC) values, as presented in Table 2.1, represent the maximum airborne activity of each radionuclide that would result in an annual radiation dose at or below regulatory limits for members of the public. These DAC values are conservatively set to ensure that even continuous exposure over a year would not exceed established safety standards.

The data for these limits are derived from two key regulatory sources: 40 CFR Part 61, Subpart H, which specifically addresses national emission standards for emissions of radionuclides other than radon from U.S. Department of Energy (DOE) facilities, and 10 CFR Part 20, Appendix B, which provides concentration limits for airborne radionuclides applicable to licensees. These regulations are designed to protect public health and the environment by setting stringent limits on radioactive emissions.

For example, the EPA annual limit for plutonium-239/240 and americium-241 is 7.4×10^{-2} Bq/m³, while for uranium (total) it is 2.96×10^{-1} Bq/m³. Other radionuclides, such as strontium-90, cesium-137, cobalt-60, and potassium-40, have their own specific limits, as shown in Table 2.1. In all cases, WIPP's measured values are far below these regulatory thresholds, and some radionuclides (like ^{137}Cs and ^{60}Co) are not detected at all in WIPP air samples.

Long-Term Trends at Station A

Figures 2.3 through 2.6 illustrate historical gross alpha and gross beta activity concentrations at Station A from 1999 to the end of 2024. Figures 2.3 and 2.4 show radioactivity per volume

of air, values which remained constant from pre-operational through the end of 2013, as the February 2014 incident resulted in a significant spike in gross alpha and beta concentrations. Whereas the amount of beta particles returned to pre-release levels shortly after the incident, alpha particles continue to be detected today; fortunately, alpha activity has been on a steady decline for the past 10 years. Figures 2.5 and 2.6 show radioactivity per gram of particulate material. With the exception of 2014 data, the data points in these two plots appear to form a constant horizontal bar, showing that the amount of radioactivity in Station A air is directly related to the number of suspended dust particulates. This serves as evidence that the radioactivity stored at WIPP is not volatile, but rather it is carried by the dust produced by mining and other underground activities.

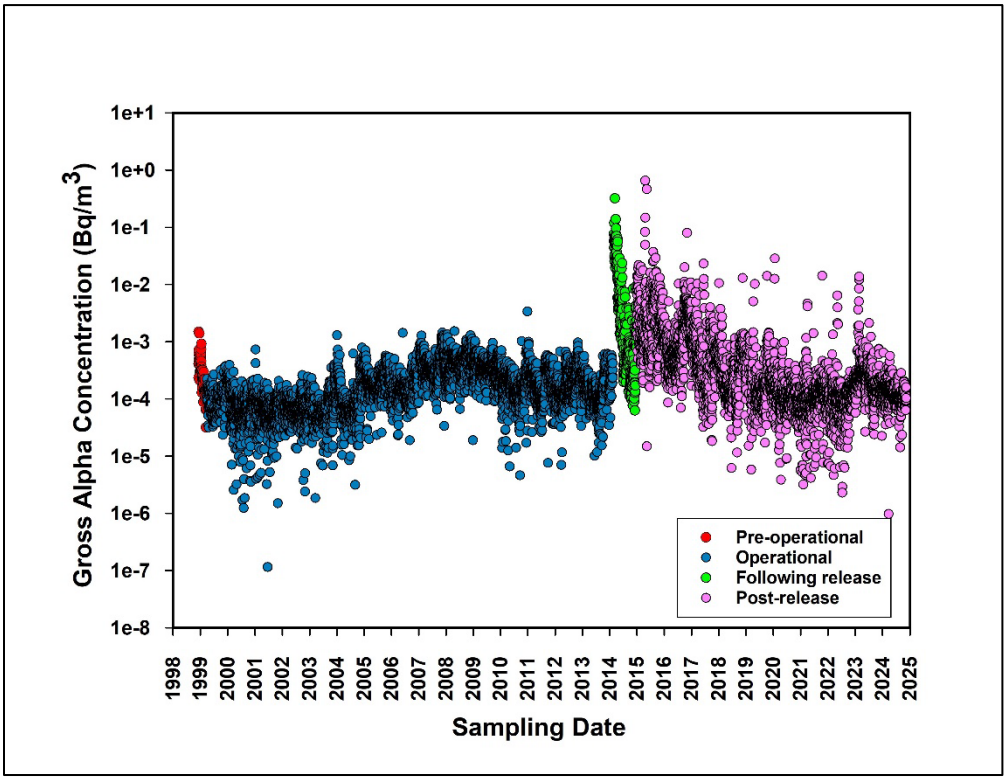


Figure 2.3. Historical Gross Alpha Concentrations at Station A

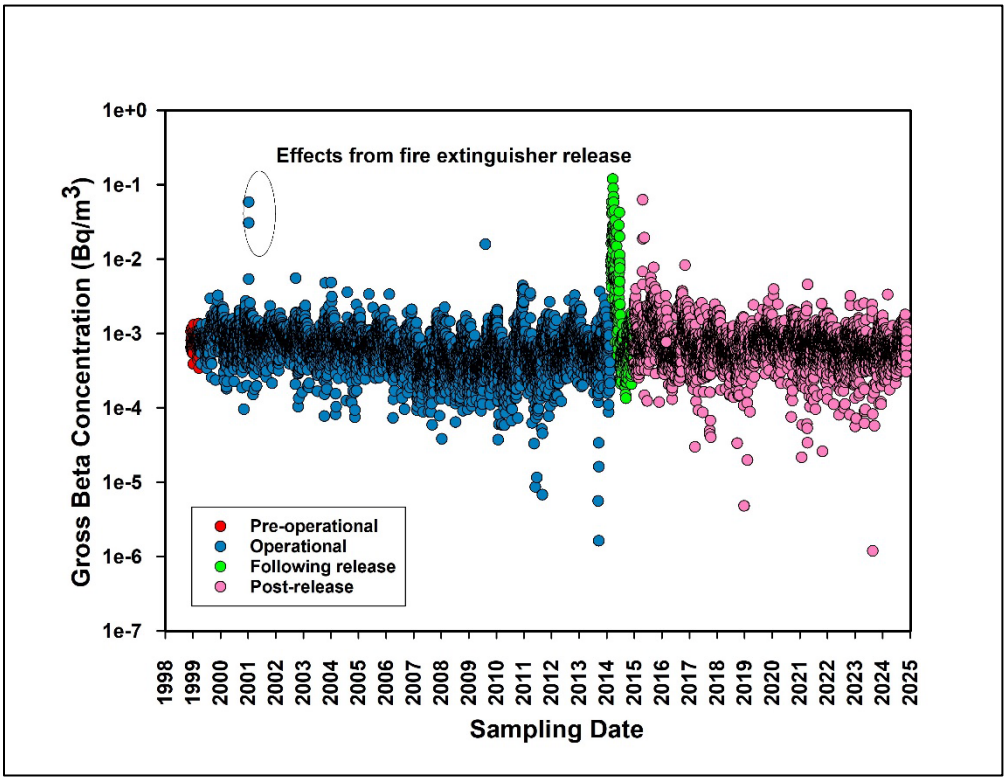


Figure 2.4. Historical Gross Beta Concentrations at Station A

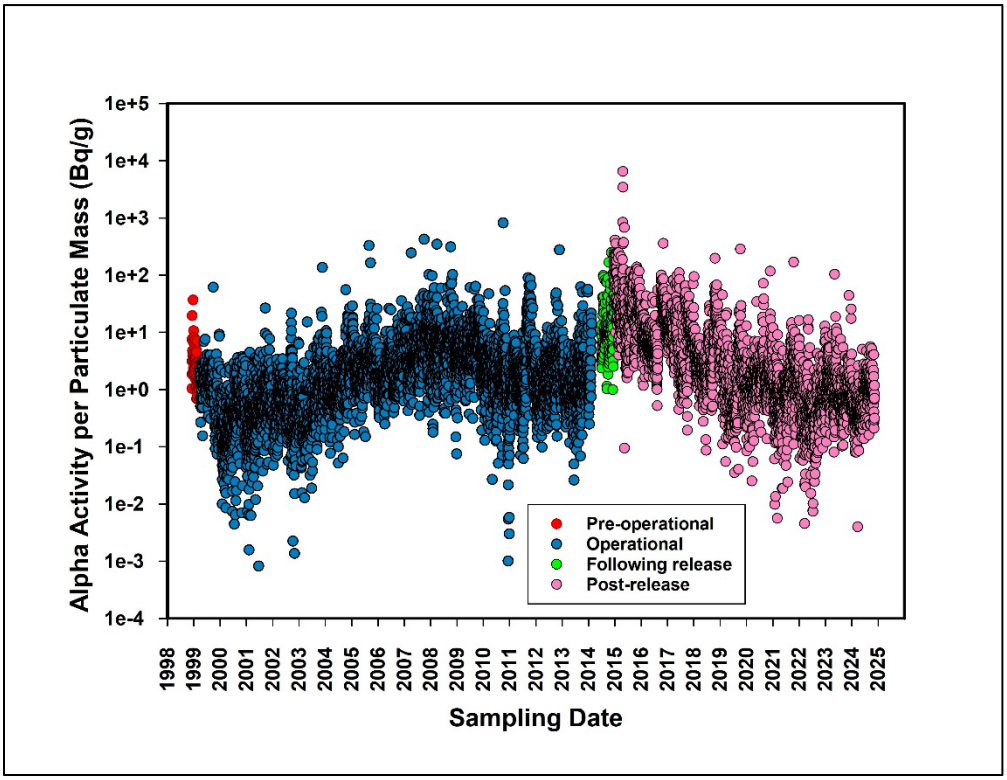


Figure 2.5. Historical Gross Alpha Activity per Particulate Mass at Station A

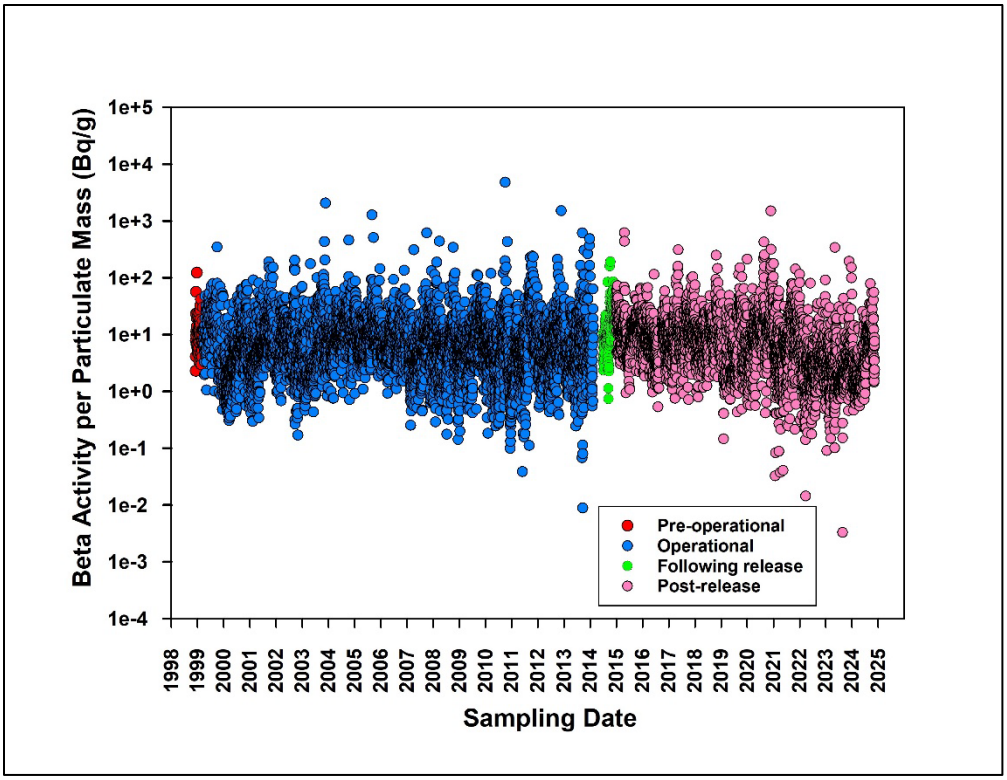


Figure 2.6. Historical Gross Beta Activity per Particulate Mass at Station A

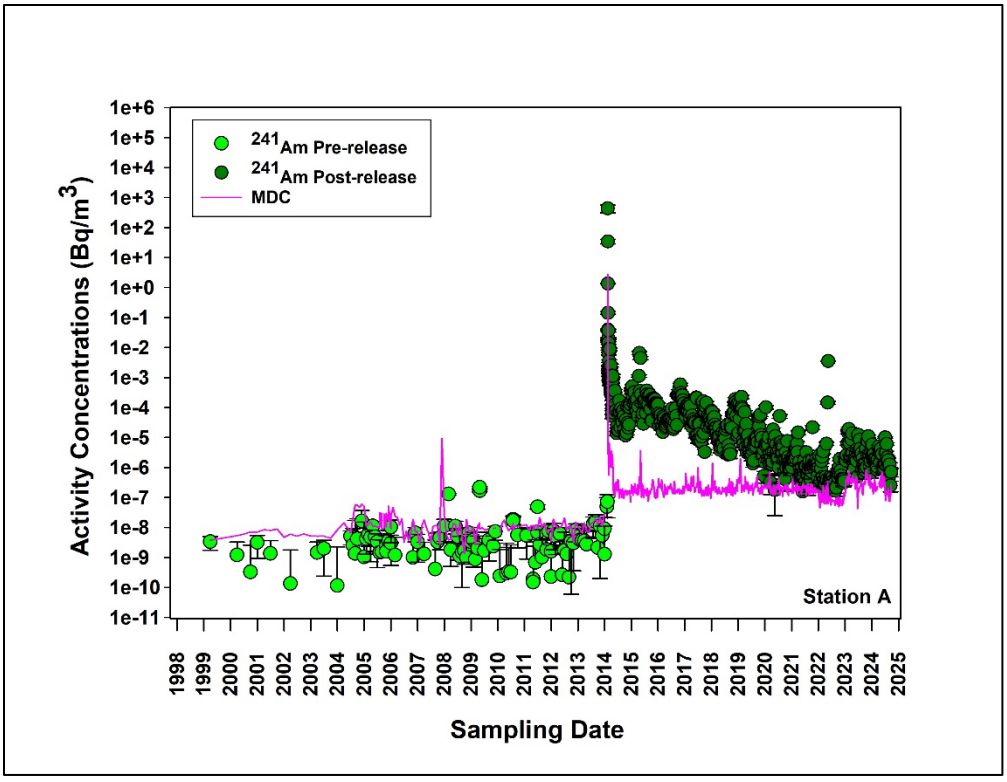
After the 2014 radiation release event, there was a temporary pause in routine monitoring while emergency procedures were carried out. Once conditions returned to normal, regular monitoring resumed.

Actinide Concentrations at Station A

We closely monitor certain isotopes, especially ^{241}Am, $^{239+240}$Pu, and ^{238}Pu. At Station A, these actinides have occasionally been detected in air samples, but only at trace levels far below any threshold of concern for public health or the environment. Figure 2.7 shows the weekly composite concentrations of these actinides. The data capture the impact of the 2014 release event and show a steady decline in activity from 2014 to the present, consistent with the gross alpha activity trends.

Please note: Several ^{241}Am results are not reported due to low chemical recoveries. The affected samples include the April 1 weekly composite, the October 1–4 weekly composites, and the November 1–2 weekly composites. These samples were re-prepared and analyzed twice, but recoveries remained below acceptable limits.

Uranium isotopes, which occur naturally in the environment, were not detected in any samples. The activity concentrations for uranium are shown in Figure 2.8.



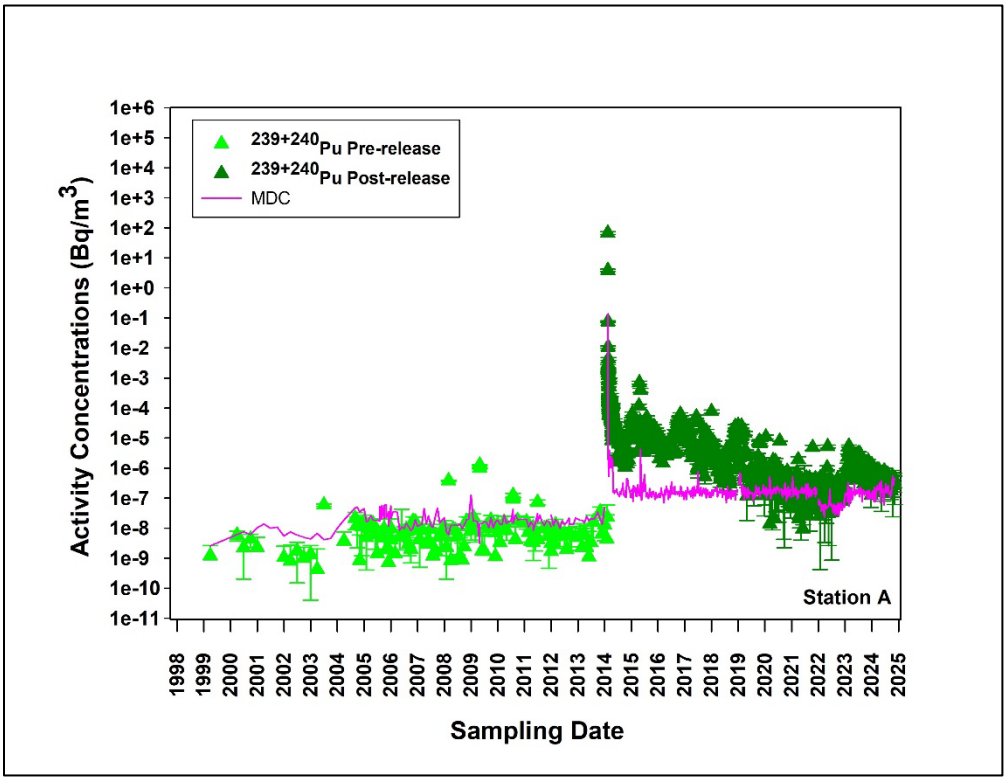


Figure 2.7. Historical Concentrations of ^{241}Am and $^{239+240}$Pu at Station A

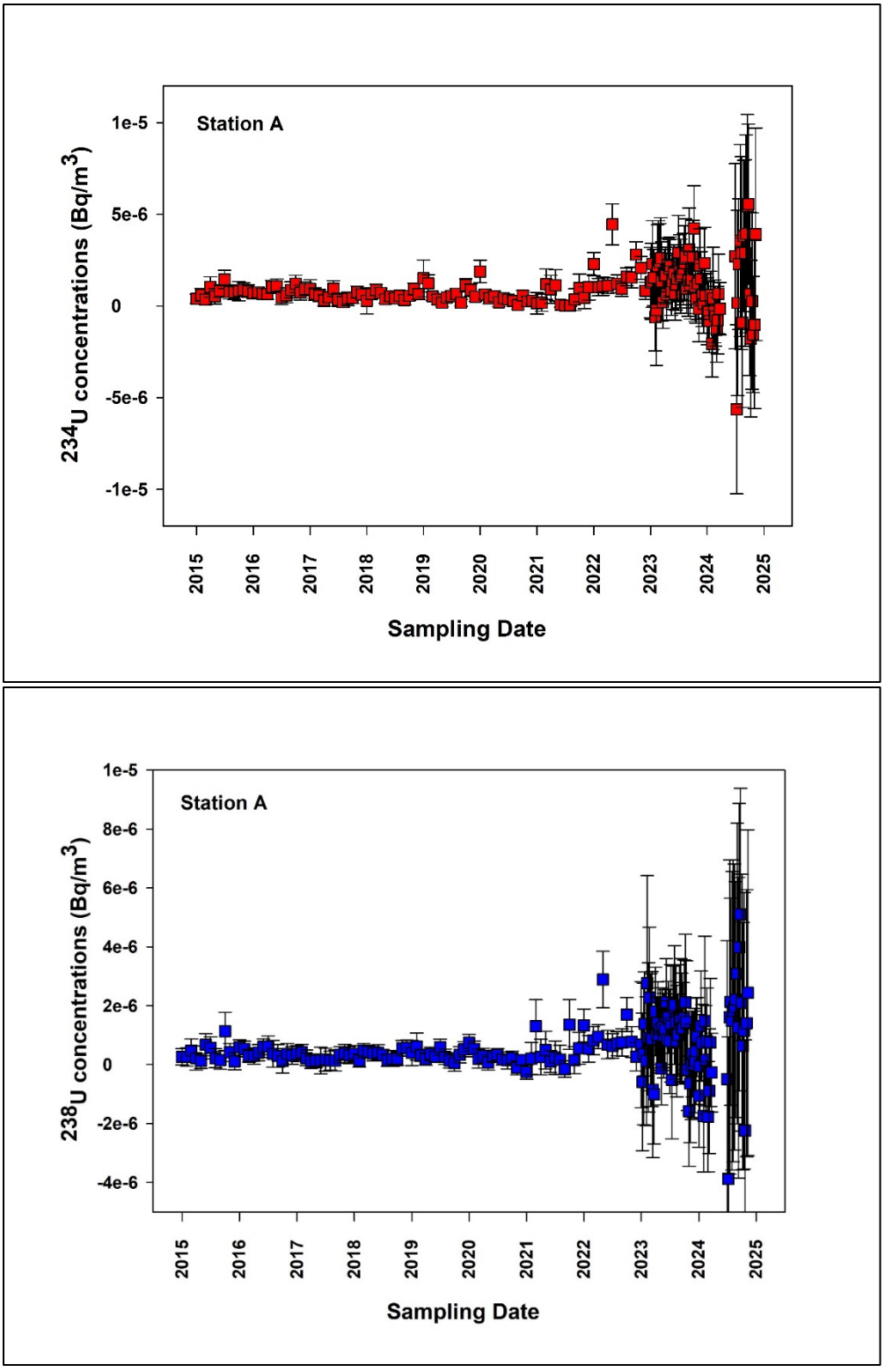


Figure 2.8. The ^{234}U (top) and ^{238}U (bottom) Activity Concentrations at Station A

Other Radionuclide Concentrations at Station A

Other radioactive isotopes, like ^{137}Cs, ^{60}Co, and ^{90}Sr, were not detected in any of the samples in 2024. In fact, these isotopes have not been detected since the 2014 incident. ^{40}K, which is naturally present in soil, was only occasionally found in previous years and was not detected in any of the samples in 2024.

What About Filtered Air? (Station B)

Station B is used to monitor the air after it has passed through the HEPA filters. CEMRC began monitoring air effluent at Station B after the 2014 release. As expected, the levels of radioactivity at Station B are lower than at Station A. The results show that the filtration system is highly effective at removing radioactive particles from the air before it is released to the environment.

Daily gross alpha and beta activity concentrations at Station B are shown in Figure 2.9. There was a brief spike in alpha activity at Station B in late 2014, which was traced back to the restart of a ventilation fan that had been used during the 2014 incident. This was a temporary event, and radioactivity levels quickly decreased.

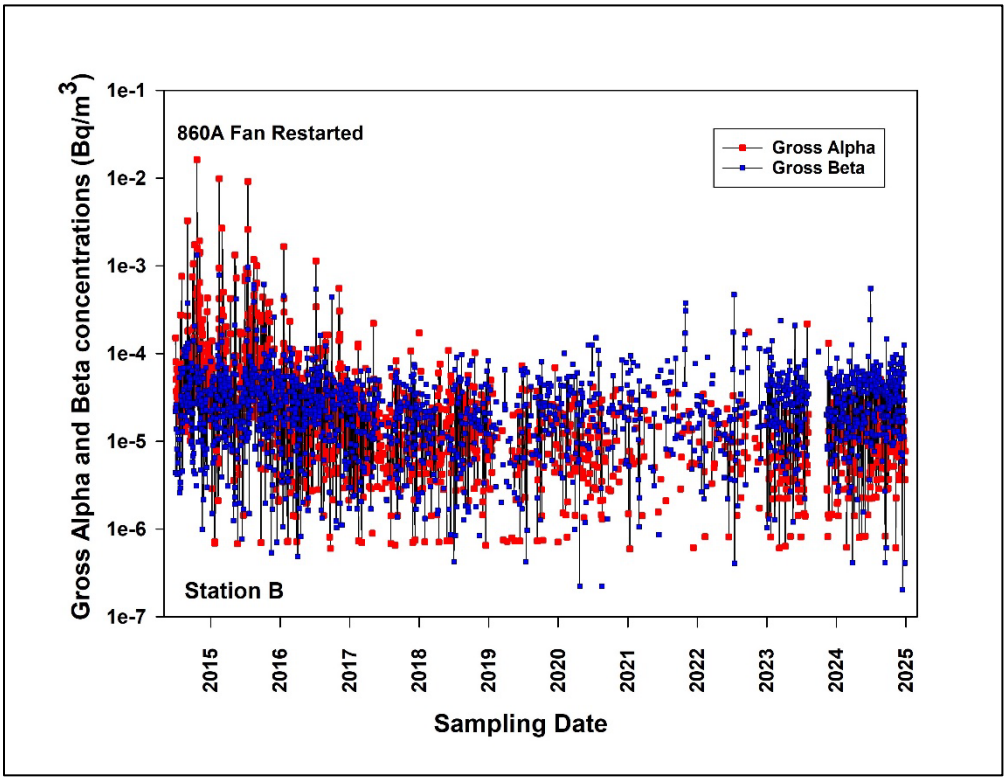


Figure 2.9. Daily Gross Alpha and Gross Beta Activity Concentrations at Station B

Radionuclide Concentrations at Station B

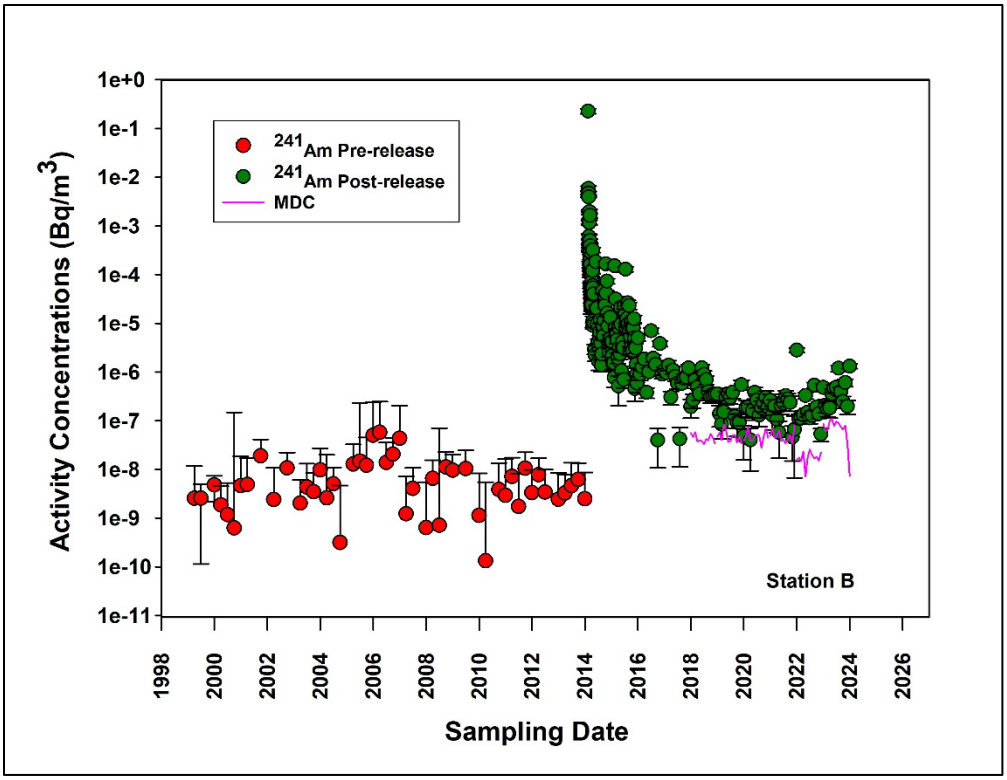
As at Station A, only trace amounts of ^{241}Am, $^{239+240}Pu$, and uranium were detected at Station B. Figures 2.10 and 2.11 show the activity concentrations for these isotopes.

Currently, ^{241}Am and $^{239+240}$Pu concentrations at Station B are very low—often below the minimum detectable concentration (MDC). Prior to the 2014 accidental release, levels of these isotopes at Station B were frequently undetectable.

Please note: ^{241}Am results are not reported for the February–December monthly composites due to low chemical recoveries. These samples were re-prepared and reanalyzed twice, but recoveries remained below acceptable limits.

Because CEMRC did not start monitoring Station B until after the 2014 release, we rely on data from WIPP's contractors to understand the historical trends. These data, which are available in the ASER Report on the WIPP website (wipp.energy.gov), show pre-release levels of ^{241}Am and $^{239+240}$Pu from 1999 to 2013; the contractors used quarterly composite samples to measure these actinides.

Other radionuclides of interest were either not detected or found at levels consistent with natural background. At Station B, gamma-radiation-emitting radionuclides have not been detected since the 2014 incident. ^{90}Sr was not detected in any monthly samples.



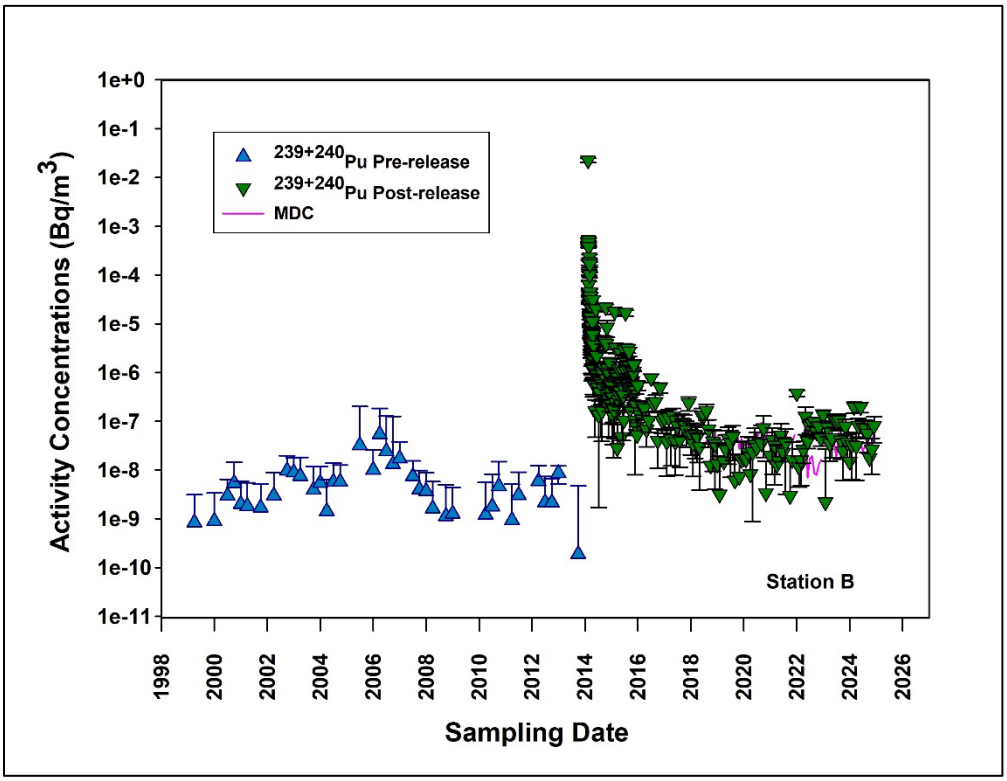


Figure 2.10. Historical Concentrations of ^{241}Am and $^{239+240}$Pu and at Station B

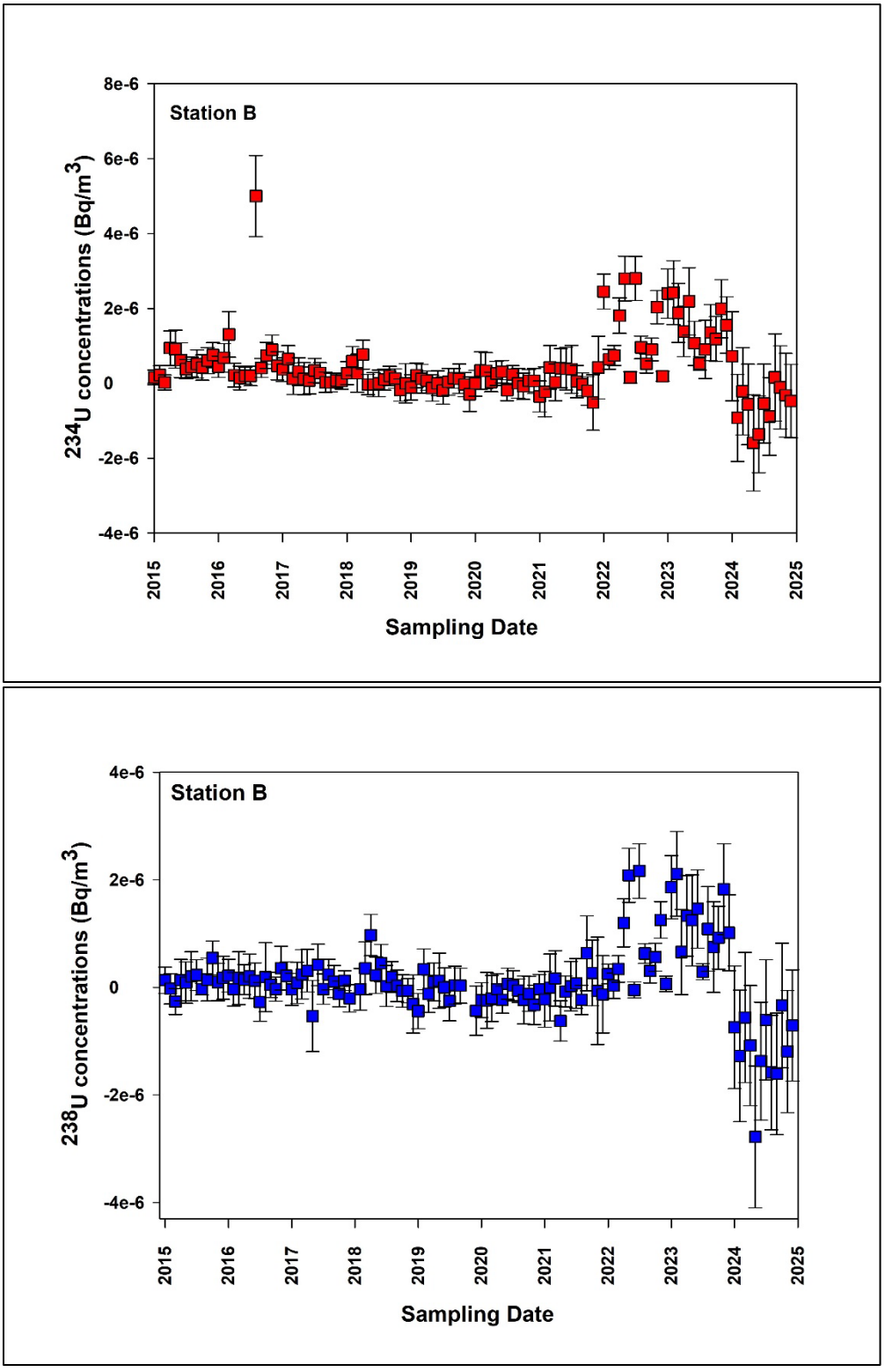


Figure 2.11. The ^{234}U (top) and ^{238}U (bottom) Activity Concentrations at Station B

Conclusions

As a reminder, Station A samples represent the underground air which WIPP workers breathe, whereas Station B samples represent the air that WIPP releases into the environment.

In 2024, air samples from deep inside the WIPP facility still contain tiny traces of radioactive materials—specifically, plutonium and americium—left over from the 2014 incident. These findings are not unexpected and match the patterns seen in recent years. While the levels of radioactivity remain higher than what was measured before the release, they are still well below safety thresholds set by regulators. Most importantly, these levels continue to decline each year, showing a steady return toward normalcy.

The 2024 monitoring results confirm that the air leaving the WIPP facility remains safe. The levels of alpha and beta radiation continue to decrease following the release of 2014 and are consistent with what has been measured in previous years. The HEPA filtration system functions as expected, ensuring that the air released from WIPP meets strict safety standards.

All data and historical trends are available in APPENDIX A - Tables A.1 through A.32. However, the overall conclusion is that WIPP’s airborne emissions are closely watched, and the results show that the facility is operating safely and responsibly.

CHAPTER 3 - AIRBORNE PARTICULATE MONITORING

Airborne particulate monitoring is a key part of CEMRC's environmental monitoring at WIPP. By tracking fine particles in the air, CEMRC scientists can detect both routine and unexpected releases, helping ensure the WIPP facility emissions stay within public safety limits and providing early warning in case of an accidental release.

A central question for any environmental monitoring program is the following: How do the measured levels of radionuclides compare to established safety standards? In the context of WIPP, the U.S. Environmental Protection Agency (EPA) sets annual airborne concentration limits, known as Derived Air Concentrations (DACs), for key radionuclides. These limits, shown in Table 2.1 in Chapter 2, represent the maximum average concentration of each radionuclide in air that would result in an annual radiation dose at or below regulatory limits for members of the public. The DACs are conservatively set to ensure that even continuous exposure over a year would not exceed established safety standards. They are derived from federal regulations (40 CFR Part 61, Subpart H and 10 CFR Part 20, APPENDIX B) and serve as a broad reference standard throughout this report for evaluating WIPP's environmental performance.

These EPA limits provide the context for interpreting all air monitoring results presented in this chapter. They allow us to assess whether the facility's operations are having any measurable impact on public health or the environment, and to communicate the significance of the measured concentrations in a way that is meaningful to both regulators and the public.

The main goal of this program is to determine whether WIPP's waste handling and storage operations have released any radioactive materials into the surrounding environment. To do this, the CEMRC monitoring program includes a network of air samplers at six locations near WIPP and in the nearby communities of Loving and Carlsbad. These sites were chosen based on wind patterns and proximity to the facility, so that any potential releases would be detected rapidly.

How Airborne Particulate Samples Are Collected

To monitor the airborne particulates around WIPP, CEMRC uses high-volume air samplers at six carefully chosen locations. These samplers act like powerful vacuum cleaners, drawing in large amounts of air to capture even fine particles. The samplers are located at the following locations (Figure 3.1):

- **Onsite:** Just 0.1 km northwest of the WIPP exhaust shaft.
- **East Side:** On the east side of the WIPP facility.
- **Near Field:** About 1 km northwest of the facility.
- **Cactus Flats:** About 19 km southeast of the WIPP site.
- **Carlsbad:** West of the CEMRC facility, in the city of Carlsbad.
- **Loving:** On the south side of the village of Loving.

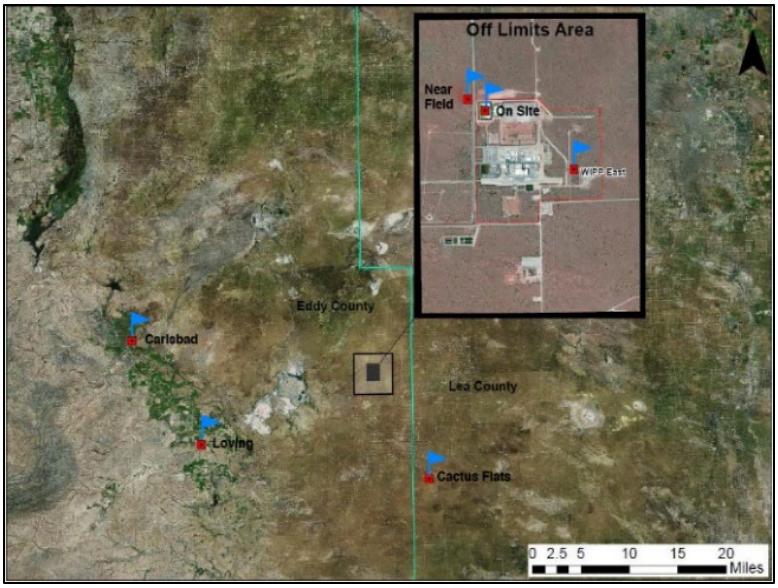


Figure 3.1. Ambient Air Sampling Locations

A typical sampling period lasts about three to four weeks, depending on the amount of dust and particulate matter accumulated on the filters. The goal is to collect as much material as possible without affecting the sampler's airflow. If the airflow drops below a certain level, the filters are changed. If there is a power outage or a sampler malfunction, the filters are also changed.

Each filter is weighed before and after sampling to determine the mass of particulate material collected. CEMRC scientists then analyze these filters for actinides and other radionuclides. The sampling height at each station is about 5 meters (16 feet) from the ground (Figure 3.2).



Figure 3.2. Typical High-Volume Sampling Station

Results and Discussion

Radioactivity in air samples is reported in two ways: as concentration in the air (Bq/m³) and as activity per mass of collected particles (Bq/g). All data values are available in APPENDIX B.

Actinide Concentrations in Ambient Air

As described in Chapter 2, the concentrations of $^{239+240}$Pu and ^{241}Am in air samples are closely tied to particulate loading — more dust in the air, especially during dry and windy months (March–June), tends to yield more detectable activity.

In 2024, most measurements of $^{239+240}$Pu and ^{241}Am were at or below the Minimum Detectable Activity (MDA, approximately 10^{-8} Bq/m³). Occasional detections were observed, reaching up to 7.6×10^{-7} Bq/m³ for $^{239+240}$Pu and 7.8×10^{-8} Bq/m³ for ^{241}Am. These levels are consistent with long-term monitoring trends and remain orders of magnitude below the U.S. EPA's Derived Air Concentrations (DACs; 40 CFR Part 61, Subpart H; 10 CFR Part 20, App. B).

WIPP's long-term data show that $^{239+240}$Pu and ^{241}Am are frequently detected in air samples and, with the exception of 2014, their levels are similar at all stations. Figure 3.3 through 3.6 show the historical concentrations of $^{239+240}$Pu and ^{241}Am. The detection of ^{238}Pu is rare, as it mostly comes from satellite accidents rather than weapons fallout. In 2024, only a handful of ^{238}Pu detections were made.

In addition, similarly to effluent air monitoring, Figures 3.7 and 3.8 show how the activities in airborne particulate monitoring result in a linear trend when plotted versus particulate mass.

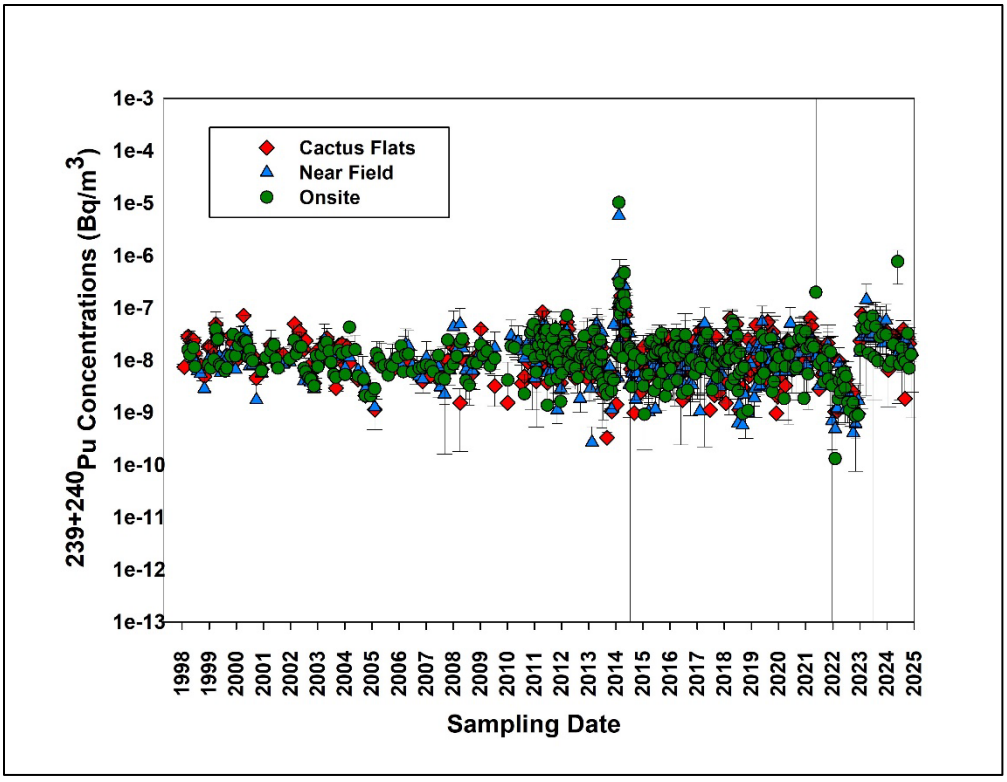


Figure 3.3. Historical $^{239+240}$Pu Concentrations at the Cactus Flats, Near Field, and Onsite Stations

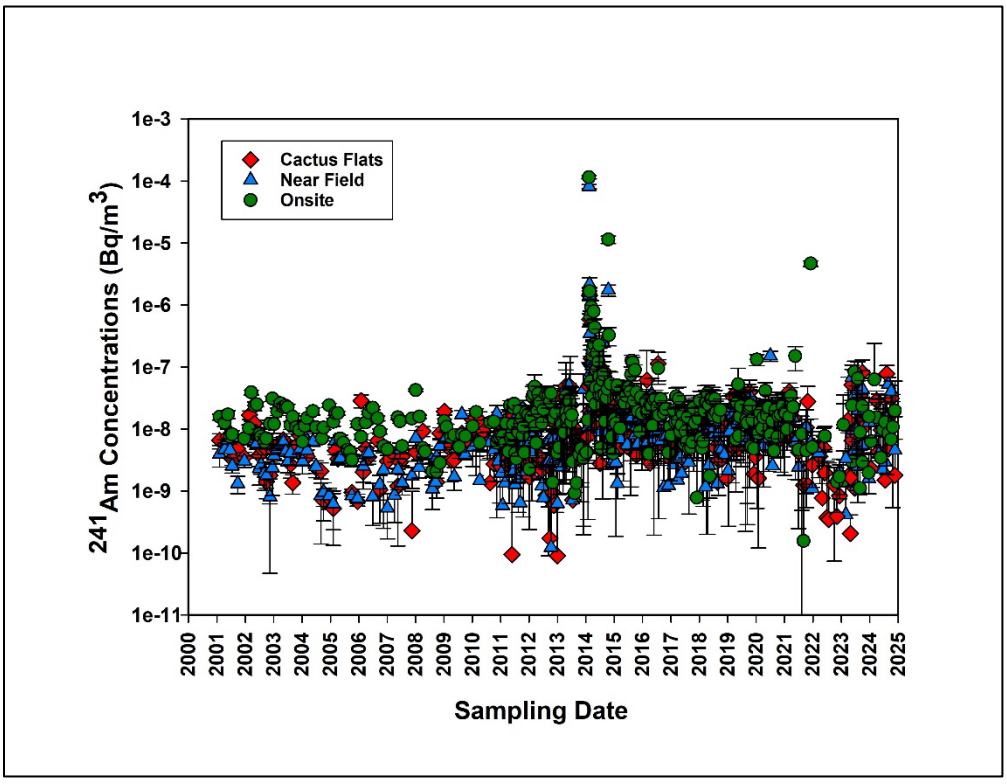


Figure 3.4. Historical ^{241}Am Concentrations at the Cactus Flats, Near Field, and Onsite Stations

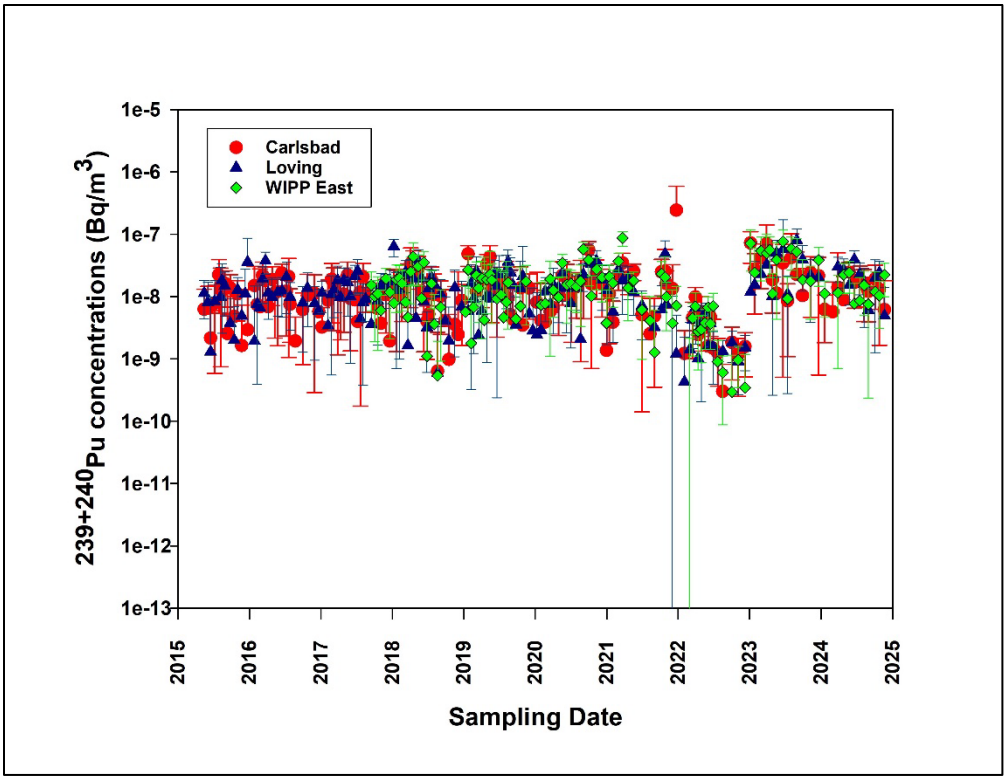


Figure 3.5. Historical $^{239+240}$Pu Concentrations at the Carlsbad, Loving, and WIPP East Stations

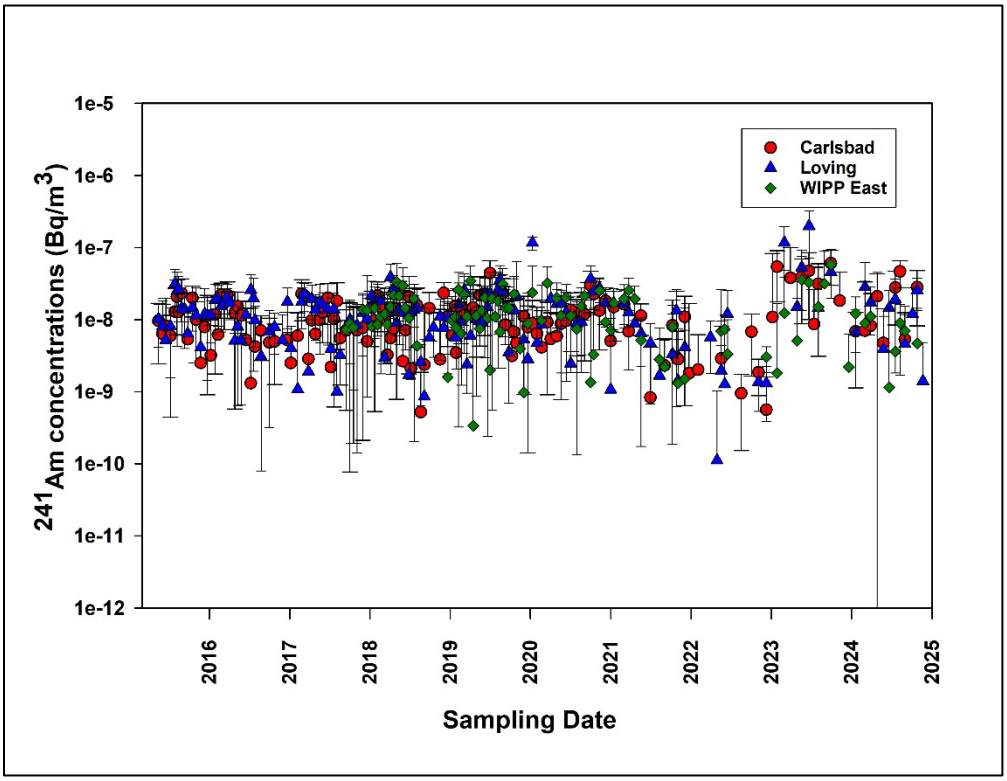


Figure 3.6. Historical ^{241}Am Concentrations at the Carlsbad, Loving, and WIPP East Stations

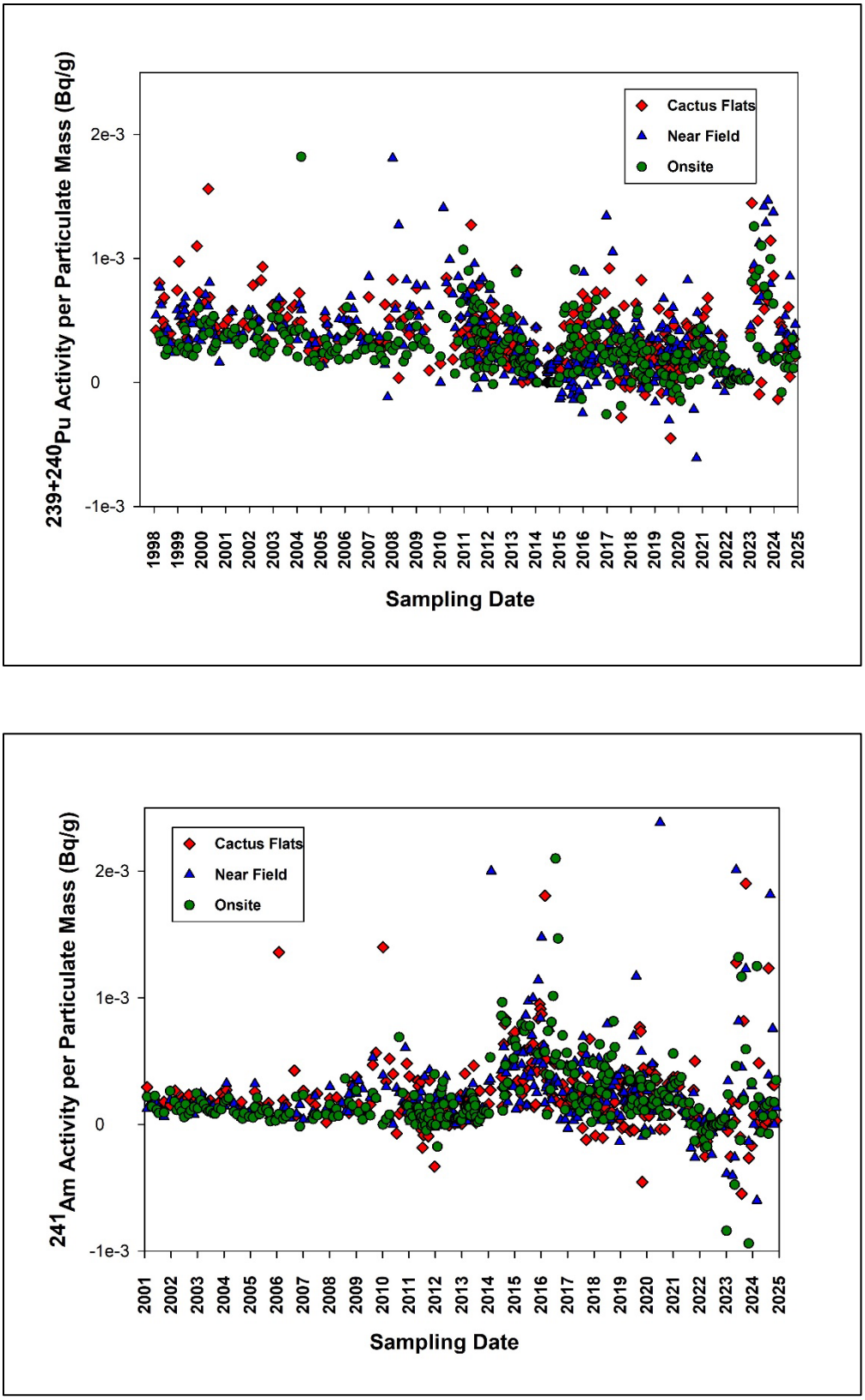


Figure 3.7. Historical $^{239+240}$Pu (top) and ^{241}Am (bottom) activity concentrations at the Cactus Flats, Near Field, and Onsite Stations

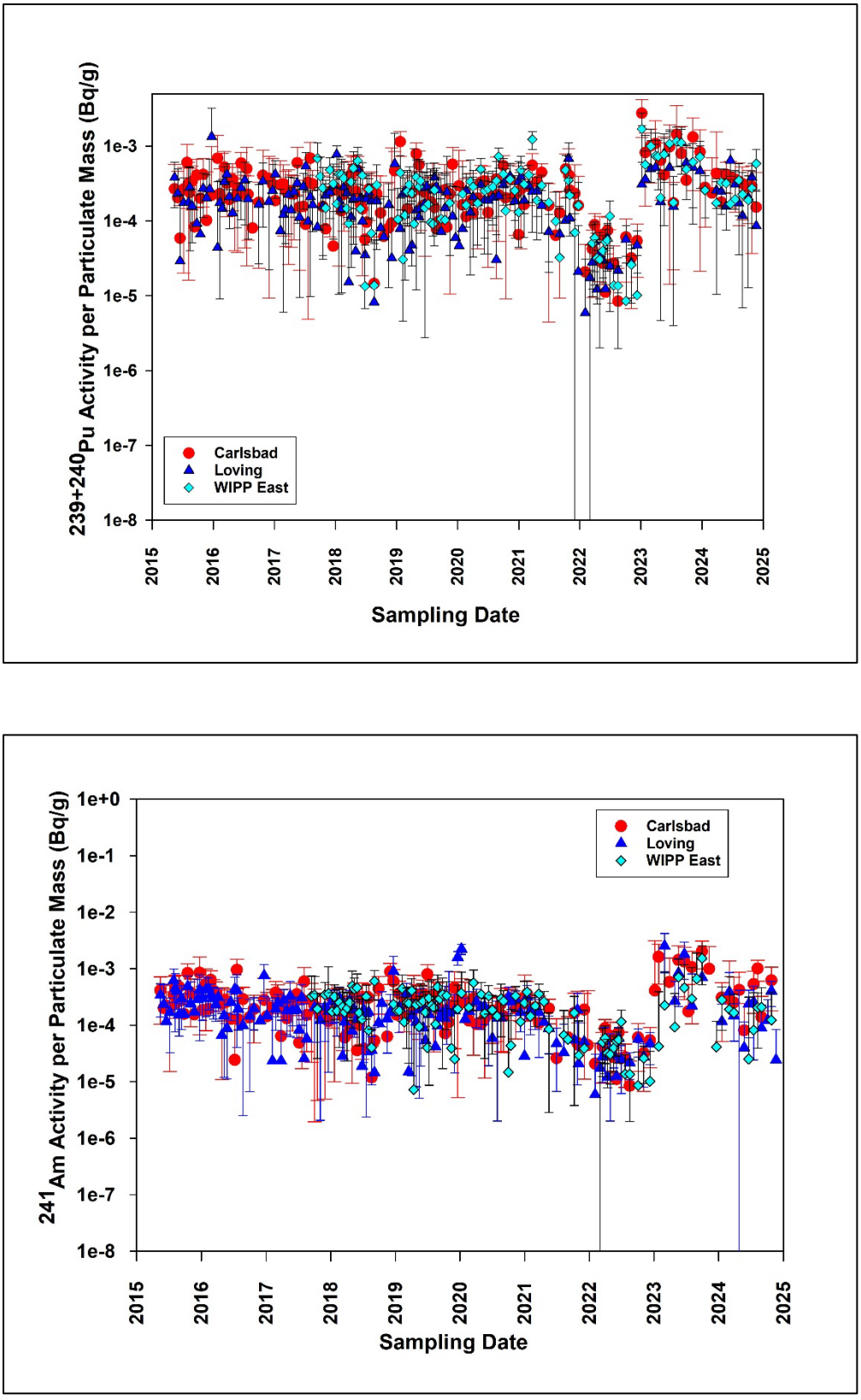


Figure 3.8. Historical $^{239+240}$Pu (top) and ^{241}Am (bottom) activity concentrations at the Carlsbad, Loving, and WIPP East Stations

Uranium Concentrations in Ambient Air

Uranium was detected in most samples at all locations in 2024. This is expected, as uranium is naturally occurring. The concentrations of uranium isotopes (^{238}U and ^{234}U) are shown in Figure 3.9 for the Cactus Flats, Near Field, and Onsite stations, and in Figure 3.10 for Loving, Carlsbad, and WIPP East.

The concentrations of ^{238}U measured were in the range of -1.18×10^{-5} to 9.34×10^{-6} Bq/m^3. The concentrations of ^{234}U were in the range of -1.16×10^{-5} to 1.09×10^{-5} Bq/m^3. When comparing each pair of ^{234}U and ^{238}U figures, it is clear that they are similar in terms of shape and activity values. This shows that the uranium detected in ambient air has a $^{234}U/^{238}U$ activity ratio close to 1, which has remained consistent throughout the years as a signature of naturally occurring uranium, unaffected by site operations.

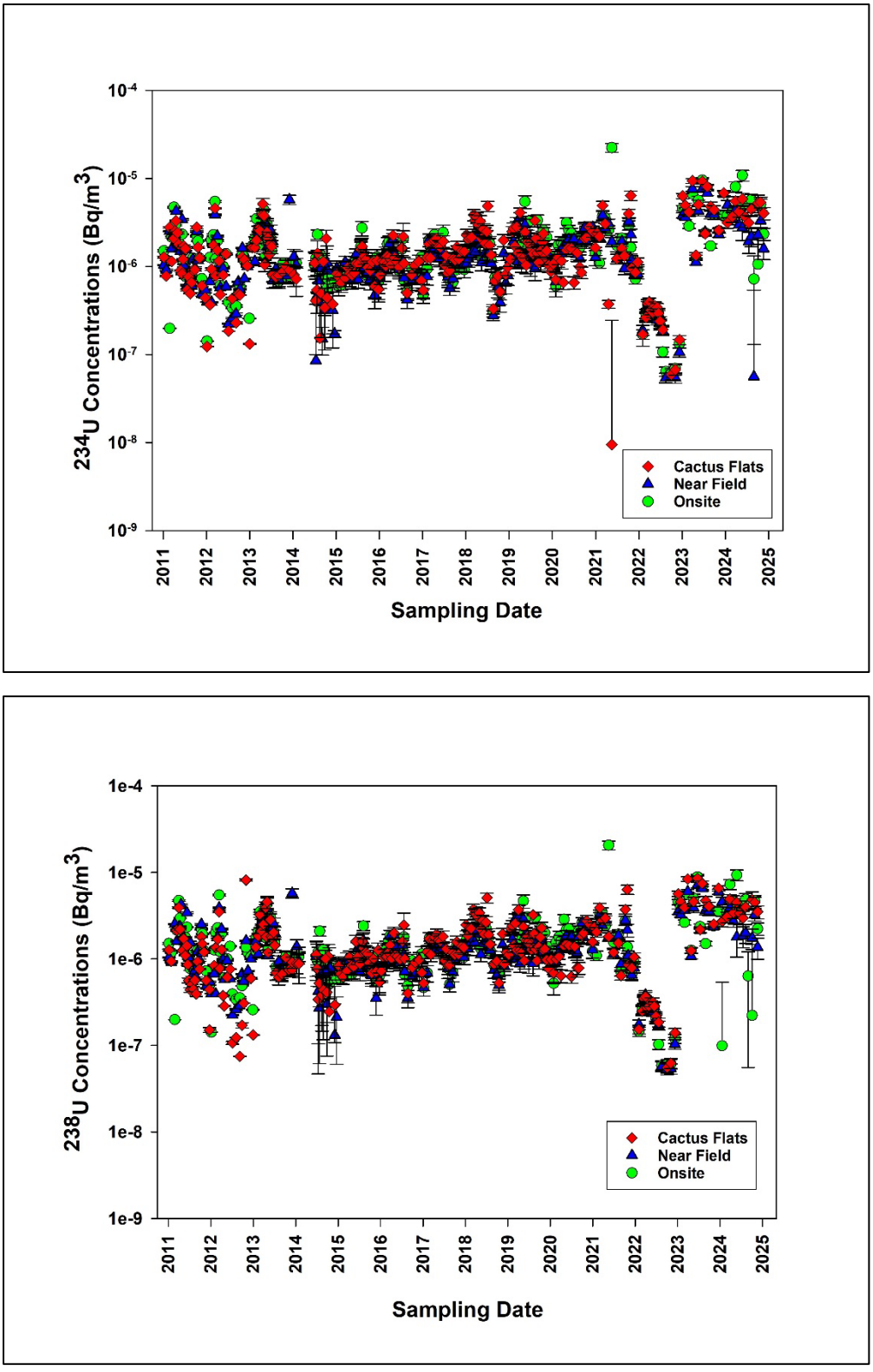


Figure 3.9. ^{234}U (top) and ^{238}U (bottom) Concentrations at the Cactus Flats, Near Field, and Onsite Stations

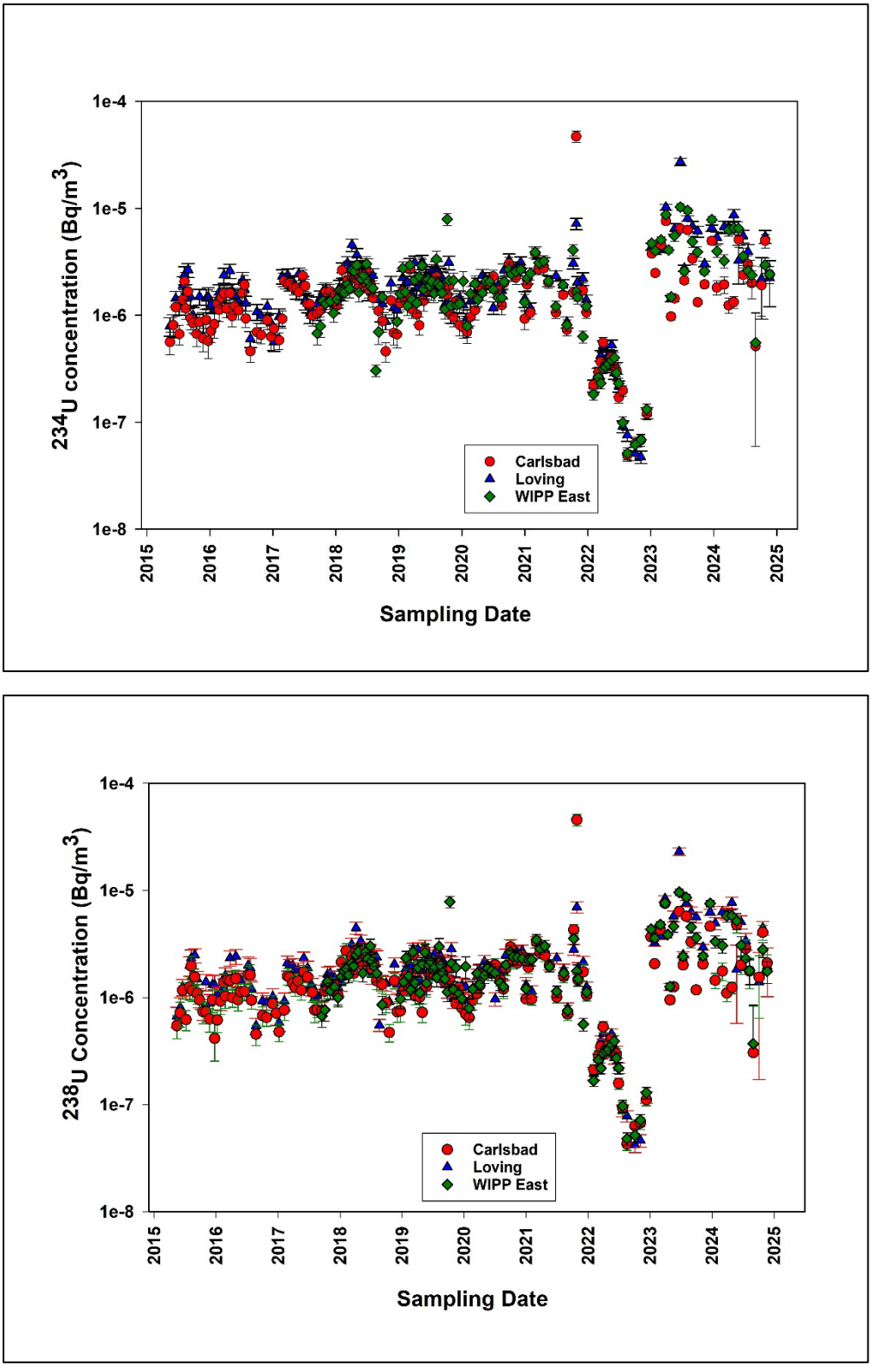


Figure 3.10. ^{234}U and ^{238}U Concentrations at the Carlsbad, Loving, and WIPP East Stations

Gamma-Radiation-Emitting Radionuclide Concentrations in Ambient Air

Several air samples contained ^{40}K as expected, given that ^{40}K occurs naturally, while neither ^{60}Co nor ^{137}Cs was detected in any samples. In 2024, the levels of these radionuclides were lower than in previous years. These isotope concentrations have remained this low since 2015, with the 2014 release incident being the last time these isotopes were detected in higher concentrations.

Strontium Concentrations in Ambient Air

The isotope ^{90}Sr was not detected in any samples collected in 2024.

Conclusions

During this monitoring period, $^{239+240}Pu$ and ^{241}Am were occasionally detected at all monitoring stations, just above the minimum detectable concentration. The levels of these actinides, as well as the amount of dust collected, were consistent with previous years. The presence of naturally occurring isotopes such as ^{40}K and uranium isotopes is expected. None of the samples showed detectable levels of ^{137}Cs, ^{60}Co, or ^{90}Sr.

Earlier studies by CEMRC found that plutonium and americium in the air are often linked to the amount of aluminum in dust particles, a sign that much of the radioactivity comes from old nuclear weapons testing, not from WIPP operations. Soil studies in the area are consistent with similar patterns.

Looking at the long-term data, it is clear that plutonium and americium in the air around WIPP mostly come from resuspended soil contaminated by past weapons testing, as well as the 2014 WIPP release event. There is no evidence of increased radionuclide activity in the region due to WIPP operations in 2024.

CHAPTER 4 - SOIL MONITORING

Soil is more than just dirt, it is a living, breathing part of our environment, supporting plants, animals, and people. Soil can act like a sponge, soaking up contaminants from the air, water, or direct spills. The soil around WIPP acts as an environmental record keeper, preserving a history of what has been deposited from past anthropogenic and natural activities. This is why scientists keep a close eye on soil around places like the WIPP: to make sure that radioactive materials are not building up where they should not be, and to protect the health of the land, local residents, and workers.

Soil Monitoring Around WIPP

Since 1998, CEMRC has been collecting soil samples from areas near the WIPP site. The main goal is to track any changes in radioactive content, especially those that might come from WIPP operations, by comparing today's soil to what was there before the facility opened.

Each year, scientists collect five sets of soil samples from two main areas, as labeled in Figure 4.1:

- "Near Field," one set around the boundary of the WIPP site (set A), and one set around the WIPP site farther away from the boundary (set B)
- A few miles southeast from the WIPP site, one set around the "Cactus Flats" area (set C), and one set also surrounding "Cactus Flats" but farther away (set D)
- WIPP Soil, adjacent to the above-ground WIPP facilities (set W); collection in this location started in 2023 in collaboration with WIPP personnel

CEMRC selected spots that are flat and undisturbed to obtain the most accurate picture of what is happening naturally. Samples are taken from the top two centimeters of soil, sieved to remove rocks and roots, and then ground into a fine powder for analysis.

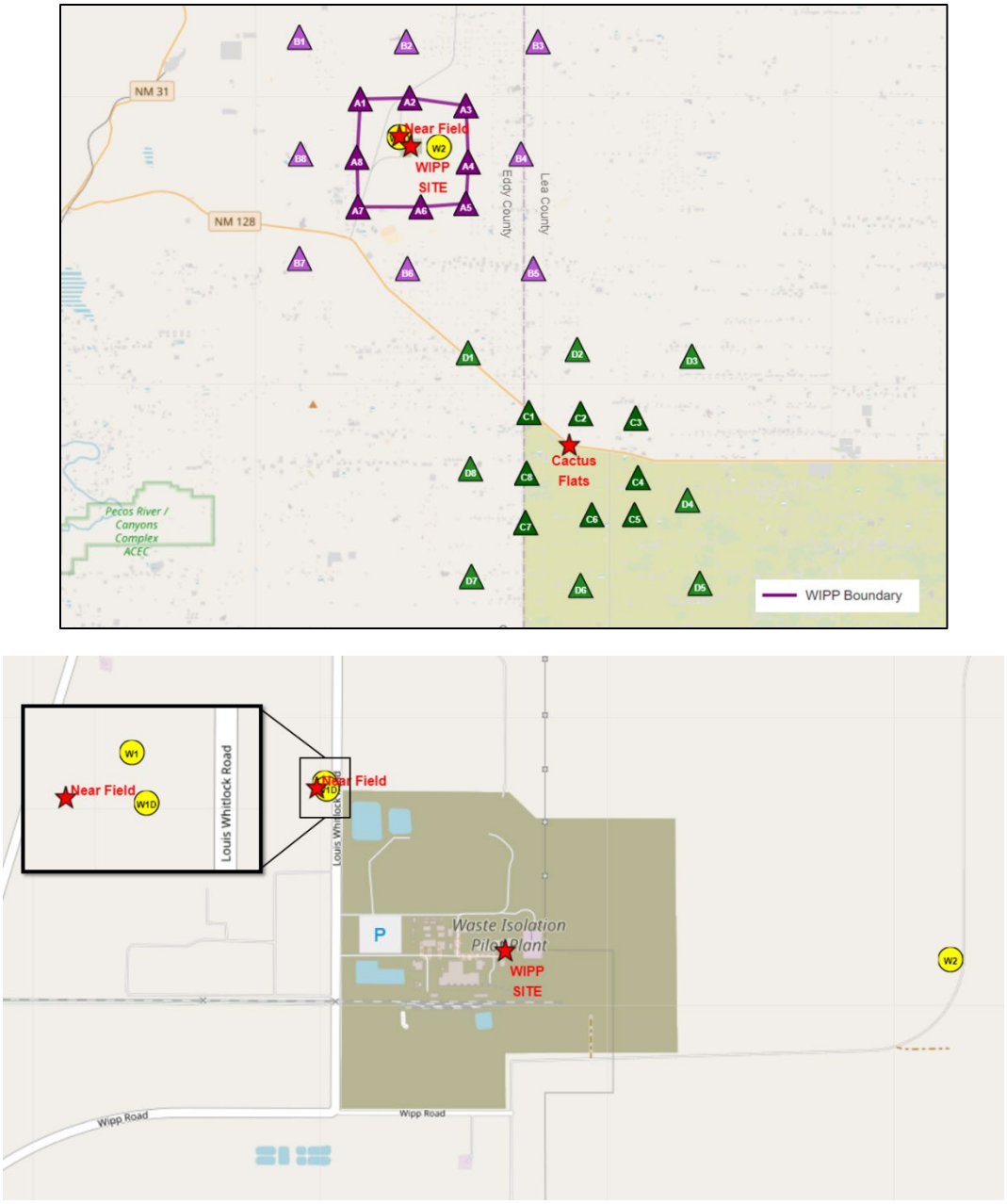


Figure 4.1. Soil Sampling Locations

Results and Discussion

Isotope activity concentrations are reported in Bq/kg. The activity concentrations are reported in APPENDIX C.

Actinide Concentrations in Soil

To interpret these results, we compare the measured concentrations with the EPA's Preliminary Remediation Goals (PRGs) for radionuclides in residential soil. PRGs are health-protective benchmarks used primarily at Superfund sites—locations with potentially

hazardous contamination—rather than in typical residential areas. The EPA does not set enforceable limits for radionuclides in soil; instead, PRGs provide guidance for evaluating potential health risks. Importantly, concentrations below the relevant PRG are not considered hazardous to human health by the EPA.

- **^{241}Am:** Not detected in any soil samples — that is good news, as this is a sign that there is no new contamination. The EPA PRG for ^{241}Am is 4.07 Bq/kg, so even if it were present at the minimum detectable level (<0.5 Bq/kg), it would be well below this benchmark.
- **$^{239+240}$Pu:** Detected in three samples, with concentrations ranging from 0.27 to 0.48 Bq/kg (Figure 4.2). Not only are these levels similar to WIPP pre-operational levels and typical background levels from global nuclear fallout, but they are far below the EPA PRG of 5.55 Bq/kg.
- **^{238}Pu:** Not detected in any soil samples.
- **^{234}U and ^{238}U:** Detected in all samples, with concentrations and ratios indicating natural origins (Figures 4.3 and 4.4). The measured uranium concentrations are one order of magnitude below the EPA PRG of 66.6 Bq/kg, indicating no sign of unusual uranium contamination.

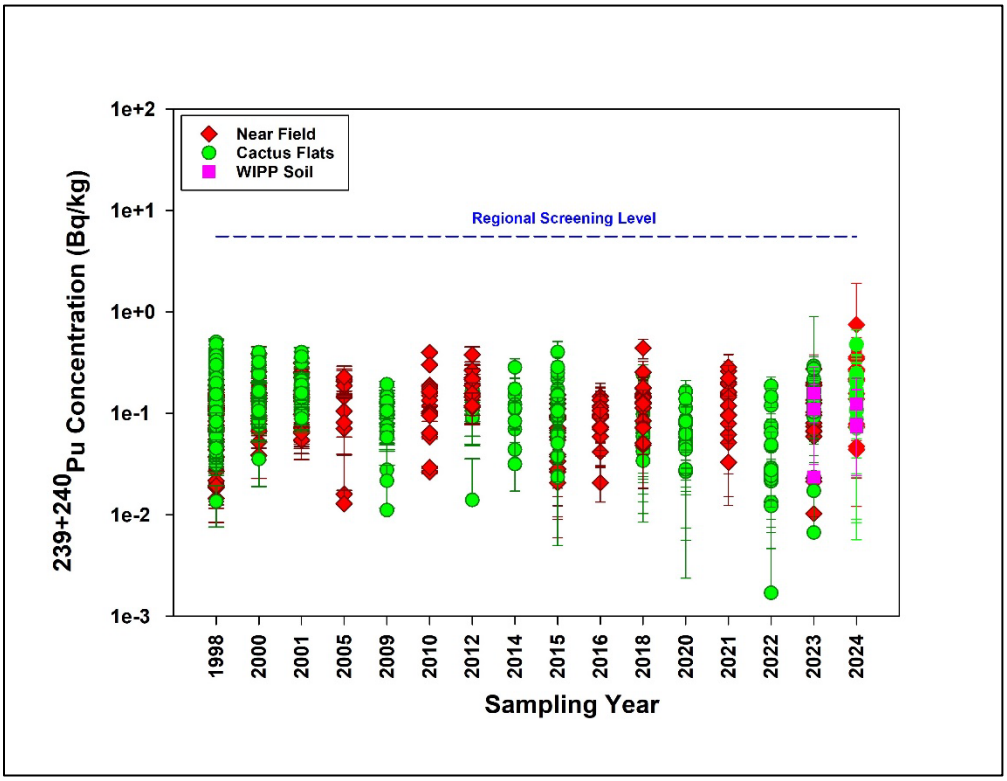
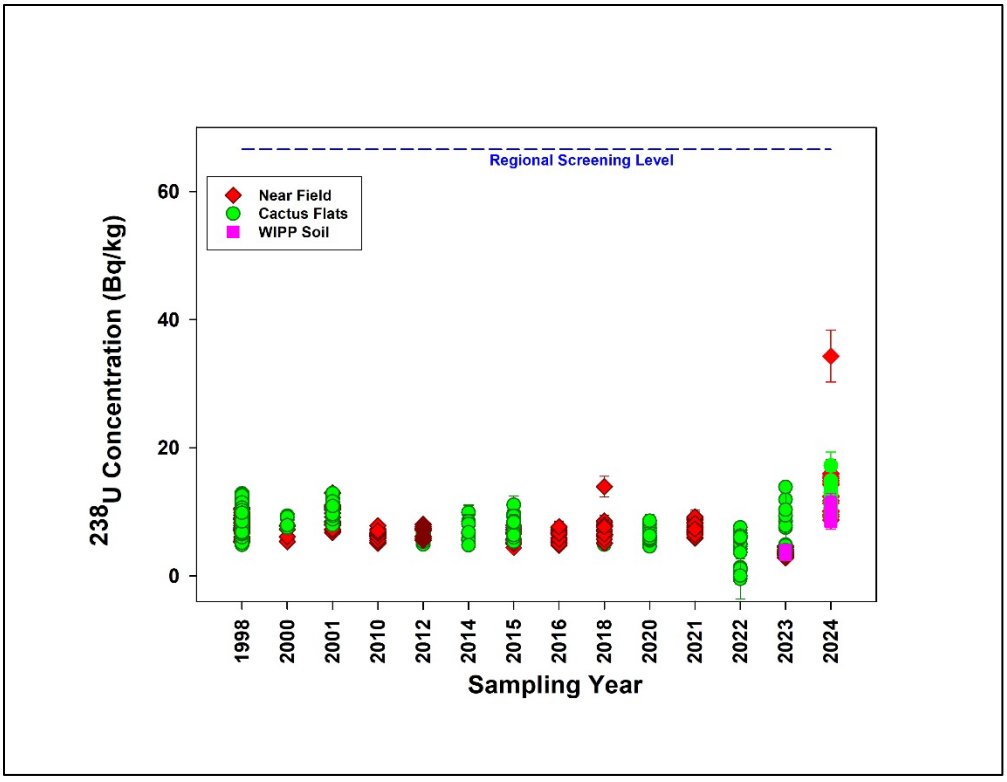


Figure 4.2. Historical Concentrations of $^{239+240}$Pu in Soils



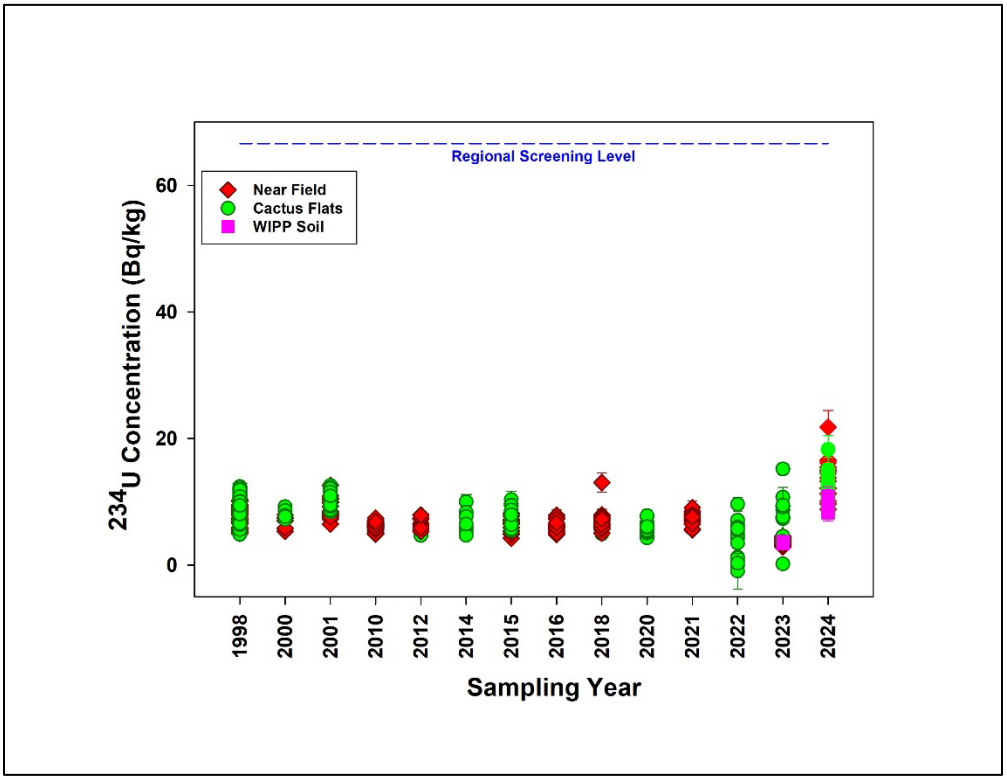


Figure 4.3. Historical Concentrations of ^{238}U and ^{234}U in Soils

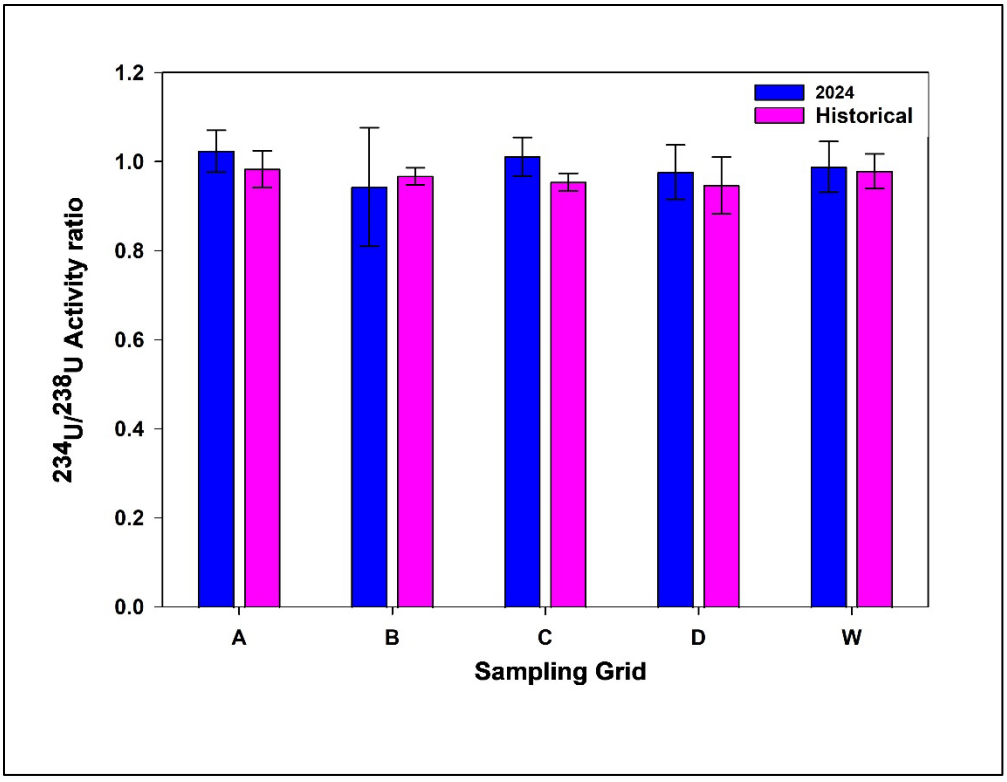


Figure 4.4. Historical $^{234}U/^{238}U$ Activity Ratios in Soils

Gamma-Radiation-Emitting Radionuclide Concentrations in Soil

- **^{40}K**: Detected in all samples, with concentrations typical for natural soils.
- **^{137}Cs**: Found in most samples, with concentrations up to 4.41 Bq/kg. This isotope is a legacy of global nuclear testing and is common in soils worldwide.
- **^{60}Co**: Not detected in any soil samples.

These data, therefore, are consistent with no unusual increases in the activity of these elements (Figures 4.5 and 4.6).

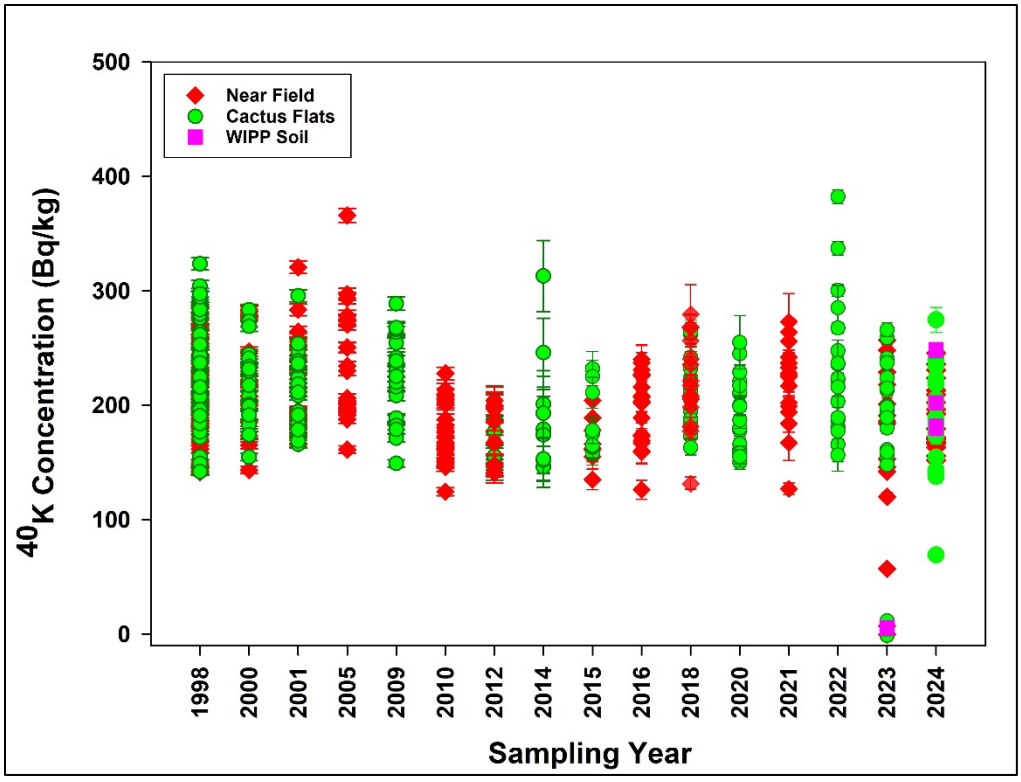


Figure 4.5. Historical Concentrations of ^{40}K in Soils

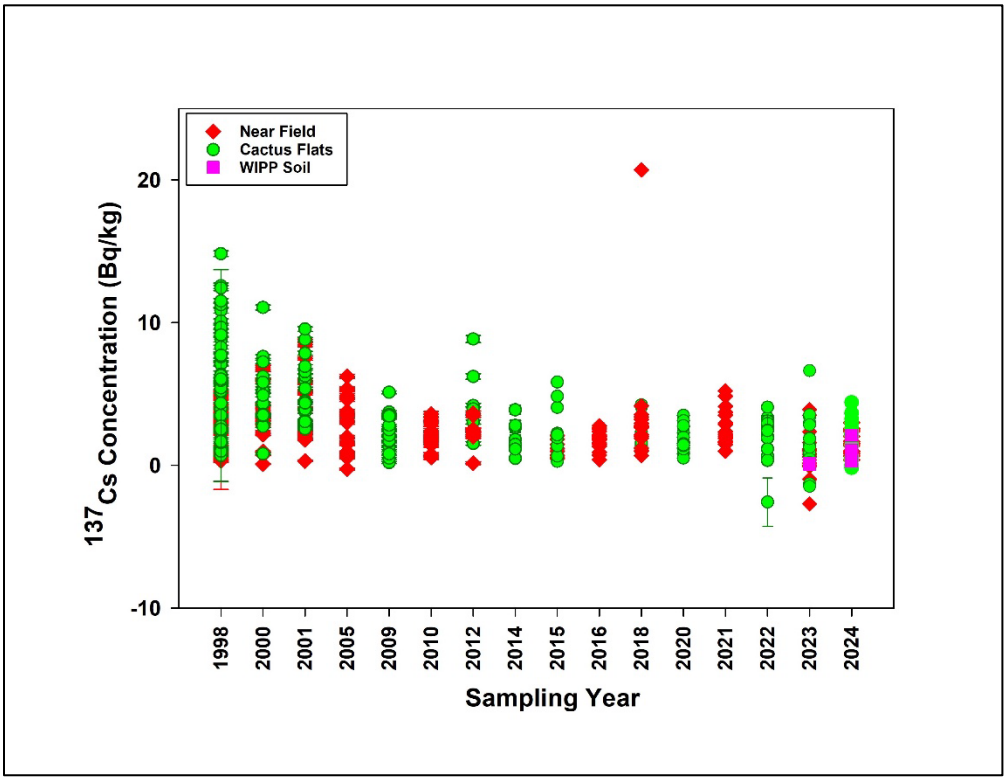


Figure 4.6. Historical Concentrations of ^{137}Cs in Soils

Strontium Concentrations in Soil

^{90}Sr: Not detected in any soil samples.

Conclusions

The soil around WIPP acts as an environmental record keeper, preserving a history of what has been deposited from the air, water, or past activities. By regularly checking the soil for radioactive materials, scientists can detect any changes or buildup over time.

The levels of plutonium, uranium, cesium, and potassium found in the soil are consistent with what is expected from historical nuclear testing in the area, rather than from WIPP operations, including the 2014 radiation release.

Importantly, all measured actinide concentrations in the soil are far below the levels the EPA considers potentially dangerous. In fact, the highest concentrations observed are well under the EPA's health-based screening levels for residential soil. This means that, even when compared to the most protective federal guidelines, the radioactivity in the soil around WIPP poses no health risk to the public.

For residents, workers, and policymakers, this means the land around WIPP remains as safe as it was before the facility opened and started accepting waste.

CHAPTER 5 - SURFACE WATER MONITORING

Surface waters, such as rivers, lakes, and reservoirs, are a vital part of the environment, supporting wildlife, recreation, and even livestock. These waters, however, can also act as pathways for contaminants, carrying radioactive materials from soil or air into broader ecosystems. This is why CEMRC scientists keep a close watch on surface water near the WIPP site, to determine whether radioactive materials are making their way into the water that people and animals depend on.

Sample Collection

Since WIPP's environmental monitoring program began, researchers have collected water samples every year from three major reservoirs along the Pecos River: Brantley Lake, Red Bluff, and Lake Carlsbad. These reservoirs are all located miles from the WIPP site, but they are important because the Pecos River is the main waterway in the area used for fishing, boating, swimming, and irrigation. In addition, samples are taken from three smaller livestock tanks that may change from year to year (Figure 5.1).

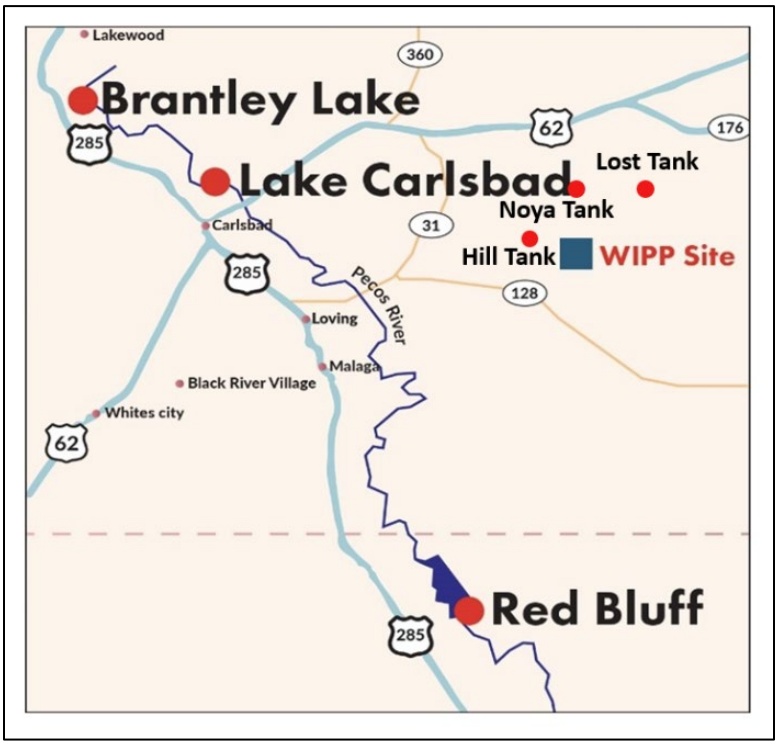


Figure 5.1. Surface Water Sampling Locations in the Vicinity of the WIPP Site

At each site, CEMRC scientists collect water from both the surface and the bottom of the water body, ensuring a thorough check for any radioactive materials as a function of depth. About 8 liters, roughly two gallons, are collected at each point (Figure 5.2).



Figure 5.2. Surface Water Sample Collection from Brantley Lake by CEMRC Personnel

Results

Activity concentrations in all surface water samples are reported in Bq/L. All data can be found in APPENDIX D.

Actinides in Surface Water

To put these results in context, regulatory agencies such as the U.S. Department of Energy (DOE) and the EPA have established reference values for radionuclides in surface water to protect both human health and aquatic life. For example, the DOE's Derived Concentration Standard (DCS) for $^{239/240}$Pu in surface water is 30 Bq/L, and for ^{241}Am it is also 30 Bq/L. These values are set conservatively to ensure that even long-term exposure to water at these concentrations would not pose a significant risk.

^{241}Am: Not detected in any water samples in 2024, continuing a 20-year trend of no measurable presence. This means levels are well below the DOE's surface water standards.

^{238}Pu and $^{239+240}$Pu: Not detected in any water samples in 2024. This means levels are well below the DOE's surface water standards.

Uranium in Surface Water

Uranium was found in all surface water samples, as expected. The measured concentrations for uranium isotopes were well below the Environmental Protection Agency's recommended limit for drinking water (1.15 Bq/L). Higher uranium concentrations were detected in water from the three lakes than in water from the three tanks (Figure 5.3). This is likely because the uranium in tank water is more likely to settle to the bottom of the tank due to reduced disturbance of the water compared to the larger reservoirs. Historically, the ratio of uranium isotopes (^{234}U/^{238}U) has been higher in the reservoirs (around 2.0) than in the livestock tanks (around 1.3), which is expected for natural waters in constant flow versus waters stored in a

tank. This trend continues in 2024 (Figure 5.4). These ratios point to uranium coming from natural sources rather than contamination from WIPP.

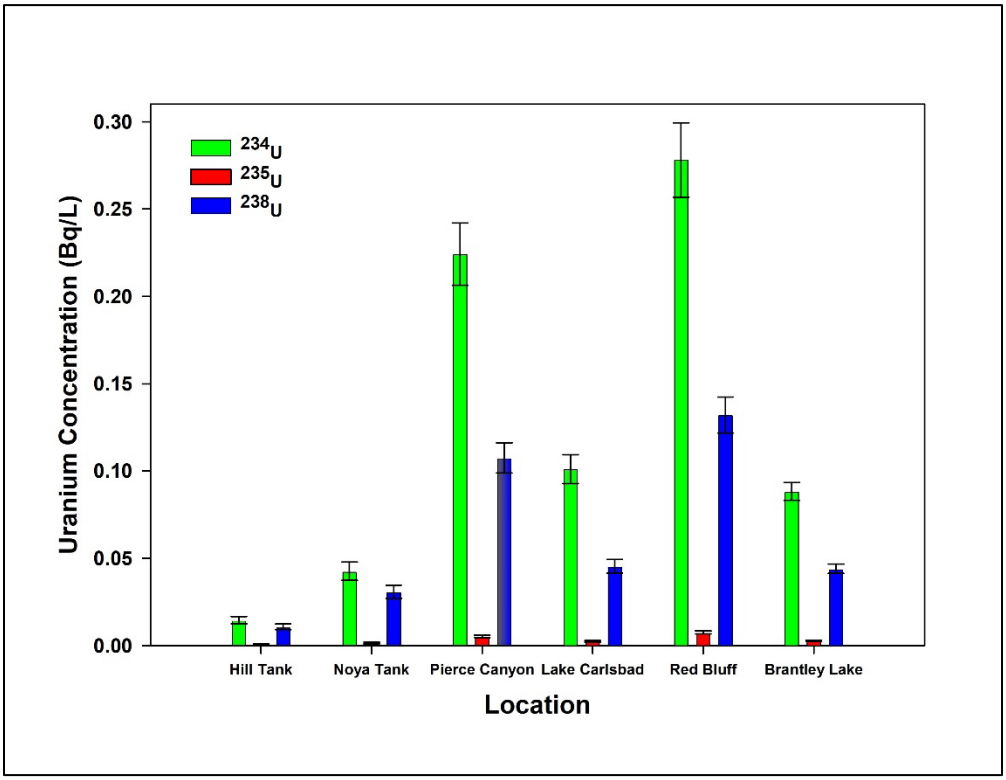


Figure 5.3. Uranium Concentrations in Surface Water Samples in 2024

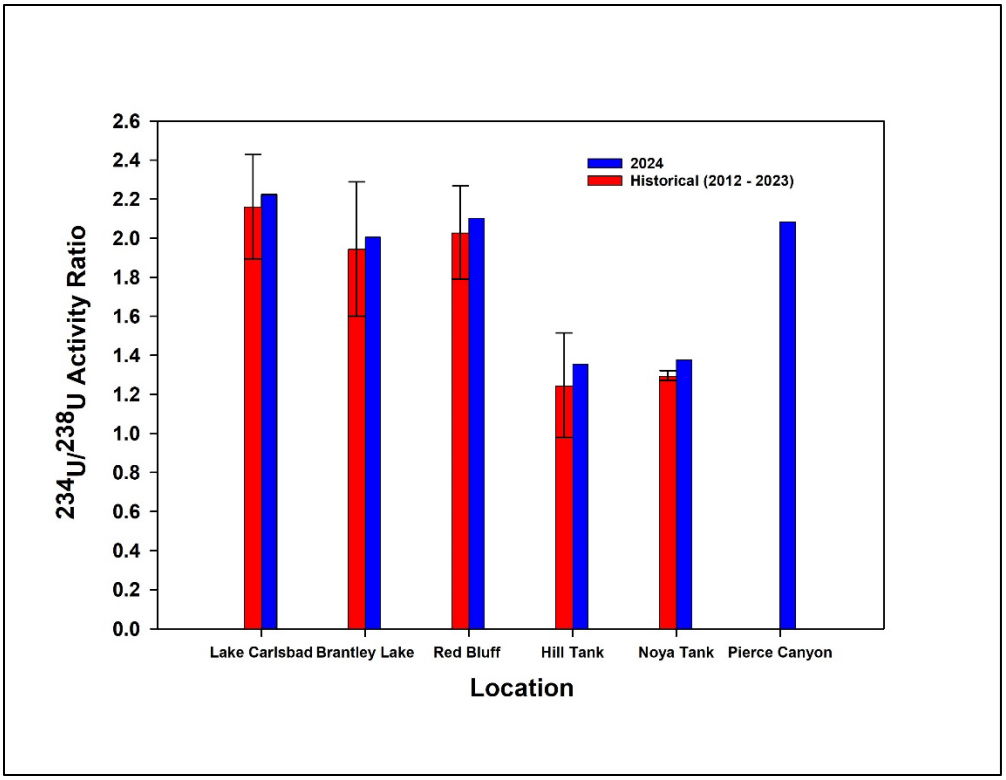


Figure 5.4. $^{234}U/^{238}U$ Activity Ratio in Surface Water Samples

(Note: This is the first sampling of Pierce Canyon; no historical data exist.)

Other Radionuclides (Cesium, Cobalt, Potassium, Strontium)

- **^{137}Cs, ^{60}Co, and ^{90}Sr**: Not detected in any surface water samples in 2024.
- **^{40}K**: Detected only in two samples, at levels expected for natural waters.

Conclusions

- The levels of plutonium, americium, uranium, cesium, cobalt, and potassium found in these waters are either undetectable or at natural background levels.
- All uranium concentrations are well below federal safety limits for drinking water.
- There is no evidence that WIPP operations have contributed to radioactive contamination in local surface waters, even after more than two decades of monitoring.

The 2024 concentrations of all radionuclides of interest in surface waters have remained steady over the years, with no spikes or increases that would suggest a release from WIPP operations.

CHAPTER 6 - DRINKING WATER MONITORING

Drinking Water Monitoring Near WIPP

Safe drinking water is essential for public health. That is why the water we drink is routinely tested to ensure it meets strict health and environmental standards. Around the WIPP, monitoring drinking water is especially important to confirm that WIPP operations are not affecting the quality of local water supplies.

Water Sources

The communities near WIPP derive their drinking water from various sources, including underground aquifers (natural layers of rock and soil that hold water) and the Pecos River. The main water source for Carlsbad, for example, is the Capitan Reef aquifer, while other towns rely on the Ogallala aquifer or the Pecos River.

Water Safety Standards

The U.S. Environmental Protection Agency (EPA) sets safe levels for contaminants in drinking water, called Maximum Contaminant Levels (MCLs). These MCLs are legally enforceable standards that public water systems must meet. For example, the MCL for uranium is 1.15 Bq/L.

Important Note: This report focuses on monitoring the impact of WIPP operations on drinking water, not on whether the water systems are meeting regulatory compliance.

Water Testing Methodology

Since 1997, CEMRC scientists have been collecting drinking water samples from six municipal water supply systems near WIPP: Carlsbad (both Sheep Draw and Double Eagle PRV4 sources), Hobbs, Loving, Malaga, and Otis. Each year, these samples are tested for both non-radiological and radiological contaminants. About 8 liters (2 gallons) of water are collected from each location. These locations are shown in Figure 6.1.

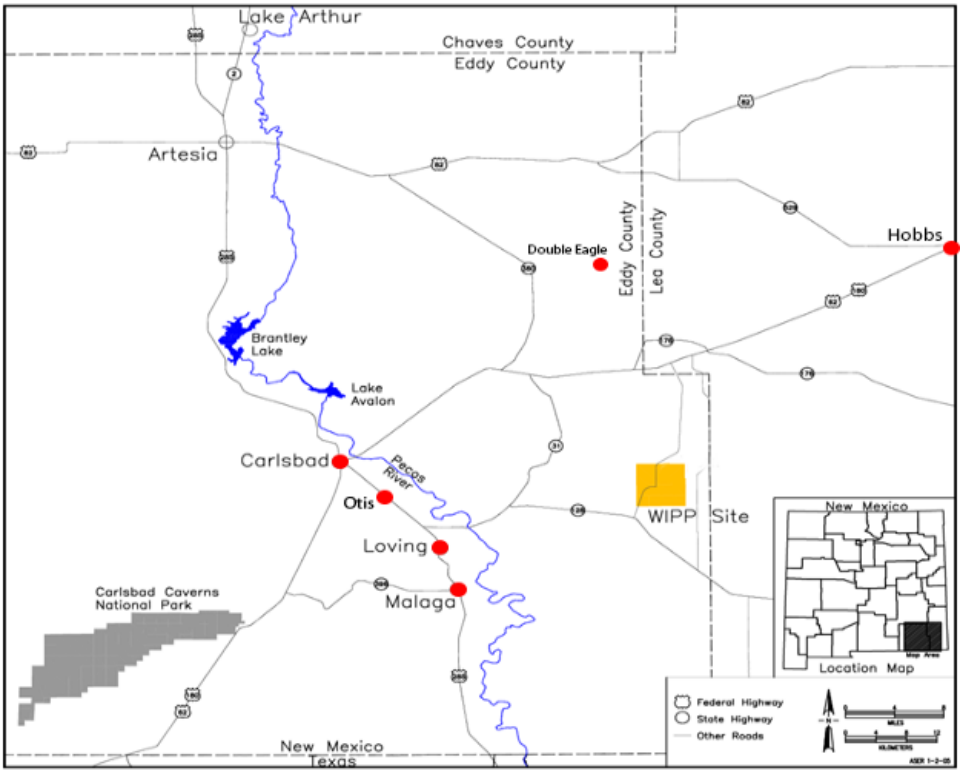


Figure 6.1. Drinking Water Sampling Locations

Results and Discussion

Actinide Concentrations in Drinking Water

The EPA sets strict standards for radionuclides in drinking water to protect public health. For example, the EPA's MCL for gross alpha particle activity (excluding radon and uranium) is 0.555 Bq/L, and for combined radium-226 and radium-228 it is 0.185 Bq/L. While there are no individual MCLs specifically for plutonium or americium, these actinides are included under the gross alpha standard.

The transuranic isotopes ^{238}Pu, $^{239+240}$Pu, and ^{241}Am were not detected in any drinking water samples in 2024. This continues a long-standing trend, as these elements have never been found above detectable levels in the area's drinking water. All results are well below EPA health-based standards for drinking water, providing strong assurance that local water supplies remain safe.

Uranium Concentrations in Drinking Water

Uranium was found in all drinking water samples, as expected. The concentrations of uranium isotopes were well below EPA's safety limit of 1.15 Bq/L (See Figure 6.2). In fact, the levels were similar to those found in other drinking water supplies across the U.S.

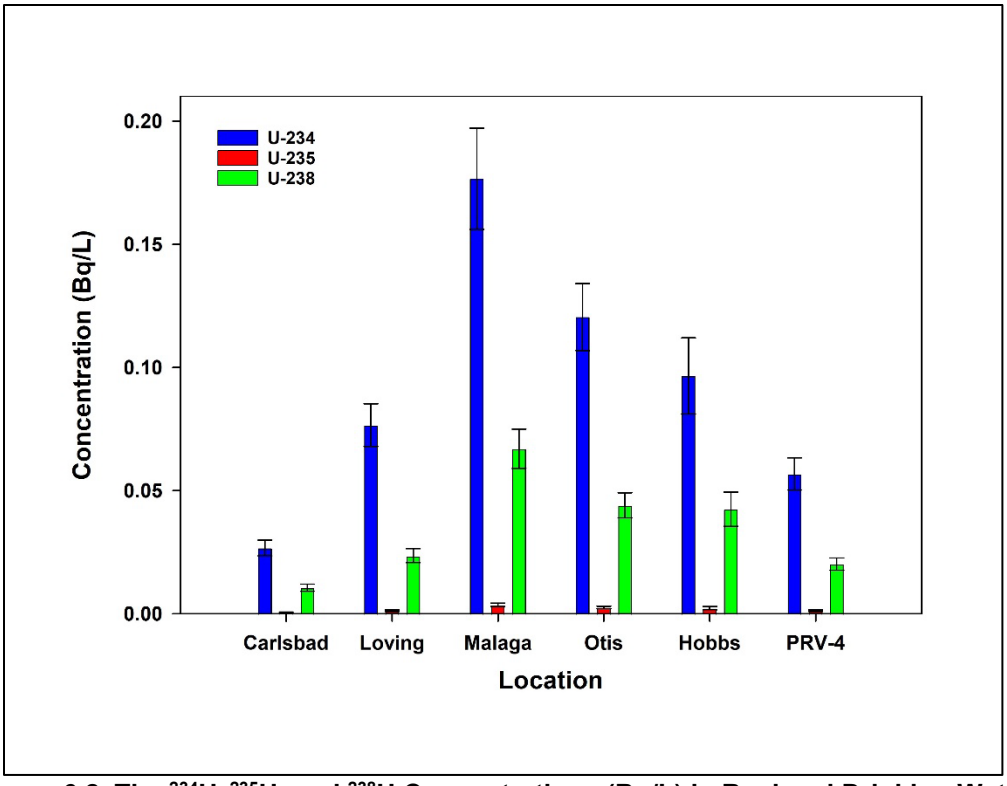


Figure 6.2. The ^{234}U, ^{235}U, and ^{238}U Concentrations (Bq/L) in Regional Drinking Water

The $^{234}U/^{238}U$ ratios in the sampling locations ranged from 2.27 to 3.24 (Figure 6.3), consistent with historical data for the region, and showing that the uranium is present from natural sources rather than from human-made contamination.

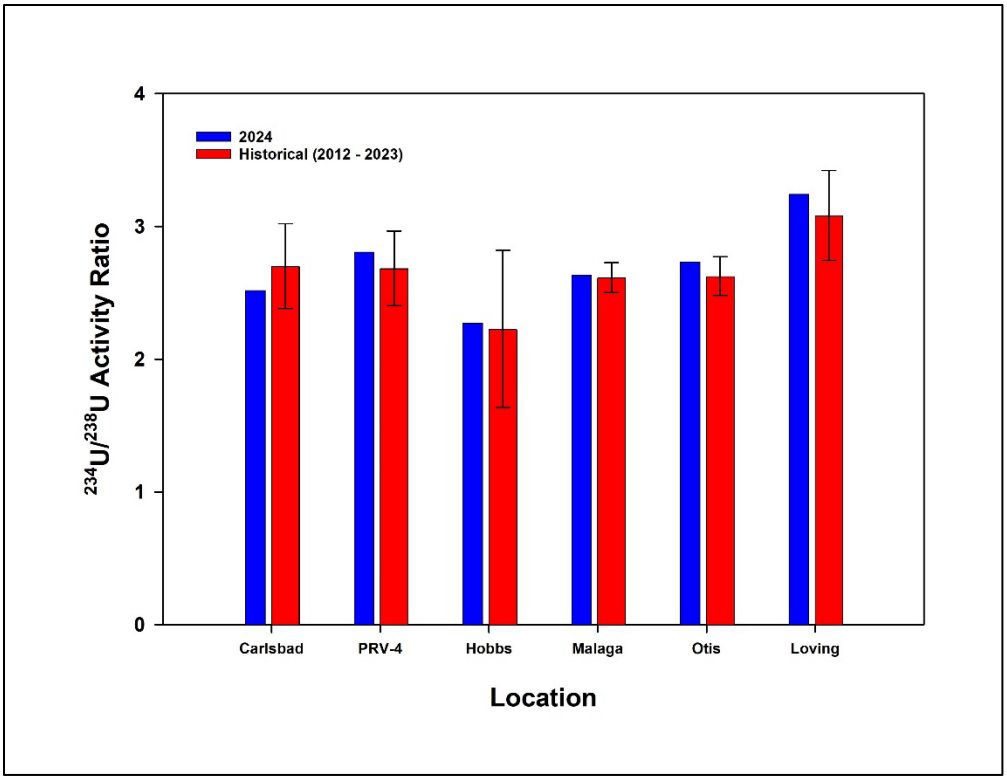


Figure 6.3. $^{234}U/^{238}U$ Activity Ratio in Regional Drinking Water

Other Radionuclide Concentrations

- **^{137}Cs:** Not detected in any drinking water samples in 2024.
- **^{60}Co:** Not detected in any drinking water samples in 2024.
- **^{40}K:** Not detected in any drinking water samples in 2024.
- **^{90}Sr:** Not detected in any drinking water samples in 2024.

All data can be found in APPENDIX E.

Conclusions

- Drinking water near WIPP is regularly tested for radioactive materials to ensure it is safe to drink.
- Plutonium and americium have never been detected in the area's drinking water.
- Uranium is present, but at levels well below EPA safety limits and consistent with natural sources.
- Other radioactive isotopes of cesium, cobalt, potassium, and strontium were not detected.
- There is no evidence that WIPP operations, including the 2014 release event, have affected the quality of local drinking water.

For residents of Carlsbad, Hobbs, Loving, Malaga, and Otis, this means the drinking water remains safe and unaffected by WIPP's presence and waste disposal activities.

CHAPTER 7 - SEDIMENT MONITORING

Sediment, the fine particles that settle at the bottom of lakes and rivers, can act like a sponge for radioactive materials. Over time, these materials can accumulate in sediment, potentially affecting aquatic life and even human health if the sediment is disturbed or the contaminants enter the food chain. That is why scientists monitor sediment near WIPP: to track any buildup of radioactive substances over time and ensure the environment remains protected.

Sediment Sampling

Since 1998, CEMRC scientists have been collecting sediment samples from three public reservoirs along the Pecos River: Brantley Lake, Lake Carlsbad, and Red Bluff. These reservoirs are important recreational and water resources for the region (Figure 7.1).

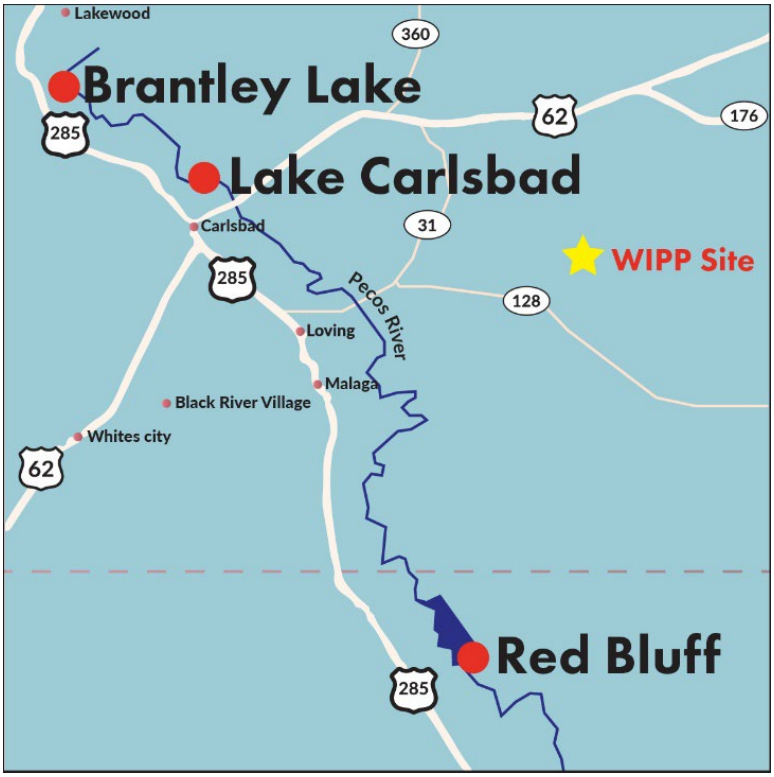


Figure 7.1. Sediment Sampling Locations

To come up with the most accurate picture, scientists collect sediments from the deepest parts of each reservoir. These deep basins tend to accumulate fine sediments, where contaminants are most likely to settle. Samples are collected from about 5-10 cm (2-4 inches) below the surface of the sediment, ensuring they capture any accumulated radioactive materials (Figure 7.2).



Figure 7.2. Sediment Sample Collection by CEMRC Personnel

Results and Discussion

Actinide Concentrations in Sediments

While the EPA does not set national regulatory limits specifically for radionuclide concentrations in sediments, risk-based screening levels for soil are often used as a point of reference. To interpret these results, we compare the measured concentrations with the EPA's Preliminary Remediation Goals (PRGs) for radionuclides in residential soil. PRGs are health-protective benchmarks used primarily at Superfund sites—locations with hazardous contamination—rather than in typical residential areas. These PRGs provide guidance for evaluating potential health risks in sediments. Importantly, concentrations below the relevant PRG are not considered hazardous to human health by the EPA.

For example, the EPA's PRG for residential soil is 5.55 Bq/kg for $^{239+240}$Pu, 4.07 Bq/kg for ^{241}Am, and 8.51 Bq/kg for ^{90}Sr. These values are commonly used as health-protective benchmarks for environmental media like sediment, especially when evaluating potential risks to human health and the environment.

- **^{241}Am and ^{238}Pu:** Not detected in any sediment samples in 2024, indicating no measurable contamination (Figure 7.4).
- **$^{239+240}$Pu:** Detected in Red Bluff Lake, but at a concentration of 0.276 Bq/kg, well below the EPA's soil remediation level and within the range found during baseline studies in 1998 (Figure 7.3).
- **Uranium Isotopes (^{234}U, ^{235}U, and ^{238}U):** Detected in all sediment samples. The concentrations of ^{238}U and ^{234}U were highest in Red Bluff and lowest in Brantley Lake. The ratio of uranium isotopes (^{234}U/^{238}U) ranged from 1.18 to 1.82, indicating a natural origin for the uranium (Figures 7.5 and 7.6).

Overall, all measured actinide concentrations in sediments are far below the levels that EPA or DOE would consider a potential health concern and are consistent with natural background or historical baseline values. This provides strong evidence that WIPP operations have not contributed to actinide contamination in local bodies of water.

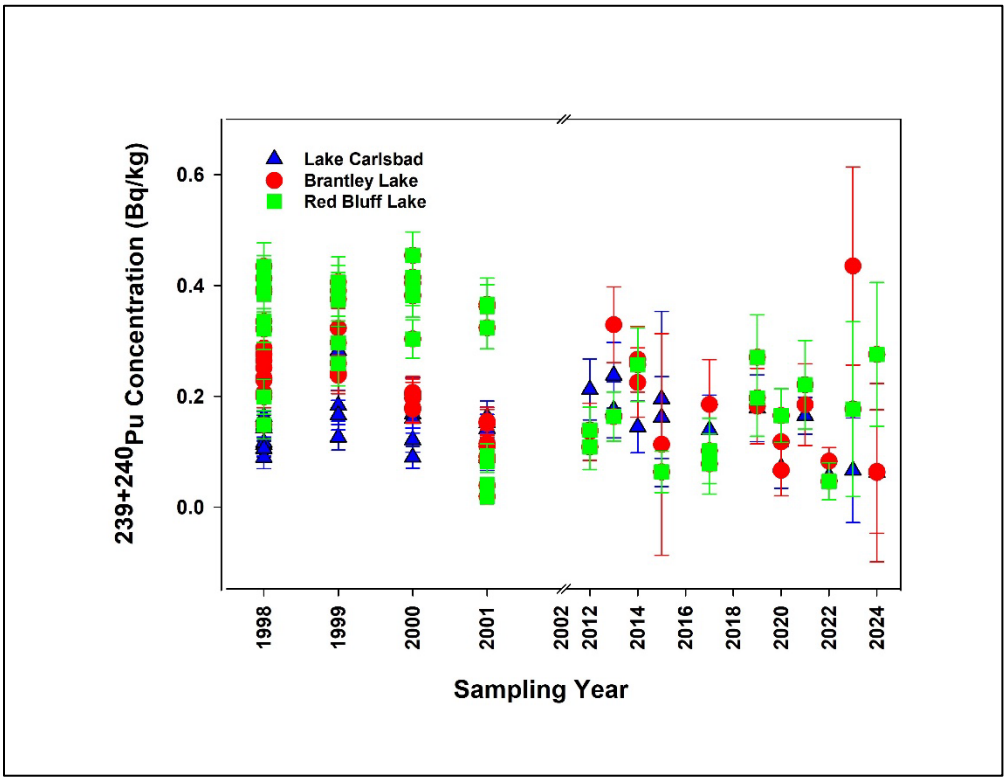


Figure 7.3. Historical Concentrations of $^{239+240}$Pu in Regional Reservoir Sediments

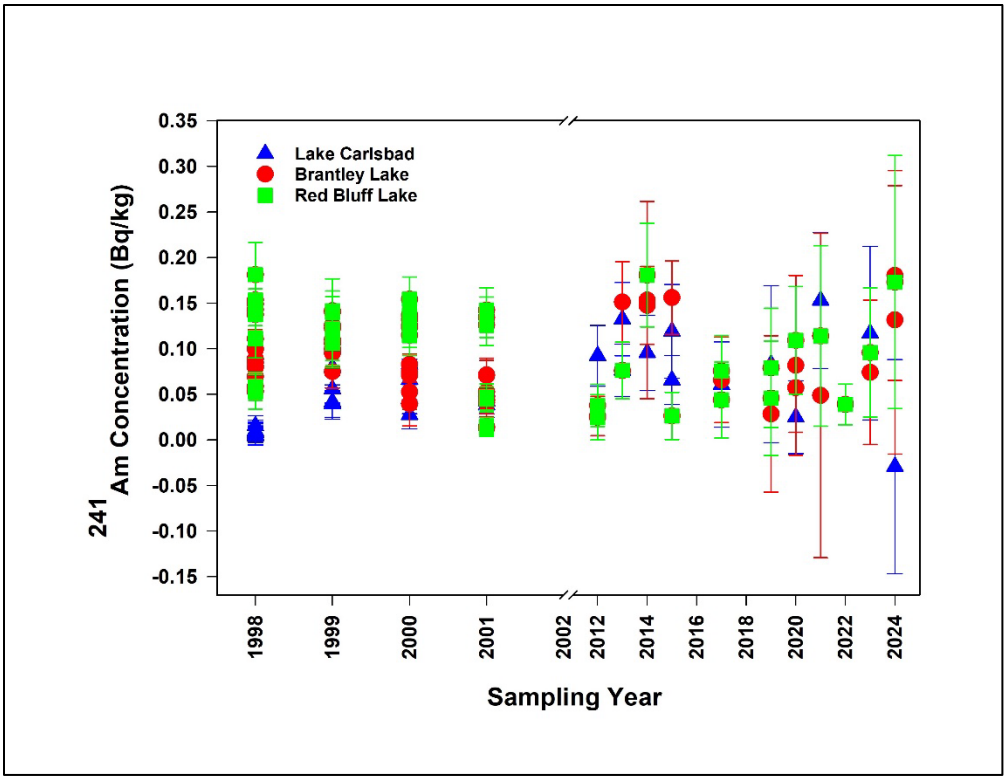


Figure 7.4. Historical Concentrations of ^{241}Am in Regional Reservoir Sediments

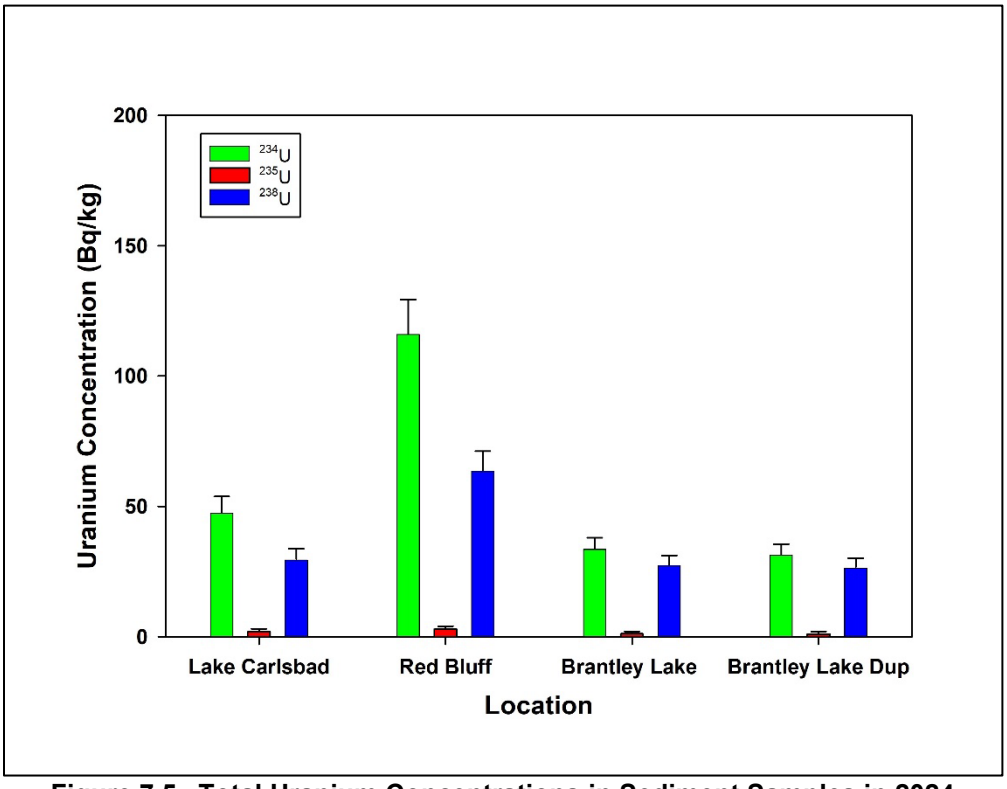


Figure 7.5. Total Uranium Concentrations in Sediment Samples in 2024

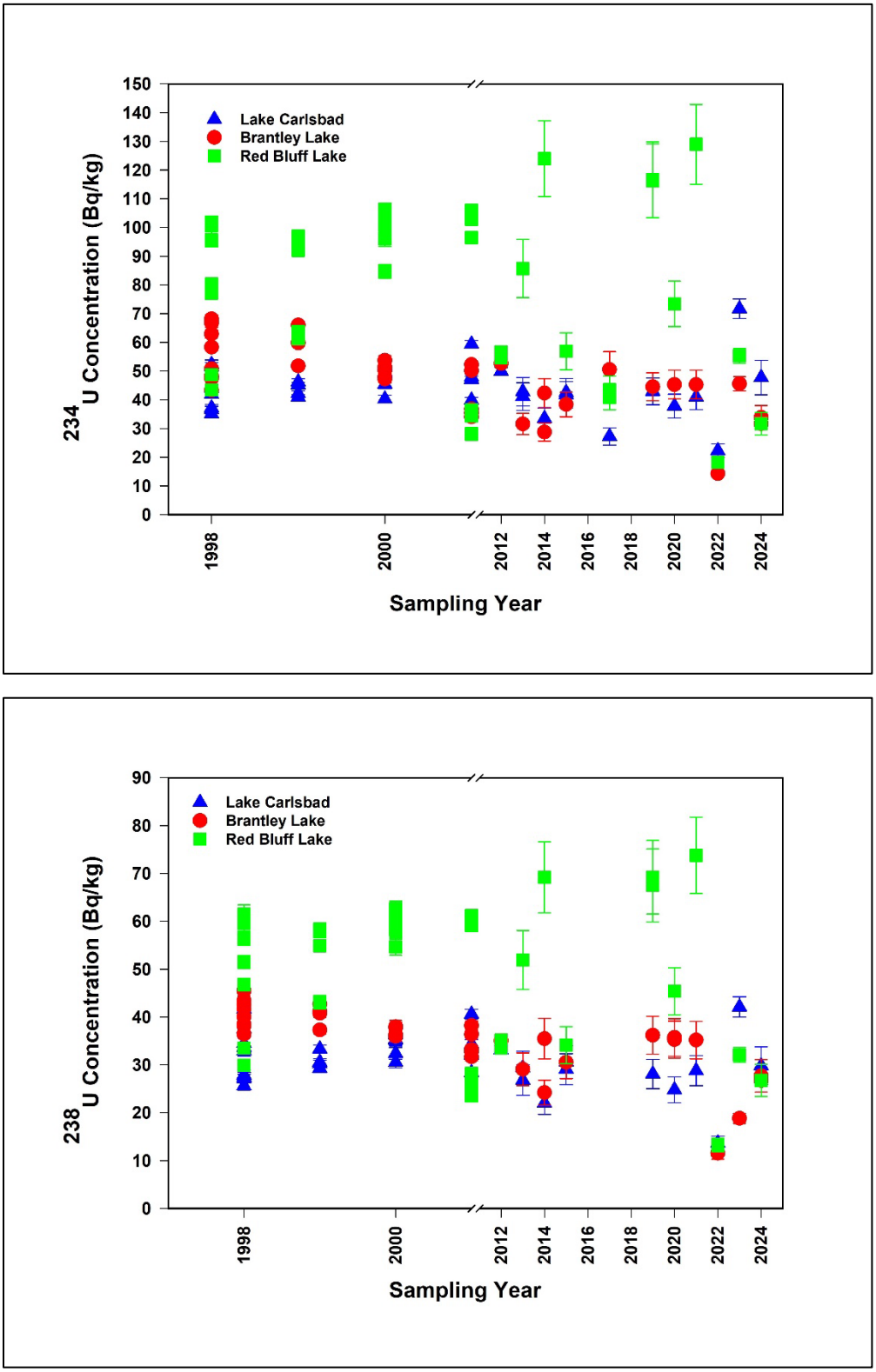


Figure 7.6. Historical Concentration of ^{234}U and ^{238}U in Sediment Samples

Other Radionuclide Concentrations in Sediments

^{60}Co and ^{90}Sr: Not detected in any sediment samples.

^{137}Cs and ^{40}K: Detected in all sediment samples, at levels consistent with previous years (Figures 7.7 and 7.8).

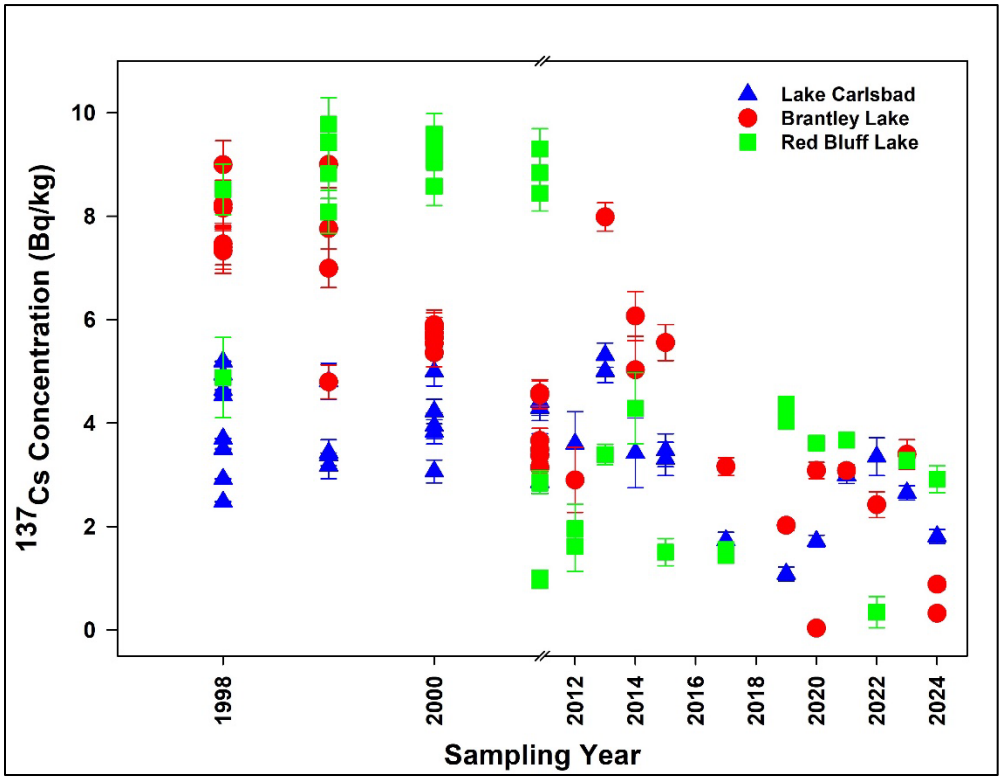


Figure 7.7. Historical Concentration of ^{137}Cs in Sediment Samples

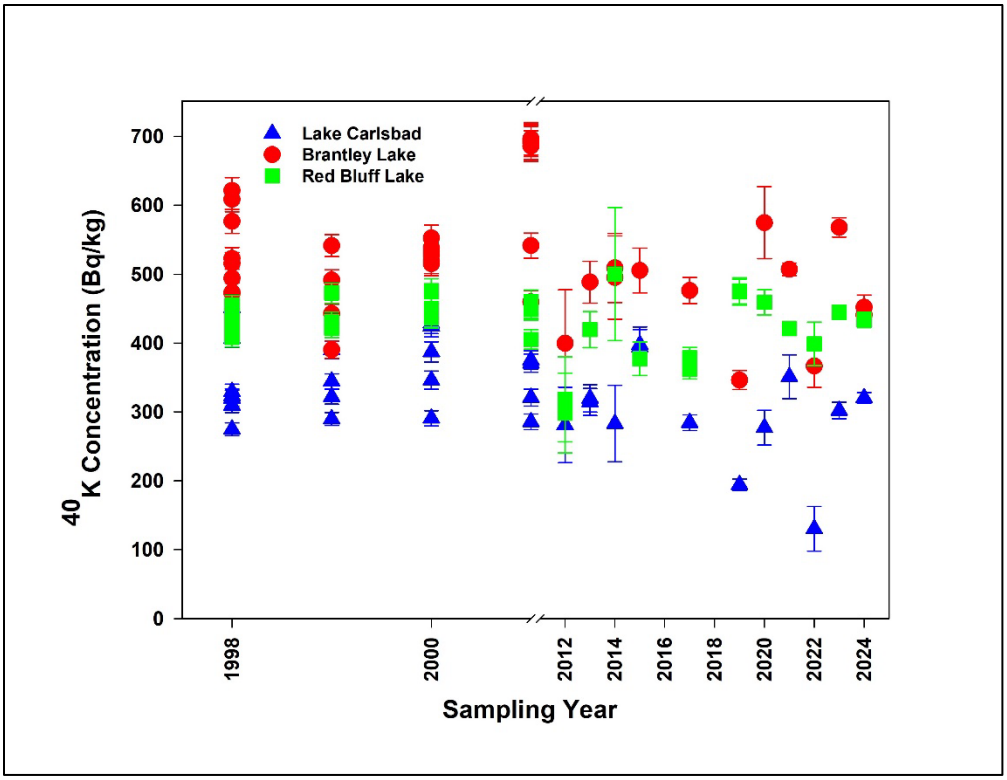


Figure 7.8. Historical Concentration of ^{40}K in Sediment Samples

Conclusions

- Sediments in the reservoirs near WIPP are regularly monitored for radioactive materials.
- ^{241}Am and ^{238}Pu, were not detected in any samples.
- $^{239+240}$Pu was found in one sample, but at a level consistent with historical data.
- Uranium, ^{137}Cs, and ^{40}K were detected, but at levels consistent with historical results and ratios indicating natural sources.
- There is no evidence that WIPP operations have resulted in radioactive contamination in local sediments.

All data can be found in APPENDIX F.

For residents and recreational users of the reservoirs, this means the sediments have not been impacted by WIPP operations.

CHAPTER 8 - VEGETATION MONITORING

Plants can absorb radioactive materials from the soil, air, and water around them. If livestock eat contaminated vegetation, these materials can then enter the food chain, potentially affecting human health. That is why CEMRC scientists monitor vegetation near the WIPP site: to ensure that radioactive substances are not accumulating in plants and posing a risk to animals or people.

Vegetation Sampling

Each year, CEMRC scientists collect vegetation samples from five sites near WIPP, corresponding to locations where airborne particulate samples are also collected. These sites include Near Field, Cactus Flats, Loving, Carlsbad, and East Tower, shown in Figure 8.1. Vegetation is not available for collection at the Onsite location because the area is paved.

At each site, scientists collect a mix of leafy vegetation, cutting plants at least an inch above the ground. About 300-500 grams of vegetation are collected, then dried and ground into a fine powder for analysis.

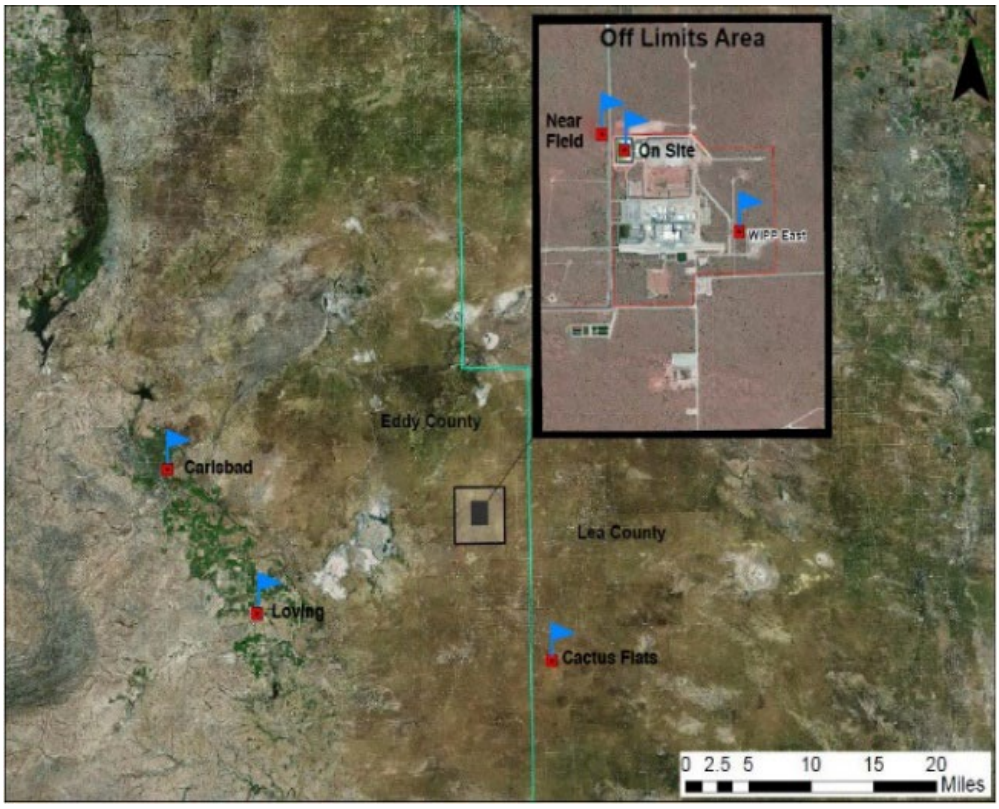


Figure 8.1. Vegetation Sampling Locations

Results

Actinide Concentrations (Plutonium, Americium, and Uranium)

While the EPA and DOE do not set specific regulatory limits for radionuclide concentrations in vegetation, results are often compared to background levels and to soil screening values as a conservative benchmark. The EPA's Regional Screening Levels (RSLs) for residential soil, for example, are 5.55 Bq/kg for $^{239+240}$Pu and 4.07 Bq/kg for ^{241}Am. These values are much higher than the concentrations typically found in vegetation and are used as a reference point for evaluating potential health risks from environmental exposure. All vegetation data are reported in APPENDIX G.

- **^{241}Am**: Not detected in any vegetation samples in 2024, indicating no measurable contamination.
- **^{238}Pu:** Not detected in any vegetation samples in 2024, indicating no measurable contamination.
- **$^{239+240}$Pu:** Not detected in any vegetation samples in 2024, indicating no measurable contamination.
- **^{234}U, ^{235}U, and ^{238}U:** Detected in all vegetation samples. All values were consistent with natural background and well below any health-based reference value. The ratio of uranium isotopes (^{234}U/^{238}U) ranged from 1.01 to 1.06, indicating a natural origin for the uranium (Figure 8.2).

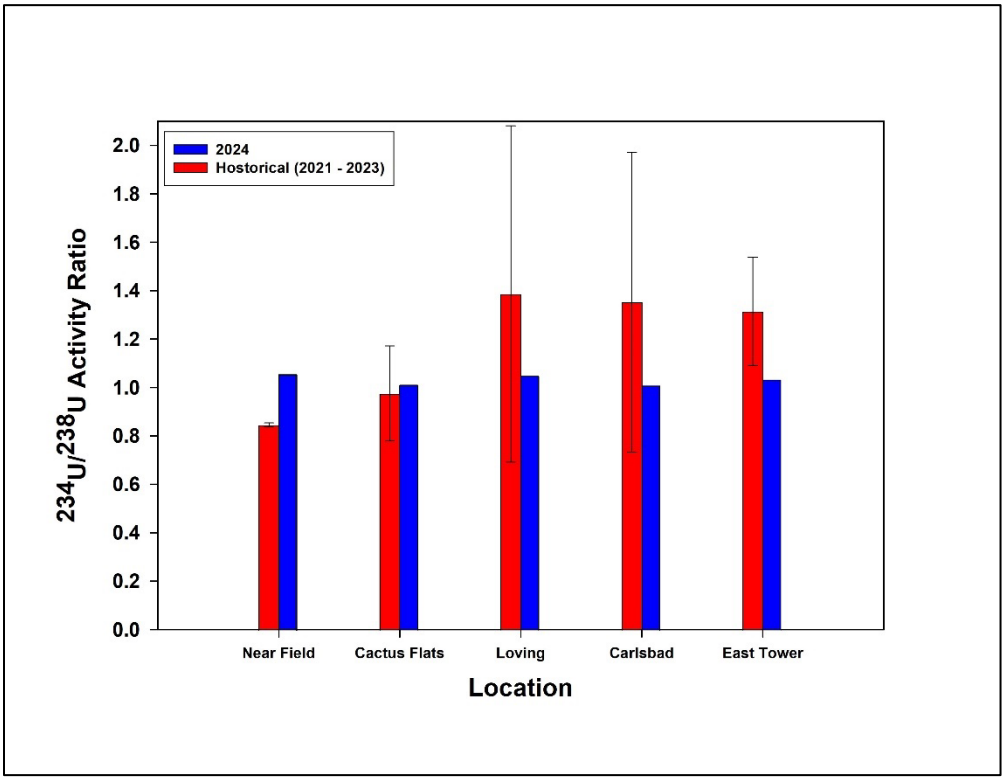


Figure 8.2. ^{234}U/^{238}U Activity Ratio in Vegetation Samples

Overall, all measured uranium isotope concentrations in vegetation are far below the levels that EPA or DOE would consider a potential health concern and are consistent with natural background or historical values. This indicates that WIPP operations have not contributed to actinide contamination in local vegetation.

Other Radionuclides (Cesium, Cobalt, Potassium, and Strontium)

- **^{60}Co**: Not detected in any vegetation samples.
- **^{137}Cs**: Not detected in any vegetation samples.
- **^{40}K**: Detected in all vegetation samples, as expected, at concentrations ranging from 165 to 301 Bq/kg.
- **^{90}Sr**: Not detected in any vegetation samples.

Conclusions

- The $^{234}U/^{238}U$ activity ratio indicates that the uranium detected in vegetation is naturally occurring.
- There is no evidence that WIPP operations have increased radioactive contamination in local vegetation.
- For local residents and livestock owners, this means the vegetation remains safe and unaffected by WIPP's presence and operations.

CHAPTER 9 - *IN-VIVO* MONITORING

The in-vivo (or direct) radiobioassay is a measurement of the human body to determine the amount of radioactive material in the body. CEMRC's Internal Dosimetry (ID) Laboratory has been performing in-vivo radiobioassay measurements for radiological and radiation control workers. Additionally, CEMRC's ID Laboratory provides a free radiobioassay service to the public residing within a 100-mile radius of the WIPP site through a program called "Lie Down and Be Counted" (LDBC) since 1997. The LDBC program is the most public aspect of CEMRC and is open to adult residents and children aged 13 and older living within a 100-mile radius of the WIPP site. The purpose of the LDBC program was to establish a baseline of "normal" or "background" radiation present in adults living in the region surrounding WIPP prior to the onset of radioactive waste emplacement at the site. Further, once disposal operations began at the WIPP site, the LDBC program allows for the continued monitoring of the public to determine if WIPP-related disposal activities have any observable impact on area residents' health. Concerned citizens are encouraged to participate in the In-vivo radiobioassay program and find out what level of radioactive isotopes might exist in their lungs and whole body. The background data collected prior to the beginning of operations at WIPP serves as a baseline for comparisons with periodic follow-up measurements that are slated to continue through the operational phase of the WIPP facility.

The LDBC program uses a state-of-the-art lung and whole-body counting system that can measure the body's burden of radioactive elements at extremely low levels. The CEMRC ID laboratory has unique capabilities to detect radionuclides internally deposited in the body. The procedure is non-intrusive; participants are asked to follow a small number of steps before lying down on a bed inside of a counting room for 30 minutes, allowing for measurements to be taken. Participants then go over their results with a CEMRC scientist. Each participant contributes to scientific research conducted by the center.

The current scope of work requires CEMRC's ID laboratory to perform whole-body measurements for the Department of Energy-Carlsbad Field Office (DOE-CBFO), DOE contractors, radiological and radiation workers, and the public residing within a 100-mile radius of the WIPP site. In the event of an incident or accidental release, in-vivo measurements will be performed for DOE clients and contractor staff within the first two days following the event. In the event of a scheduling conflict, the DOE and contractor staff's in-vivo measurements have priority over non-DOE clients and members of the public. The results of in-vivo measurements for members of the public are reported in aggregate form and all necessary precautions are taken to ensure confidentiality and to avoid the release of individualized data. Unexpected positive results from any in-vivo measurement trigger an automatic recount. Details of the in-vivo counting facility, bioassay methodologies, and demographic characteristics counting method are described in the following sections. This chapter provides an overview of the ongoing public radiobioassay measurements through December 31, 2024.

In-vivo Counting Facility

The *in-vivo* counting facility consists of a large, shielded counting chamber made from pre-1945 cast iron to limit the background radiation and an instrument control workstation in the adjacent room. Radiobioassay operations are performed from the instrument control workstation. The operations room is also equipped with a video display terminal and intercom that are used to monitor subjects during the measurement. The counting chamber, as shown in Figure 9.1, is equipped with high purity germanium detector *arrays designed specifically for* lung *and* whole-body counting, an oxygen monitor, a video camera, emergency backup lights, and a voice-activated intercom for the subjects to communicate with the operator at any time during the counting process. The counting facility is also equipped with a music system to help participants relax during counting, if they so choose. Four lung detectors are located above the bed and are positioned close to the subject's chest and four whole-body detectors are located under the bed. The whole-body detectors face the torso and upper leg parts of the body. CEMRC's ID laboratory has met the requirements and recommendations of the DOE Implementation Guide for Internal Dosimetry Programs (10 CFR 835) and the American National Standards Institute Performance Criteria for Radiobioassay (ANSI/HPS N13.30) (1996, 2011) and continues to meet the most current criteria for radiobioassay measurements.



Figure 9.1. The Whole-Body counting facility at CEMRC

During January – March 2022, the Lung and Whole-Body radiobioassay measurement system's hardware was upgraded to the Lynx digital signal analyzer(s) shown in Figure 9.2 and the software was upgraded to APEX In-vivo software based on Hewlett Packard (HP) workstation with Windows 10 operating system. This whole system, namely Lynx rack and the APEX In-vivo is referred to hereafter as APEX In-vivo system. The Lynx rack with twelve Lynx units is shown in Figure 9.2. The upgraded APEX In-vivo system passed the

performance testing of the Department of Energy Laboratory Accreditation Program (DOELAP). DOELAP for radiobioassay (DOE-STD-1111-2018) granted CEMRC direct radiobioassay performance qualification for the operational system with valid accreditation from 12/15/2022 through 12/14/2025.



Figure 9.2. Lynx rack with twelve Lynx units mounted.

Minimum Detectable Activity

The minimum detectable activity (MDA) is an *a priori* value used to evaluate the laboratory's ability to detect a radionuclide in a person. The MDA is defined as the amount of a radionuclide that, if present, would be detected 95% of the time under the routine operation of a facility. The MDA is used to measure the efficacy of a facility and should not be used to decide if a specific radiobioassay has or has not detected activity within a person (ANSI/HPS N13.30, 1996). To determine whether activity has been detected in a particular person, the

parameter L_C (decision level) is used. The L_C represents the 95th percentile of a null distribution resulting from the differences of repeated, pair-wise background measurements. An individual result is assumed to be statistically greater than background if it is greater than the L_C. It is important to note that the use of this criterion will result in a statistically inherent 5% false positive error rate (5% of all measurements will be determined to be positive when there is no true activity in the person). Details of MDA and L_C calculations can be found elsewhere (CEMRC, 1998; ANSI/HPS N13.30, 1996; Webb and Kirchner, 2000).

The details of energy and efficiency calibration of the lung and whole-body counting detectors are discussed in greater detail in a previous CEMRC Report (CEMRC, 2017). The lung detector efficiency varies with the person's chest wall thickness (CWT). Average MDA (nCi) with one standard deviation and percent variation for lung and whole-body detector systems are provided in APPENDIX H, Tables H.1 and H.2, respectively. One factor complicating the measurement of low-energy photon emissions from the lung is the absorption of photons in the tissue overlying the lung – adipose (fat), muscle, cartilage, and bone. The thickness of these tissues and, consequently, the attenuation can vary significantly from one individual to the next. This is particularly important for the detection of the 17 keV plutonium X-rays. At this energy, 6 mm of muscle can attenuate half of the transmitted X-rays. In the early days of lung counting, height/weight relationships had been used to estimate the CWT, but these were crude and could easily lead to errors of a factor of 2 or more (CDC, 2006, page 27). For routine *in-vivo* radiobioassay measurements where no lung activity is expected, CEMRC ID uses an empirically derived prediction algorithm to estimate chest wall thickness, using easily measurable physical parameters, namely height and weight of the subject (RB-TBM-016, 2020). This prediction algorithm is based on a composite of the works by Dean (1973), Garg (1977), and Fry et al. (1980) that was chosen by CDC (CDC, 2006, page 30). In cases where a precise measurement of chest wall thickness is critical (e.g., when an intake of an insoluble radionuclide is probable or suspected) CEMRC has an established ultrasonic procedure that could be used in lieu of the prediction algorithm. Ultrasonic measurements of the chest yield both thickness and composition. The arrangement for ultrasonic measurement is the responsibility of the participant.

A routine radiobioassay program should be able to detect intakes within a year that will deliver a Committed Effective Dose of 100 mrem. If this performance objective cannot be met, then a performance shortfall is said to exist. The current version of CEMRC's Lung and Whole-body Counting technical manual (RB-TBM-016, 2020) provides a detailed comparison of lung and whole-body detector system's MDAs (determined with the VMS ABACOS+ system) with annual limit of intakes. The MDA values provided by APEX In-vivo software for each radiobioassay measurement (of the public) during the 2022 – 2024 period are utilized to calculate the Apex In-vivo MDA averages.

Volunteer Participation in the LDBC Program (1997 – 2024)

Between July 21, 1997, and March 26, 1999 (a period referred to as the "pre-operational" phase), the CEMRC ID laboratory had counted 366 public volunteers. This group of 366

measurements constituted the pre-operational baseline to which subsequent results are compared. WIPP received the first waste shipment on March 26, 1999. Counts performed after WIPP became operational are referred to as the "operational" phase monitoring. Between March 27, 1999, and December 31, 2024, CEMRC ID laboratory had counted 1236 public volunteers. These measurements include baseline count (individuals counted for the first time), routine count (counting of previously measured participants, specifically counts performed on individuals at least after two years following the baseline count), and recounts (repeat counts to confirm a positive result). The total number of public volunteers who have participated in the LDBC program between July 21, 1997, and December 31, 2024, are shown in Figure 9.3.

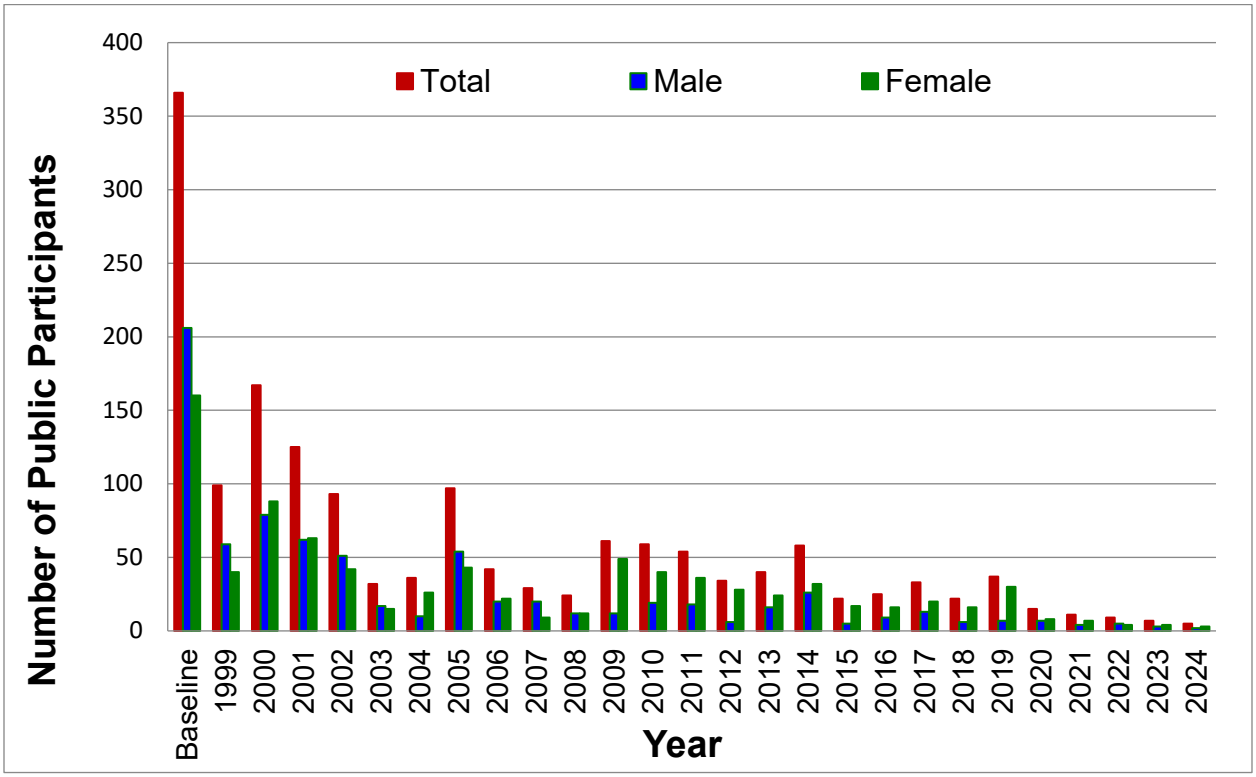


Figure 9.3. Number of LDBC public participants from 1997-2024

In addition to the LDBC public counts, the CEMRC ID laboratory also provides *in-vivo* radiobioassay service to Waste Control Specialists (WCS, Andrews, TX), Los Alamos National Laboratory (LANL), DOE Carlsbad Field Office (DOE-CBFO), WIPP Laboratories, and WIPP contractor personnel. The total number of radiobioassay measurements performed through December 2024 is 6217, which includes baseline (in this context baseline means the first time counted at CEMRC), routine, recounts, exit, potential intake, and any other special counts on radiological workers.

Demographic Characteristics

Public volunteers participating in the LDBC project are asked to complete a questionnaire to gather a demographic profile of the participants, such as age, sex, ethnicity, occupation,

foreign travel, wild game consumption, smoking habits, and participation in any nuclear medicine procedures. APPENDIX H, Table H.3 compares the LDBC demographic characteristics between the baseline and operational phase date. An increase of voluntary participation by Hispanics from 13.4% to 24.3% can be seen during the period between 1999 and 2024. According to the U.S. census, the percentage of the Hispanic population nationwide for this same time period increased from 12.5% to 20.0% and from 42.1% to 49.1% in the State of New Mexico. In addition, it is important to note that if the presence of a radionuclide is dependent on a subclass of interest (i.e., sex, ethnicity, etc.), valid population estimates can still be made by correcting for the proportion of under- or over-sampling for the particular subclass. Variations observed for the remainder of the demographic characteristics are also listed in APPENDIX H, Table H.3.

Results and Discussion

LDBC Results Greater Than the Decision Limits (L_C)

The LDBC results greater than the decision limits (L_C) for the baseline and operational measurements for the period 1997 - 2024 are listed in APPENDIX H, Table H.4. Results listed in APPENDIX H, Table H.4 are for the participants counted only once. For the baseline measurements (N = 366), the percentage of results greater than L_C were consistent with a 5% random false-positive error rate, at the 95% confidence level (1% to 9%), for all radionuclides except ^{232}Th via the decay of ^{212}Pb, ^{235}U/^{226}Ra, ^{60}Co, ^{137}Cs, ^{40}K, ^{54}Mn, and ^{232}Th via the decay of ^{228}Ac. As discussed in the 1998 report, five of these radionuclides [^{232}Th via ^{212}Pb, ^{60}Co, ^{40}K, ^{54}Mn (^{228}Ac interference), and ^{232}Th (via ^{228}Ac)] are part of the shield room background and positive detection is expected at low frequency. The ^{40}K isotope is a naturally occurring isotope of an essential biological element, so detection in all individuals is expected. The ^{137}Cs and ^{235}U/^{226}Ra isotopes are not components of the shielded room background and were observed at frequencies greater than the 95% confidence interval for the false-positive error rate, discussed in more detail below.

For the operational measurement (N = 1236), the percentage of results greater than L_C were consistent with the baseline at a 95% confidence level (margin of error), except for ^{60}Co and ^{232}Th (via ^{228}Ac). For these radionuclides, the percentage of results greater than L_C decreased relative to the baseline. This would be expected for ^{60}Co, given that it has a relatively short half-life (5.27 years) and the content of ^{60}Co within the shield has decreased via decay by approximately 85% since the baseline phase of monitoring. The differences in ^{232}Th (via ^{228}Ac) results between the baseline and operational monitoring phase were also observed in 2001 and 2002 and are likely due to the replacement of aluminum (aluminum tends to contain Th and U) in some of the detector cryostat components with components manufactured from low radiation background steel.

The percentage of results greater than L_C for ^{235}U/^{226}Ra was 10.7% for the baseline, was significantly higher than the distribution-free confidence interval for a 5% random false-positive error rate; and for the period 1999-2021, the average percentage of results greater than L_C was 11%. From 2022 onwards, with the upgraded APEX In-vivo software and Lynx

hardware for the Lung and Whole-Body radiobioassay measurement system, there were no results greater than L_C for ^{235}U and ^{226}Ra, for the public volunteers who participated between 2022 and 2024. The percentage of results greater than L_C for $^{235}U/^{226}Ra$ is reset to 0%.

The ^{40}K results have been positive for all participants counted both before and after WIPP became operational. Starting from 2023, for the radiobioassay measurements of public participants during the period from 3/27/1999 to 12/31/2024, the ^{40}K activity is adjusted to account for the negative bias introduced by the deionized water BOMAB used for environmental background subtraction. Between 3/27/1999 to 12/31/2024, the ^{40}K activity range is 1,475 to 5,674 Bq per person, the ^{40}K average activity values (± standard error (SE)) are 3,098 (± 18) Bq per person overall, 3,701 (± 6) Bq per person for males, and 2,660 (± 10) Bq per person for females. The ^{40}K activity in the body of an adult person with body mass of 70 kg ranges from 4,000 to 5,000 Bq (ICRP Publication 23, 1975). Such results are expected because ^{40}K is an essential biological element contained primarily in muscle. The amount of potassium in the body is proportionate to the muscle mass, which depends on sex, age, and physical activity level. Muscle mass also depends on human ethnicity, height, and body weight (Silva 2010, He et al., 2003). The ^{40}K average activity value per person for males was significantly greater than that of females because, in general, males tend to have larger body sizes and greater muscle content than females. These results are consistent with findings previously reported in the CEMRC reports and elsewhere (Webb and Kirchner, 2000). Figure 9.4 shows the number of LDBC participants with ^{40}K results greater than L_C, and Figure 9.5 shows the average ^{40}K activities among the LDBC participants during the period from 1997 to 2024.

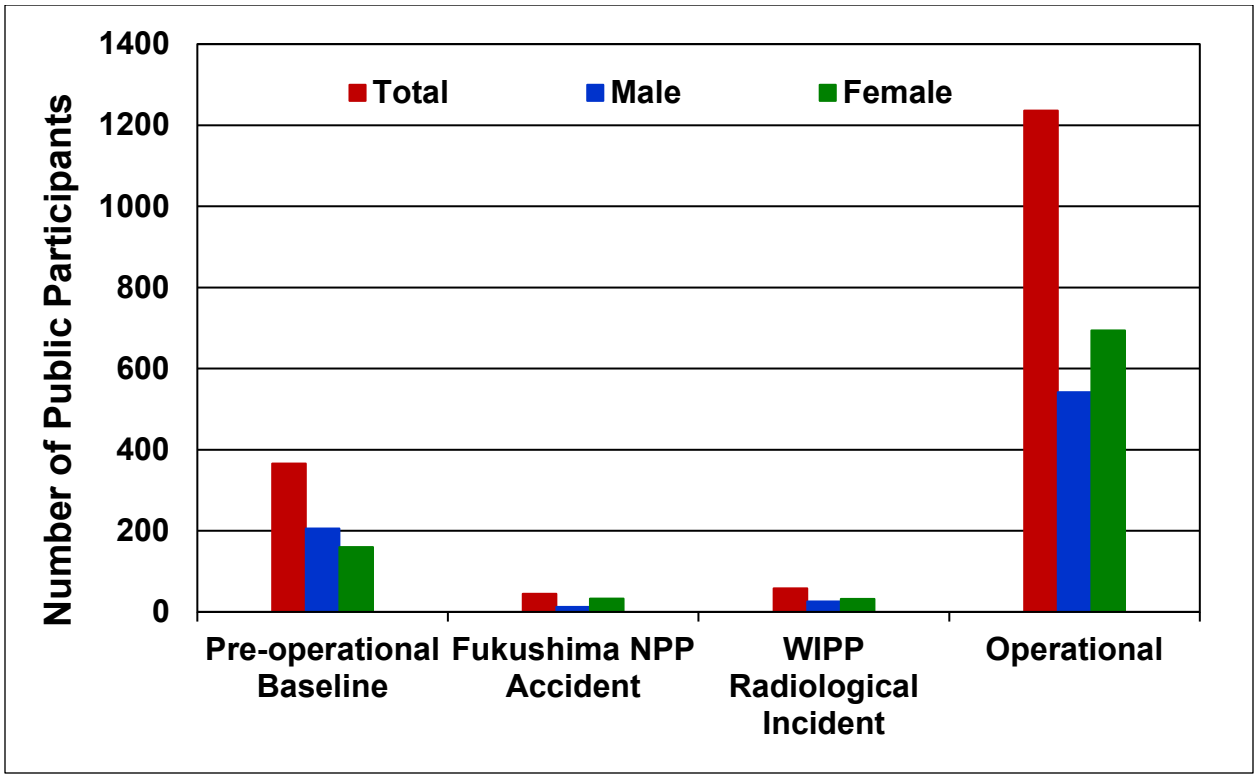


Figure 9.4. Number of participants with ^{40}K with results greater than L_c during 1997-2024

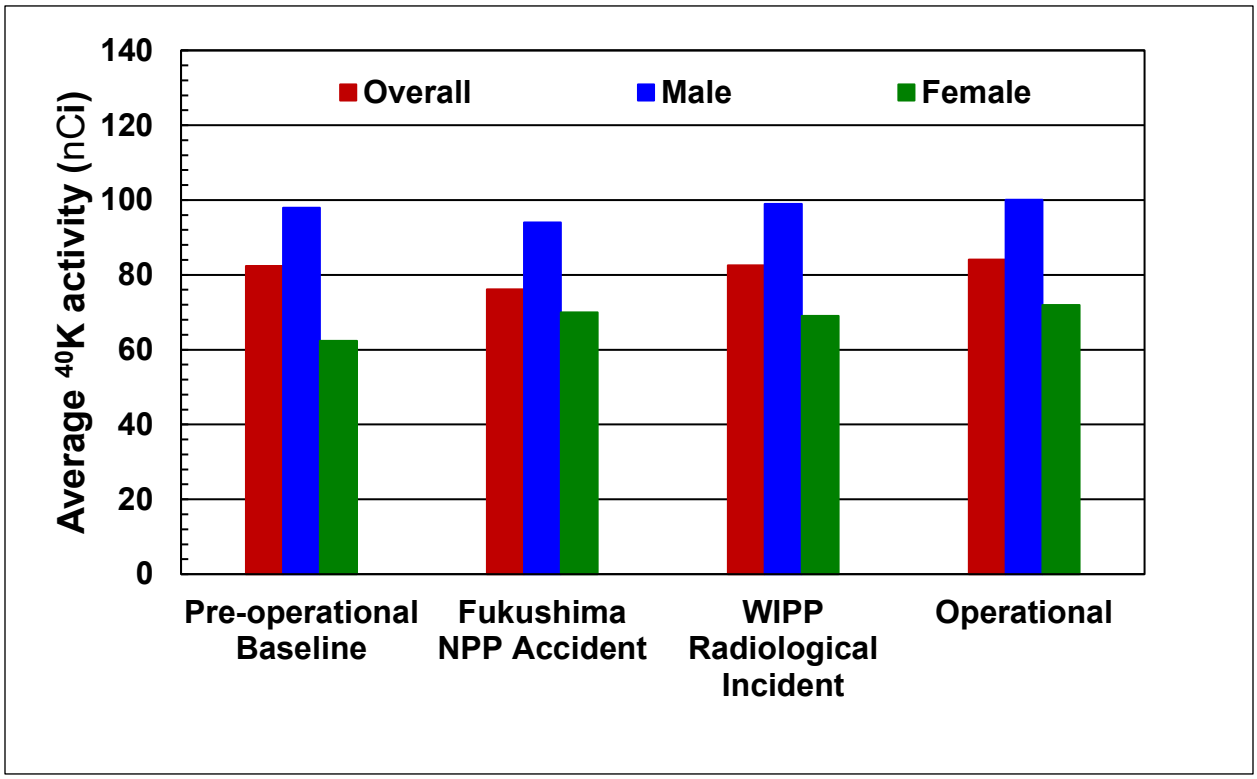


Figure 9.5. Average ^{40}K Activity (nCi) among LDBC participants during 1997-2024

Detectable ^{137}Cs activity is present in about 28.4% (95% confidence level) for baseline, and 16.6% operational monitoring counts of residents living within a 100 mi radius of WIPP. Results are given in APPENDIX H, Table H.4. These results are consistent with findings previously reported in the CEMRC reports and elsewhere (Webb and Kirchner, 2000). Detectable ^{137}Cs body burdens ranged from 5 to 128 Bq per person, with overall average activity (± SE) of 11 (± 1) Bq per person, 11 (± 1) Bq per male participant, and 11 (± 2) Bq per female participant. As previously reported (CEMRC Reports; Webb and Kirchner, 2000) the presence of ^{137}Cs was independent of ethnicity, age, radiation work history, consumption of wild game, nuclear medical treatments, and European travel. However, the occurrence of detectable ^{137}Cs with activity higher than L_C at CEMRC seemed to have an association with sex, where males had a higher prevalence (63%) relative to females (37%). Figure 9.6 and Figure 9.7 show the number of participants with ^{137}Cs results greater than L_C and ^{137}Cs average activity (nCi), respectively, among LDBC participants during 1997 - 2024.

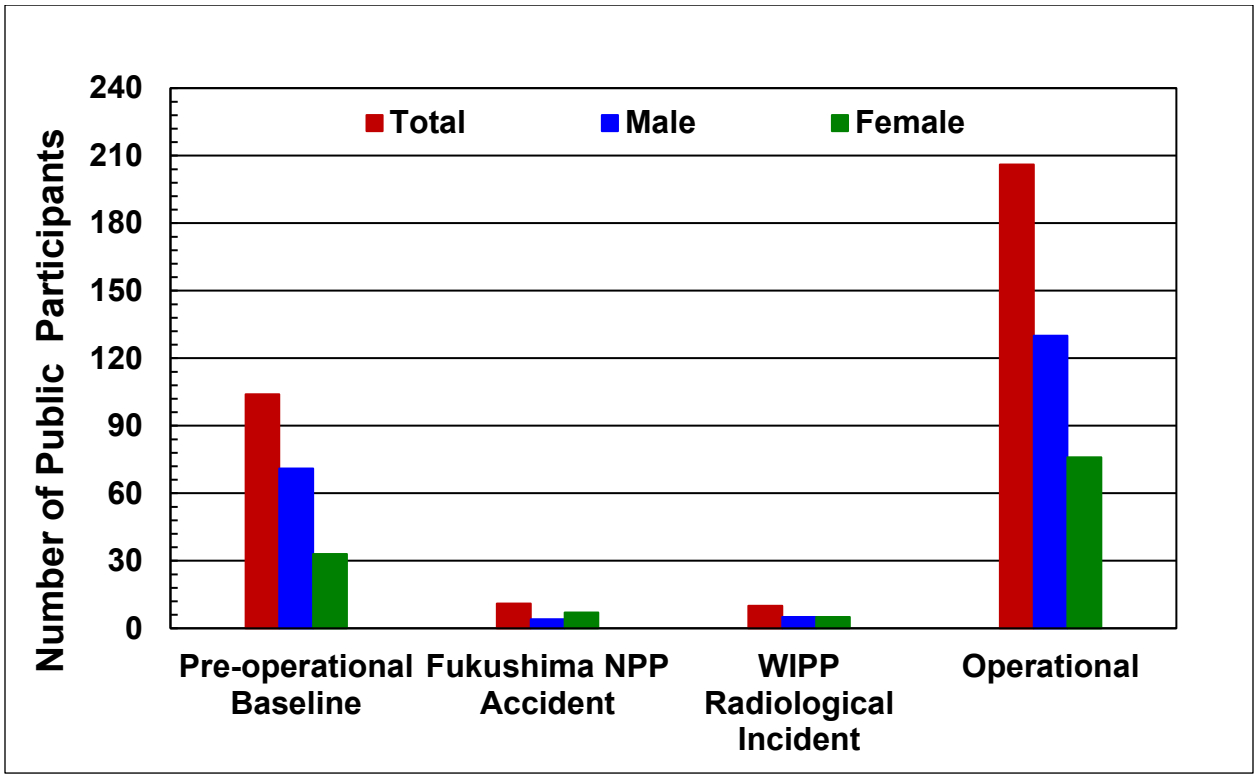


Figure 9.6. Number of participants with ^{137}Cs results greater than L_c during 1997-2024

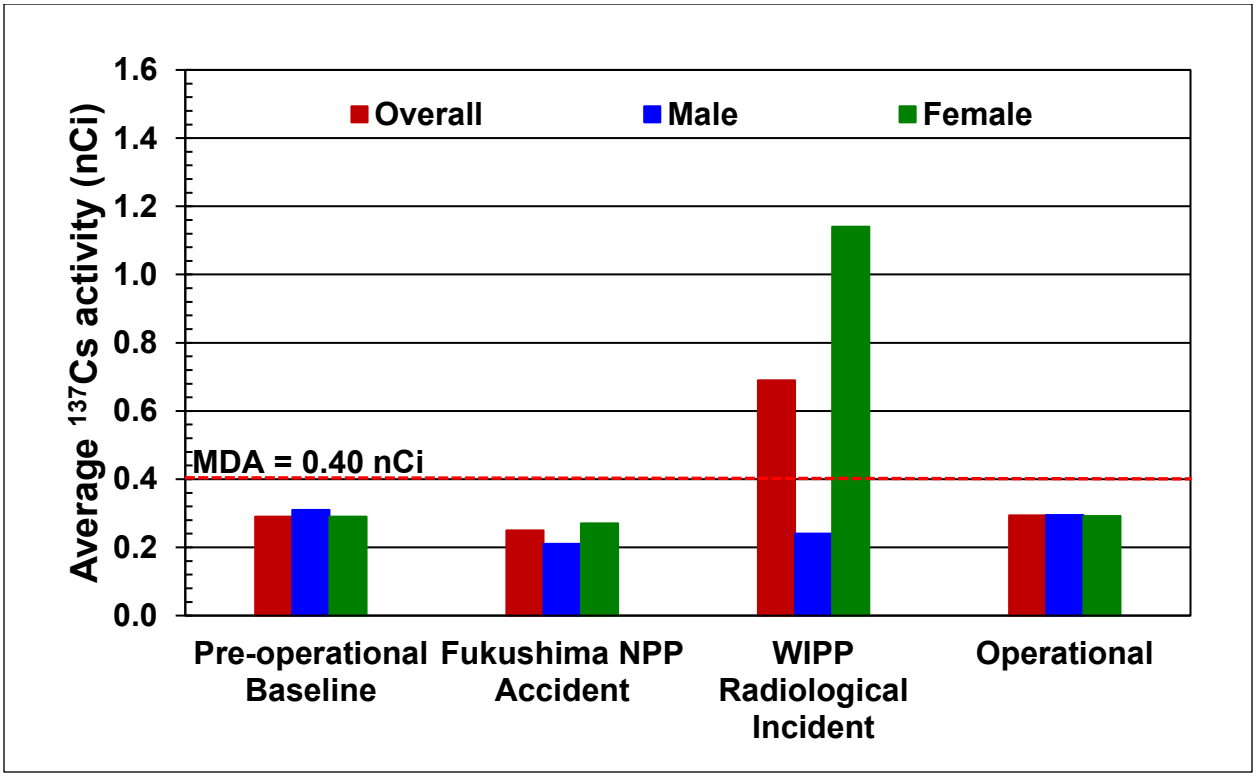


Figure 9.7. Average ^{137}Cs activity (nCi) among LDBC participants during 1997-2024

Furthermore, the presence of ^{137}Cs was associated with smoking. Smokers had a higher prevalence of detectable ^{137}Cs (29.7%) as compared to non-smokers (24.1%) (CEMRC Report, 2005/2006). The association with sex is likely related to the tendency for a larger muscle mass in males than in females, as supported by the ^{40}K results. The association of ^{137}Cs with smoking could be related to the presence of fallout ^{137}Cs in tobacco, a decreased pulmonary clearing capability in smokers, or other unidentified factors.

Plutonium and americium isotopes, the main component of the WIPP's waste, were also monitored among the public. Lung counting is the primary method for determining intakes of Pu isotopes and ^{241}Am. The lung burdens of these nuclides in public participants were measured using the 17 keV X-ray line for plutonium isotopes and the 59.5 keV gamma line for ^{241}Am. Efficiency, and therefore the sensitivity level, varies for every count because of the effects of chest wall thickness (CWT) on the attenuation of the 17 keV x-rays and the 59.5 keV gamma ray. Apex In-vivo estimates CWT using mass to height ratios for routine counting. However, the use of ultrasound for precise CWT measurement is recommended for special or positive counts. A typical low energy gamma spectrum of the lung counter of a public count and background are shown in Figure 9.8. For lung counts, increases in chest wall thickness can increase the individual's MDA. In its more than 20 years of *in-vivo* monitoring, CEMRC has never detected Pu isotopes or ^{241}Am in any public volunteers.

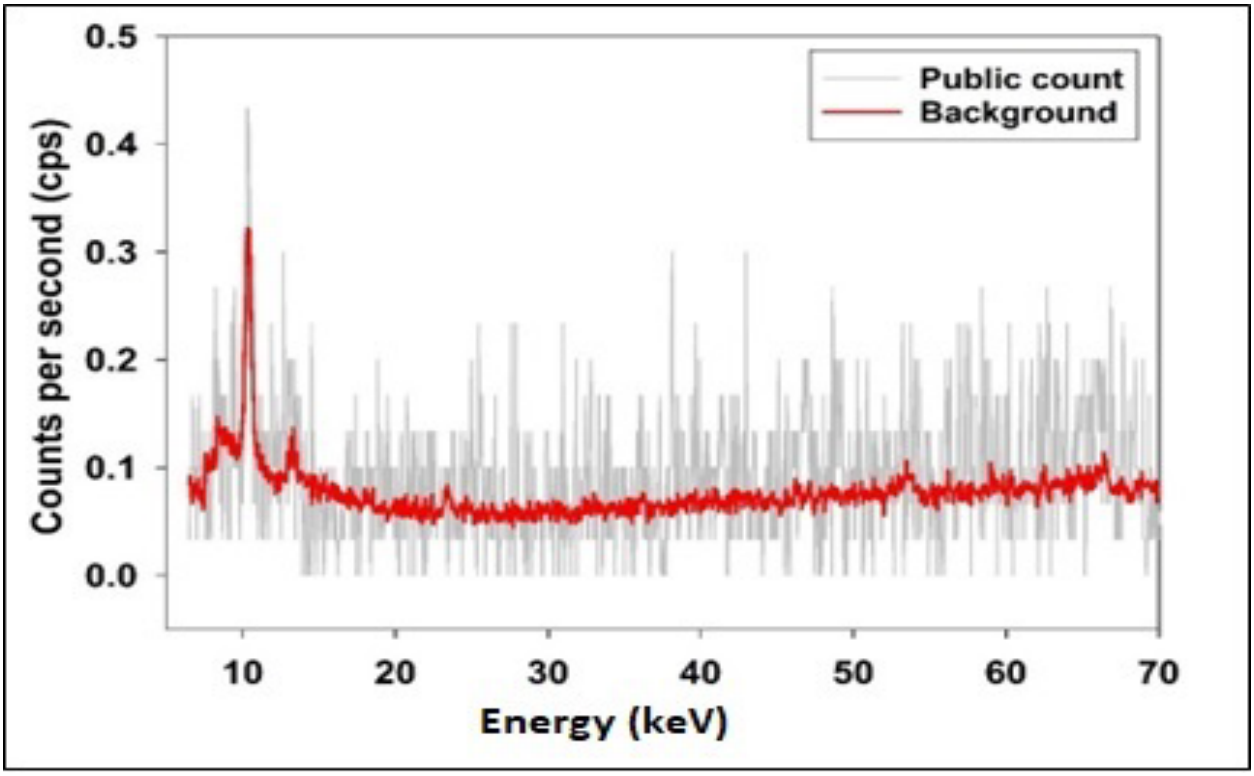


Figure 9.8. Typical 17 keV (Pu isotopes) and ^{241}Am (59.5 keV) energy region of Low Lung Group gamma spectrum of a public volunteer

For most radiobioassay results, a two-step process is used to decide whether the analyte is present. In the first step, a statistical decision level (L_C) is used to determine if the counts in an energy region of a sample spectrum are significantly greater than in the same region in a background spectrum. This process is discussed in the 1998 CEMRC Report. The second step of the process involves a review of the spectrum by a technical expert to confirm the first step's conclusion. For example, the application of a decision level (L_C) to a low lung count spectrum may lead to the conclusion that no ^{241}Am is present. In contrast, a ^{241}Am photopeak may be visible to the technical person. In such cases, the technical expert may decide to overrule the initial decision and declare that ^{241}Am is present. At CEMRC, the *in-vivo* bioassay program attempts to perform measurements with 95% confidence level and therefore there will be a risk of 5% false positive rate, meaning, statistically, 5% of all measurements will be determined as positive even when there is no actual activity in the person. These results, particularly the absence of detectable plutonium and americium levels, suggest that there has been no impact from WIPP's operations.

Conclusions

CEMRC's ID laboratory staff have been satisfactorily conducting the LDBC program since its inception in 1997. Comparisons of radiological activities measured between the pre-operational and operational groups revealed no significant differences, thereby indicating that waste disposal activities at WIPP currently showed no measurable radiological impact on

local residents' health. Furthermore, the absence of detectable levels of plutonium and americium suggests that there has been no impact from WIPP operations.

Resident participation from communities other than Carlsbad, NM, has not been significant, partly because of the time and distance involved in travel to the CEMRC facility. Resident participation from Carlsbad has also been declining steadily since 2006. The main reasons for this decline have been the small local population size and the overwhelming public trust and support for the WIPP project. Local acceptance of WIPP is due partly to its robust safety record and comprehensive environmental monitoring program. Generally, there is not a great degree of concern among the local and surrounding communities about their health and safety because of WIPP's operation.

Even though there has not been a substantial increase in the number of citizens who take advantage of the LDBC program, the mere availability of such a program and the public participation in CEMRC's whole-body counting program provides transparency which is key to maintaining public trust and confidence. However, in recent years, there has been increased awareness and interest among students participating in the Early College Initiative in the area. Additionally, the ID group is also continuously striving to increase the visibility of the LDBC program by participating in community outreach events, such as job fairs, science nights for youths and young adults, and by interacting directly with local citizens.

CHAPTER 10 - NON-RADIOLOGICAL MONITORING

Non-radiological monitoring is a vital part of the WIPP-EM program because the operations at the WIPP site involve both radioactive and hazardous (non-radioactive) materials. The focus of the Environmental Chemistry (EC) group is to monitor the non-radiological hazard potential to the environment in and around the WIPP site by analyzing various sample types including airborne effluent, ambient air particulates, drinking water, and surface water. The current scope of work requires non-radiological studies for a variety of metals, inorganic anion constituents, and inorganic cation constituents, as well as characterizing some common indicator parameters of local water sources. Current methods utilized by the EC group for inorganic analyses performed on each sample type are provided in APPENDIX I, Table I.1. In 2024, CEMRC's non-radiological monitoring program included effluent monitoring at the FAS Stations A and B, airborne particulate monitoring surrounding the WIPP site, and annual sampling of local drinking water and surface water sources.

CEMRC has been sampling and analyzing WIPP exhaust air for inorganic constituents since December 1998. Before the 2014 release, only Station A was used for exhaust air compliance monitoring purposes. After the 2014 release, all inorganic analyses of WIPP exhaust air were halted because the filters collected were analyzed for radiological constituents to support the evaluation of the event. The CEMRC EC group resumed inorganic analyses of exhaust air in 2015 for both Station A and Station B filters.

CEMRC has also been sampling and analyzing airborne particulates from areas surrounding the WIPP site since 1999. However, in 2005, the sampling process changed, and all inorganic analyses were suspended. CEMRC resumed analysis and reporting results for airborne particulates in 2020.

In addition to air and particulate monitoring, CEMRC has also been sampling and analyzing inorganic constituents in drinking water from six community supplies and three regional surface water reservoirs since 1997. Three supplemental surface water locations were added to the list in 2021. In this chapter, inorganic results for the current drinking water and surface water sources are provided for the current year.

Non-Radiological Monitoring of Airborne Effluent

Sample Collection

Particulates in the exhaust air are collected on 47 mm diameter membrane filters (Versapor™ membrane filter, PALL Corporation, Port Washington, NY, USA) with the use of a cylindrical shrouded probe, commonly referred to as a Fixed Air Sampler (FAS). Typically, two sets of filters are collected from both Station A and Station B: a primary set and a secondary (backup) set. Before the 2014 accidental release event, the primary set of filters was used for the analysis of both radiological and non-radiological constituents, while the backup set of filters was archived. After the 2014 event, the primary set of filters was used for radiochemical analyses, while the backup set was used for inorganic analyses. Occasionally, both the

primary and backup filter sets are needed for immediate radiochemical analyses. In such instances, inorganic analyses are not performed on this sample type.

Sample Preparation and Analysis

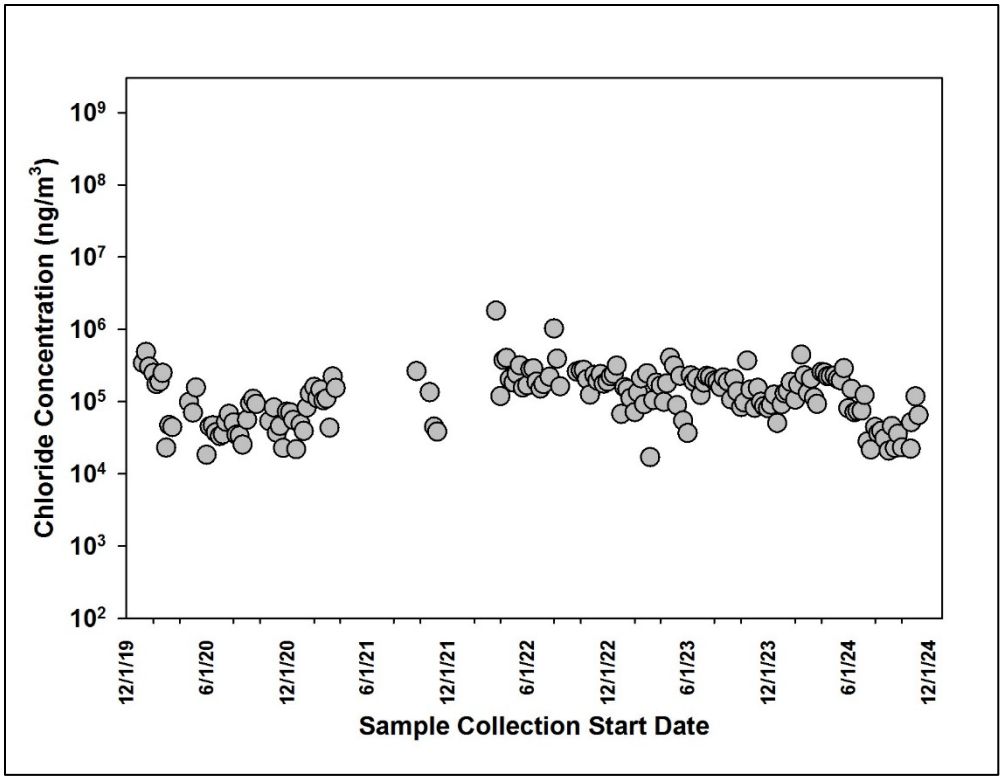
In 2020, additional analyses were requested on the FAS filters. To meet the new requirements, each FAS filter is cut in half, with one half digested for metal analysis and the other used for selected anion and cation analysis. Current methods utilized by CEMRC for inorganic analyses are summarized in APPENDIX I, Table I.1.

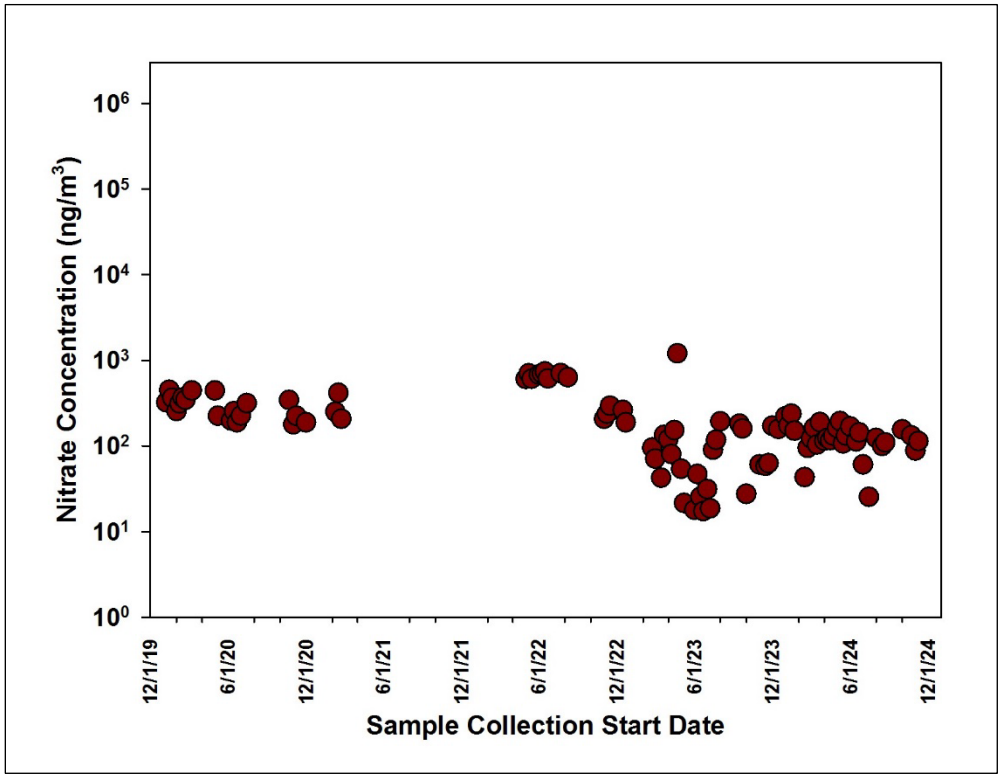
The backup filters for non-radiological metal analyses are digested in a strong acid mixture with the use of a CEM MARS Xpress™ or CEM MARS 6™ microwave unit (Charlotte, NC, USA). Individual FAS filters are placed in separate Teflon vessels and digested at 195 ˚C within an acid matrix consisting of nitric acid, hydrochloric acid, and hydrofluoric acids. A blank filter and Certified Reference Material (CRM) filter are also digested simultaneously with these FAS filters using the same method for quality control (QC) purposes. Acids used for digestions are either purchased as “trace metal” grade as noted by the manufacturer or purified in-house with a Milestone Inc. (Shelton, CT, USA) sub-boiling quartz distillation apparatus. After digestion, individual FAS filter solutions are combined into a weekly (Station A) or monthly composite (Station B), and the composite is analyzed, together with the corresponding blank and CRM filters, for selected metals using a Perkin Elmer Inductively Coupled Plasma-Mass Spectrometer (ICP-MS). Metal concentrations of FAS filters from Station A and Station B are reported as the mass of metal divided by the volume of air (ng/m^3).

For anion and cation analyses, a water extraction using 40 mL ultrapure water is performed and the extraction solutions are combined into a weekly (Station A) or monthly composite (Station B). The composite solution is filtered prior to analysis by Ion Chromatography (IC) for selected inorganic anions and cations. Blanks and spiked blanks are also extracted in the same manner for quality control purposes. Anion and cation concentrations of FAS filters from Station A and Station B are reported as the mass of metal divided by the volume of air (ng/m^3).

Anion and Cation Concentrations Measured at Station A and Station B

Inorganic anion and cation analysis for Station A and Station B filters began in 2020. Selected anions include chloride, nitrate, phosphate, and sulfate and selected cations include sodium, ammonium, calcium, potassium, and magnesium. Concentration measurements for anions and cations are reported in APPENDIX I for Station A (Table I.2 and Table I.3) and Station B (Table I.4 and Table I.5), respectively. For Station A, chloride, nitrate, and sulfate (shown in Figure 10.1) are the only anions detected regularly above the MDC. The cations calcium, potassium, magnesium, and sodium are all regularly detected above the MDC in Station A filters as shown in Figure 10.2. For Station B, the only anion regularly detected above the MDC is chloride (Figure 10.3) and the only cations detected regularly above the MDC are sodium and calcium as shown in Figure 10.4. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no filters were received for analysis.


Chloride Concentration (ng/m3)
10^9
10^8
10^7
10^6
10^5
10^4
10^3
10^2
12/1/19
6/1/20
12/1/20
6/1/21
12/1/21
6/1/22
12/1/22
6/1/23
12/1/23
6/1/24
12/1/24
Sample Collection Start Date


Nitrate Concentration (ng/m3)
10^6
10^5
10^4
10^3
10^2
10^1
10^0
12/1/19
6/1/20
12/1/20
6/1/21
12/1/21
6/1/22
12/1/22
6/1/23
12/1/23
6/1/24
12/1/24
Sample Collection Start Date

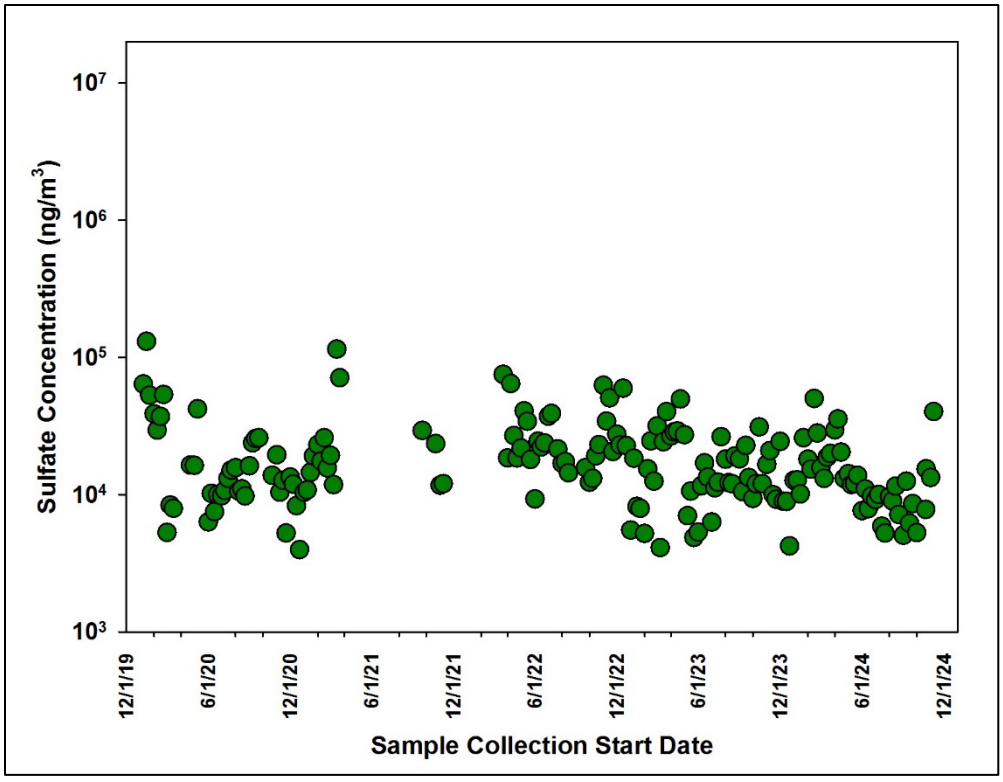
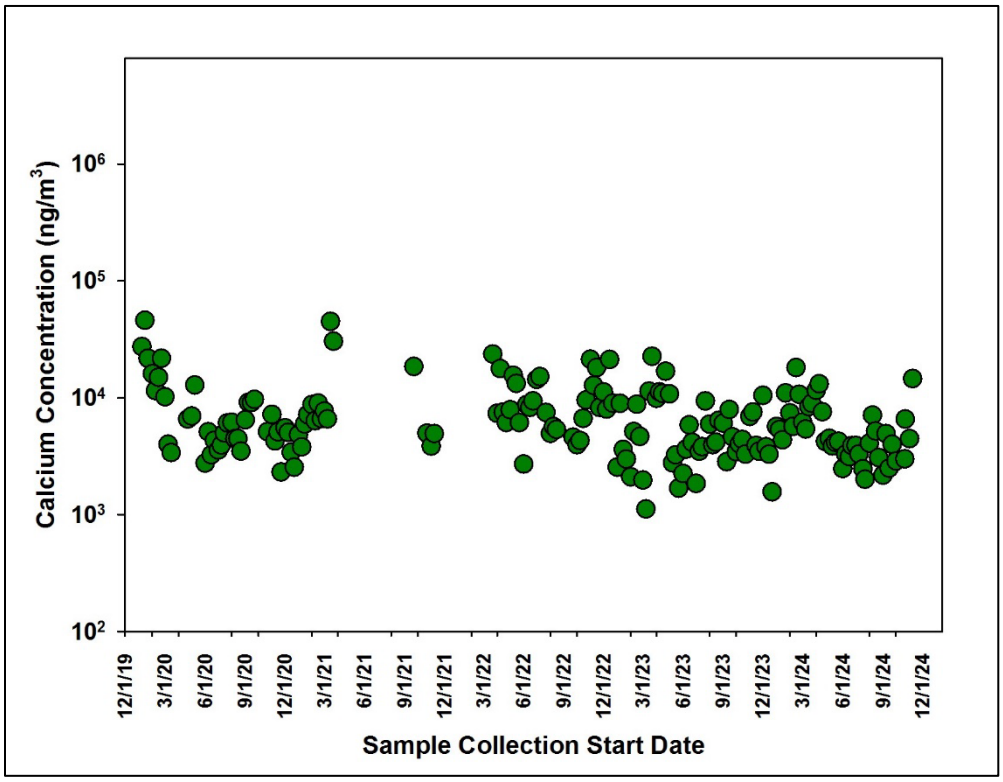
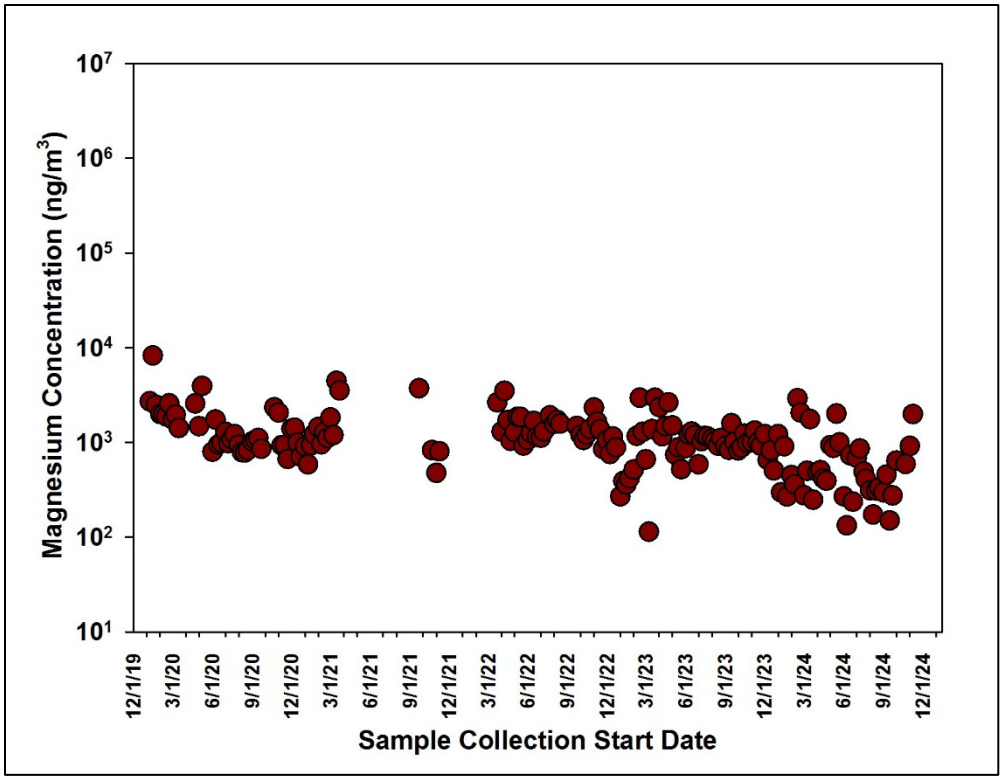
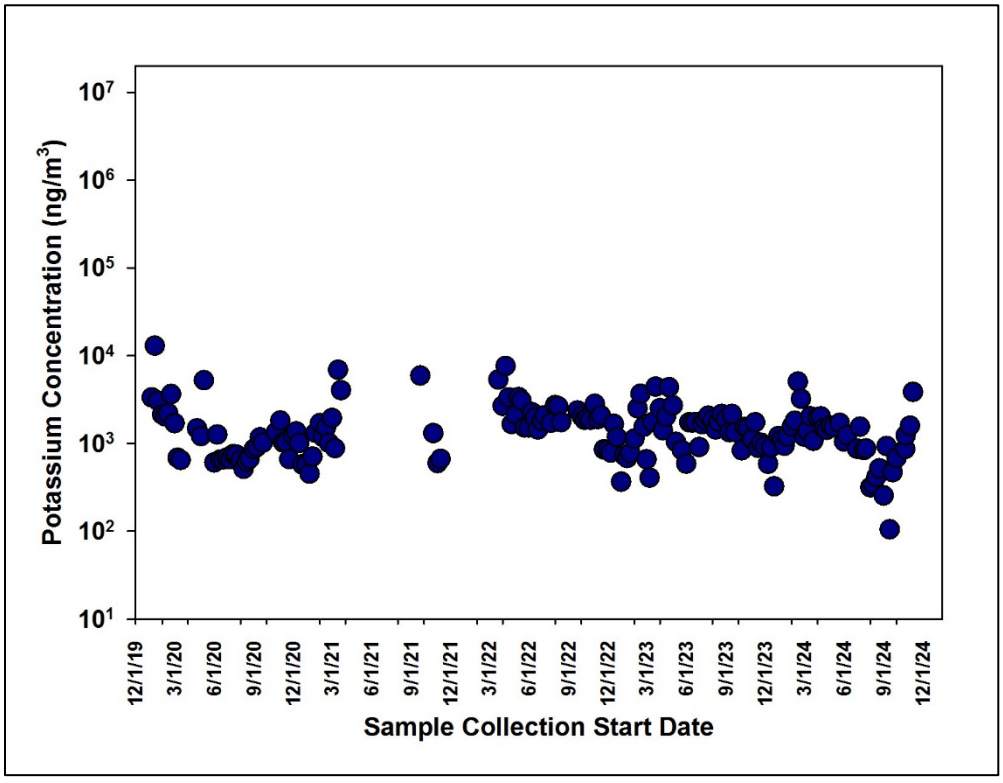


Figure 10.1. Historical Concentrations of Selected Inorganic Anions at Station A




Magnesium Concentration (ng/m3)
10^7
10^6
10^5
10^4
10^3
10^2
10^1
12/1/19
3/1/20
6/1/20
9/1/20
12/1/20
3/1/21
6/1/21
9/1/21
12/1/21
3/1/22
6/1/22
9/1/22
12/1/22
3/1/23
6/1/23
9/1/23
12/1/23
3/1/24
6/1/24
9/1/24
12/1/24
Sample Collection Start Date


Potassium Concentration (ng/m3)
10^7
10^6
10^5
10^4
10^3
10^2
10^1
12/1/19
3/1/20
6/1/20
9/1/20
12/1/20
3/1/21
6/1/21
9/1/21
12/1/21
3/1/22
6/1/22
9/1/22
12/1/22
3/1/23
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9/1/23
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12/1/24
Sample Collection Start Date

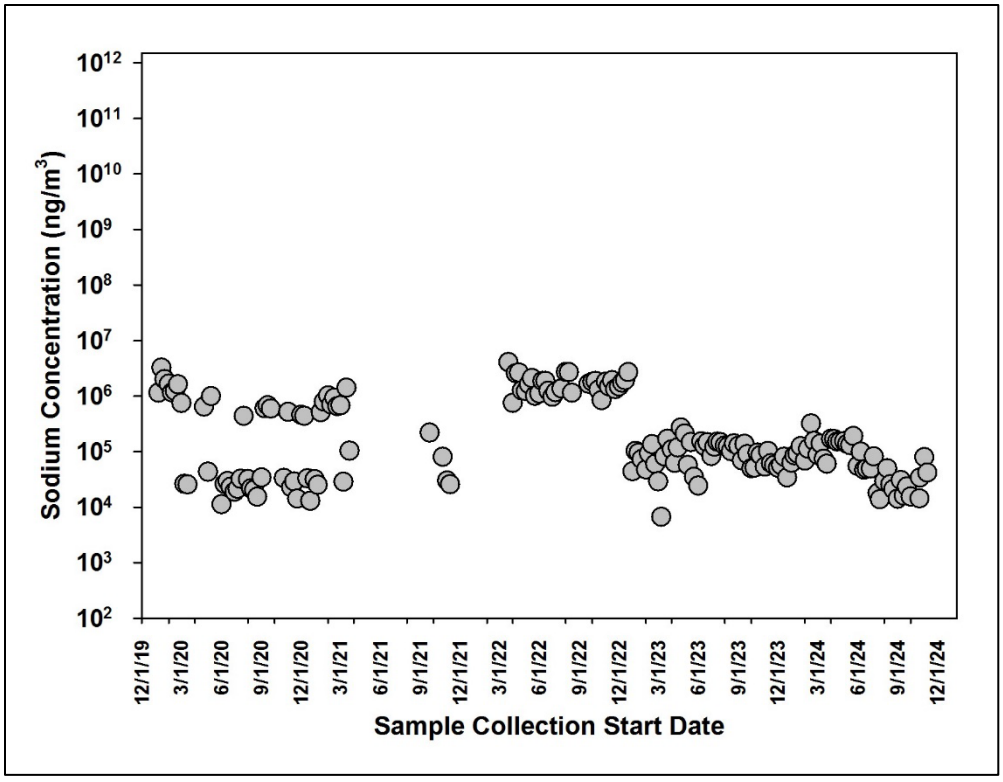


Figure 10.2. Historical Concentrations of Selected Inorganic Cations at Station A

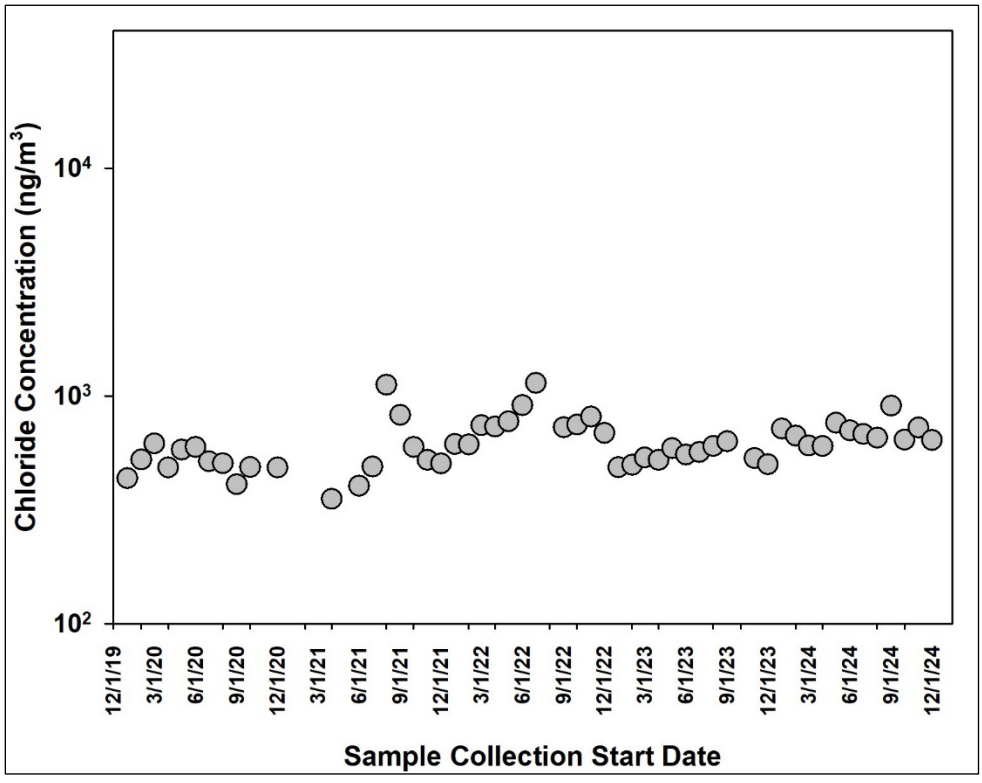
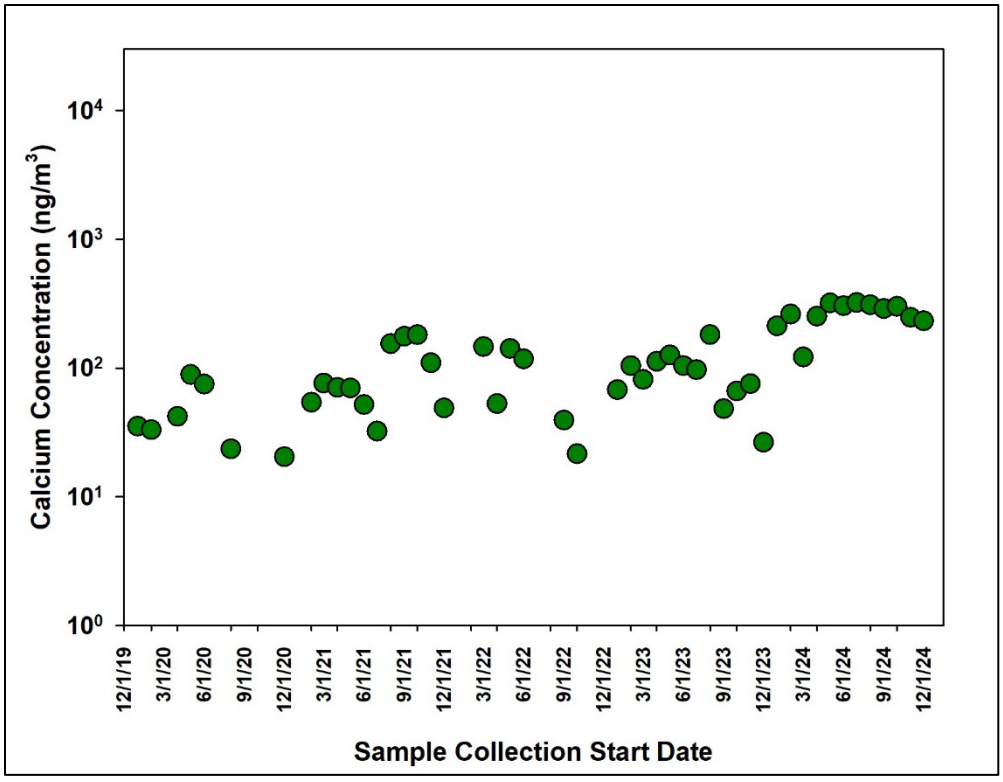


Figure 10.3. Historical Concentrations of Selected Inorganic Anions at Station B



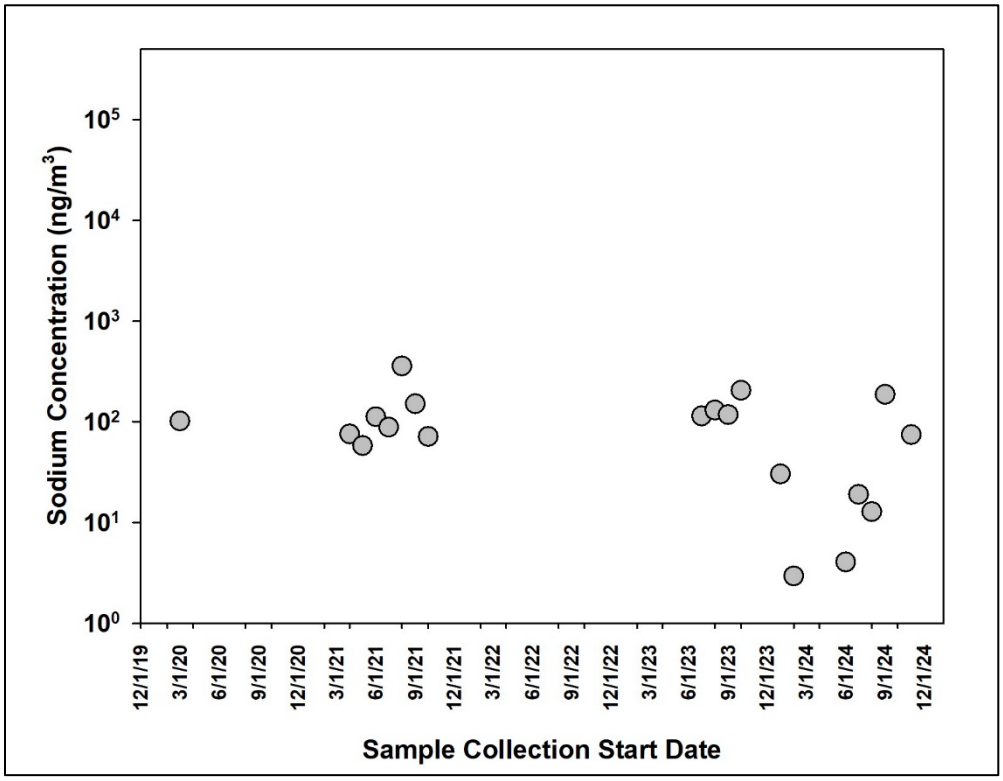


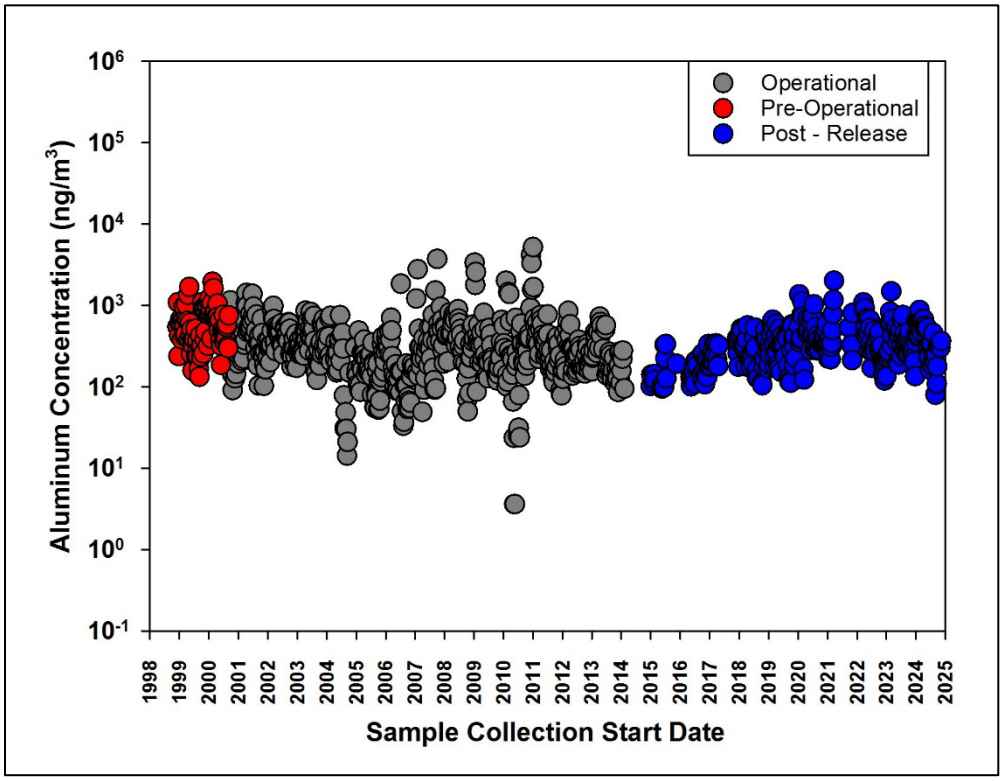
Figure 10.4. Historical Concentrations of Selected Inorganic Cations at Station B

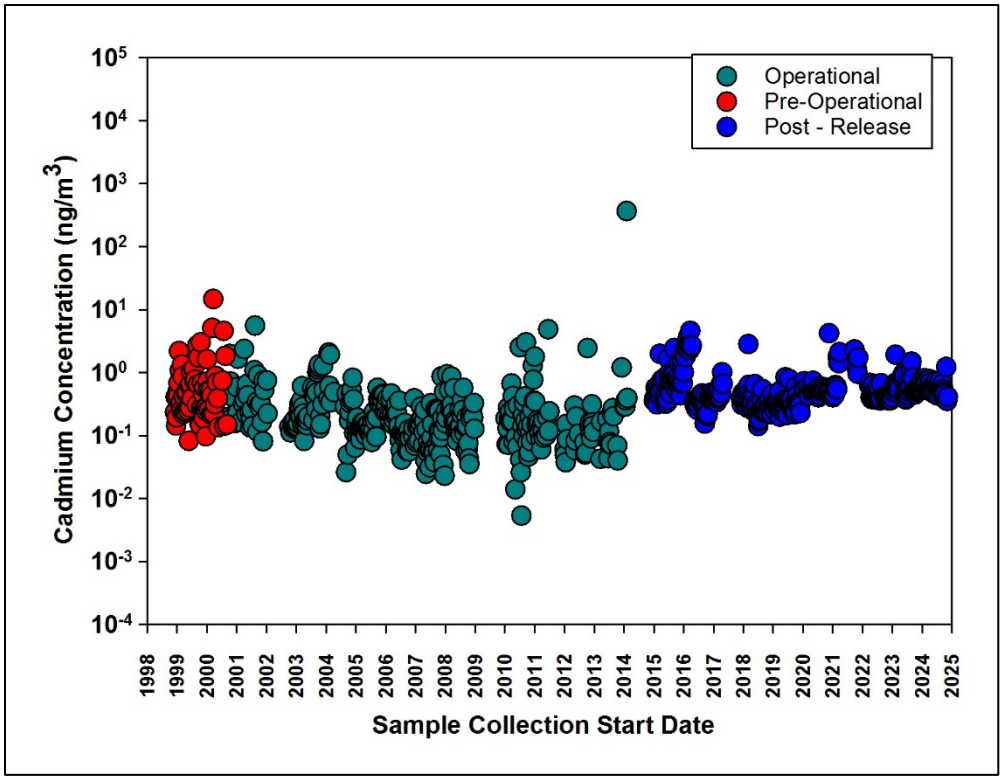
Metal Concentrations at Station A

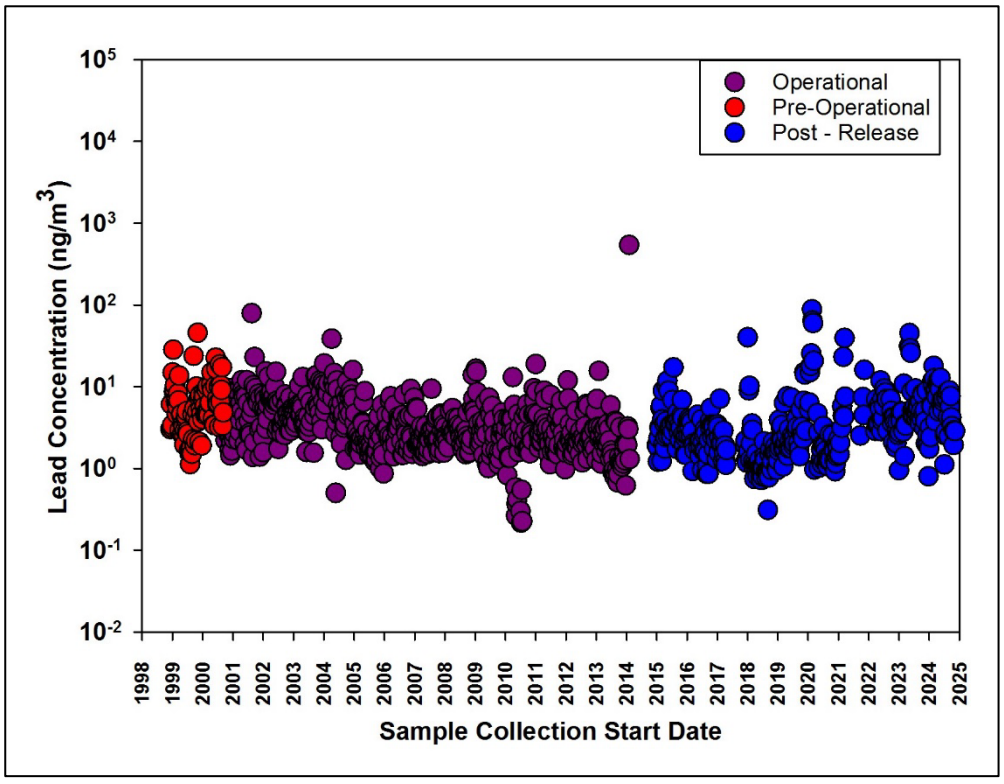
Historical time-series plots for the following selected trace metals are shown in Figure 10.5 from 1998 through December 2024 for aluminum (Al), cadmium (Cd), lead (Pb), magnesium (Mg), silicon (Si), thorium (Th), and uranium (U). Concentrations for these trace metals on Station A filters collected in 2024 are reported in APPENDIX I, Table I.6. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no filters were received for analysis. In the case of silicon, analysis began in 2001 on an experimental basis only, but was discontinued in 2005. Routine reporting for this element began in 2015. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits or no filters were received for analysis.

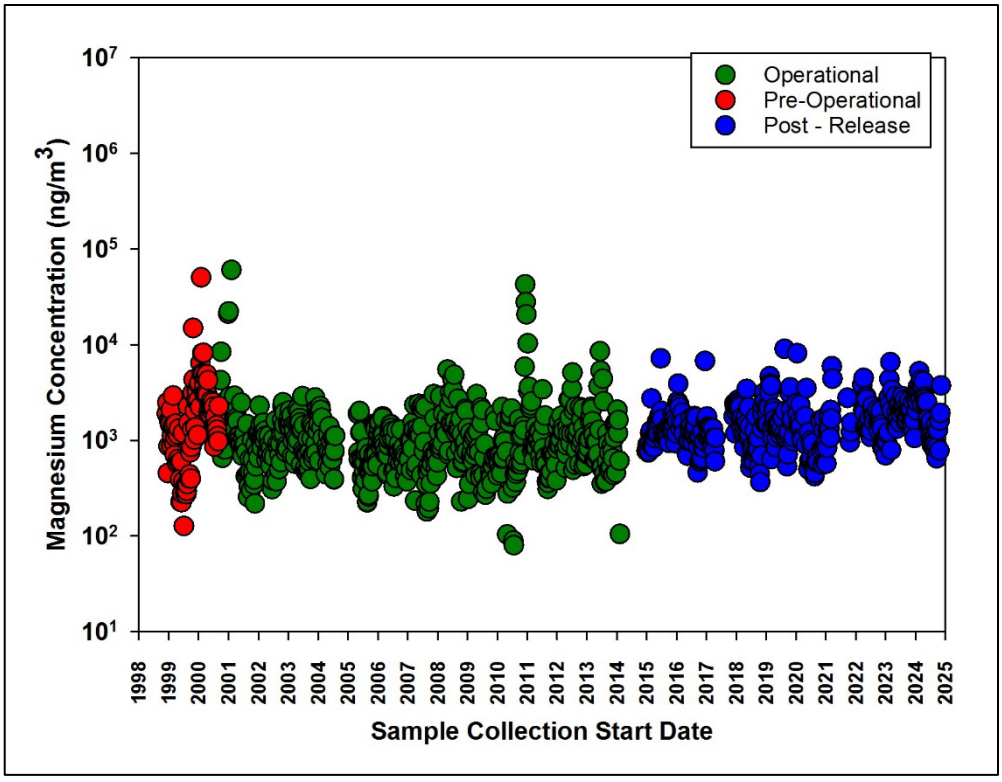
All regularly reported trace metals are detected regularly above the MDC at Station A. While variability between weekly composite results is common, long–term monitoring data show that there are no differences between the baseline, operational, and post-release data.

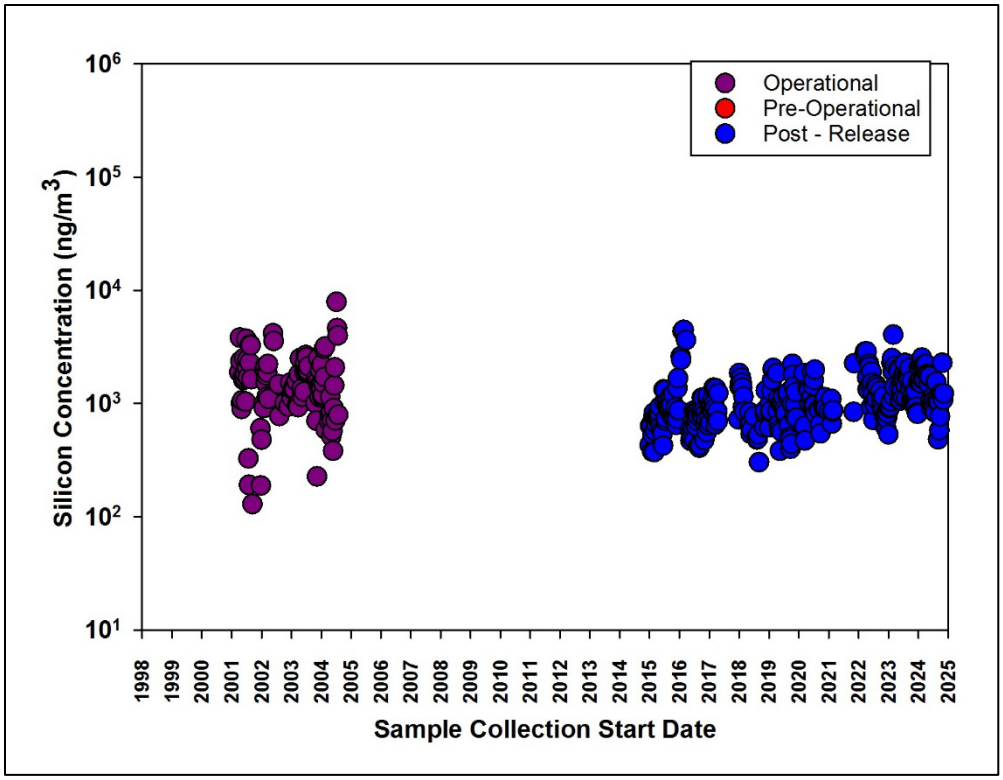
Aluminum concentrations are of particular interest because of the relationship observed between Al concentrations in ambient air and the $^{239+240}$Pu and ^{241}Am activities (Arimoto et al., 2002 and 2005). Windblown dust is the main source for Al and many other elements (e.g., Fe, Mn, Sc, and the rare earth elements) in ambient air, as well as representing a source for U and some other naturally occurring radionuclides (Arimoto et al., 2005; Kirchner et.al., 2002). Special attention was also paid to magnesium as it is the primary component in the MgO backfill material that is the only engineered barrier at WIPP.

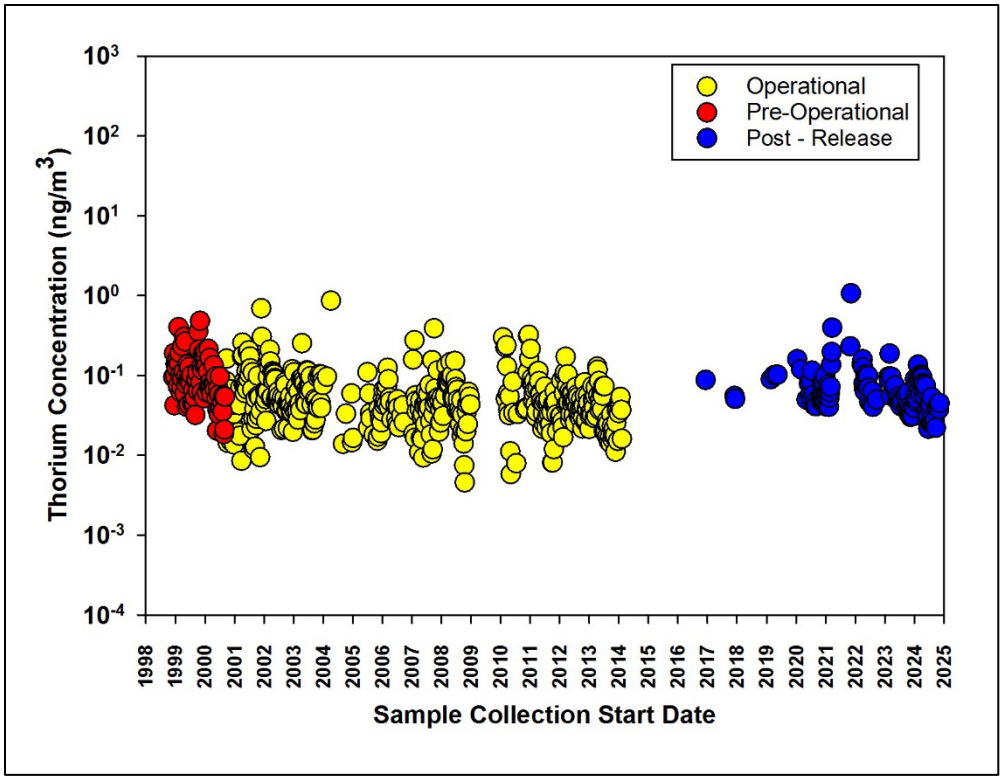



Operational
Pre-Operational
Post - Release
Cadmium Concentration (ng/m3)
Sample Collection Start Date


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


Operational
Pre-Operational
Post - Release
Magnesium Concentration (ng/m3)
10^7
10^6
10^5
10^4
10^3
10^2
10^1
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025
Sample Collection Start Date


Operational
Pre-Operational
Post - Release
Silicon Concentration (ng/m3)
10^6
10^5
10^4
10^3
10^2
10^1
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025
Sample Collection Start Date



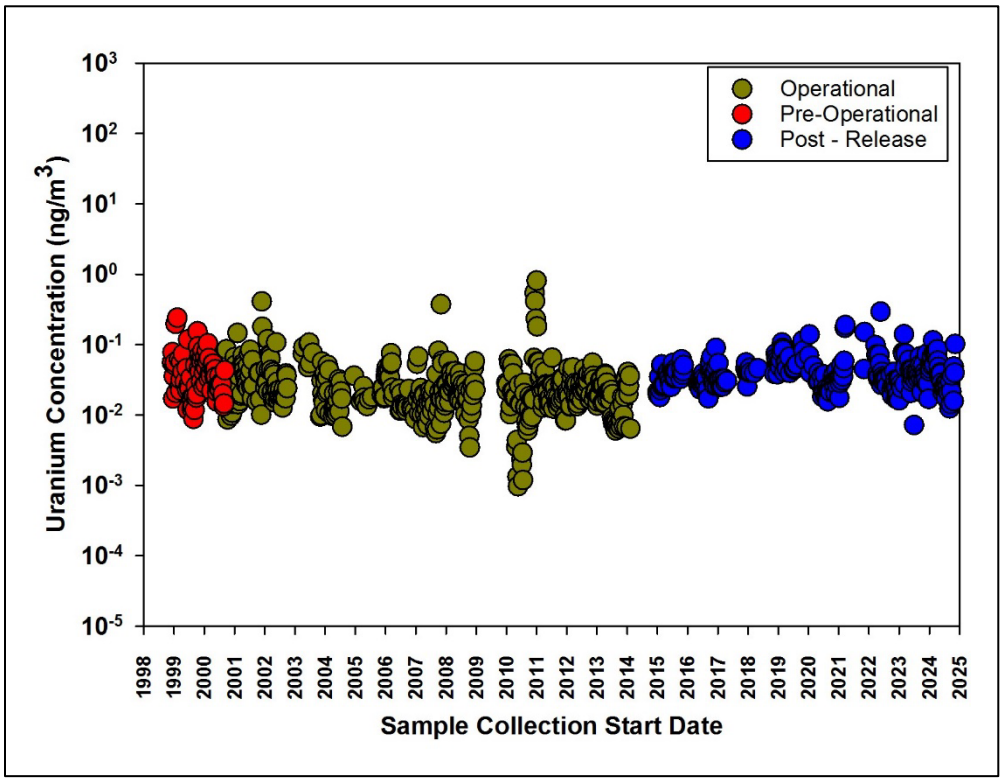
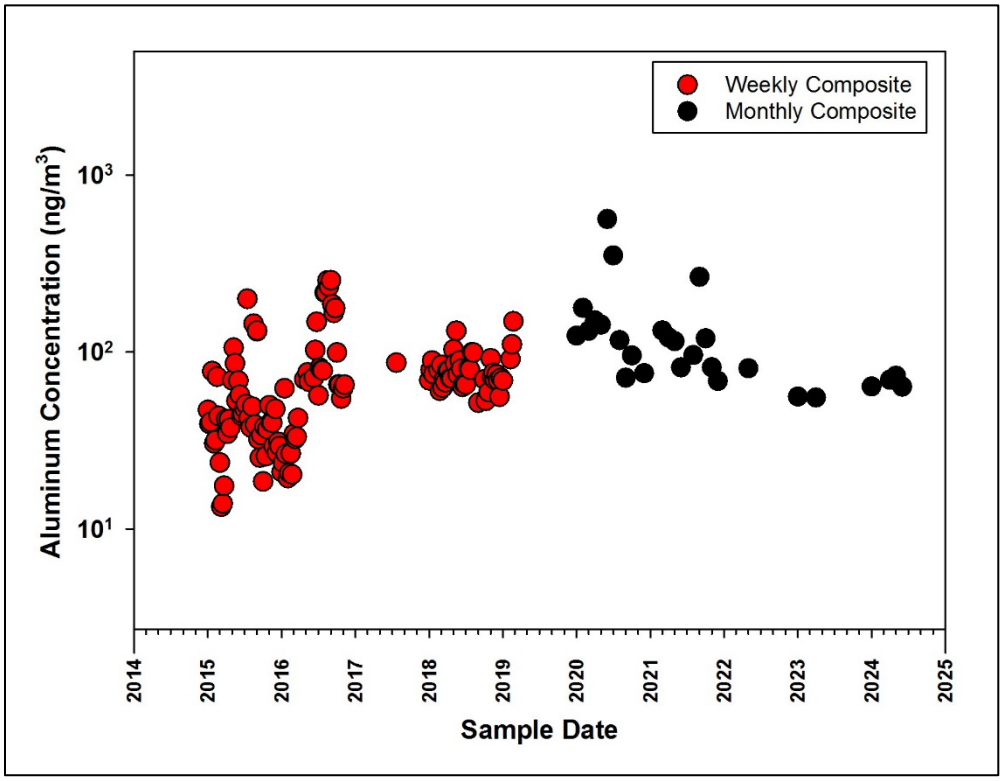
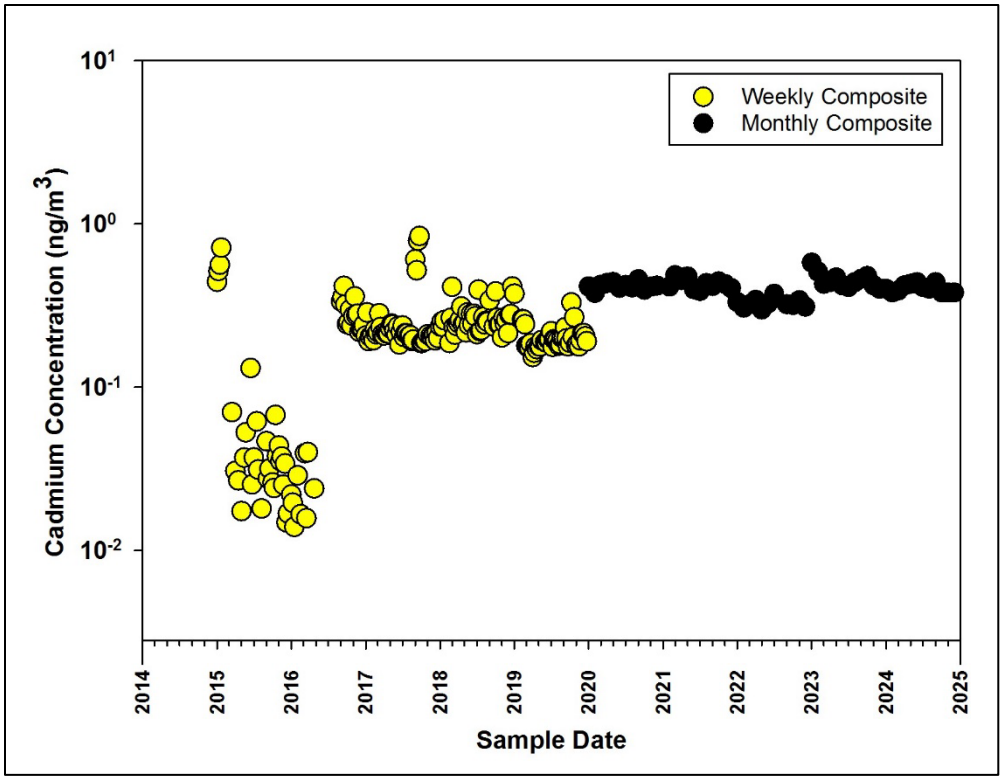


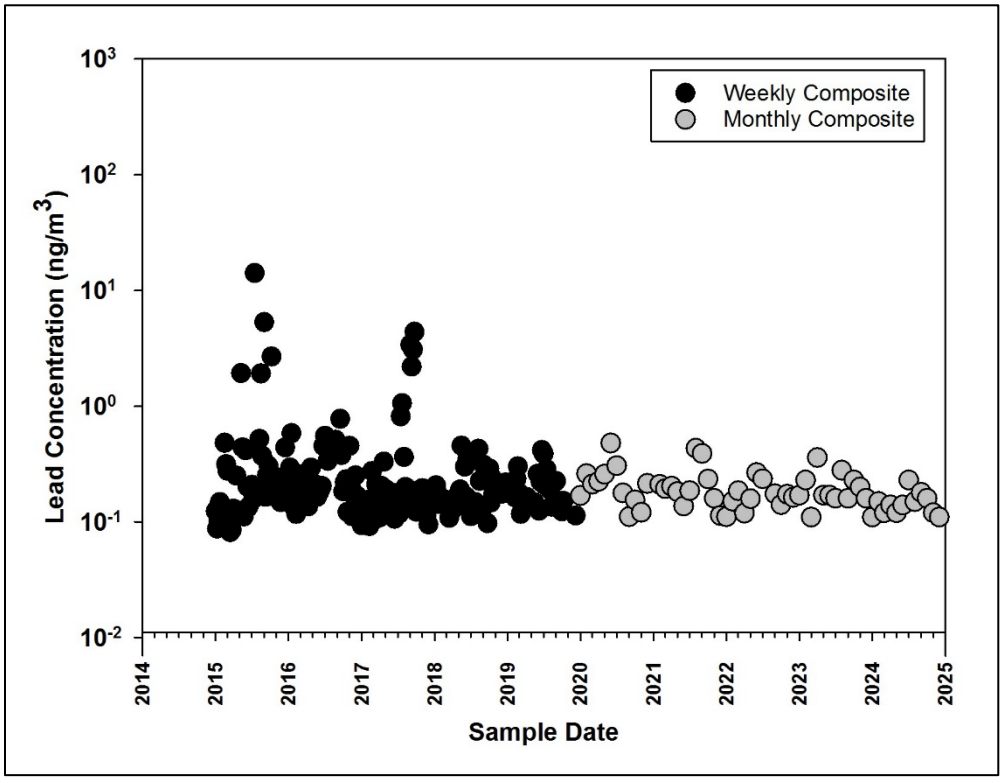
Figure 10.5. Historical Concentrations of Selected Metals at Station A

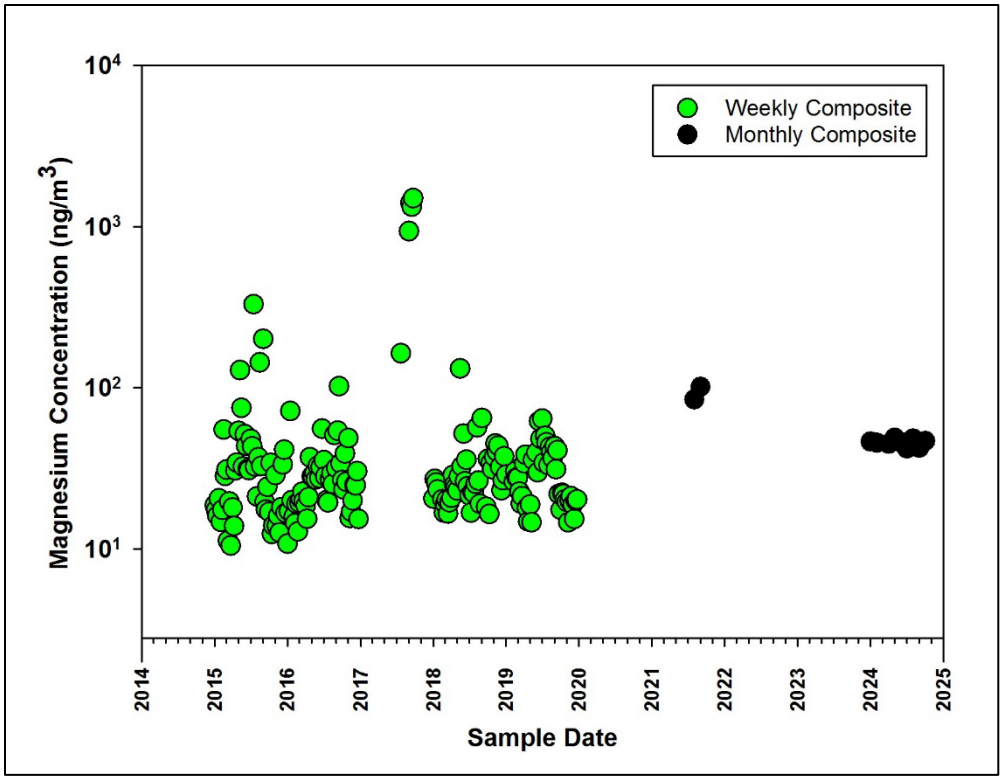
Metal Concentrations at Station B

Inorganic analyses for Station B exhaust filters began in 2015. Historical time-series plots for Station B filters are shown in Figure 10.6. Concentrations for weekly composites of aluminum (Al), magnesium (Mg), cadmium (Cd), lead (Pb), and silicon (Si) are detected regularly above the MDC at Station B since 2015. In 2020, CEMRC switched from reporting the analysis results for weekly composites of Station B samples to monthly composites. Results of selected metals for 2024 monthly composites are reported in APPENDIX I, Table I.7. It is noteworthy that the concentrations of most elements detected at Station B are much lower than at Station A, which is expected, given that station B collects effluent air after HEPA filtration. It should also be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no filters were received for analysis.




Weekly Composite
Monthly Composite
Cadmium Concentration (ng/m3)
10^1
10^0
10^-1
10^-2
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
Sample Date


Weekly Composite
Monthly Composite
Lead Concentration (ng/m3)
10^3
10^2
10^1
10^0
10^-1
10^-2
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
Sample Date



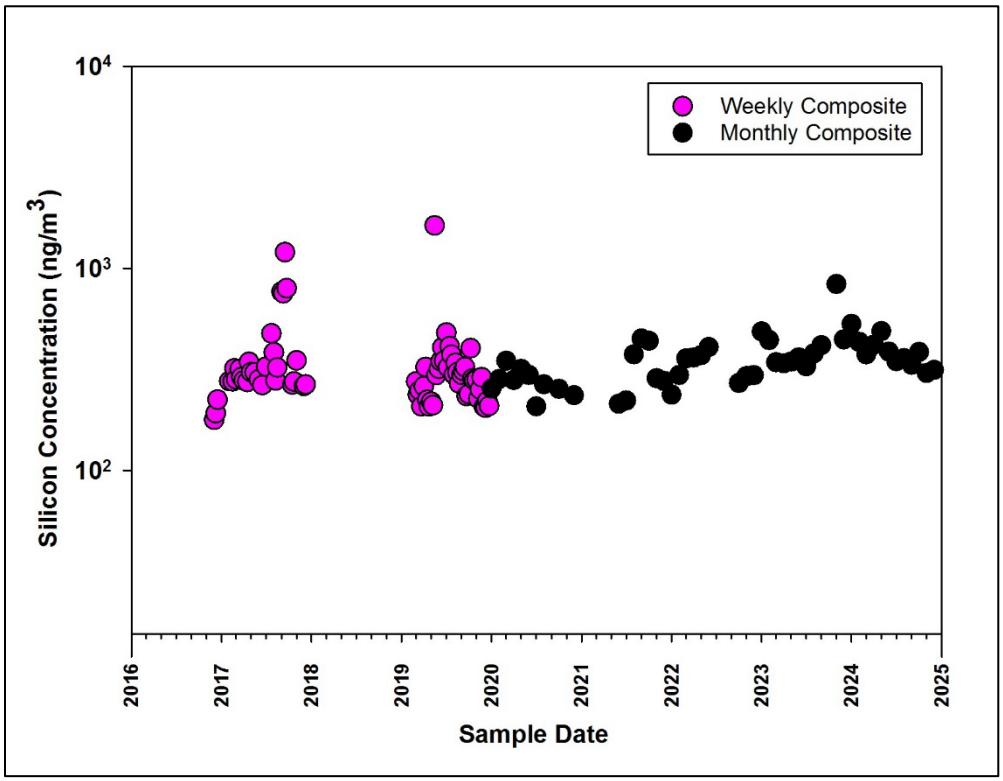


Figure 10.6. Historical Concentrations of Selected Metals at Station B

Non-Radiological Monitoring of Airborne Particulates

Sample Collection

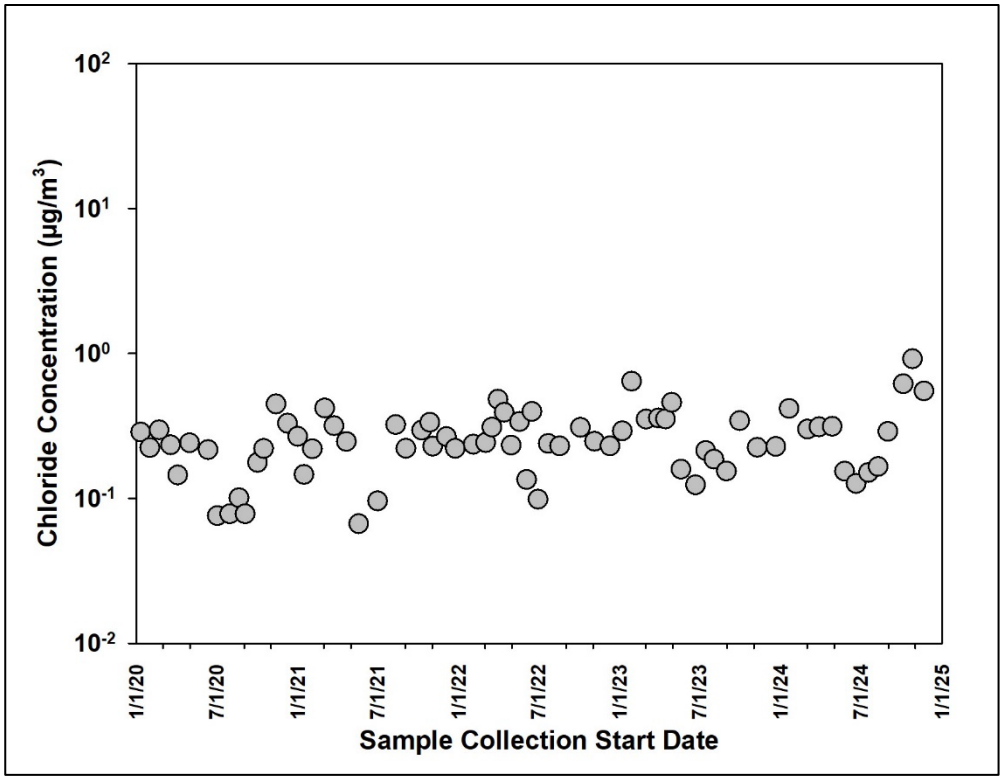
Airborne particulates in the air surrounding the WIPP site are collected on cellulose-based, Whatman 41 filters (GE Healthcare Life Sciences). The Whatman 41 filters are only used for inorganic analyses at the following two locations: Near Field and Cactus Flats.

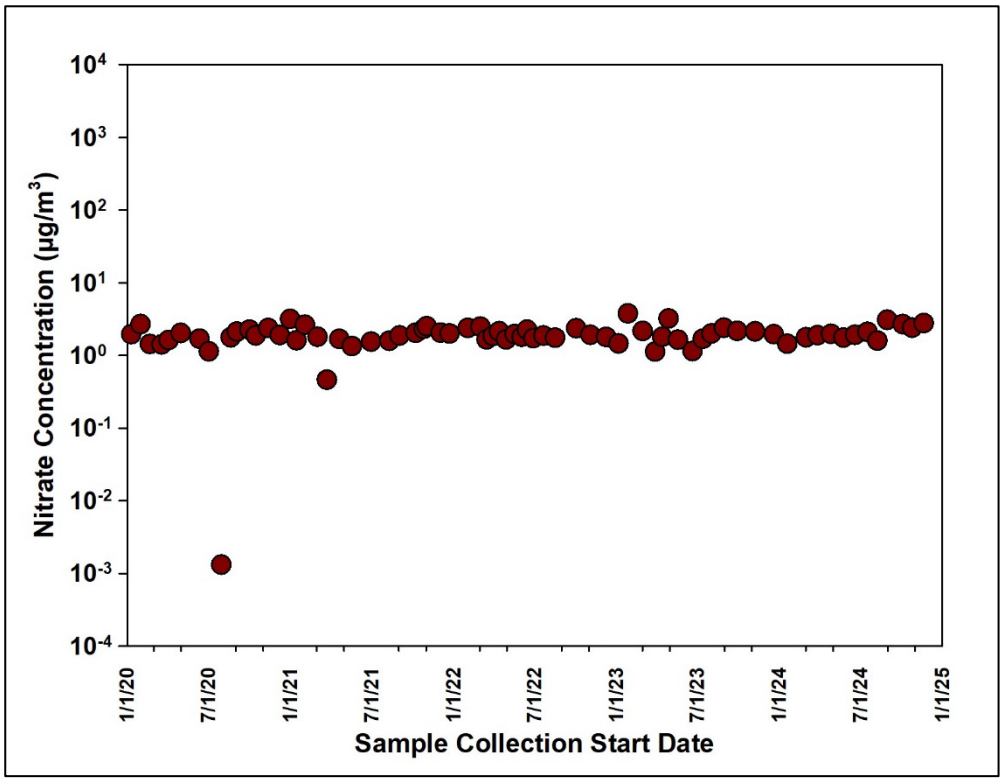
Sample Preparation and Analysis

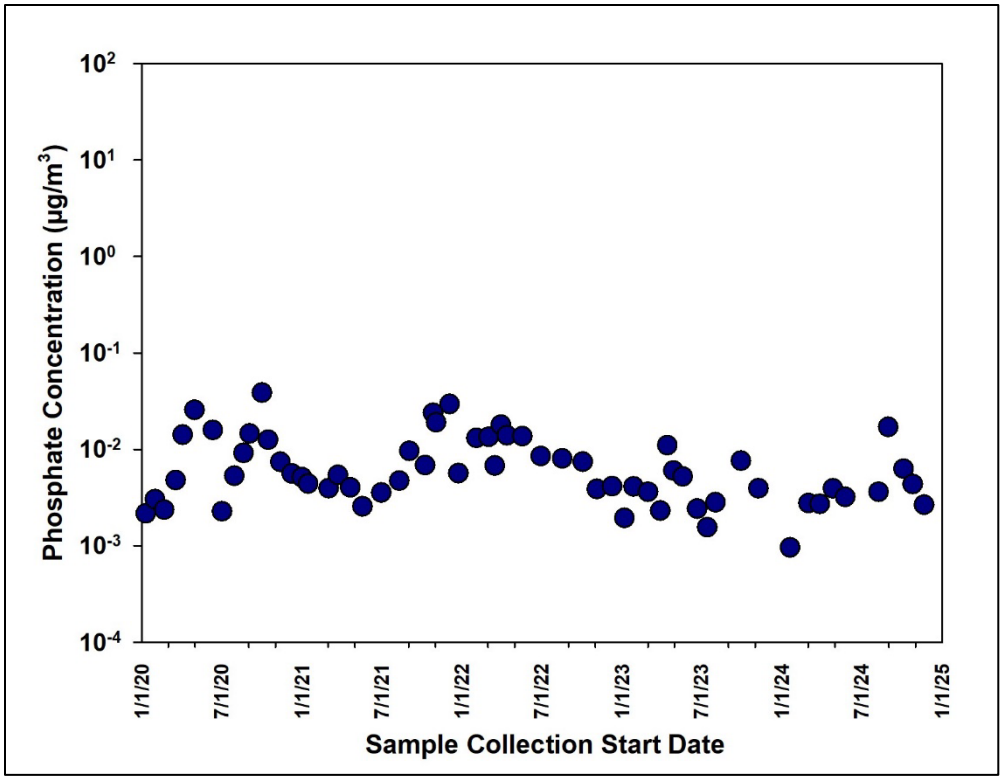
A water extraction using 40 mL ultrapure water is performed at room temperature on a ¼-sheet of each Whatman 41 filter sample. The extracted solution is filtered prior to analysis by Ion Chromatography (IC) for inorganic anions and cations. Blanks and spiked blanks are also extracted in the same manner for quality control purposes. All samples are filtered prior to analysis by Ion Chromatography (IC). Current methods utilized by CEMRC for non-radiochemical analyses performed on each sample type are summarized in APPENDIX I, Table I.1.

Anion and Cation Concentrations Measured at Near Field

Historical time-series plots for selected inorganic anions and cations are shown in Figure 10.7 and Figure 10.8, respectively, from January 2020 through December 2024 for samples collected at Near Field. Chloride, nitrate, phosphate, sulfate, calcium, potassium, magnesium, and sodium are all regularly detected above the MDC at the Near Field location. Concentrations of selected anions and cations for 2024 Near Field samples are reported in APPENDIX I, Table I.8 and I.9, respectively. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no filters were received for analysis.


Chloride Concentration (µg/m3)
10^2
10^1
10^0
10^-1
10^-2
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
7/1/24
1/1/25
Sample Collection Start Date


Nitrate Concentration (µg/m3)
10^4
10^3
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
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
7/1/24
1/1/25
Sample Collection Start Date



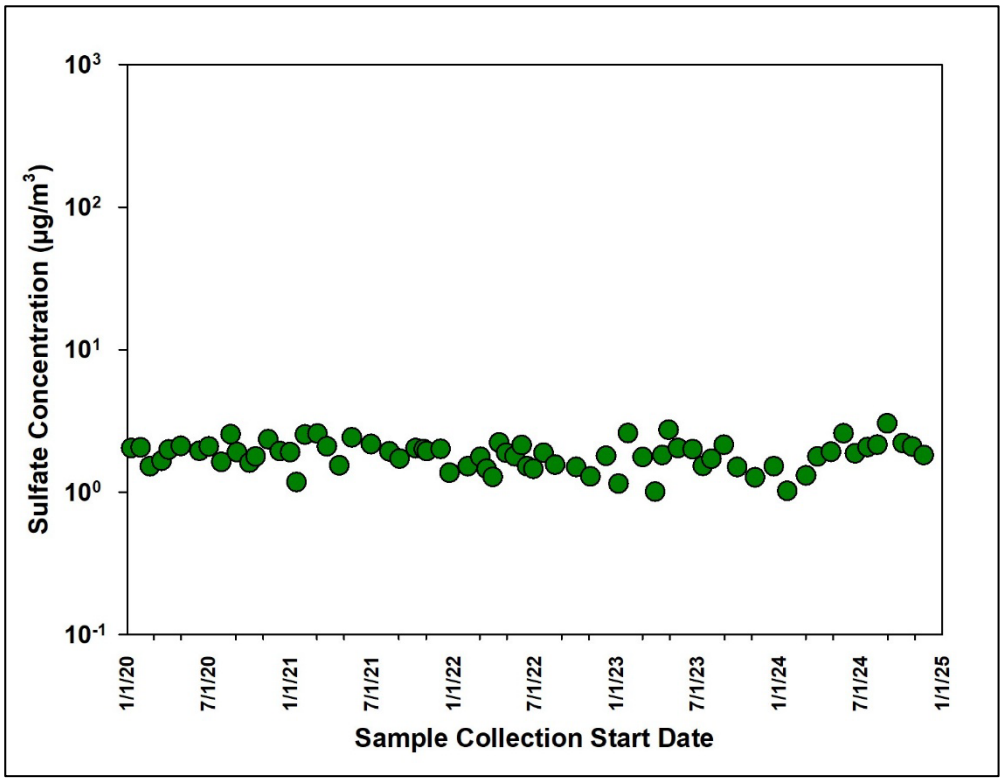
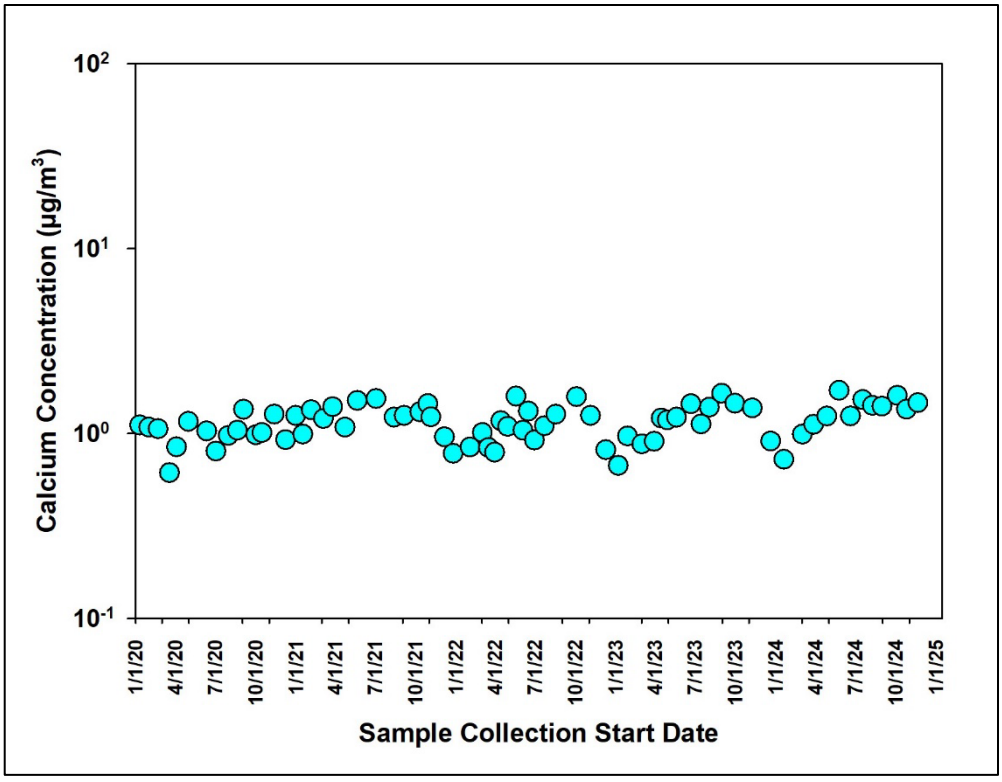
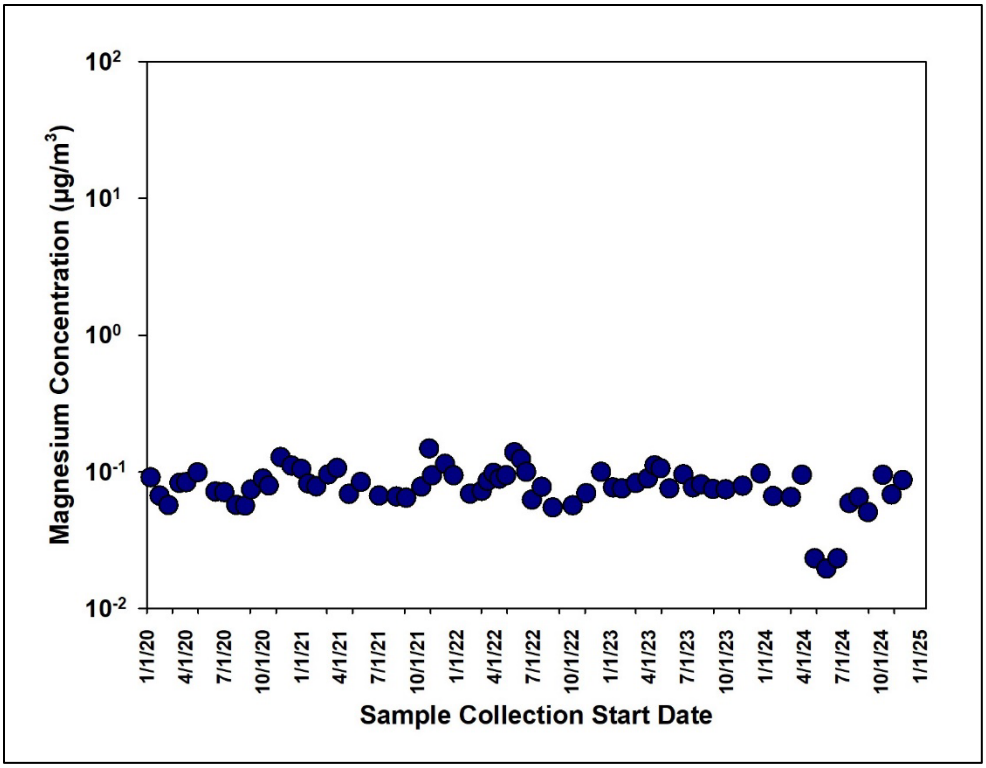
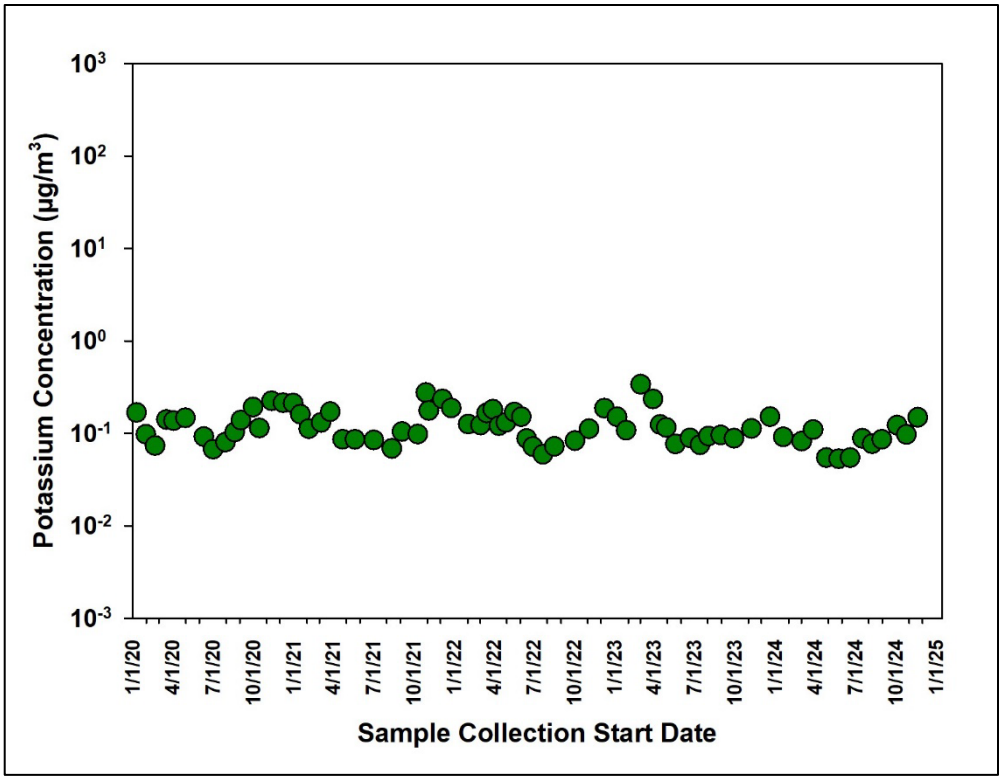
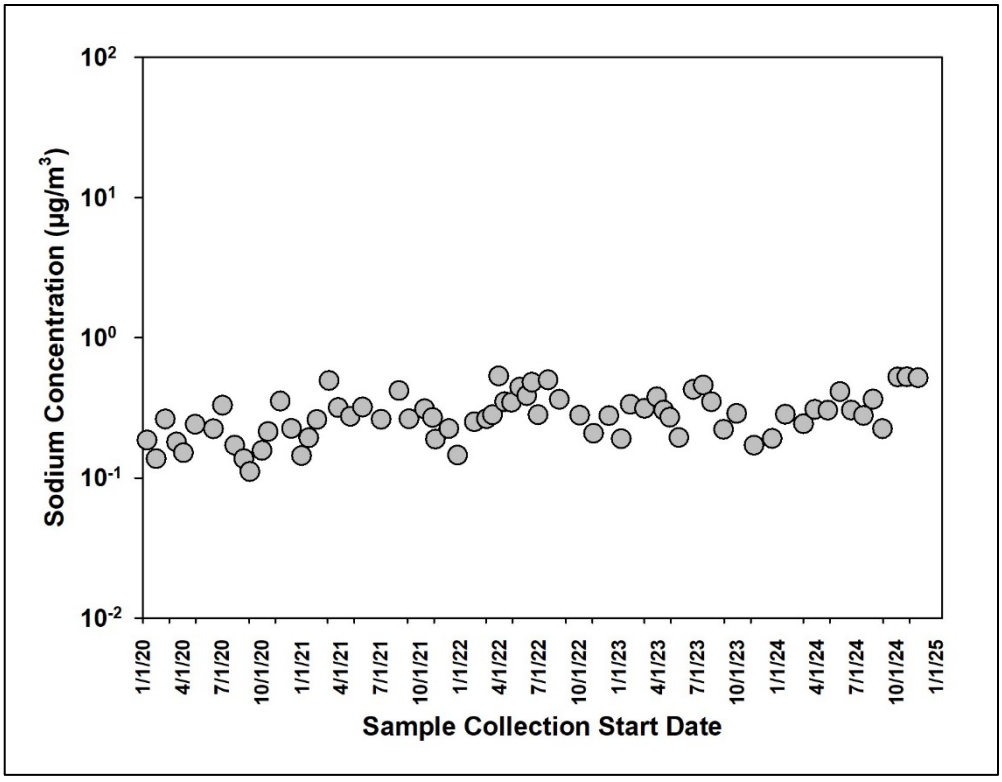


Figure 10.7. Historical Concentrations of Selected Anions at Near Field


Calcium Concentration (µg/m³)
10²
10¹
10⁰
10⁻¹
1/1/20
4/1/20
7/1/20
10/1/20
1/1/21
4/1/21
7/1/21
10/1/21
1/1/22
4/1/22
7/1/22
10/1/22
1/1/23
4/1/23
7/1/23
10/1/23
1/1/24
4/1/24
7/1/24
10/1/24
1/1/25
Sample Collection Start Date


Magnesium Concentration (µg/m³)
10²
10¹
10⁰
10⁻¹
10⁻²
1/1/20
4/1/20
7/1/20
10/1/20
1/1/21
4/1/21
7/1/21
10/1/21
1/1/22
4/1/22
7/1/22
10/1/22
1/1/23
4/1/23
7/1/23
10/1/23
1/1/24
4/1/24
7/1/24
10/1/24
1/1/25
Sample Collection Start Date


Potassium Concentration (µg/m3)
10^3
10^2
10^1
10^0
10^-1
10^-2
10^-3
1/1/20
4/1/20
7/1/20
10/1/20
1/1/21
4/1/21
7/1/21
10/1/21
1/1/22
4/1/22
7/1/22
10/1/22
1/1/23
4/1/23
7/1/23
10/1/23
1/1/24
4/1/24
7/1/24
10/1/24
1/1/25
Sample Collection Start Date


Sodium Concentration (µg/m3)
10^2
10^1
10^0
10^-1
10^-2
1/1/20
4/1/20
7/1/20
10/1/20
1/1/21
4/1/21
7/1/21
10/1/21
1/1/22
4/1/22
7/1/22
10/1/22
1/1/23
4/1/23
7/1/23
10/1/23
1/1/24
4/1/24
7/1/24
10/1/24
1/1/25
Sample Collection Start Date

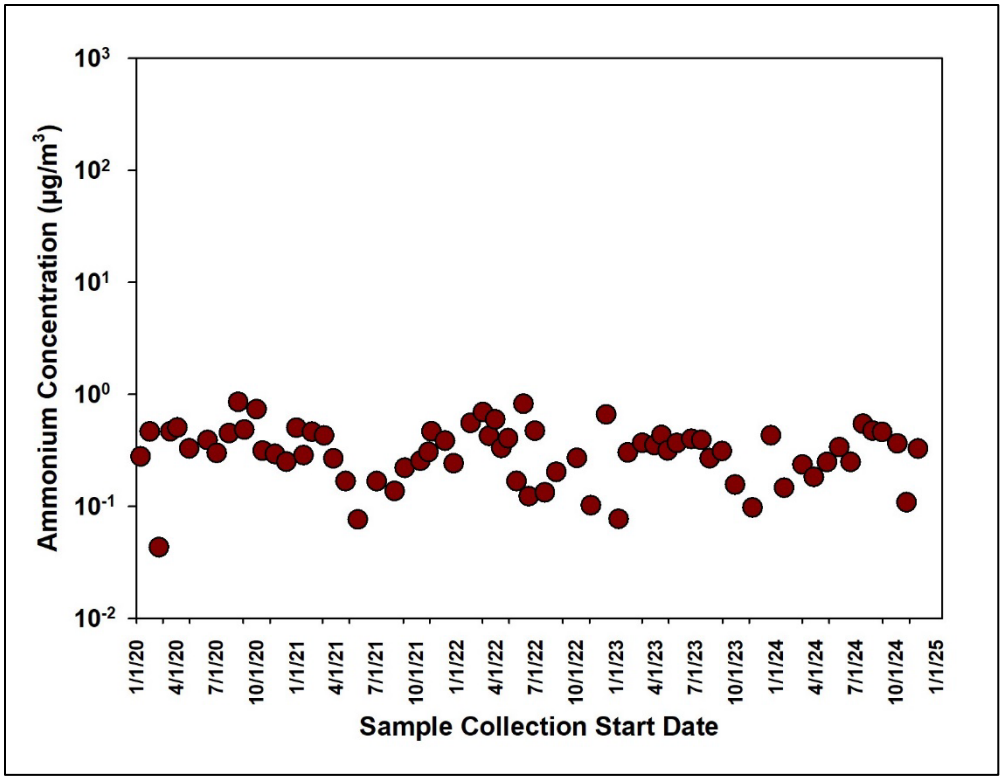
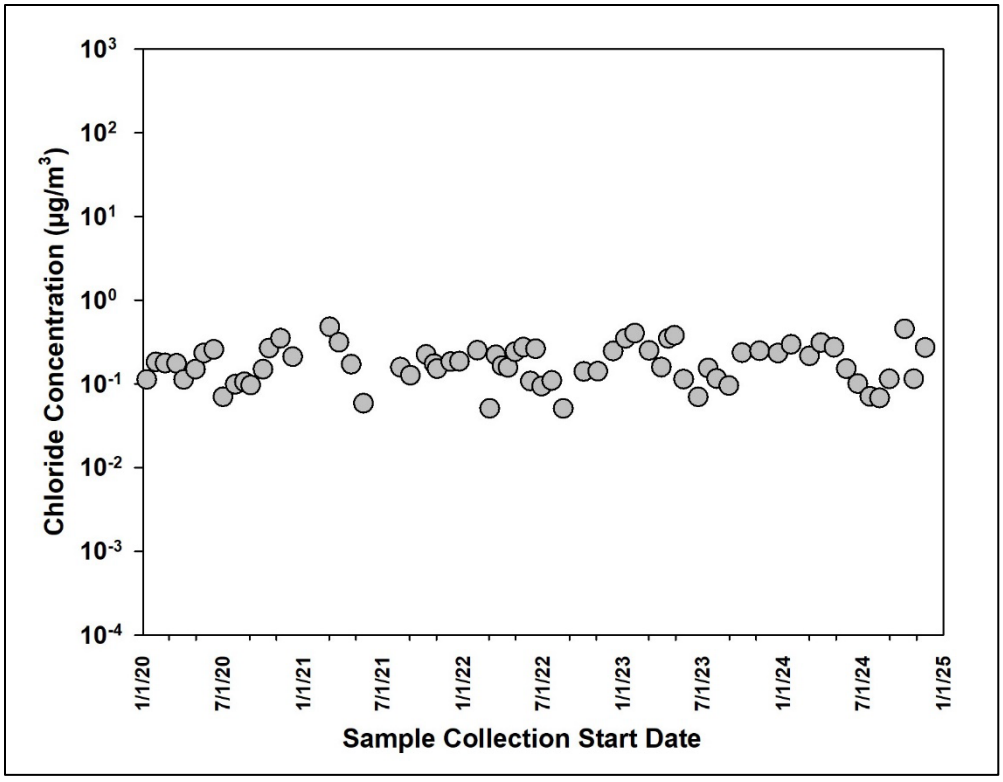
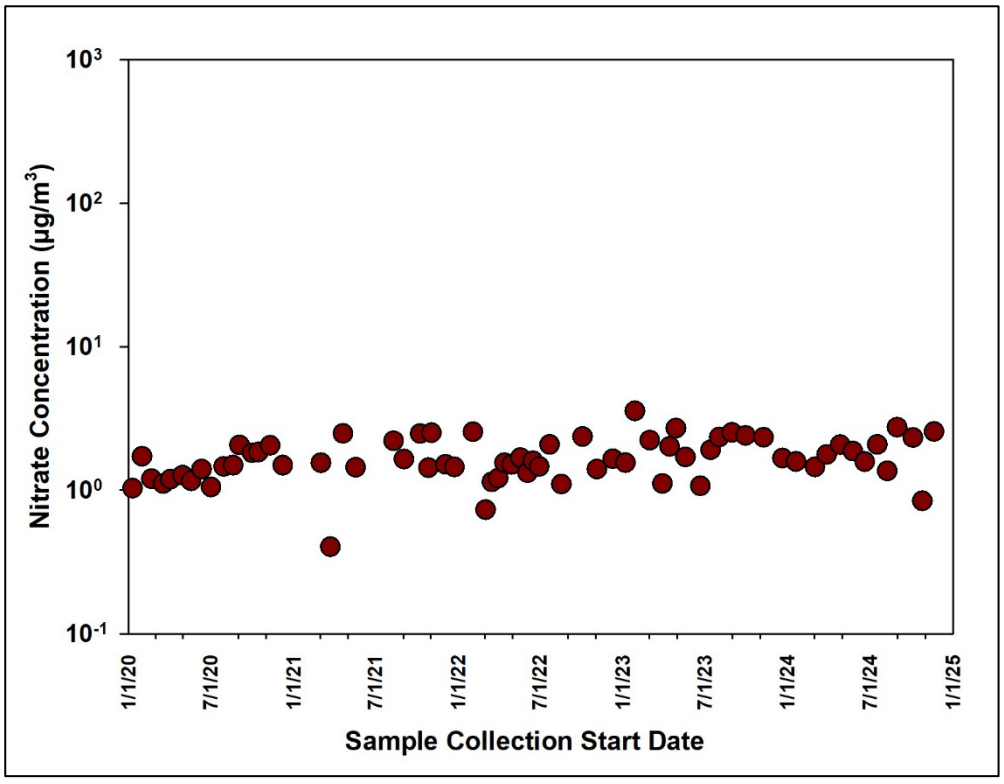


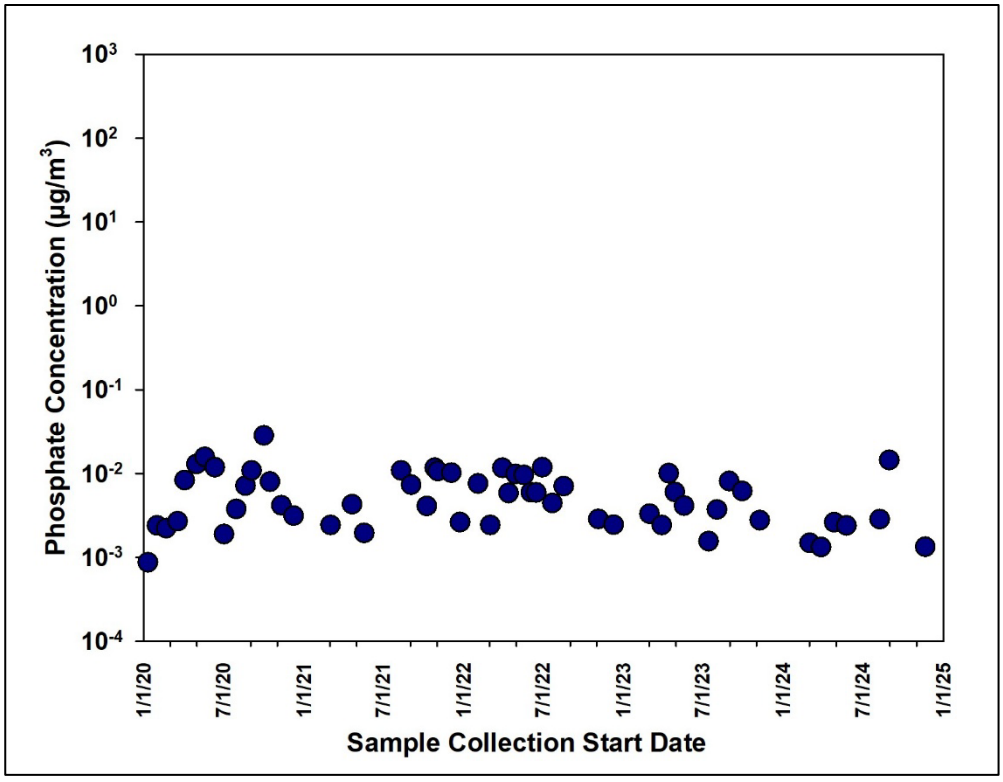
Figure 10.8. Historical Concentrations of Selected Cations at Near Field

Anion and Cation Concentrations Measured at Cactus Flats

Historical time-series plots for selected inorganic anions and cations are shown in Figure 10.9 and Figure 10.10, respectively, from January 2020 through December 2024 for samples collected at Cactus Flats. Chloride, nitrate, phosphate, sulfate, calcium, potassium, magnesium, and sodium are all regularly detected above the MDC at the Cactus Flats location at concentrations similar to those measured at the Near Field site. Detailed concentrations of selected anions and cations for 2024 Cactus Flats samples are reported in APPENDIX I, Table I.10 and I.11. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no filters were received for analysis.


Chloride Concentration (µg/m3)
10^3
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
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
7/1/24
1/1/25
Sample Collection Start Date


Nitrate Concentration (µg/m3)
10^3
10^2
10^1
10^0
10^-1
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
7/1/24
1/1/25
Sample Collection Start Date



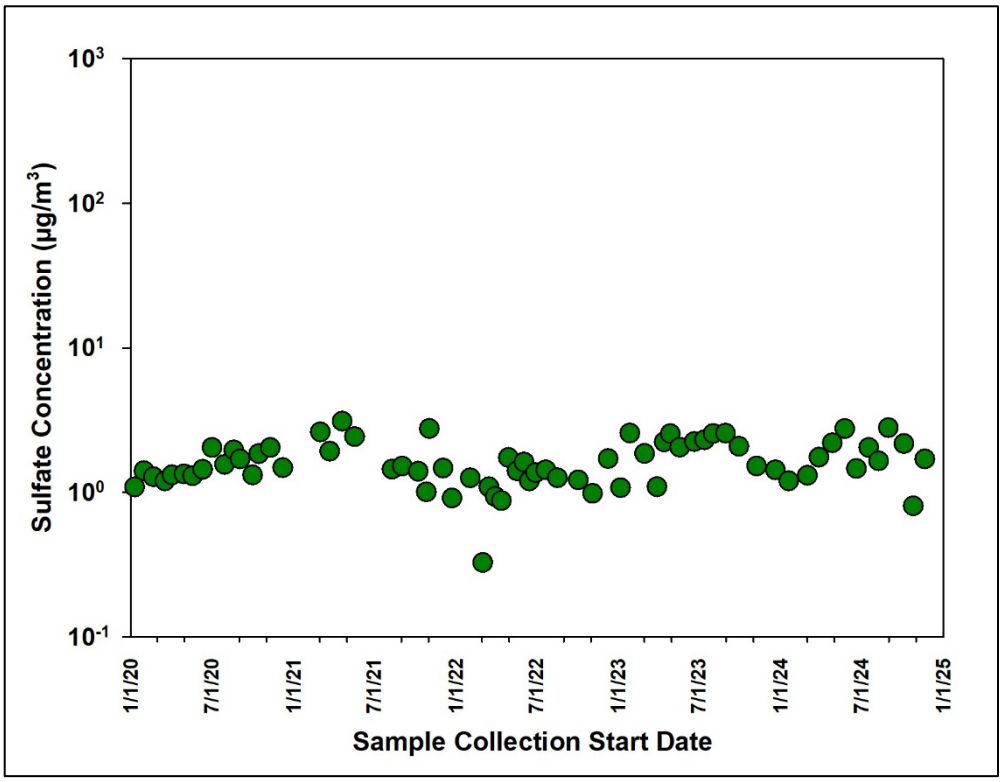
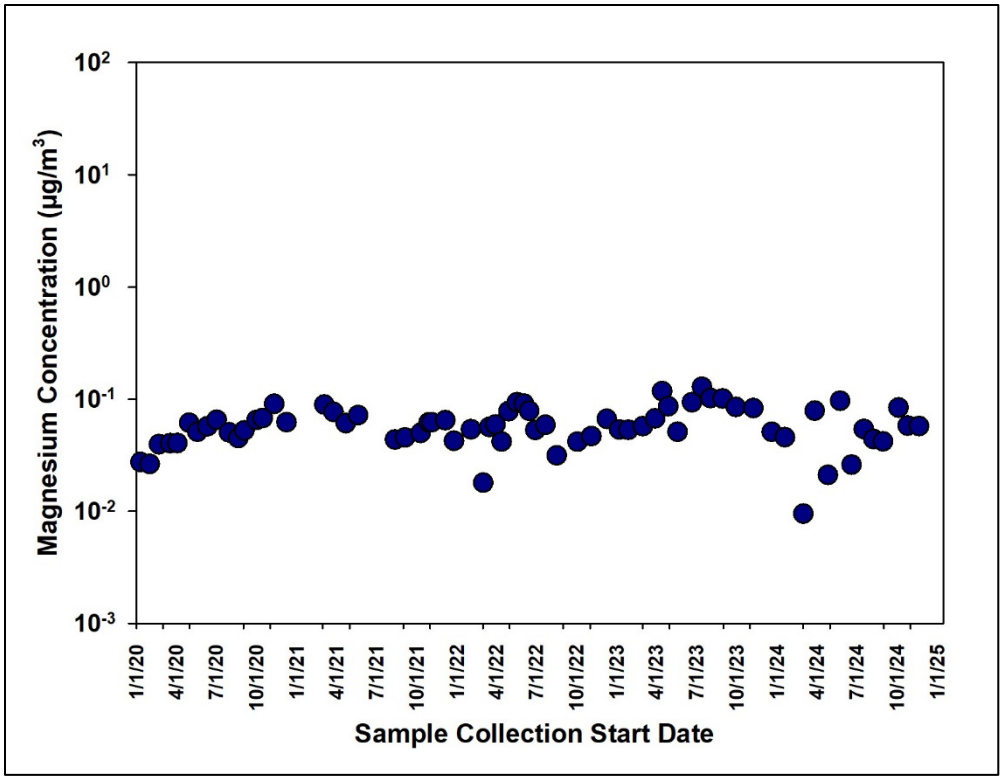
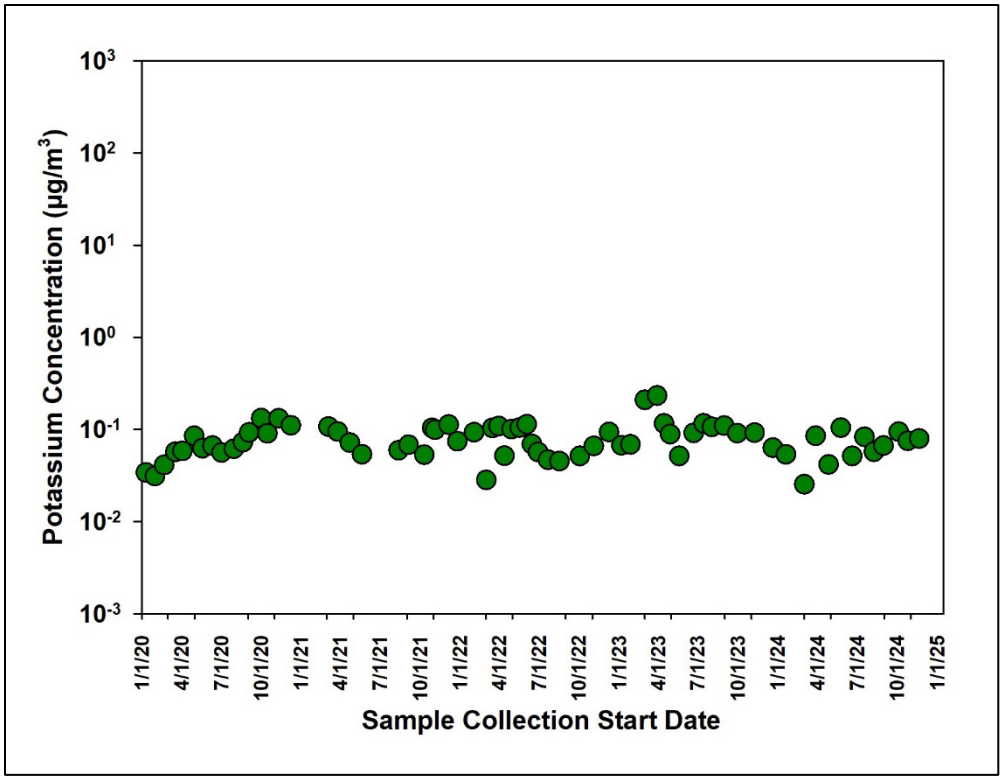
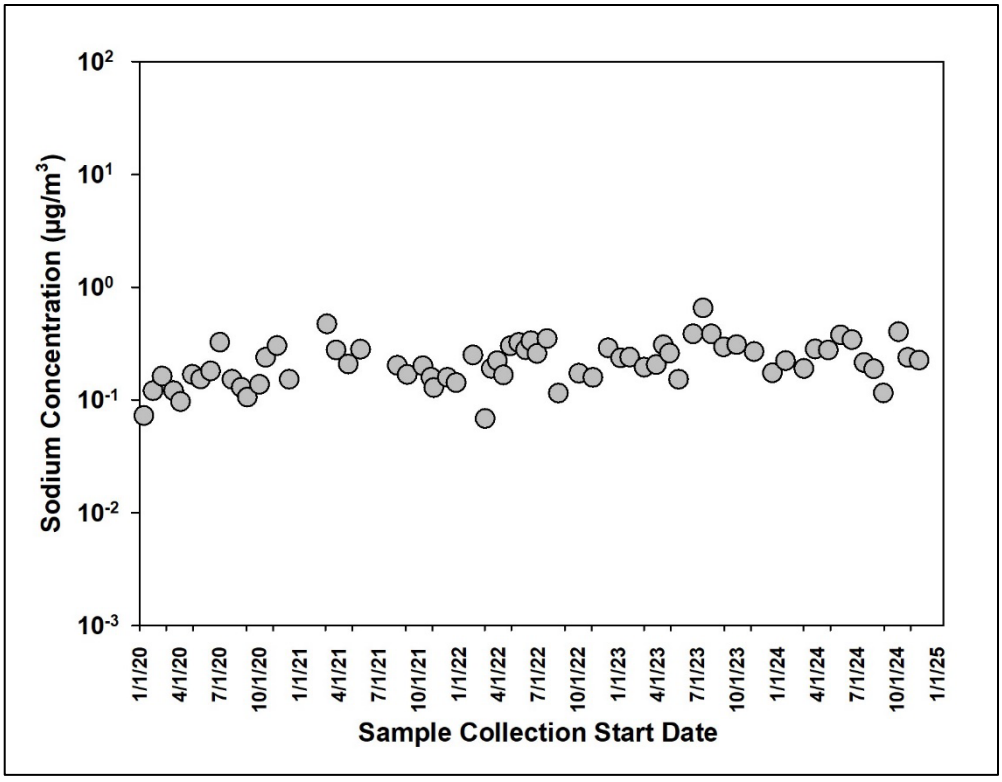
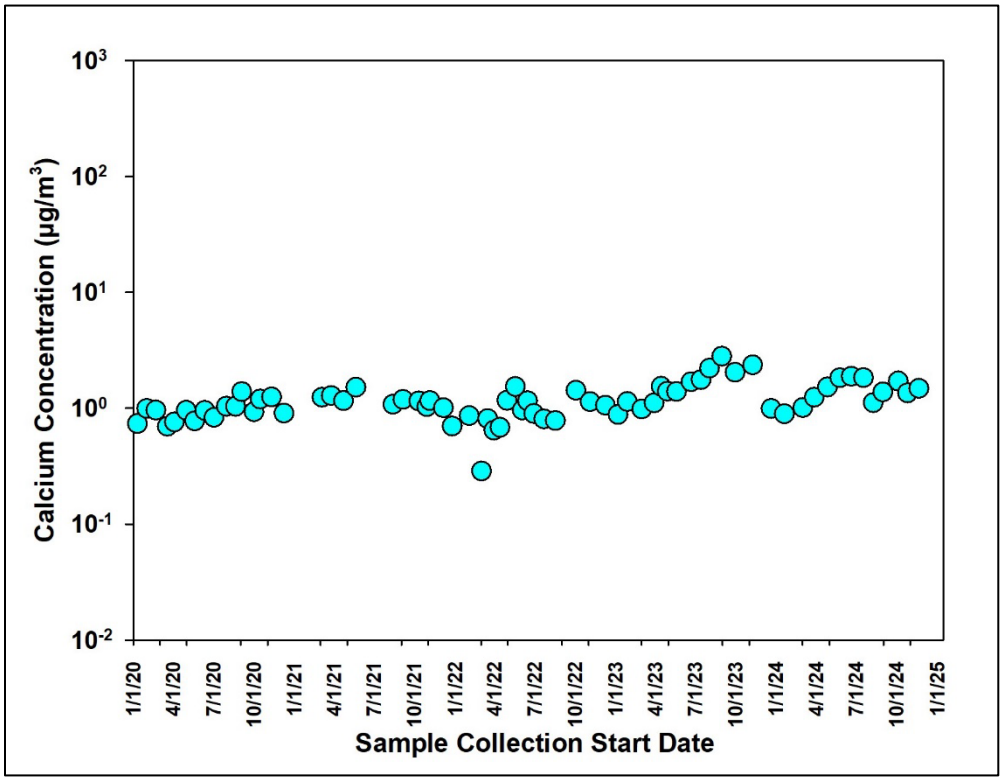


Figure 10.9. Historical Concentrations of Selected Anions at Cactus Flats


Magnesium Concentration (µg/m3)
10^2
10^1
10^0
10^-1
10^-2
10^-3
1/1/20
4/1/20
7/1/20
10/1/20
1/1/21
4/1/21
7/1/21
10/1/21
1/1/22
4/1/22
7/1/22
10/1/22
1/1/23
4/1/23
7/1/23
10/1/23
1/1/24
4/1/24
7/1/24
10/1/24
1/1/25
Sample Collection Start Date


Potassium Concentration (µg/m3)
10^3
10^2
10^1
10^0
10^-1
10^-2
10^-3
1/1/20
4/1/20
7/1/20
10/1/20
1/1/21
4/1/21
7/1/21
10/1/21
1/1/22
4/1/22
7/1/22
10/1/22
1/1/23
4/1/23
7/1/23
10/1/23
1/1/24
4/1/24
7/1/24
10/1/24
1/1/25
Sample Collection Start Date


Sodium Concentration (µg/m3)
10^2
10^1
10^0
10^-1
10^-2
10^-3
1/1/20
4/1/20
7/1/20
10/1/20
1/1/21
4/1/21
7/1/21
10/1/21
1/1/22
4/1/22
7/1/22
10/1/22
1/1/23
4/1/23
7/1/23
10/1/23
1/1/24
4/1/24
7/1/24
10/1/24
1/1/25
Sample Collection Start Date


Calcium Concentration (µg/m3)
10^3
10^2
10^1
10^0
10^-1
10^-2
1/1/20
4/1/20
7/1/20
10/1/20
1/1/21
4/1/21
7/1/21
10/1/21
1/1/22
4/1/22
7/1/22
10/1/22
1/1/23
4/1/23
7/1/23
10/1/23
1/1/24
4/1/24
7/1/24
10/1/24
1/1/25
Sample Collection Start Date

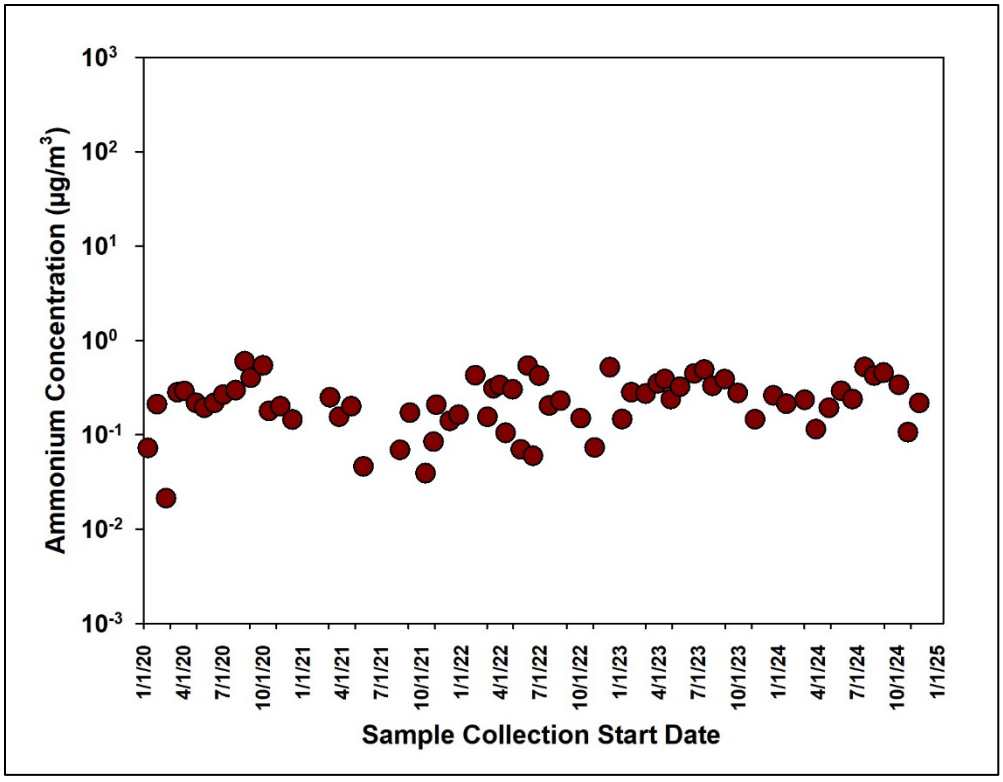


Figure 10.10. Historical Concentrations of Selected Cations at Cactus Flats

Non-Radiological Monitoring of Drinking Water

Sample Collection

Drinking water samples for non-radiological analyses were collected from six community water supplies of Carlsbad, Loving, Otis, Hobbs, Malaga, and Double Eagle. Details regarding the sampling locations and procedure for drinking water sample collection are described in Chapter 6.

Sample Preparation and Analysis

Once the water samples are received by the CEMRC staff, three aliquots are removed immediately for non-radiochemical analyses: (1) 1 L for anion and cation analysis, (2) 500 mL for mercury analysis, and (3) 1 L for metal analysis. Each 1 L aliquot removed for anion and cation analysis is split into two parts. The first half of the 1 L sub-sample is immediately refrigerated and analyzed for inorganic anions within 48 hours of collection. No preservative is added to this sample. The other half of the 1 L inorganic sub-sample is preserved with a dilute nitric acid solution for inorganic cation analysis.

Because of the high salinity of the drinking water samples, both anion and cation analyses require further dilution using ultrapure water prior to analysis. For metal analysis, each aliquot is preserved with nitric acid during collection. Because of the high salinity, these samples are also diluted prior to analysis.

For mercury analysis, each sample is collected in a 500 mL glass container and preserved with bromo-monochloride immediately upon arrival at CEMRC. Sample dilution is not performed for mercury analysis of water samples because mercury is rarely detected above detection limits. It should be noted that mercury analysis is performed separately from other metals in drinking water samples because of the specific requirements for sample preservation.

Metal analysis is performed using an ICP-MS, while inorganic cation and anion analyses are performed using an IC. Current methods utilized by CEMRC for non-radiochemical analyses performed on each sample type and their detection limits are summarized in APPENDIX I, Table I.1.

The trace metal and measured in drinking water samples are reported in µg/L, which is calculated as the element mass in micrograms (µg) divided by volume of the drinking water in liters (L); similarly, the inorganic anion and cation concentrations are reported in mg/L.

Metal Concentrations in Drinking Water

Analytical results for metal analysis of 2024 drinking water samples are reported in APPENDIX I, Table I.12. The following elemental constituents are commonly above the MDC in the drinking water samples collected from the areas surrounding the WIPP site: arsenic (As), barium (Ba), chromium (Cr), copper (Cu), lead (Pb), and antimony (Sb). Figure 10.11 through Figure 10.16 illustrate the historical concentrations of these selected metals from the six regional drinking water locations. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no samples were received for analysis.

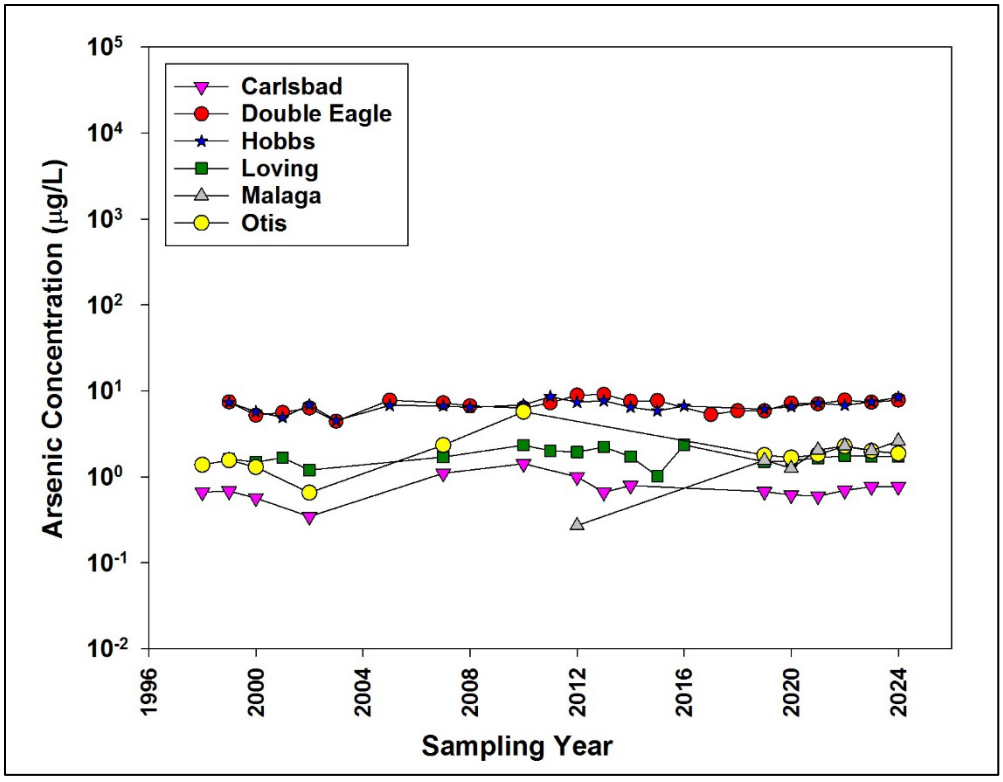


Figure 10.11. Historical Concentrations of Arsenic in Drinking Water

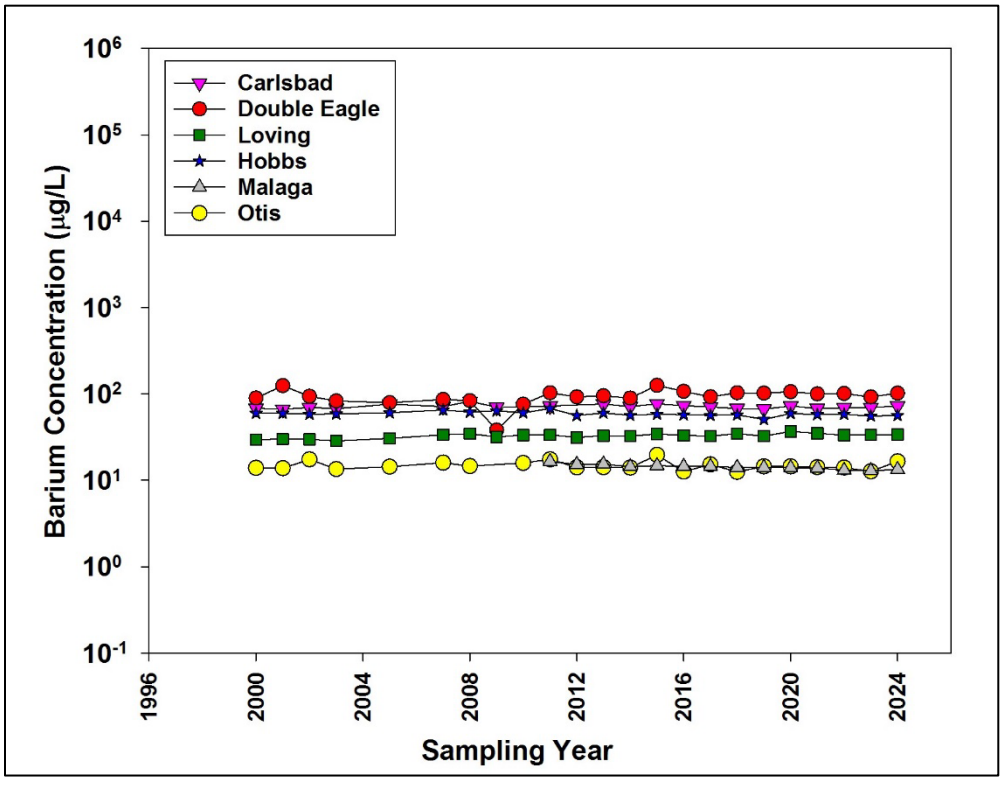


Figure 10.12. Historical Concentrations of Barium in Drinking Water

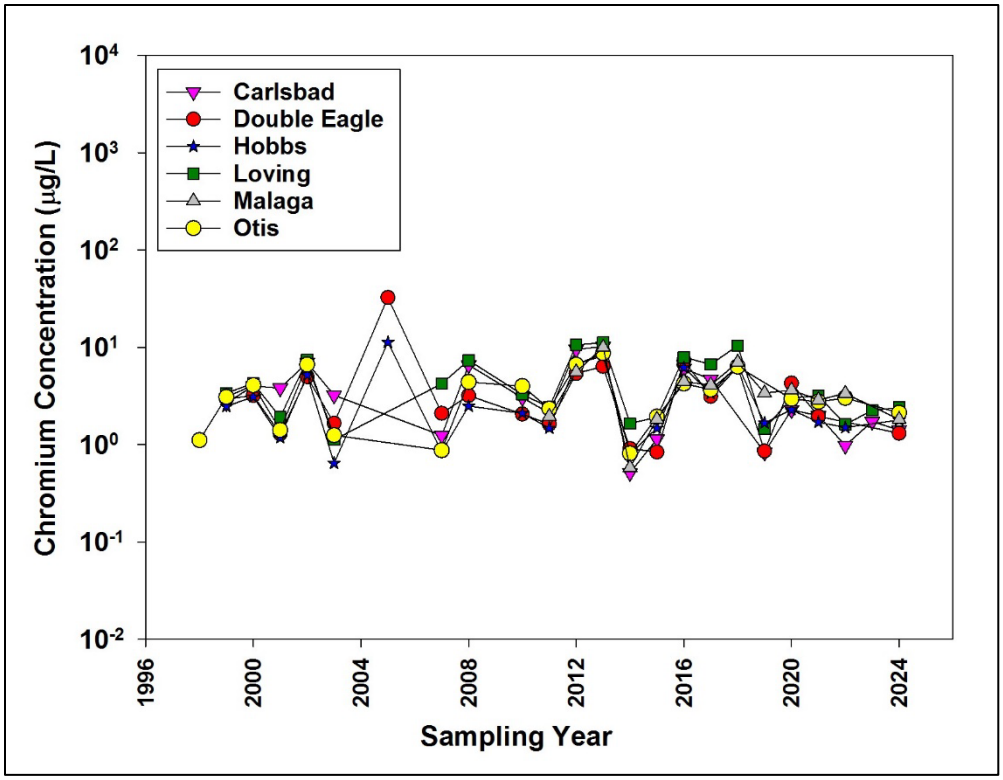


Figure 10.13. Historical Concentrations of Chromium in Drinking Water

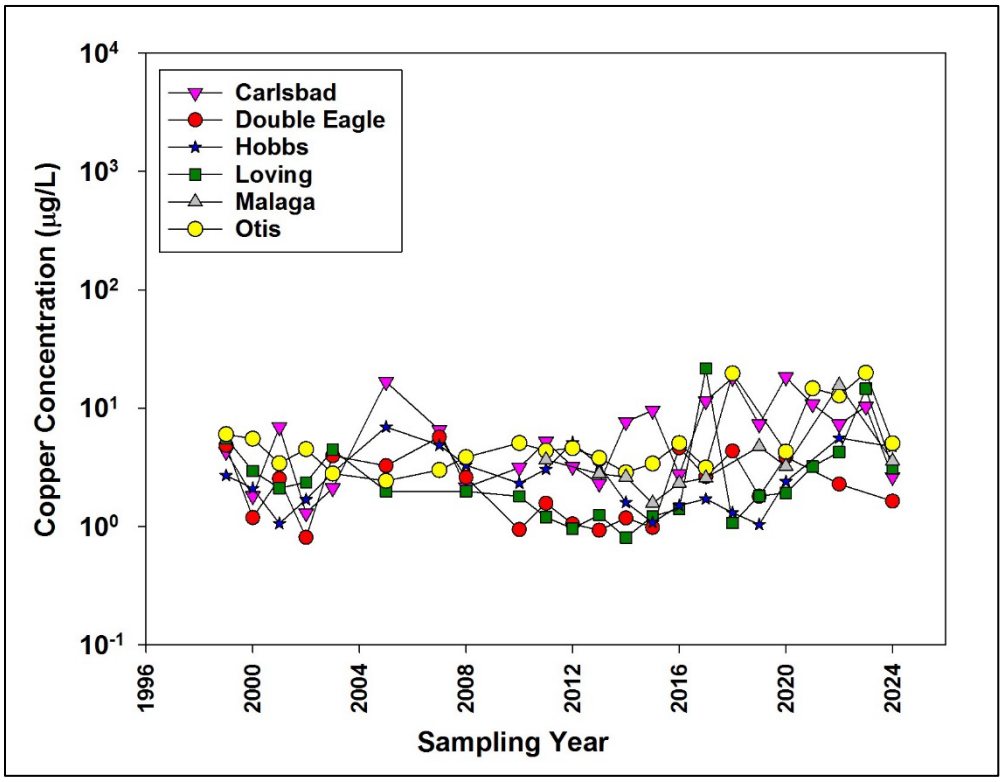


Figure 10.14. Historical Concentrations of Copper in Drinking Water

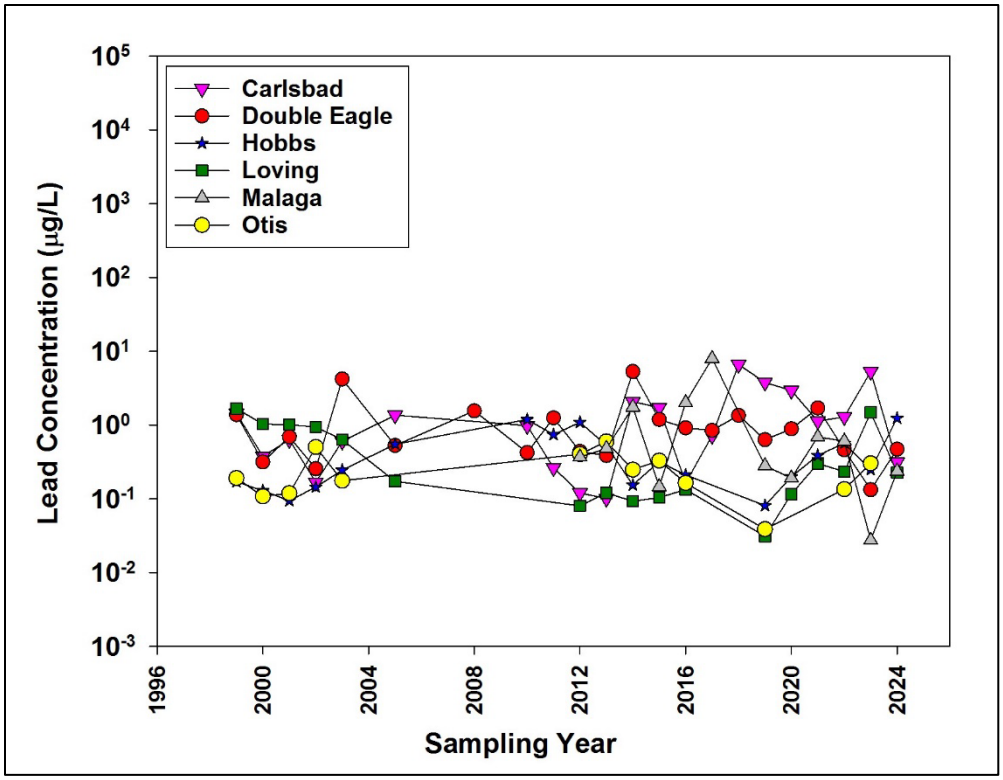


Figure 10.15. Historical Concentrations of Lead in Drinking Water

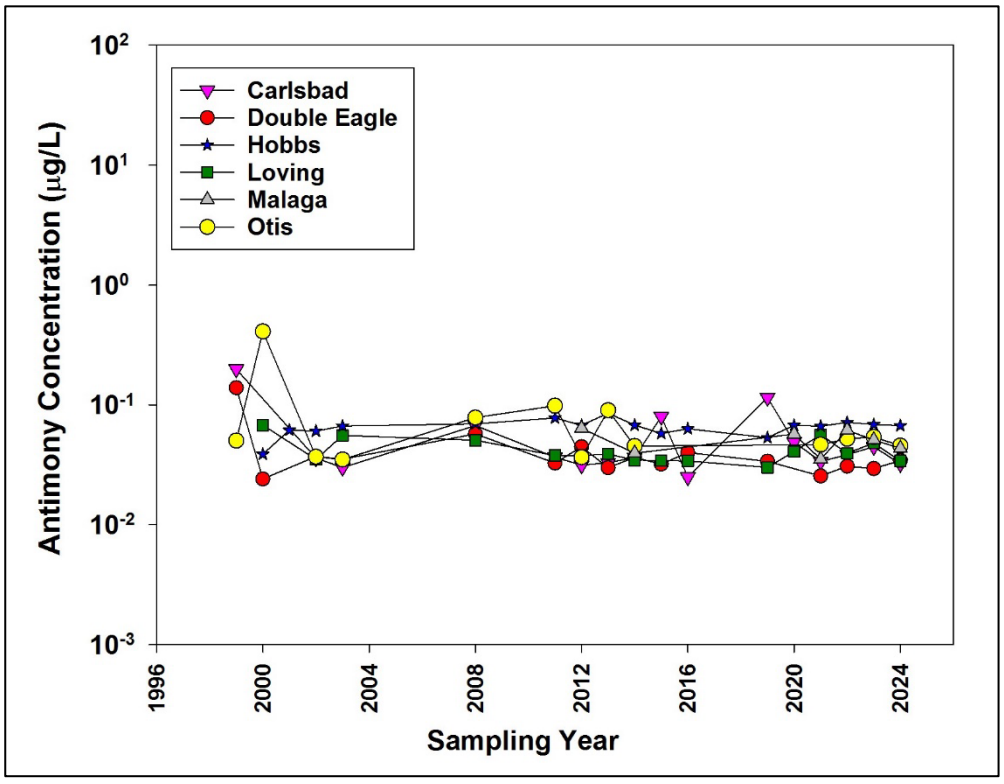


Figure 10.16. Historical Concentrations of Antimony in Drinking Water

Present results as well as the results of previous analyses of drinking water are consistent for each source across sampling periods. Furthermore, the current CEMRC results for drinking water from the Carlsbad (Sheep Draw) and WIPP (Double Eagle, PRV4) locations generally agree with the measurements for the same elements monitored by the City of Carlsbad.

Concentrations of Inorganic Anions in Drinking Water

Four inorganic anions are monitored in regional drinking water: chloride, fluoride, nitrate, and sulfate. Results for these anions are reported in APPENDIX I, Table I.13. All four of these anions are detected regularly above the MDC for inorganic anions. Figure 10.17 through Figure 10.20 illustrate the historical concentrations of these anions from the six regional drinking water locations. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no samples were received for analysis.

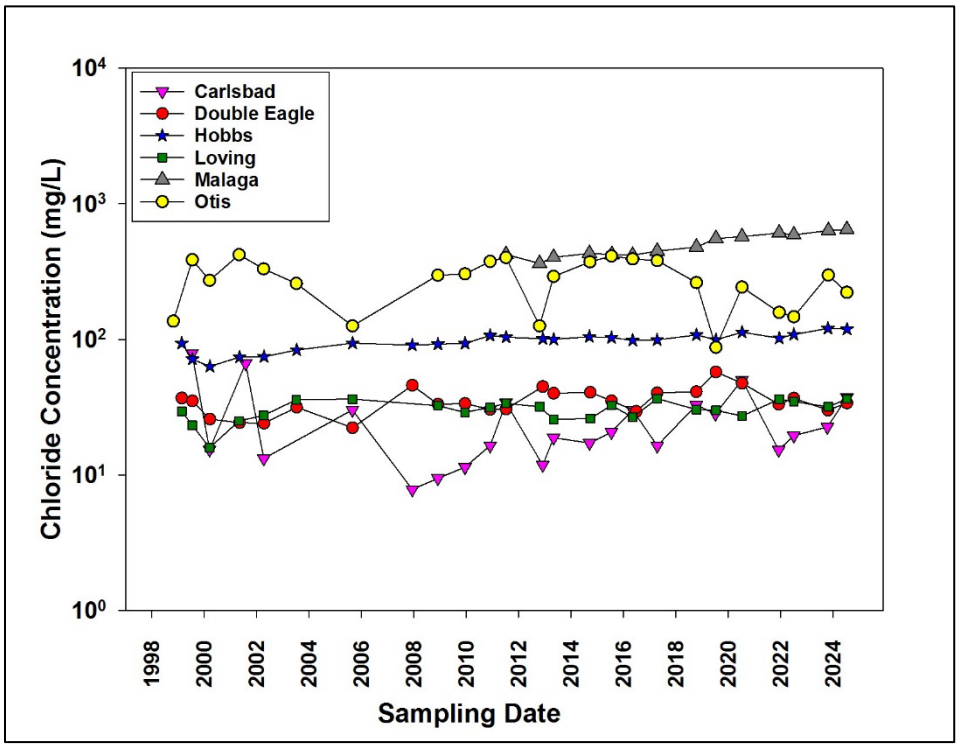


Figure 10.17. Historical Concentrations of Chloride in Drinking Water

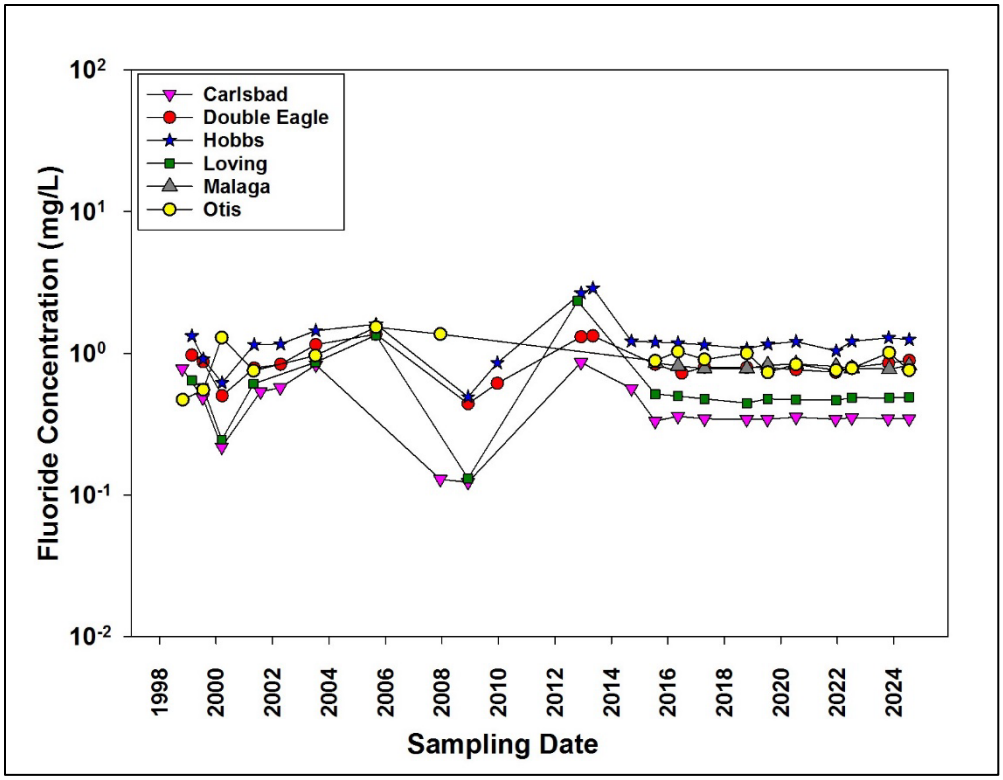


Figure 10.18. Historical Concentrations of Fluoride in Drinking Water

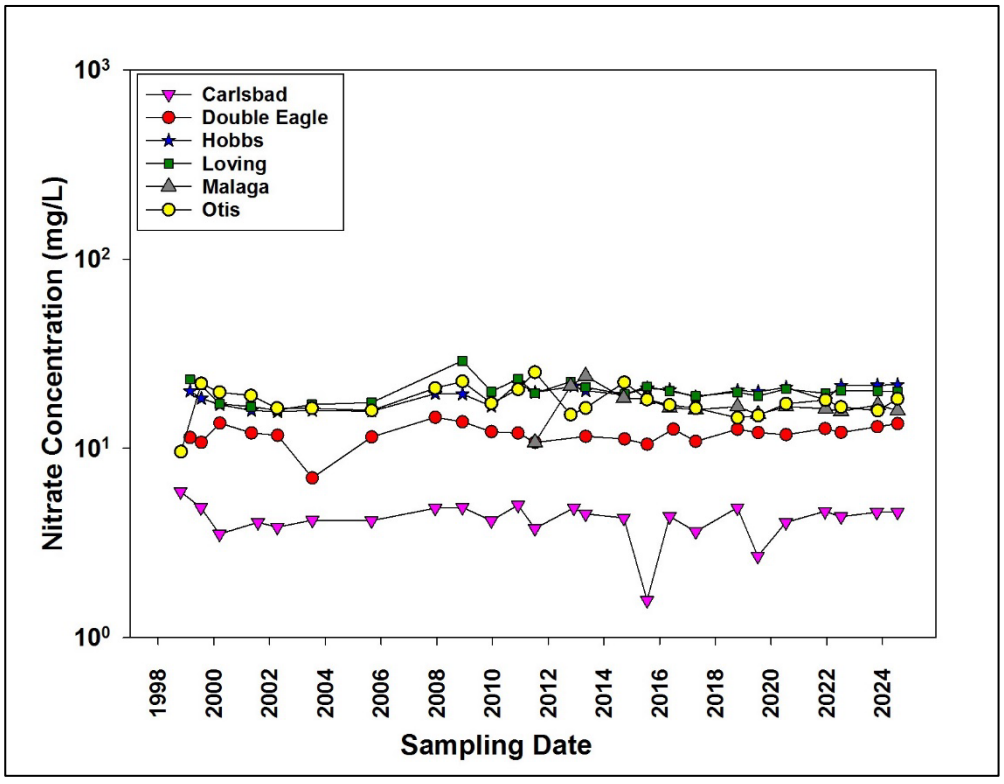


Figure 10.19. Historical Concentrations of Nitrate in Drinking Water

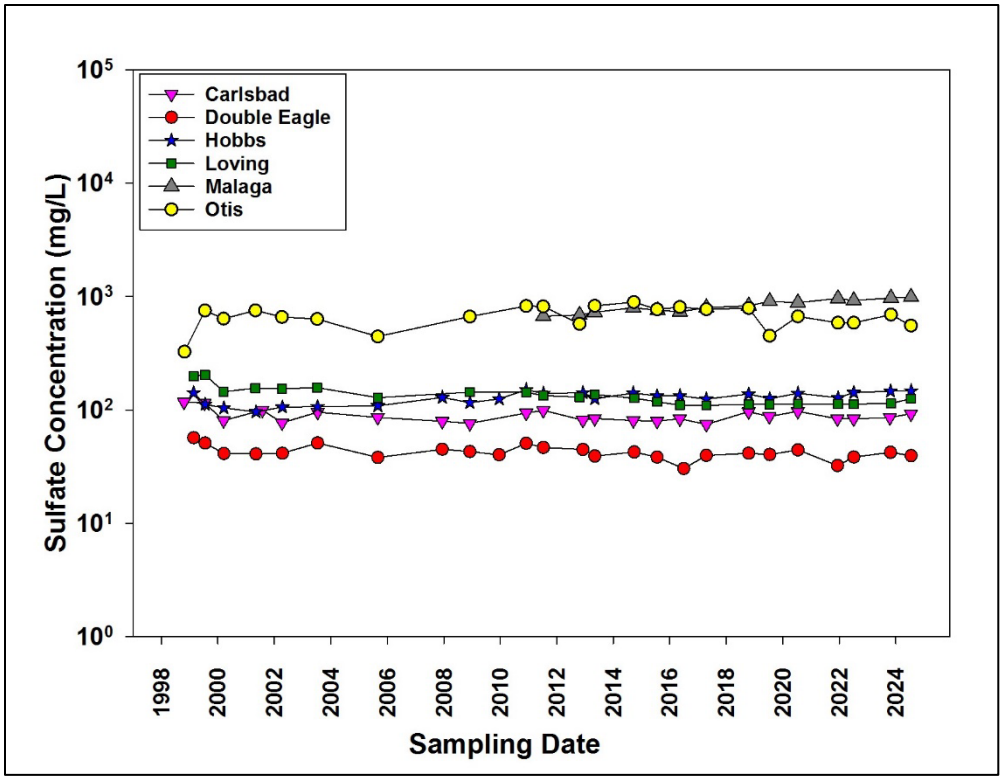


Figure 10.20. Historical Concentrations of Sulfate in Drinking Water

Concentrations of Inorganic Cations in Drinking Water

Inorganic cation analyses for regional drinking water began in 2016. Four inorganic cations are monitored: calcium, magnesium, potassium, and sodium. Results for these cations are reported in APPENDIX I, Table I.14. Calcium, magnesium, and sodium are detected regularly above the MDC and Figure 10.21 through Figure 10.23 illustrate the historical concentrations of these cations from the six regional drinking water locations. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no samples were received for analysis.

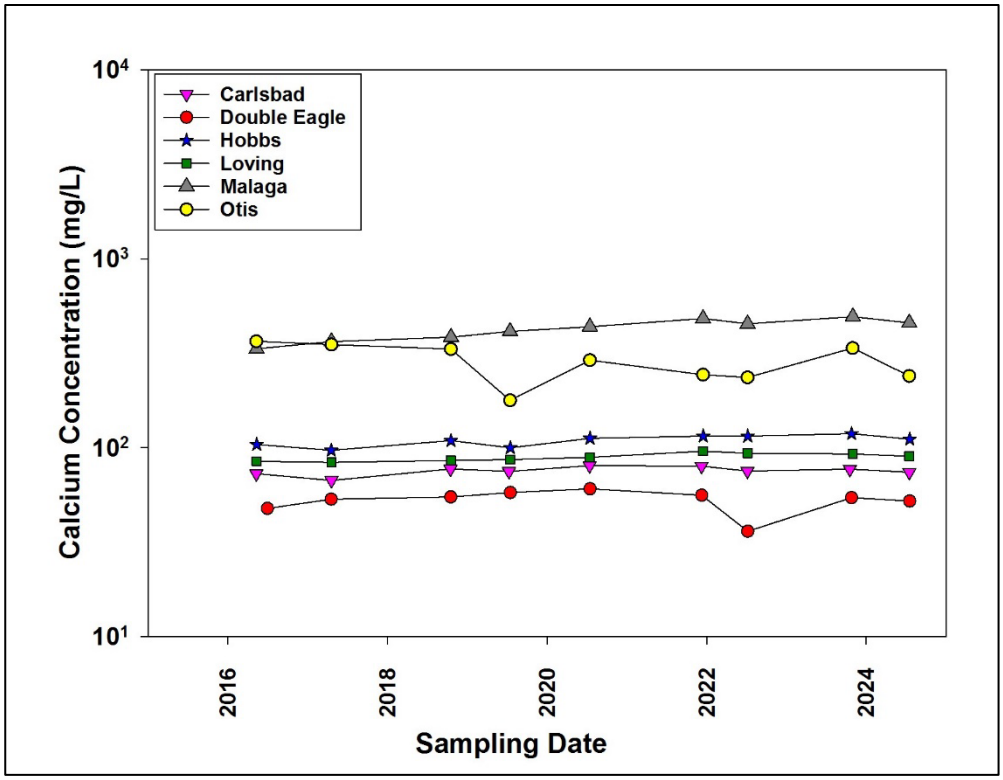


Figure 10.21. Historical Concentrations of Calcium in Drinking Water

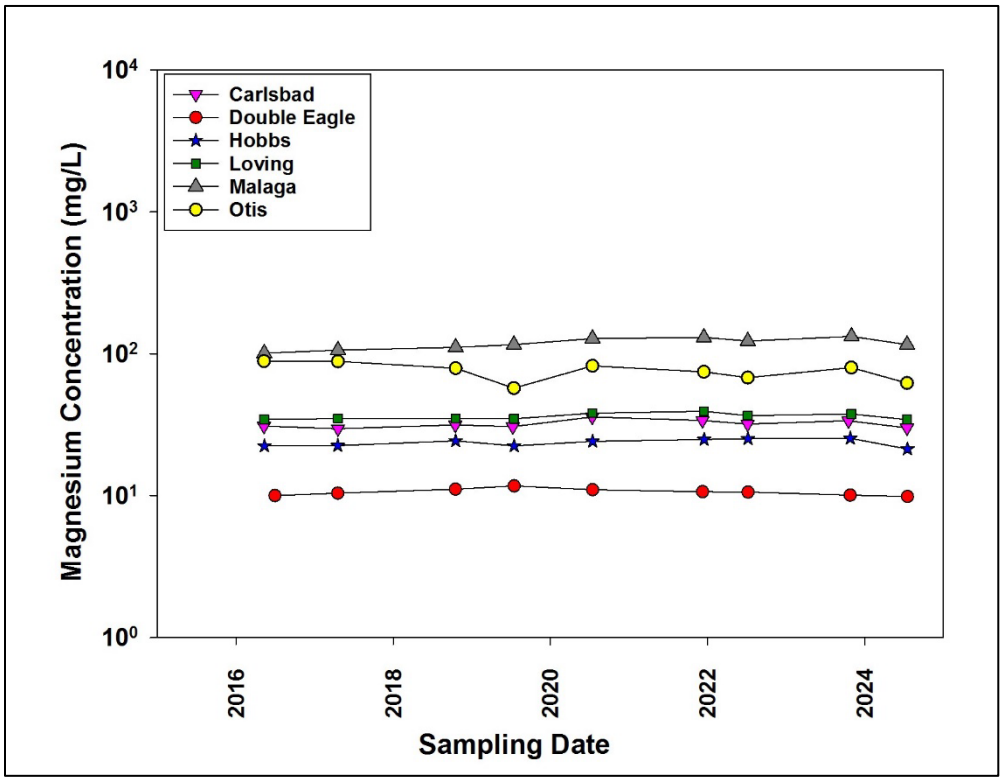


Figure 10.22. Historical Concentrations of Magnesium in Drinking Water

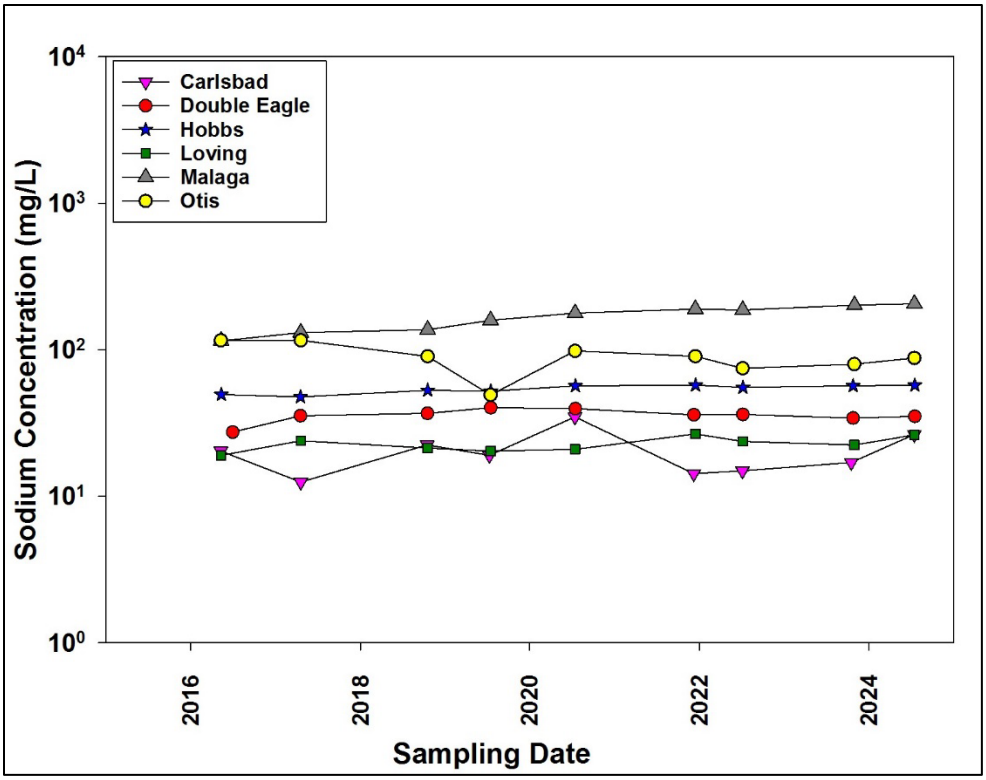


Figure 10.23. Historical Concentrations of Sodium in Drinking Water

Additional Analyses Performed on Drinking Water

To characterize the drinking water more comprehensively, additional types of non-radiological analyses were added in 2020. These parameters include specific gravity, pH, conductivity, total organic carbon (TOC), total dissolved solids (TDS), and total suspended solids (TSS). Results of all these analyses are provided in APPENDIX I, Tables I.15 - I.19. Historical data are shown for pH, conductivity, TOC, and TDS in Figure 10.24 through Figure 10.27, respectively. It should be noted that TSS concentrations are rarely detected above detection limits.

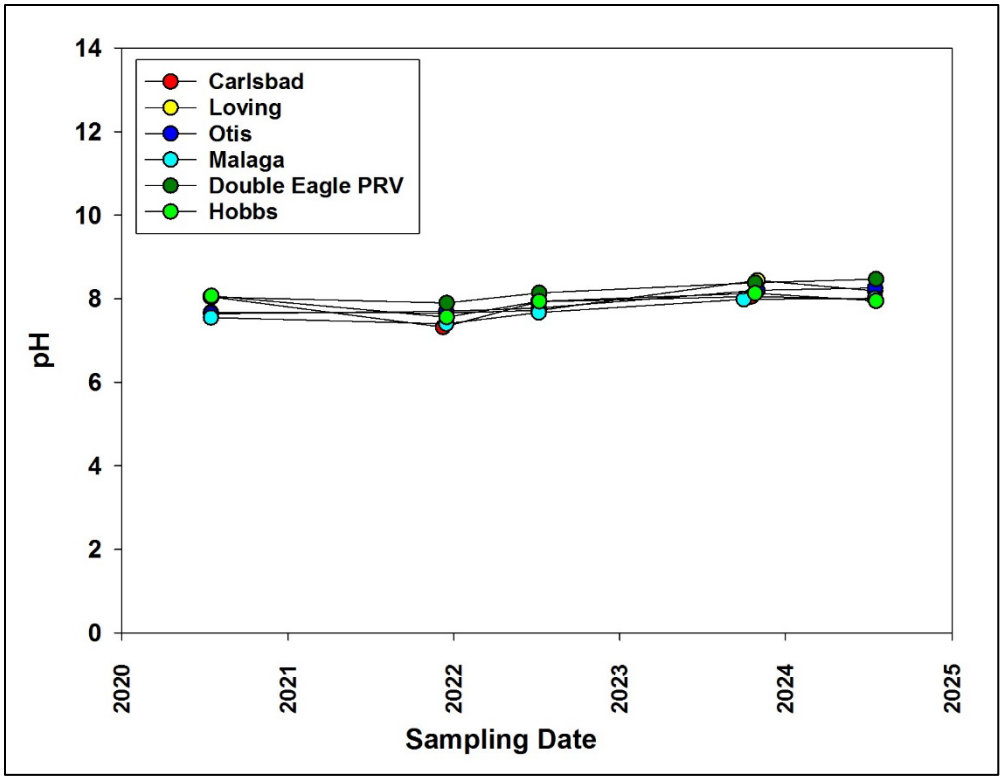


Figure 10.24. Historical pH Measurements in Drinking Water

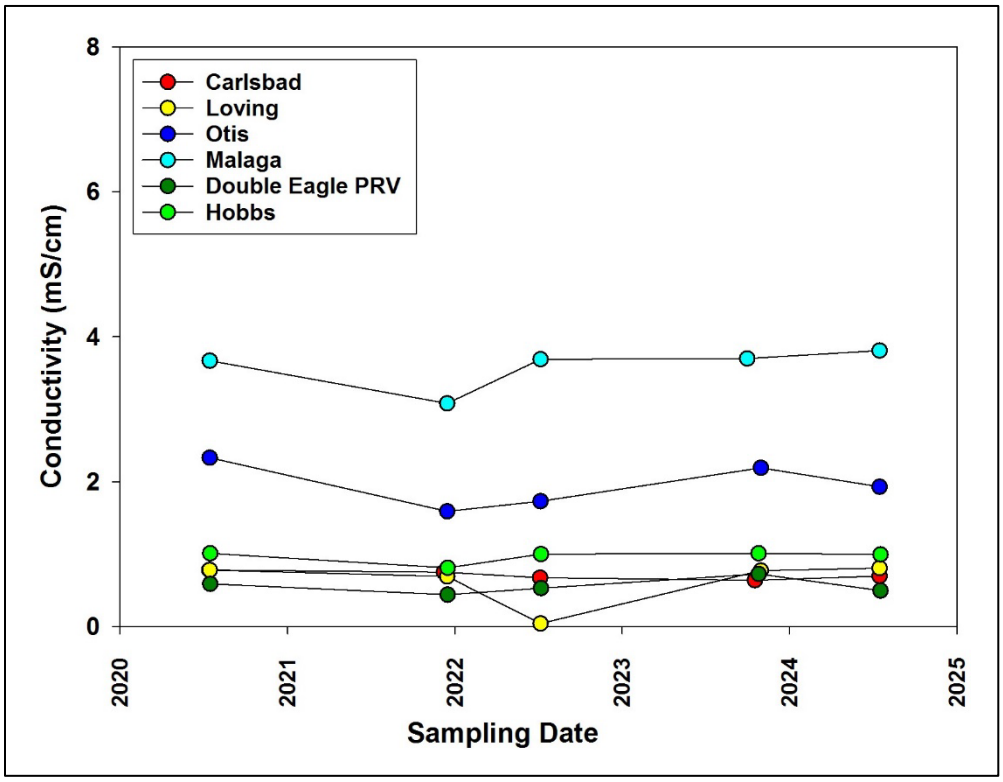


Figure 10.25. Historical Conductivity Measurements in Drinking Water

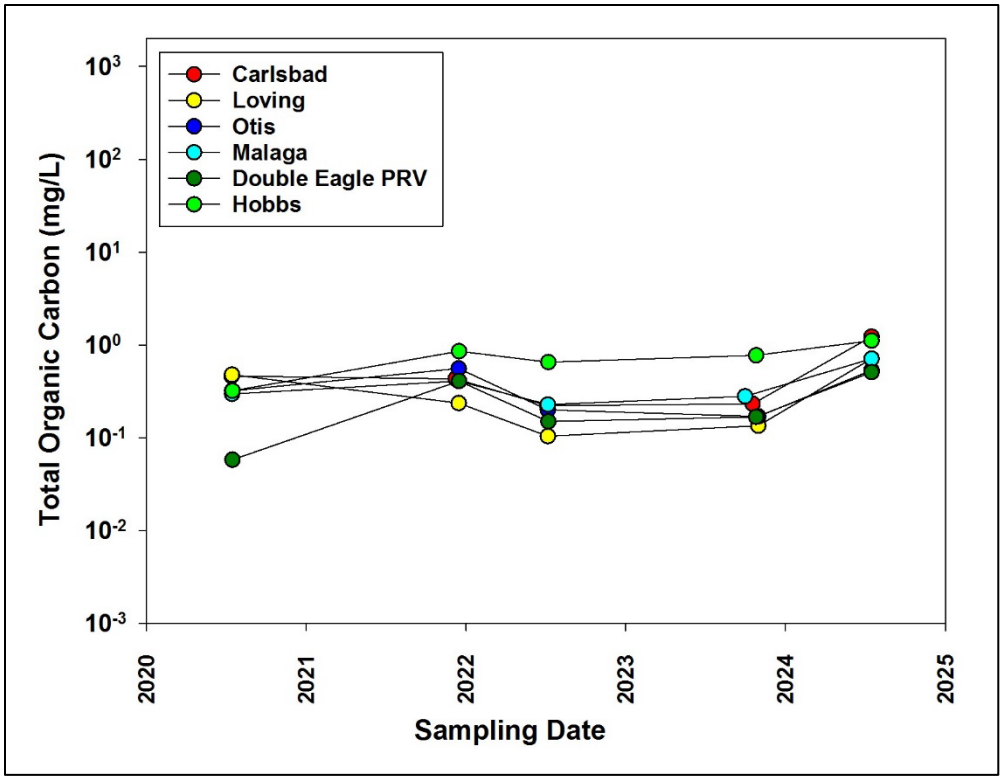


Figure 10.26. Historical Total Organic Carbon Concentrations in Drinking Water

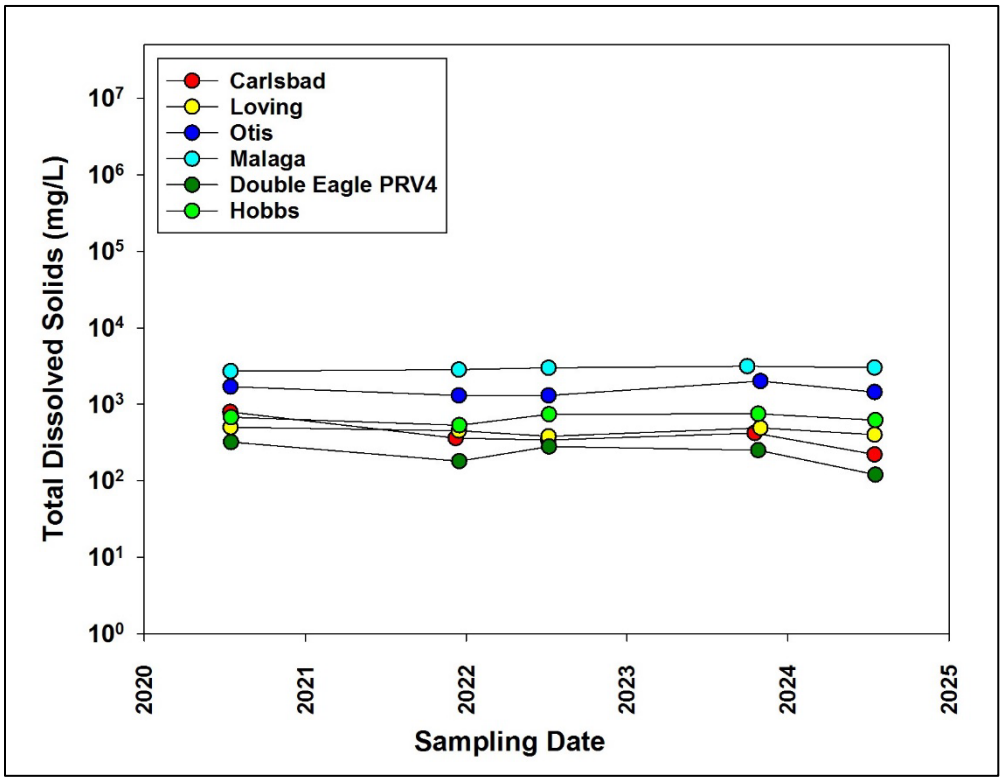


Figure 10.27. Historical Total Dissolved Solids in Drinking Water

Non-Radiological Monitoring of Surface Water

Sample Collection

Surface water samples for non-radiological analyses were collected from three regional reservoirs situated on the Pecos River. Sampling at the following locations began in 1999: Lake Carlsbad, Brantley Lake, and Red Bluff. A shallow and a deep sample are collected at these locations. In 2021, three supplemental locations were added to the CEMRC surface water sampling program in coordination with the WIPP sampling program. These locations serve to monitor for potential livestock uptake. The supplemental locations vary each year. In 2024, the supplemental sample locations were identified as “Hill Tank,” “Noya Tank,” and “Pierce Canyon”.

Sample Preparation and Analysis

Once the surface water samples are received by CEMRC staff, samples are divided into the same aliquots as drinking water: (1) 1L for inorganic anion and cation analysis, (2) 500 mL for mercury analysis and (3) 1 L for elemental analyses. Surface water samples are separated, preserved, and analyzed in the same manner as drinking water samples except that all surface water samples are filtered prior to analysis because of the high particulate content.

Metal analysis is performed using an ICP-MS, while inorganic anion and cation analyses are performed using an IC. Current methods utilized by CEMRC for non-radiochemical analyses performed on each sample type and their detection limits are summarized in APPENDIX I, Table I.1.

Metal Concentrations in Surface Water

Analytical results for metal analysis of 2024 surface water samples are reported in APPENDIX I, Table I.20 and I.21. Arsenic (As), barium (Ba), lead (Pb), and nickel (Ni) are metals commonly found above the MDC in the surface water samples collected from the areas surrounding the WIPP site. The concentration of non-radiochemical materials in surface water is determined primarily by local geology and topography, but it can be influenced by urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, and farming. Figure 10.28 through Figure 10.31 illustrate the historical concentrations of selected metals from the 3 regional surface water locations. Because the location of the supplemental water sources changes annually, long term results do not exist. See current results for the supplemental locations sampled in 2024 in APPENDIX I. Present results as well as the results of previous analyses of surface water were consistent for each source across sampling periods. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits or no samples were received for analysis.

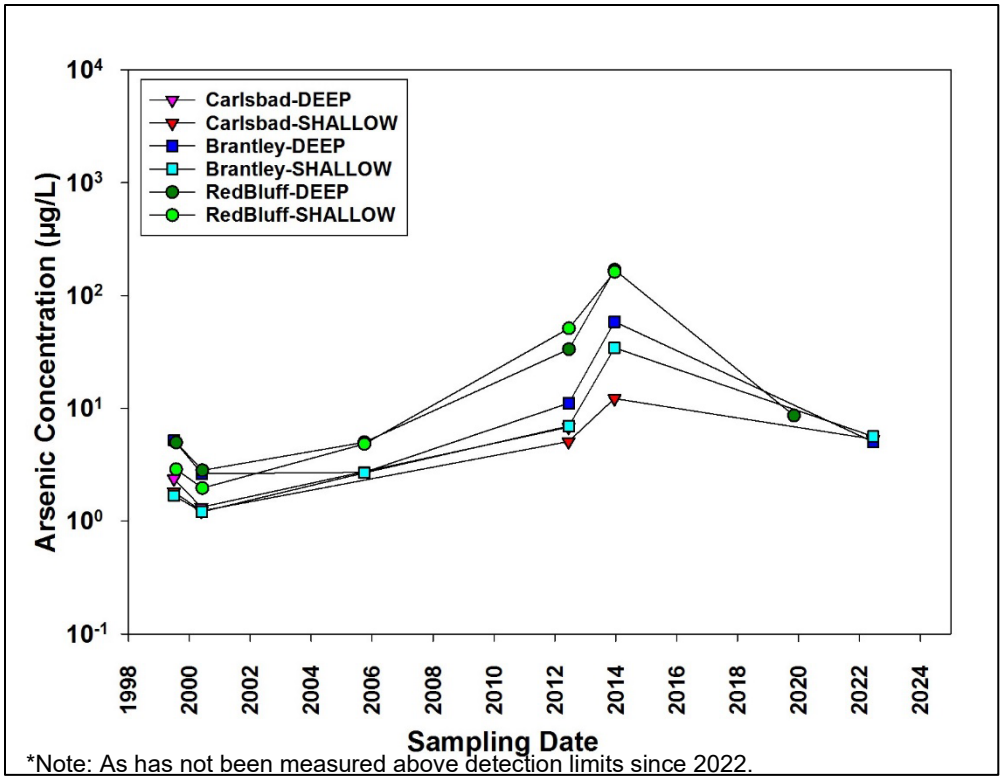


Figure 10.28. Historical Concentrations of Arsenic in Surface Water

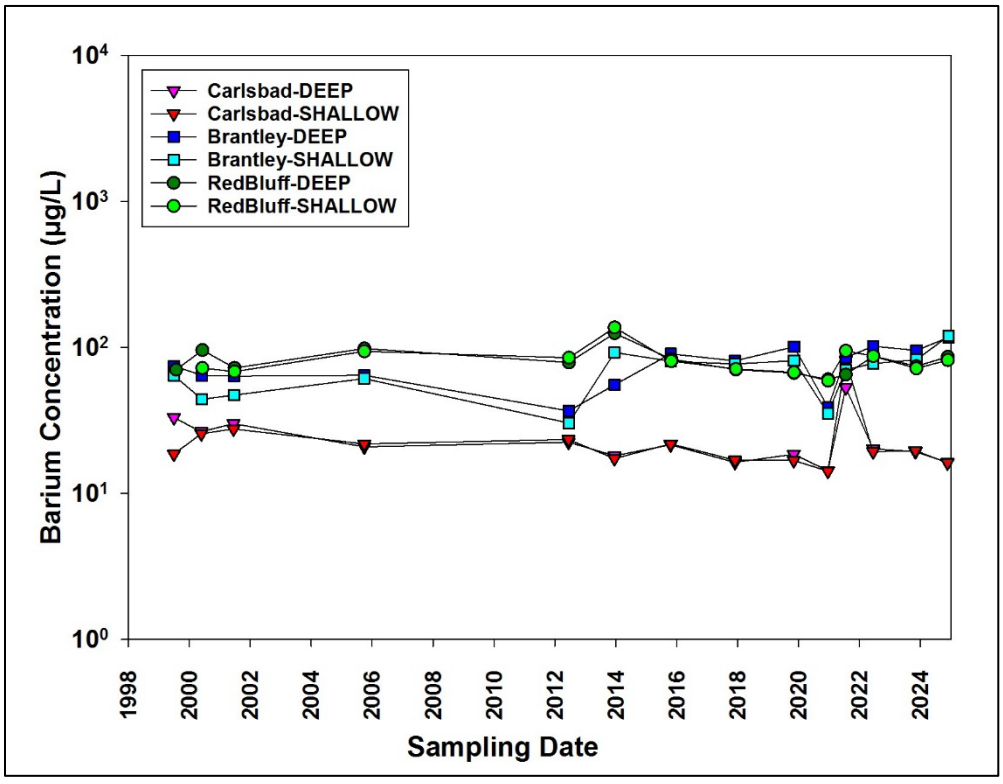


Figure 10.29. Historical Concentrations of Barium in Surface Water

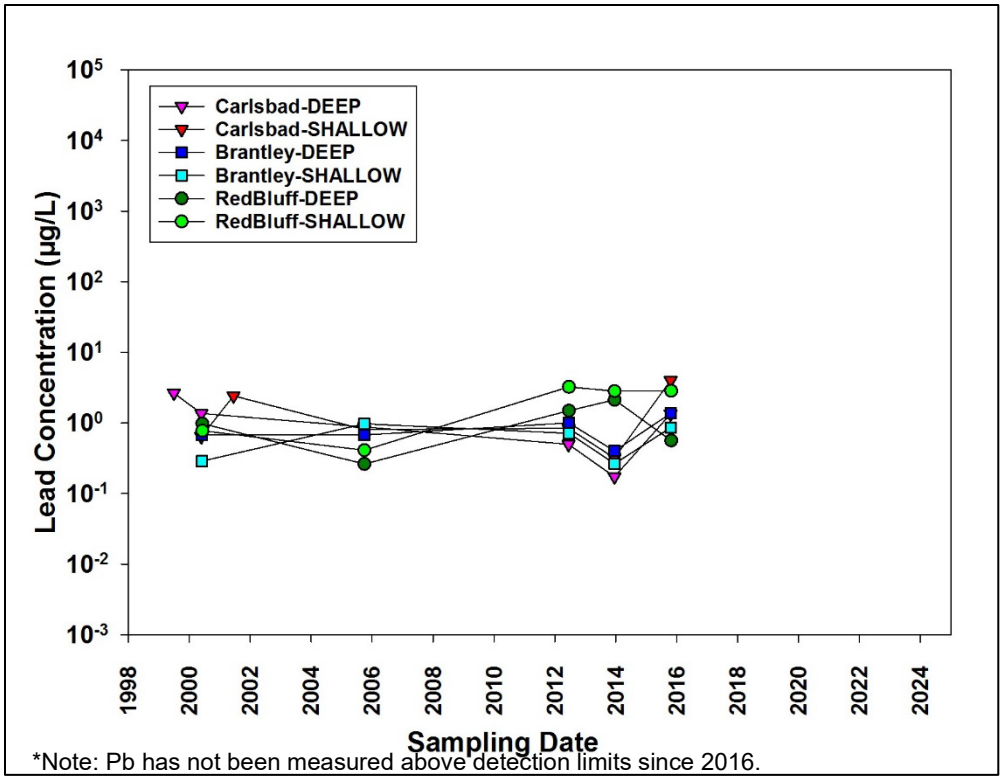


Figure 10.30. Historical Concentrations of Lead in Surface Water*

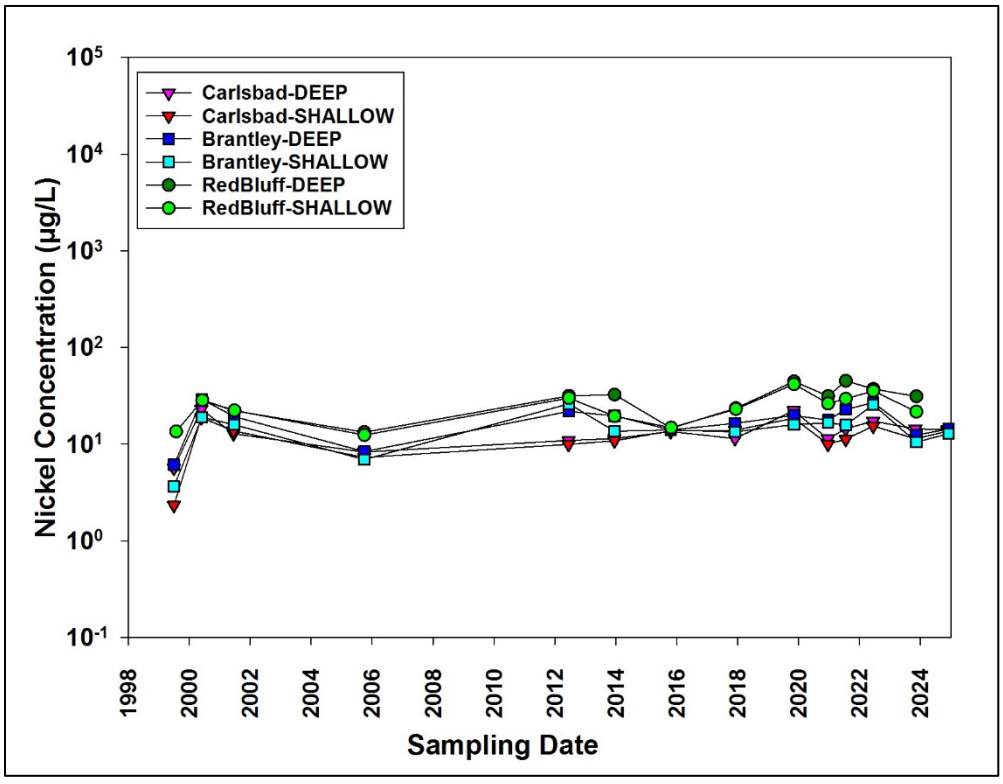


Figure 10.31. Historical Concentrations of Nickel in Surface Water

Concentrations of Inorganic Anions in Surface Water

Inorganic anion concentrations measured in regional and supplemental surface water samples are listed in APPENDIX I, Table I.22 and I.23. Chloride, nitrate, and sulfate are regularly detected above the MDC while phosphate is rarely detected above the detection limits. Figure 10.32 through Figure 10.34 show historical concentrations for the regional surface water samples. Because the location of the supplemental water sources changes annually, long term results do not exist. See current results for the supplemental locations sampled in 2024 in APPENDIX I. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no samples were received for analysis.

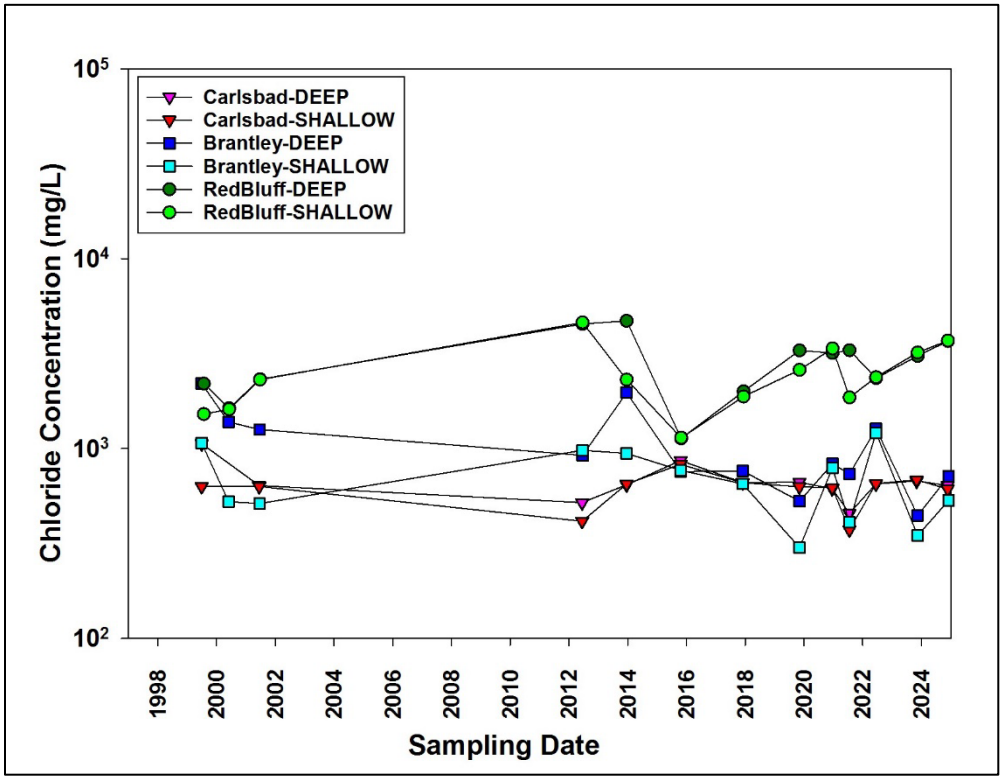


Figure 10.32. Historical Concentrations of Chloride in Surface Water

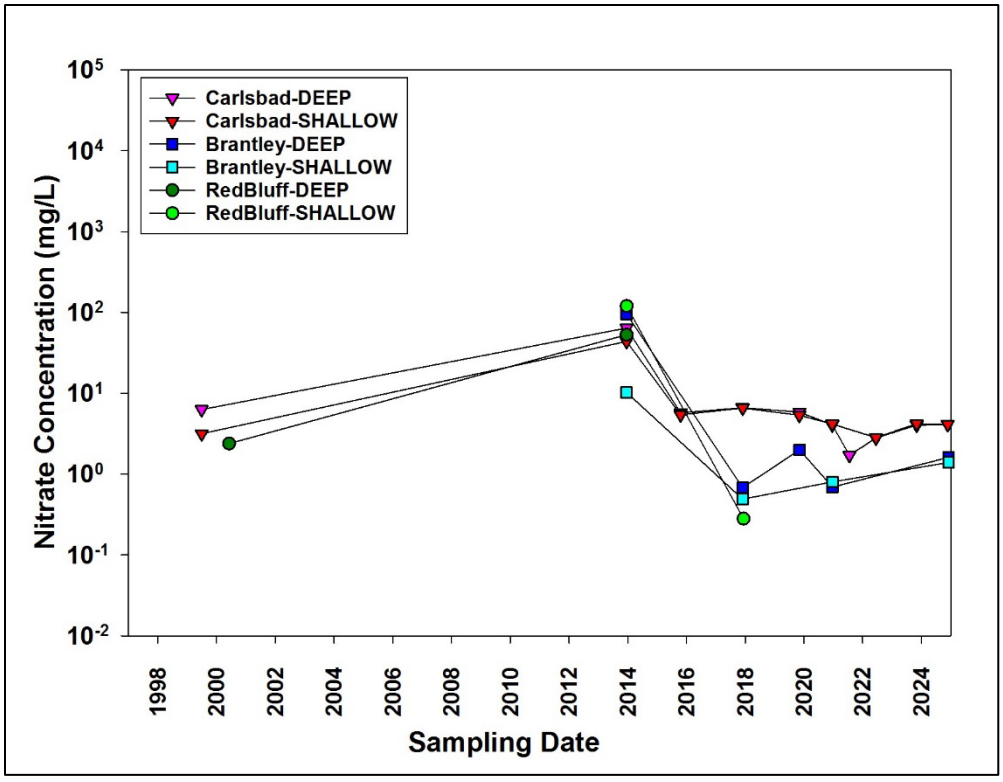


Figure 10.33. Historical Concentrations of Nitrate in Surface Water

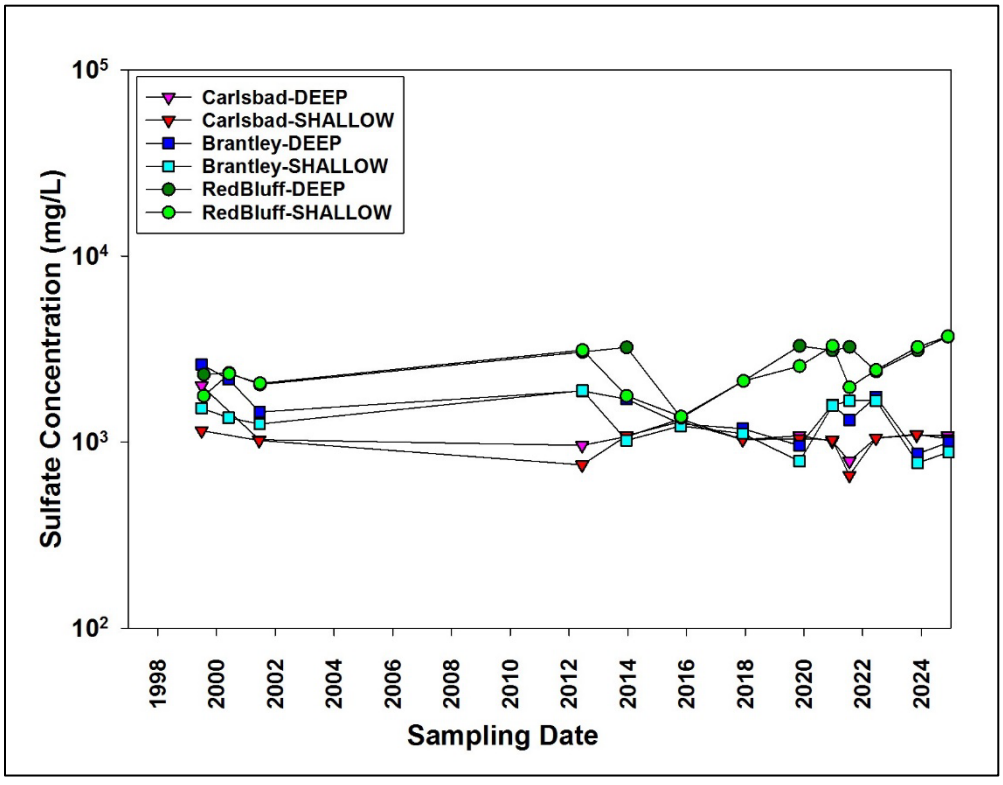


Figure 10.34. Historical Concentrations of Sulfate in Surface Water

Concentrations of Inorganic Cations in Surface Water

Inorganic cations measured in regional and supplemental surface water reservoirs are provided in APPENDIX I, Table I.24 and I.25. Concentrations for calcium, magnesium, potassium, and sodium have been routinely detected above the MDC since cation analysis began in 2017. Figure 10.35 through Figure 10.38 show historical concentrations for the regional surface water samples. Because the location of the supplemental water sources changes annually, long term results do not exist. See current results for the supplemental locations sampled in 2024 in APPENDIX I. It should be noted that any gaps in the data are either a result of concentrations measured below detection limits, or no samples were received for analysis.

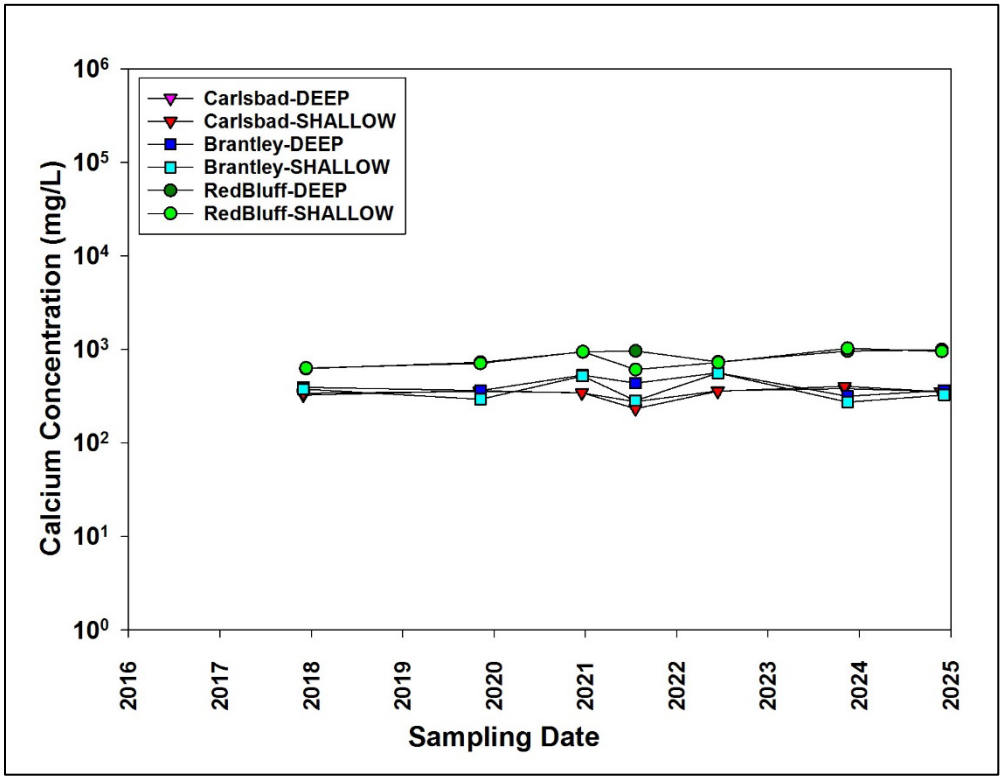


Figure 10.35. Historical Concentrations of Calcium in Surface Water

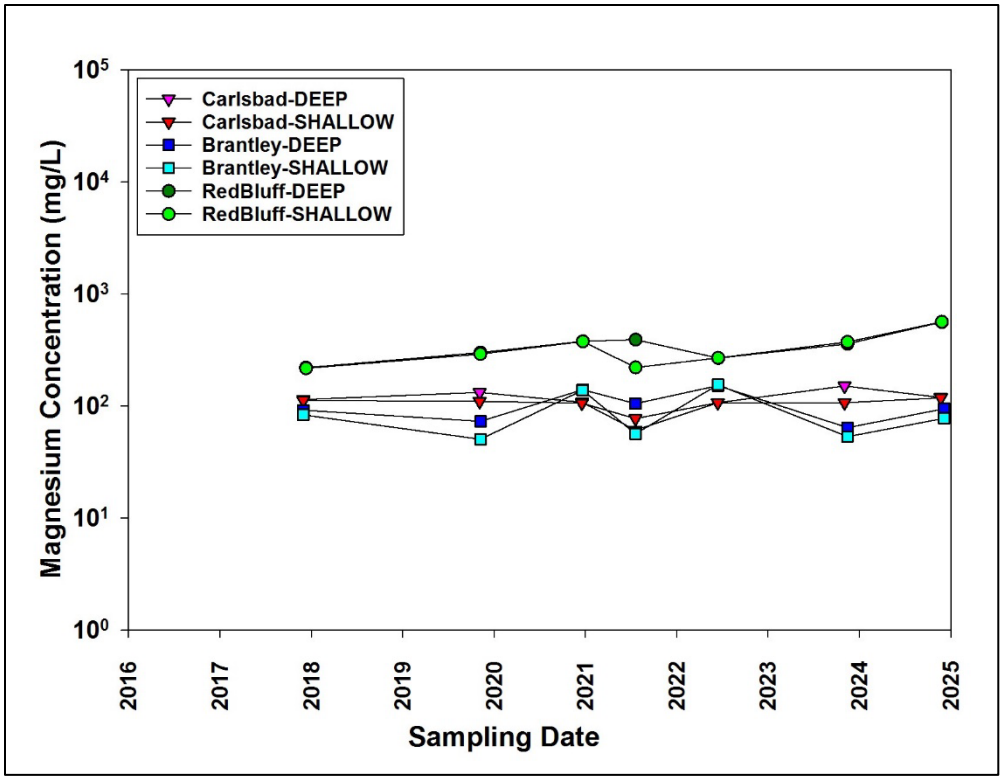


Figure 10.36. Historical Concentrations of Magnesium in Surface Water

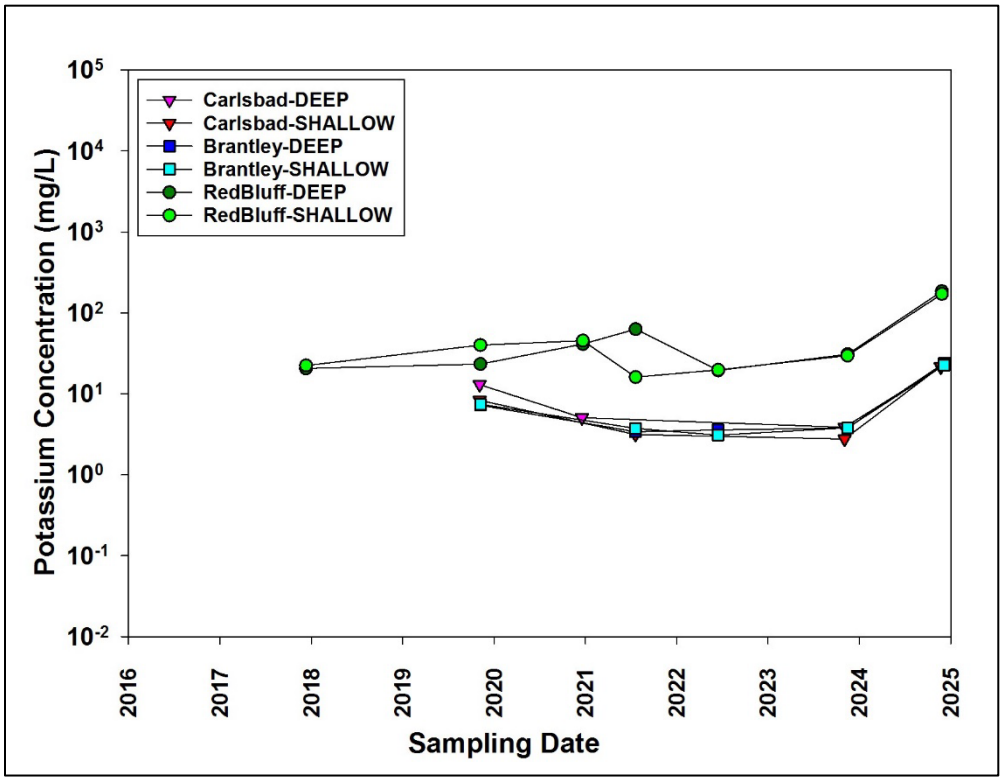


Figure 10.37. Historical Concentrations of Potassium in Surface Water

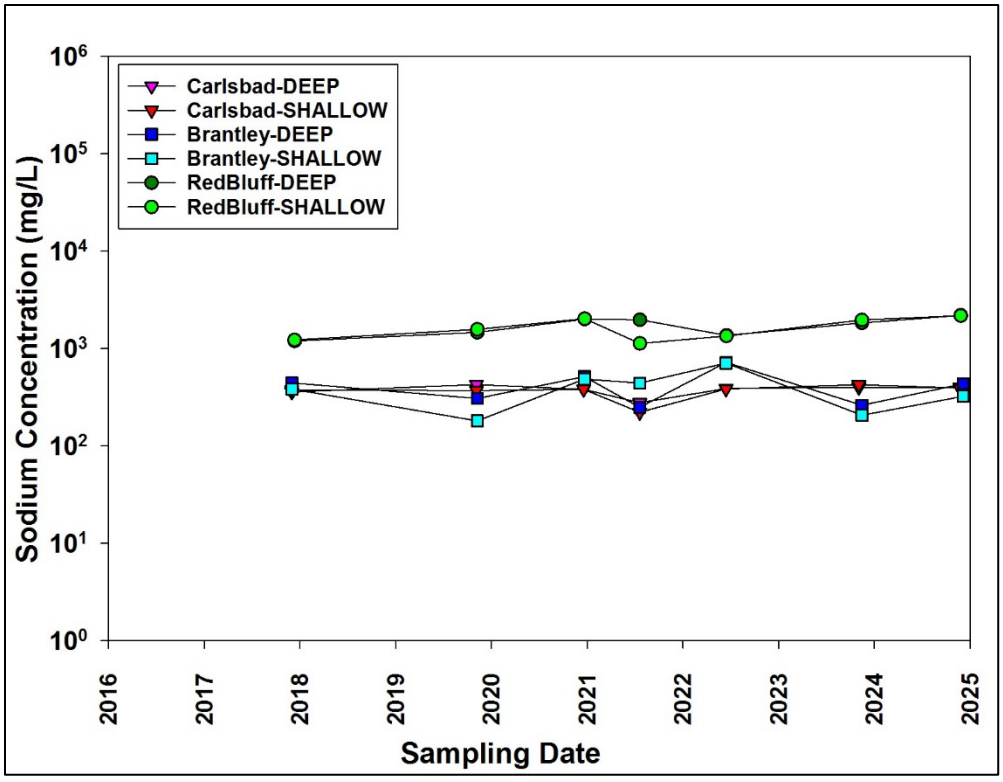


Figure 10.38. Historical Concentrations of Sodium in Surface Water

Additional Analyses Performed on Surface Water

Several additional types of non-radiological characterization were added to surface water sample processing in 2020. These parameters include the following: specific gravity, pH, conductivity, total organic carbon (TOC), total dissolved solids (TDS), and total suspended solids (TSS). Results of all these analyses are provided in APPENDIX I. Historical data for the 3 regional locations are shown for pH, conductance, TOC, and TDS in Figure 10.39 through Figure 10.42, respectively. Because the location of the supplemental water sources changes annually, long term results do not exist. See current results for the supplemental locations sampled in 2024 APPENDIX I.

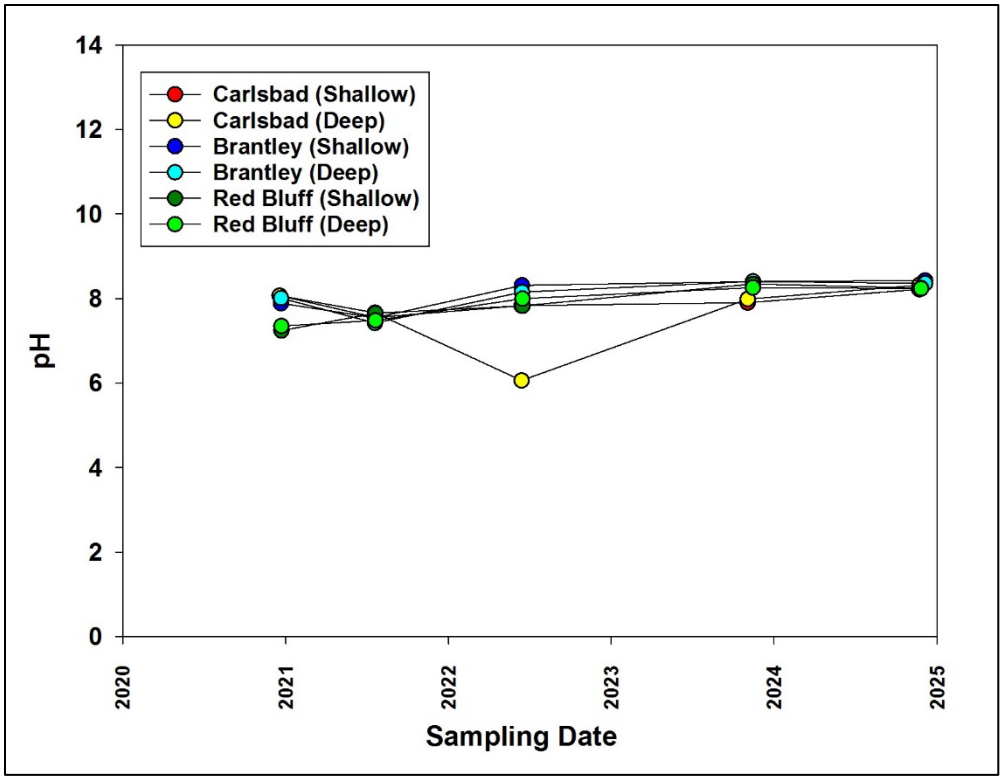


Figure 10.39. Historical pH Measurements in Surface Water

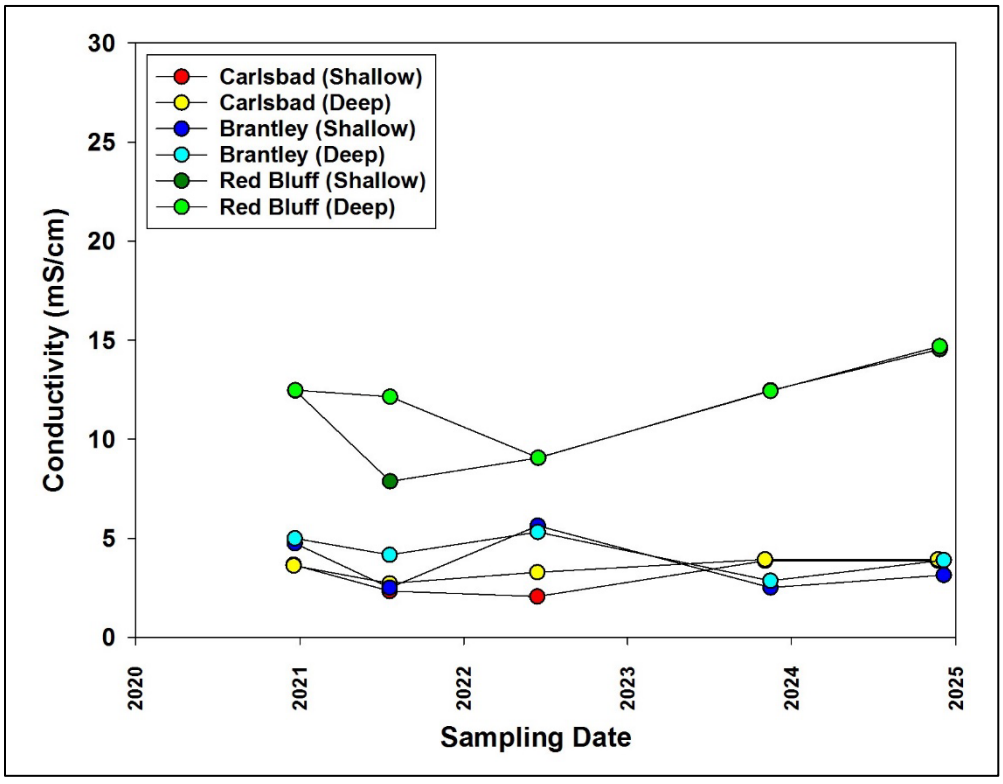


Figure 10.40. Historical Conductivity Measurements in Surface Water

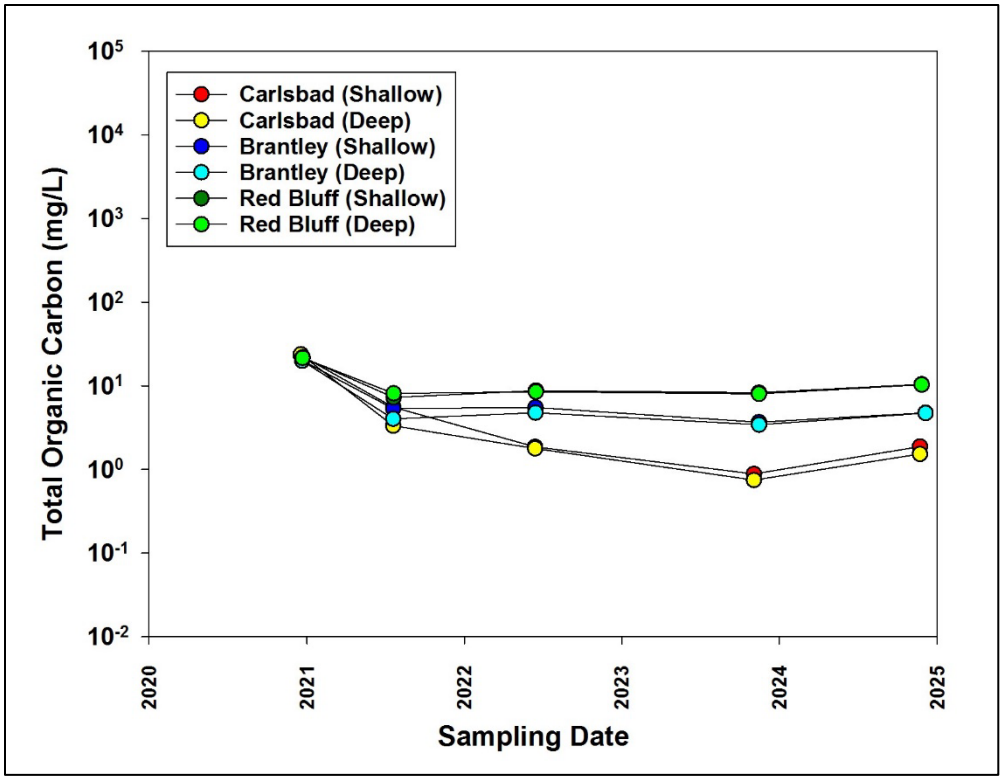


Figure 10.41. Historical Total Organic Carbon Concentrations in Surface Water

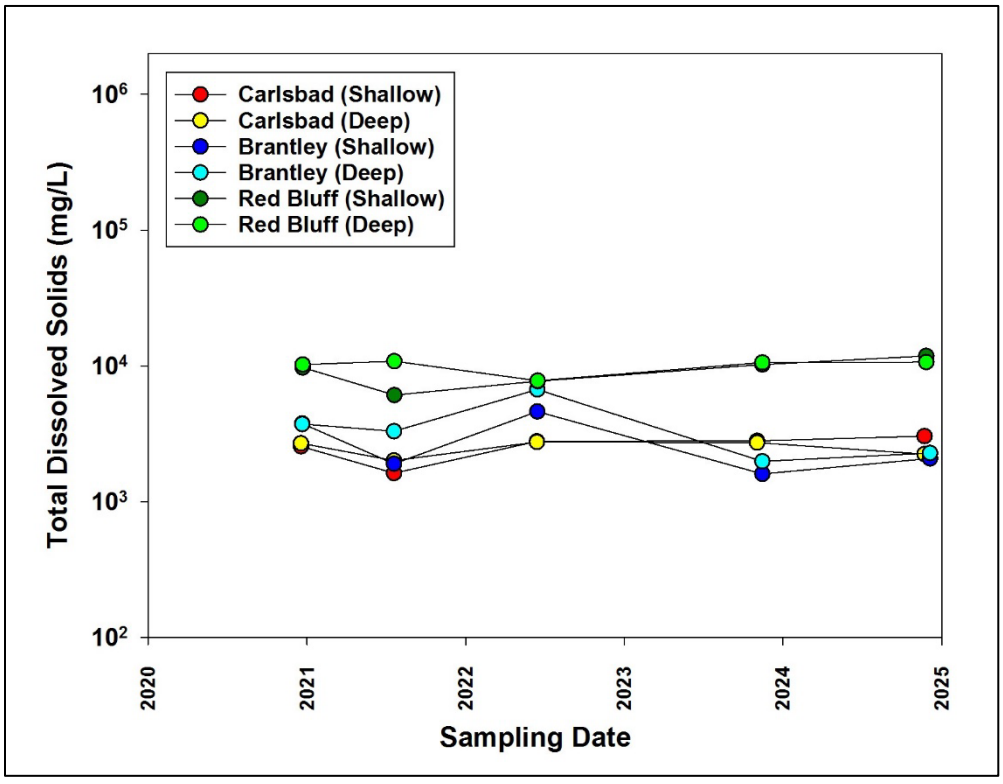


Figure 10.42. Historical Total Dissolved Solids Concentrations in Surface Water

Conclusions

This chapter presents the non-radiological monitoring results of a variety of environmental media including effluent air, airborne particulates, drinking water, and surface water for the calendar year 2024. While some variation is expected, no noticeable changes were observed in 2024 that could be attributed to activities at the WIPP site.

Variations in effluent air for selected anions and cations measured at Station A are expected and likely a result of anthropogenic activity due to the nature of the WIPP site. Variations in selected metals measured at Station A have been observed since before the WIPP site accepted the first shipment of waste and are likely related to underground activity as well. It is important to note that metal concentrations measured at Station B are significantly lower than those measured at Station A and exhibit a much smaller degree of variation. This confirms that very little inorganic material makes it past the WIPP's extensive exhaust filtration system.

Variations in inorganic concentrations observed in airborne particulates collected at both above-ground locations behaved similarly despite being over 20 miles apart. This suggests that similar events, such as weather and anthropogenic activity, were observed at both locations. Changes in concentrations are likely due to a combination of weather and local topography. Mining, oil and gas extraction, and a variety of agricultural activities are common in southeast New Mexico and are known to play an important role in the types and amounts of inorganic materials measured in airborne particulates.

High salt component concentrations, such as chloride, sodium, magnesium, and potassium, are routinely detected in regional drinking water due to the presence of natural salt deposits in the region. Over time, only minor variations have been observed in the concentrations of inorganic constituents, along with parameters such as pH and conductivity. Among the monitored locations, Malaga, Otis, and Hobbs consistently show the highest levels of inorganic constituents, while Carlsbad and Loving typically exhibit the lowest. Very small changes were observed in each of the reservoirs over time suggesting that environmental changes have little to no noticeable impact on these water sources. Metals commonly associated with health risks such as arsenic, barium, chromium, copper, lead, mercury, and antimony were all found to be well below the U.S. EPA's Maximum Contaminant Levels (MCLs). The respective MCLs (in mg/L) are arsenic (0.010), barium (2), chromium (0.1), copper (1.3), lead (0.010), mercury (0.002), and antimony (0.006). Mercury levels were even below the method detection limit of 0.001 mg/L. Nitrate concentrations across all sources ranged from 4.63 to 18.0 mg/L, remaining safely below the WHO MCL of 50 mg/L. All sites complied with the EPA-recommended pH range for drinking water (6.5–8.5). However, Hobbs, Otis, and Malaga had total dissolved solids (TDS) levels exceeding the EPA limit of 500 mg/L.

In general, surface water samples tend to exhibit much higher concentrations of all inorganic materials compared to drinking water. The highest concentrations can be found almost always in Red Bluff, while the concentrations in Lake Carlsbad are the lowest among the

three regional water sources. Virtually all the metal concentrations were very consistent over time, while anions and cations appear to fluctuate annually suggesting they are more influenced by changes in the environment, mining and agricultural activities. For example, during dry monsoon seasons that are characterized by low rainfall and unusually high temperatures, evaporation could be responsible for increases in salt components such as sodium, calcium, chloride, sulfate, and magnesium. Chloride and sulfate are the most abundant anions in surface water, with Red Bluff showing the highest concentrations (~3700 mg/L) compared to ~1000 mg/L at other sites. Chloride mainly originates from natural rock weathering, while sulfate comes from both natural sources (gypsum dissolution) and human activities such as agriculture and mining.

CHAPTER 11 - LOW BACKGROUND RADIATION EXPERIMENT (LBRE)

Introduction

To complement our radiation work at WIPP with bacteria, mammalian cells, nematodes and mosquitos we deployed the well-studied biological model, the fruit fly *Drosophila melanogaster*. The LBRE grant was able to hire Jakob Plante, a 3.8 GPA graduate from New Mexico Institute of Mining and Technology to develop this model organism for experimentation at WIPP. Plante successfully defended his MS thesis entitled *Effects of Reduced Background Radiation on Drosophila melanogaster Reproduction and Growth* in May 2025.

Materials and Methods

In culturing a new model organism, the main challenge we had was to reduce the endogenous radiation from the standard fruit fly medium (Nutri-fly) which has a calculated dose rate of 28.1 nGy/hr coming primarily from the potassium in the medium (Table 11.1). We grew flies in an alternate medium that reduced endogenous dose rate to 5.2 nGy/hr which is the medium we used in our Summer 2024 experiments at WIPP. However, there were some problems with maintaining the flies long term on the medium, and so in the Fall of 2024, we added 20% of the standard Nutri-Fly medium. Using both media, we nevertheless documented a growth inhibition in flies grown underground in the absence of normal levels of background radiation. Growth parameters including measuring pupae development and adult crawling rate and mortality were documented. Additionally, RNA was harvested for future gene expression analysis, using RNA-Seq transcriptome sequencing.

Table 11.1 Dose rate contribution of different media used to raise *Drosophila melanogaster*.

Group	Media	Potassium per Tube (mg)	Est. Dose Rate (nGy/hr)	Total Dose (uGy)
Summer Surface Growth and Survival	Base media	1.1	88.2	29.6
Summer Underground Growth and Survival	Base Media	1.1	5.21	1.75
October Surface Control	Base media + 20% Nutri-Fly	2.2	99.0	33.3
October Underground Control	Base media + 20% Nutri-Fly	2.2	10.8	3.63
October Underground Rescue	Base media + 20% Nutri-Fly	2.2	10.8; 99.0	29.0
October Surface Reciprocal	Base media + 20% Nutri-Fly	2.2	99.0; 10.8	7.86
October Surface Microbiome	Nutri-Fly	5.4	116	39.0
October Underground Microbiome	Nutri-Fly	5.4	28.1	9.44

Results and Discussion

In the summer of 2024, we transported and emplaced at WIPP 75 tubes in the Surface control laboratory and 75 tubes emplaced in the pre WW II steel vault in the WIPP underground representing a total of 450 flies. Both short-term incubations (2 weeks) and long-term (6 weeks) incubations were carried out. Another batch of flies were emplaced in a separate Summer experiment. These summer experiments used the basal medium to grow the flies. Both experiments demonstrated a significant decrease in pupae number in the flies that were grown in radiation-deprived conditions in the underground vault (Figure 11.1).

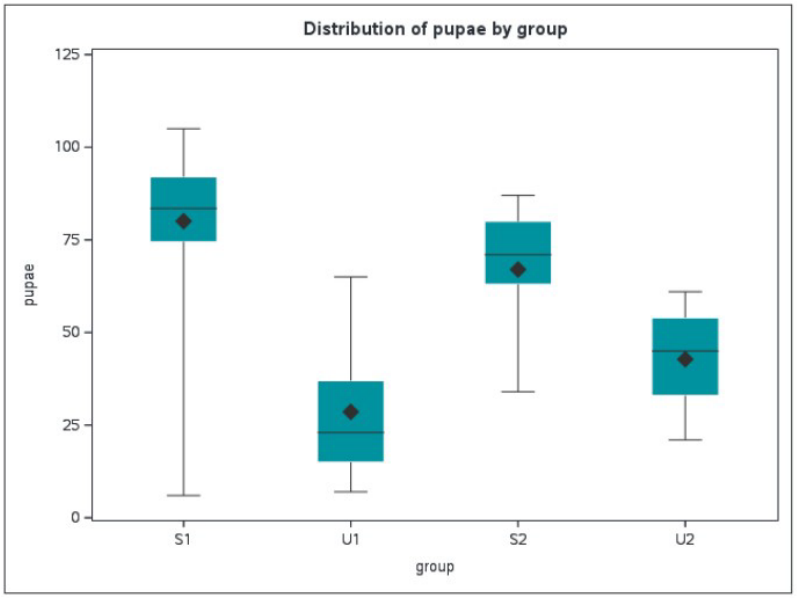


Figure 11.1. In two separate experiments carried out in the summer of 2024, Drosophila pupae numbers were significantly inhibited in the WIPP underground (U1 and U2) compared to being grown in control conditions at the surface (S1 and S2). S1-U1 p-value < 0.0001, S2-U2 p-value = 0.001 using the Wilcoxon rank-sum test.

We repeated this experiment in October at WIPP, using the base media + 20% Nutri-Fly media and we imposed a Reciprocal Control manipulation to “rescue” the flies in the underground to see if moving them back to the surface would abrogate the inhibition (Figure 11.2). We incubated three pairs of male and female flies for two days at the WIPP surface or underground, and then moved a subset of flies to the opposite treatment. Over the next 14 days 16, we monitored pupae development and at day 16 terminated the experiment by extracting RNA from all four groups.

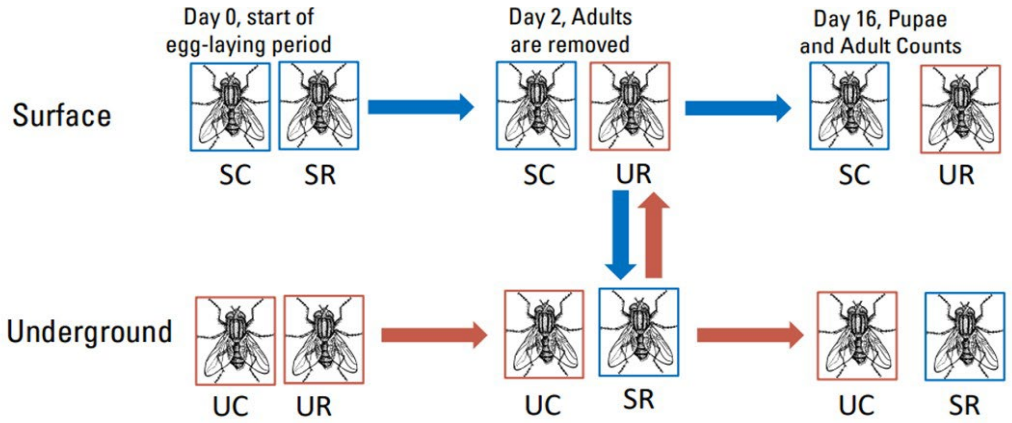


Figure 11.2. Reciprocal control experiment in which at day 2, a subset of flies underground were "rescued" (UR) to the surface to monitor if pupae inhibition could be reversed. Similarly, a batch of Surface flies were brought underground at day 2.

In the October experiment at WIPP, we again documented the significant retardation of pupae development – the flies that remained 16 days underground were significantly lower pupae numbers (compare Underground Control with Surface Control in Figure 11.3). And, intriguingly, when the flies underground were brought to the surface, the pupae numbers recovered (see Underground > Surface treatment). In a similar Reciprocal Control experiment, we ran at WIPP with bacteria in 2014 (Castillo et al. 2015), we documented the same rescue effect. These results further demonstrate the biological harm that occurs when organisms are deprived of normal, background levels of radiation.

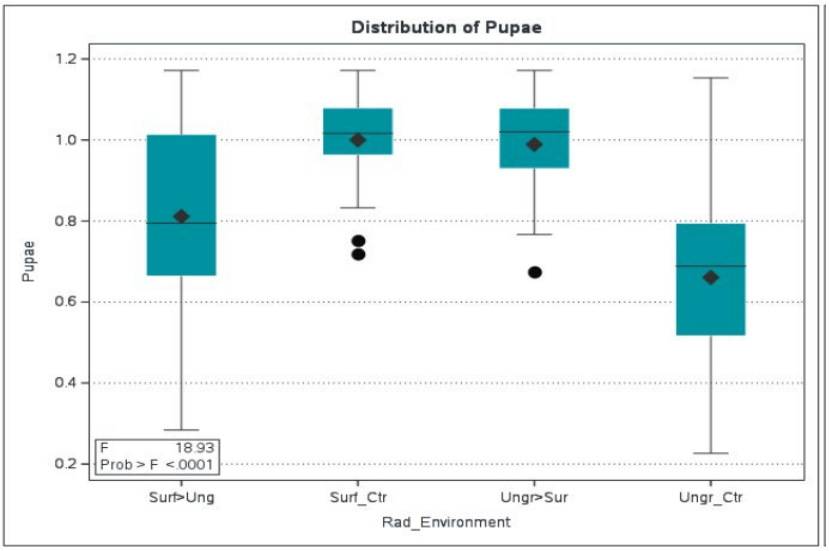


Figure 11.3. Reciprocal control experiment in which flies remained at the surface (Surf Ctr) or the underground (Ungr Ctr) for 16 days. In contrast, half of the flies were moved from the underground to the Surface (Ungr --> Sur) or moved from the Surface to the underground (Surf --> Ung).

One of the current LBRE project goals is to identify Permian-age biosignatures in WIPP halite inclusion fluid. We have developed procedures to disinfect halite crystals (Beowulf Owen 2023 MS Thesis) and extract PCR-amplifiable DNA from the “Generic Weep Brine” that is used by Julie Swanson at Los Alamos National Laboratory (LANL) to represent WIPP halite brine (see 2023 CEMRC Annual Report). We report here recent progress made in developing our clean room and the microscopy methods we intend to use to identify biomarkers.

We completed our move of our Ancient DNA Laboratory to a clean room in which we have constructed and installed a sterile-area glove box. There are two compartments in the glove box, one a staging area where reagents and supplies are introduced, and the other compartment housing the drill, magnifying cameras, and lights (Figure 11.4.A). During drilling, two camera angles can be projected onto the screen at once to allow for precision drilling and sampling of halite fluid (Figure 11.4.B). Inclusion samples are tested for cell growth, DNA and Energy-Dispersive X-ray Spectroscopy (EDS) to complement Transmission and Scanning Electron Microscopy (TEM & SEM) data.



Figure 11.4. A. HEPA-filtered glove box in new cleanroom location in NMSU Biology department. B. Using two magnifying cameras, student drills into WIPP halite in pilot study.

CHAPTER 12 - QUALITY ASSURANCE

General Analytical Quality Assurance

Quality assurance (QA) and quality control (QC) practices encompass all aspects of CEMRC's WIPP Environmental Monitoring Programs (WIPP-EM). The development and implementation of an independent health and environmental monitoring program has been CEMRC's primary activity. The multilayered components of the CEMRC QA Program ensure that all analytical data reported in this report are of high quality, reliable, and that they meet quality assurance and quality control objectives.

CEMRC is subject to the policies, procedures, and guidelines adopted by NMSU, as well as state and federal laws and regulations that govern the operation of the University and radiological facilities. The management of CEMRC is committed to conducting a well-defined quality assurance program, incorporating good professional practices and focusing on the quality of its testing and calibration in research and service to sponsors. CEMRC's technical programmatic areas in 2024 included Environmental Chemistry, Radiochemistry, Field Programs, and Internal Dosimetry. Since its inception, CEMRC's WIPP-EM program has been conducted as a scientific investigation, meaning that it operates without any compliance, regulatory, or oversight responsibilities. As such, there are no specific requirements for reporting data other than following good scientific practices.

Quality Assurance/Quality Control for Field Sampling

Samples for CEMRC's WIPP-EM Programs are collected by personnel trained following approved procedures. Established sampling locations are accurately identified and documented to ensure continuity of data. Field duplicate samples are used to assess sampling and measurement precision. Logbooks are maintained by technical staff in field operations to record locations and other specifics of the sample collection, such as data on instrument identifications, performance, calibration, and maintenance. Data generated from field sampling equipment are error checked by using routine cross-checks, control charts, and graphical summaries. Most data collected in written form are also entered in electronic files and electronic copies are cross-checked against the original data forms. All electronic files are backed up daily.

Calibration and maintenance of equipment and analytical instruments are carried out on predetermined schedules coinciding with the manufacturer's specifications or modified to special project needs. Calibrations are either carried out by equipment vendors or by CEMRC personnel using certified calibration standards.

Quality Assurance/Quality Control for Radiochemistry

Quality control in the analytical laboratories is maintained through tracking and verification of analytical instrument performance, the use of American Chemical Society (ACS) certified chemicals, and the use of National Institute of Standards and Technology (NIST) traceable radionuclide solutions and standards. Control checks are performed on all nuclear counting

instruments prior to counting a new sample to ensure that the instrumentation is working properly. Routine background determinations are also performed on all detector systems to subtract background signals from sample activities. Analytical data are verified and validated as required by project-specific quality objectives before being used to support decision-making.

CEMRC also typically participates in two national performance evaluation programs, NIST Radiochemistry Inter-Comparison Program (NIST-RIP) and the DOE-Mixed-Analyte Performance Evaluation Program (MAPEP) for soil, air filter, vegetation, and water analysis. Isotopes of interest in these performance evolution programs are $^{233/234}U$, ^{238}U, ^{238}Pu, $^{239+240}Pu$, ^{241}Am, ^{90}Sr, and gamma-radiation emitters. Proficiency testing helps ensure the accuracy and precision of analytical results reported to DOE and other stakeholders. The MAPEP performance evaluation results for Series 52 are presented in APPENDIX J. In summary, 31 of the reported results were acceptable, 1 result was acceptable with warning, and 2 results were not acceptable.

Quality Assurance/Quality Control for Environmental Chemistry

The analytical methods employed for inorganic analyses in the environmental chemistry program at CEMRC are based, when applicable, on various standard procedures (EPA/600/4-79-020, 1983; EPA/SW-846, 1997; American Public Health Association, 1981). For some matrix/analyte combinations, appropriate external standard procedures do not exist. For those cases, specialized procedures were developed to meet the need of the WIPP-EM program.

Inorganic trace metal analyses were performed using Perkin Elmer Inductively Coupled Plasma Mass Spectrometry (ICP-MS), while inorganic cations and anions were measured using Ion Chromatography (IC). For ICP-MS, triplicate readings were performed on each sample, with the average result reported. Instrument performance checks shown in APPENDIX J, Table J.3 were run daily; the instrument was calibrated before every sample analysis. The calibration range depends on the type of sample being analyzed.

The Ion Chromatography (IC) instrument was calibrated for inorganic cation concentrations ranging from 0.25 to 10 ppm and inorganic anion concentrations ranging from 2 to 100 ppm. Currently, CEMRC procedures for IC analysis only require calibrating the IC instrument once a month, but calibration checks were performed during every sample analysis as routine quality assurance.

For both ICP-MS and IC analyses, a variety of quality control samples, including blanks, spiked blanks, duplicates, and spiked samples, were prepared and run alongside every set of WIPP-EM samples during analysis. Certified reference materials were also analyzed with every sample batch. Once a year, CEMRC participates in several blind proficiency test (PT) studies coordinated by the Environmental Resource Associates (ERA). All of the reported results were within the acceptable ranges as set forth by ERA for inorganic metals, anions, and cations. The results of the blind tests are shown in APPENDIX J, Tables J.4 and J.5.

Quality Assurance/Quality Control for Internal Dosimetry

The *in vivo* radiobioassay program at CEMRC participates in the Department of Energy's *In-Vivo* Laboratory Accreditation Program (DOELAP) via the WIPP M&O contractor and is currently accredited as a service laboratory to perform the following direct bioassays:

- Transuranic elements via L x-rays of ^{238}Pu
- ^{241}Am in lung
- ^{234}Th in lung
- ^{235}U in lung
- Fission and activation products in the lung, including ^{54}Mn, ^{57}Co, ^{58}Co, and ^{60}Co
- Fission and activation products in the whole body, including ^{134}Cs and ^{137}Cs

Under DOELAP, the *in vivo* bioassay program is subject to the performance and quality assurance requirements specified in the Department of Energy Laboratory Accreditation Program for Radiobioassay (DOE-STD-1112-98) and Performance Criteria for Radiobioassay (ANSI-N13.30). A DOELAP testing cycle was completed in 2018 that included counting phantoms representative of each of the categories listed above.

To evaluate system performance, quality control data were routinely performed throughout the year to verify that the lung and whole-body counting system was operating as it was at the time the system was calibrated. Quality control parameters that track both overall system performance and individual detector performance were measured. Quality control parameters tracked to evaluate individual detector performance include the following:

- Net peak area, peak centroid and peak resolution (Full Width at Half Maximum, FWHM) across the energy range of the spectrum
- Detector background

Quality control parameters tracked to assess overall system performance include the following:

- Mean weighted activity of a standard source
- Summed detector background
- Efficiency calibration verification using NIST-traceable standards and phantoms

In addition, CEMRC's Internal Dosimetry program has participated in the DOE Radiological and Environmental Sciences Laboratory (RESL) quarterly blind testing of Bottle Manikin Absorber (BOMAB) phantom for ^{54}Mn, ^{60}Co, ^{134}Cs, and ^{137}Cs and Torso for ^{238}Pu, ^{241}Am, $^{235, 238}$U, $^{57, 60}$Co, ^{54}Mn activities deposited in the body. These bottle phantom/torso were counted on the whole-body counting system and the measured activities were reported

back to RESL to compare against the known activities. CEMRC has consistently passed all performance criteria for the tests.

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APPENDIX A - RADIONUCLIDE CONCENTRATIONS AT STATIONS A AND B

Actinide concentrations at Stations A and B

Uranium concentrations at Stations A and B

Gamma radionuclide concentrations at Stations A and B

Strontium concentrations at Stations A and B

Table A.1. Activity concentrations of ^{241}Am (Bq/m^3) at Station A

Sample Date	^{241}Am Activity Bq/m^3	Unc. (2-sig) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	2.52E-05	3.47E-06	2.18E-06	Detected
2nd week	5.80E-05	5.73E-06	2.97E-06	Detected
3rd week	2.38E-05	3.53E-06	1.81E-06	Detected
4th week	1.76E-05	2.44E-06	1.33E-06	Detected
February 2024				
1st week	2.83E-05	3.89E-06	1.94E-06	Detected
2nd week	1.95E-05	4.15E-06	4.28E-06	Detected
3rd week	1.61E-05	3.00E-06	2.75E-06	Detected
4th week	1.29E-05	2.38E-06	1.62E-06	Detected
March 2024				
1st week	2.08E-05	3.26E-06	1.95E-06	Detected
2nd week	8.46E-06	2.09E-06	1.74E-06	Detected
3rd week	1.04E-05	2.37E-06	2.28E-06	Detected
4th week	1.76E-05	2.78E-06	2.33E-06	Detected
April 2024				
1st week				
2nd week	4.95E-05	6.80E-06	2.77E-06	Detected
3rd week	3.21E-05	5.29E-06	3.47E-06	Detected
4th week	1.39E-05	2.88E-06	2.19E-06	Detected
May 2024				
1st week	3.38E-05	6.32E-06	4.68E-06	Detected
2nd week	4.29E-05	7.99E-06	2.09E-06	Detected
3rd week	2.71E-05	6.77E-06	6.26E-06	Detected
4th week	2.79E-05	6.72E-06	6.77E-06	Detected
June 2024				
1st week	9.41E-06	2.44E-06	2.28E-06	Detected
2nd week	8.36E-06	2.48E-06	2.85E-06	Detected
3rd week	9.77E-06	3.79E-06	4.97E-06	Detected
4th week	1.28E-05	3.07E-06	3.44E-06	Detected

Table A.1. Activity concentrations of ^{241}Am (Bq/m^3) at Station A (continued)

Sample Date	^{241}Am Activity Bq/m^3	Unc. (2-sig) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	1.00E-04	6.07E-06	1.65E-06	Detected
2nd week	1.30E-05	1.63E-06	7.84E-07	Detected
3rd week	3.11E-05	3.60E-06	1.64E-06	Detected
4th week	6.05E-05	5.98E-06	1.63E-06	Detected
August 2024				
1st week	2.13E-05	2.28E-06	1.25E-06	Detected
2nd week	1.42E-05	2.28E-06	1.88E-06	Detected
3rd week	1.74E-05	3.05E-06	1.93E-06	Detected
4th week	4.39E-06	9.04E-07	7.58E-07	Detected
September 2024				
1st week	1.24E-05	2.09E-06	7.35E-07	Detected
2nd week	7.03E-06	1.38E-06	1.36E-06	Detected
3rd week	2.49E-06	9.59E-07	1.16E-06	Detected
4th week	7.06E-06	2.22E-06	2.74E-06	Detected
October 2024				
1st week				
2nd week				
3rd week				
4th week				
November 2024				
1st week				
2nd week				

Table A.2. Activity concentrations of $^{239+240}Pu$ (Bq/m^3) at Station A

Sample Date	$^{239+240}Pu$ Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	1.31E-05	2.47E-06	9.67E-07	Detected
2nd week	9.84E-06	2.12E-06	1.78E-06	Detected
3rd week	3.60E-06	1.34E-06	1.59E-06	Detected
4th week	3.41E-06	1.02E-06	1.02E-06	Detected
February 2024				
1st week	3.55E-06	1.23E-06	7.47E-07	Detected
2nd week	4.56E-06	1.86E-06	2.33E-06	Detected
3rd week	5.60E-06	1.70E-06	1.92E-06	Detected
4th week	7.77E-06	1.85E-06	7.63E-07	Detected
March 2024				
1st week	3.81E-06	1.50E-06	1.95E-06	Detected
2nd week	6.34E-06	1.85E-06	1.80E-06	Detected
3rd week	2.70E-06	1.51E-06	2.64E-06	Not Detected
4th week	8.59E-06	1.84E-06	1.83E-06	Detected
April 2024				
1st week	4.67E-06	1.68E-06	2.03E-06	Detected
2nd week	8.53E-06	2.25E-06	2.12E-06	Detected
3rd week	7.73E-06	3.64E-06	3.31E-06	Detected
4th week	4.72E-06	1.56E-06	1.79E-06	Detected
May 2024				
1st week	6.21E-06	1.41E-06	6.95E-07	Detected
2nd week	2.20E-06	1.84E-06	3.73E-06	Not Detected
3rd week	3.30E-06	1.66E-06	2.71E-06	Not Detected
4th week	6.82E-06	1.66E-06	1.58E-06	Detected
June 2024				
1st week	4.64E-06	1.71E-06	1.99E-06	Detected
2nd week	1.55E-06	7.56E-07	1.07E-06	Not Detected
3rd week	7.82E-06	1.64E-06	5.93E-07	Detected
4th week	7.89E-06	1.90E-06	1.55E-06	Detected

Table A.2. Activity concentrations $^{239+240}$Pu (Bq/m^3) at Station A (continued)

Sample Date	$^{239+240}$Pu Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	6.03E-06	1.66E-06	1.64E-06	Detected
2nd week	5.96E-06	1.92E-06	3.01E-06	Detected
3rd week	2.78E-06	1.24E-06	1.98E-06	Not Detected
4th week	2.24E-06	9.39E-07	1.46E-06	Not Detected
August 2024				
1st week	5.15E-06	1.56E-06	1.96E-06	Detected
2nd week	5.97E-06	1.84E-06	2.63E-06	Detected
3rd week	2.44E-06	1.37E-06	2.49E-06	Not Detected
4th week	3.45E-06	1.08E-06	1.34E-06	Detected
September 2024				
1st week	2.45E-06	1.09E-06	1.52E-06	Not Detected
2nd week	2.38E-06	9.92E-07	1.06E-06	Detected
3rd week	3.40E-06	1.30E-06	1.73E-06	Detected
4th week	1.73E-06	8.23E-07	1.20E-06	Not Detected
October 2024				
1st week	4.71E-06	2.31E-06	2.30E-06	Detected
2nd week	5.54E-06	2.81E-06	4.19E-06	Not Detected
3rd week	3.08E-06	2.84E-06	5.42E-06	Not Detected
4th week	2.67E-06	1.58E-06	2.64E-06	Not Detected
November 2024				
1st week	4.16E-06	2.57E-06	4.12E-06	Not Detected
2nd week	3.02E-06	2.41E-06	4.35E-06	Not Detected

Table A.3. Activity concentrations of ^{238}Pu (Bq/m^3) at Station A

Sample Date	^{238}Pu Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	5.22E-05	5.57E-06	1.98E-06	Detected
2nd week	4.62E-05	5.04E-06	2.03E-06	Detected
3rd week	4.72E-05	5.13E-06	2.26E-06	Detected
4th week	4.99E-05	4.52E-06	1.22E-06	Detected
February 2024				
1st week	6.25E-05	6.20E-06	9.47E-07	Detected
2nd week	7.71E-05	8.13E-06	3.48E-06	Detected
3rd week	4.39E-05	5.09E-06	2.89E-06	Detected
4th week	5.02E-05	5.31E-06	7.67E-07	Detected
March 2024				
1st week	3.81E-05	4.71E-06	1.35E-06	Detected
2nd week	3.72E-05	4.73E-06	1.60E-06	Detected
3rd week	3.65E-05	4.76E-06	2.22E-06	Detected
4th week	3.35E-05	3.76E-06	1.67E-06	Detected
April 2024				
1st week	3.18E-05	4.40E-06	2.21E-06	Detected
2nd week	3.74E-05	4.94E-06	1.73E-06	Detected
3rd week	3.02E-05	7.64E-06	4.27E-06	Detected
4th week	4.13E-05	5.03E-06	2.99E-06	Detected
May 2024				
1st week	3.78E-05	3.92E-06	1.84E-06	Detected
2nd week	4.15E-05	5.86E-06	3.61E-06	Detected
3rd week	3.38E-05	4.83E-06	2.86E-06	Detected
4th week	5.63E-05	5.29E-06	1.80E-06	Detected
June 2024				
1st week	4.43E-05	5.65E-06	2.82E-06	Detected
2nd week	4.01E-05	3.86E-06	1.27E-06	Detected
3rd week	4.09E-05	4.18E-06	7.51E-07	Detected
4th week	3.97E-05	4.75E-06	2.30E-06	Detected

Table A.3. Activity concentrations of ^{238}Pu (Bq/m^3) at Station A (continued)

Sample Date	^{238}Pu Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	3.65E-05	4.37E-06	2.74E-06	Detected
2nd week	3.26E-05	4.09E-06	3.21E-06	Detected
3rd week	4.52E-05	4.65E-06	1.80E-06	Detected
4th week	4.33E-05	4.08E-06	1.76E-06	Detected
August 2024				
1st week	4.34E-05	4.58E-06	1.52E-06	Detected
2nd week	4.26E-05	4.68E-06	1.48E-06	Detected
3rd week	3.86E-05	4.54E-06	2.92E-06	Detected
4th week	3.91E-05	3.89E-06	1.41E-06	Detected
September 2024				
1st week	3.43E-05	4.04E-06	2.32E-06	Detected
2nd week	3.27E-05	3.85E-06	1.54E-06	Detected
3rd week	3.46E-05	4.13E-06	1.96E-06	Detected
4th week	3.26E-05	3.48E-06	1.21E-06	Detected
October 2024				
1st week	2.44E-05	5.78E-06	5.31E-06	Detected
2nd week	3.21E-05	6.49E-06	4.54E-06	Detected
3rd week	2.78E-05	7.08E-06	4.84E-06	Detected
4th week	2.97E-05	4.91E-06	3.00E-06	Detected
November 2024				
1st week	3.23E-05	6.86E-06	5.84E-06	Detected
2nd week	2.45E-05	5.98E-06	5.17E-06	Detected

Table A.4. Activity concentrations of ^{241}Am (Bq/g) at Station A

Sample Date	^{241}Am Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
January 2024				
1st week	2.30E-01	3.17E-02	1.99E-02	Detected
2nd week	2.11E-01	2.08E-02	1.08E-02	Detected
3rd week	9.17E-02	1.36E-02	6.98E-03	Detected
4th week	8.36E-02	1.16E-02	6.34E-03	Detected
February 2024				
1st week	2.12E-01	2.92E-02	1.46E-02	Detected
2nd week	8.34E-02	1.78E-02	1.83E-02	Detected
3rd week	5.08E-02	9.47E-03	8.69E-03	Detected
4th week	6.98E-02	1.29E-02	8.74E-03	Detected
March 2024				
1st week	5.50E-02	8.61E-03	5.15E-03	Detected
2nd week	3.34E-02	8.24E-03	6.88E-03	Detected
3rd week	4.84E-02	1.10E-02	1.06E-02	Detected
4th week	4.89E-02	7.72E-03	6.48E-03	Detected
April 2024				
1st week				
2nd week	2.38E-01	3.27E-02	1.33E-02	Detected
3rd week	8.61E-02	1.42E-02	9.32E-03	Detected
4th week	1.74E-02	3.62E-03	2.75E-03	Detected
May 2024				
1st week	5.68E-02	1.06E-02	7.86E-03	Detected
2nd week	2.04E-01	3.80E-02	9.96E-03	Detected
3rd week	6.43E-02	1.61E-02	1.49E-02	Detected
4th week	2.18E-01	5.24E-02	5.28E-02	Detected
June 2024				
1st week	1.13E-01	2.92E-02	2.73E-02	Detected
2nd week	2.04E-02	6.05E-03	6.95E-03	Detected
3rd week	2.81E-02	1.09E-02	1.43E-02	Detected
4th week	2.99E-02	7.17E-03	8.02E-03	Detected

Table A.4. Activity concentrations of ^{241}Am (Bq/g) at Station A (continued)

Sample Date	^{241}Am Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
July 2024				
1st week	4.33E-01	2.62E-02	7.14E-03	Detected
2nd week	4.23E-02	5.34E-03	2.56E-03	Detected
3rd week	8.11E-02	9.37E-03	4.28E-03	Detected
4th week	1.34E-01	1.33E-02	3.62E-03	Detected
August 2024				
1st week	5.52E-02	5.91E-03	3.24E-03	Detected
2nd week	3.70E-02	5.94E-03	4.91E-03	Detected
3rd week	5.77E-02	1.01E-02	6.39E-03	Detected
4th week	1.10E-02	2.27E-03	1.90E-03	Detected
September 2024				
1st week	3.07E-02	5.20E-03	1.83E-03	Detected
2nd week	3.31E-02	6.52E-03	6.39E-03	Detected
3rd week	9.96E-03	3.84E-03	4.65E-03	Detected
4th week	2.57E-02	8.11E-03	9.97E-03	Detected
October 2024				
1st week				
2nd week				
3rd week				
4th week				
November 2024				
1st week				
2nd week				

Table A.5. Activity concentrations of $^{239+240}$Pu (Bq/g) at Station A

Sample Date	$^{239+240}$Pu Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
January 2024				
1st week	1.20E-01	2.25E-02	8.82E-03	Detected
2nd week	3.57E-02	7.68E-03	6.46E-03	Detected
3rd week	1.39E-02	5.17E-03	6.11E-03	Detected
4th week	1.62E-02	4.86E-03	4.86E-03	Detected
February 2024				
1st week	2.67E-02	9.26E-03	5.60E-03	Detected
2nd week	1.95E-02	7.94E-03	9.98E-03	Detected
3rd week	1.77E-02	5.36E-03	6.04E-03	Detected
4th week	4.20E-02	1.00E-02	4.12E-03	Detected
March 2024				
1st week	1.01E-02	3.97E-03	5.16E-03	Detected
2nd week	2.50E-02	7.31E-03	7.09E-03	Detected
3rd week	1.26E-02	7.06E-03	1.23E-02	Not Detected
4th week	2.38E-02	5.10E-03	5.09E-03	Detected
April 2024				
1st week	1.27E-02	4.57E-03	5.55E-03	Detected
2nd week	4.11E-02	1.08E-02	1.02E-02	Detected
3rd week	2.08E-02	9.79E-03	8.89E-03	Detected
4th week	5.92E-03	1.96E-03	2.24E-03	Detected
May 2024				
1st week	1.04E-02	2.38E-03	1.17E-03	Detected
2nd week	1.05E-02	8.74E-03	1.78E-02	Not Detected
3rd week	7.84E-03	3.94E-03	6.43E-03	Not Detected
4th week	5.32E-02	1.30E-02	1.24E-02	Detected
June 2024				
1st week	5.55E-02	2.05E-02	2.38E-02	Detected
2nd week	3.79E-03	1.84E-03	2.61E-03	Not Detected
3rd week	2.25E-02	4.72E-03	1.70E-03	Detected
4th week	1.84E-02	4.44E-03	3.61E-03	Detected

Table A.5. Activity concentrations of $^{239+240}$Pu (Bq/g) at Station A (continued)

Sample Date	$^{239+240}$Pu Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
July 2024				
1st week	2.61E-02	7.16E-03	7.10E-03	Detected
2nd week	1.95E-02	6.28E-03	9.83E-03	Detected
3rd week	7.25E-03	3.22E-03	5.16E-03	Not Detected
4th week	4.97E-03	2.08E-03	3.24E-03	Not Detected
August 2024				
1st week	1.34E-02	4.05E-03	5.09E-03	Detected
2nd week	1.56E-02	4.80E-03	6.86E-03	Detected
3rd week	8.07E-03	4.54E-03	8.23E-03	Not Detected
4th week	8.66E-03	2.70E-03	3.36E-03	Detected
September 2024				
1st week	6.10E-03	2.71E-03	3.79E-03	Not Detected
2nd week	1.12E-02	4.67E-03	5.00E-03	Detected
3rd week	1.36E-02	5.20E-03	6.92E-03	Detected
4th week	6.30E-03	3.00E-03	4.39E-03	Not Detected
October 2024				
1st week	3.20E-02	1.57E-02	1.56E-02	Detected
2nd week	3.64E-02	1.85E-02	2.76E-02	Not Detected
3rd week	1.14E-02	1.06E-02	2.02E-02	Not Detected
4th week	1.06E-02	6.30E-03	1.05E-02	Not Detected
November 2024				
1st week	2.35E-02	1.46E-02	2.33E-02	Not Detected
2nd week	9.81E-03	7.83E-03	1.42E-02	Not Detected

Table A.6. Activity concentrations of ^{238}Pu (Bq/g) at Station A

Sample Date	^{238}Pu Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
January 2024				
1st week	4.76E-01	5.08E-02	1.81E-02	Detected
2nd week	1.68E-01	1.83E-02	7.36E-03	Detected
3rd week	1.82E-01	1.98E-02	8.70E-03	Detected
4th week	2.37E-01	2.15E-02	5.80E-03	Detected
February 2024				
1st week	4.69E-01	4.66E-02	7.11E-03	Detected
2nd week	3.30E-01	3.48E-02	1.49E-02	Detected
3rd week	1.39E-01	1.61E-02	9.10E-03	Detected
4th week	2.71E-01	2.87E-02	4.14E-03	Detected
March 2024				
1st week	1.01E-01	1.24E-02	3.58E-03	Detected
2nd week	1.47E-01	1.87E-02	6.33E-03	Detected
3rd week	1.70E-01	2.22E-02	1.04E-02	Detected
4th week	9.29E-02	1.04E-02	4.64E-03	Detected
April 2024				
1st week	8.67E-02	1.20E-02	6.02E-03	Detected
2nd week	1.80E-01	2.38E-02	8.31E-03	Detected
3rd week	8.11E-02	2.05E-02	1.15E-02	Detected
4th week	5.18E-02	6.32E-03	3.75E-03	Detected
May 2024				
1st week	6.35E-02	6.60E-03	3.10E-03	Detected
2nd week	1.97E-01	2.79E-02	1.72E-02	Detected
3rd week	8.03E-02	1.15E-02	6.80E-03	Detected
4th week	4.39E-01	4.13E-02	1.40E-02	Detected
June 2024				
1st week	5.30E-01	6.76E-02	3.38E-02	Detected
2nd week	9.79E-02	9.43E-03	3.11E-03	Detected
3rd week	1.18E-01	1.20E-02	2.16E-03	Detected
4th week	9.25E-02	1.11E-02	5.36E-03	Detected

Table A.6. Activity concentrations of ^{238}Pu (Bq/g) at Station A (continued)

Sample Date	^{238}Pu Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
July 2024				
1st week	1.58E-01	1.89E-02	1.19E-02	Detected
2nd week	1.07E-01	1.34E-02	1.05E-02	Detected
3rd week	1.18E-01	1.21E-02	4.69E-03	Detected
4th week	9.60E-02	9.06E-03	3.90E-03	Detected
August 2024				
1st week	1.13E-01	1.19E-02	3.96E-03	Detected
2nd week	1.11E-01	1.22E-02	3.87E-03	Detected
3rd week	1.27E-01	1.50E-02	9.65E-03	Detected
4th week	9.80E-02	9.75E-03	3.54E-03	Detected
September 2024				
1st week	8.53E-02	1.01E-02	5.76E-03	Detected
2nd week	1.54E-01	1.81E-02	7.26E-03	Detected
3rd week	1.38E-01	1.65E-02	7.84E-03	Detected
4th week	1.19E-01	1.27E-02	4.39E-03	Detected
October 2024				
1st week	1.66E-01	3.93E-02	3.61E-02	Detected
2nd week	2.11E-01	4.27E-02	2.99E-02	Detected
3rd week	1.03E-01	2.63E-02	1.80E-02	Detected
4th week	1.18E-01	1.96E-02	1.20E-02	Detected
November 2024				
1st week	1.83E-01	3.88E-02	3.31E-02	Detected
2nd week	7.95E-02	1.95E-02	1.68E-02	Detected

Table A.7. Activity concentrations of U isotopes at Station A

Sample Date	^{234}U Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	-2.85E-07	1.83E-06	2.55E-06	Not Detected
2nd week	-3.09E-07	1.63E-06	1.51E-06	Not Detected
3rd week	-8.14E-07	1.72E-06	2.49E-06	Not Detected
4th week	5.84E-07	1.31E-06	1.52E-06	Not Detected
February 2024				
1st week	-2.04E-06	1.84E-06	3.42E-06	Not Detected
2nd week	4.16E-07	2.79E-06	3.71E-06	Not Detected
3rd week	-2.93E-07	1.72E-06	1.88E-06	Not Detected
4th week	-5.60E-07	1.63E-06	1.72E-06	Not Detected
March 2024				
1st week	-1.29E-06	1.76E-06	2.80E-06	Not Detected
2nd week	-7.79E-07	1.84E-06	2.88E-06	Not Detected
3rd week	6.68E-07	2.16E-06	3.04E-06	Not Detected
4th week	-1.41E-07	1.43E-06	2.33E-06	Not Detected
April 2024				
1st week	-1.06E-04	1.63E-05	1.67E-06	Not Detected
2nd week	-1.10E-04	1.62E-05	2.84E-06	Not Detected
3rd week	-1.10E-04	1.63E-05	1.91E-06	Not Detected
4th week	-8.88E-05	1.32E-05	1.43E-06	Not Detected
May 2024				
1st week	-1.09E-04	1.65E-05	1.25E-06	Not Detected
2nd week	-1.11E-04	1.63E-05	1.84E-06	Not Detected
3rd week	-1.08E-04	1.63E-05	8.05E-07	Not Detected
4th week	-1.15E-04	1.70E-05	2.00E-06	Not Detected
June 2024				
1st week	-1.09E-04	1.64E-05	3.12E-06	Not Detected
2nd week	-1.10E-04	1.63E-05	3.63E-06	Not Detected
3rd week	-1.12E-04	1.62E-05	2.58E-06	Not Detected
4th week	-8.56E-05	1.27E-05	1.82E-06	Not Detected

Table A.7. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{234}U Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	2.72E-06	5.05E-06	2.08E-06	Not Detected
2nd week	-5.63E-06	4.61E-06	3.28E-06	Not Detected
3rd week	1.73E-07	5.06E-06	3.49E-06	Not Detected
4th week	2.29E-06	3.56E-06	1.46E-06	Not Detected
August 2024				
1st week	3.57E-06	5.24E-06	2.31E-06	Not Detected
2nd week	2.89E-06	5.26E-06	2.76E-06	Not Detected
3rd week	-9.06E-07	4.63E-06	2.27E-06	Not Detected
4th week	3.82E-06	4.13E-06	2.72E-06	Not Detected
September 2024				
1st week	2.89E-06	5.09E-06	2.05E-06	Not Detected
2nd week	3.94E-06	5.40E-06	2.71E-06	Not Detected
3rd week	5.45E-06	4.99E-06	2.35E-06	Not Detected
4th week	5.56E-06	4.36E-06	1.98E-06	Not Detected
October 2024				
1st week	6.60E-07	4.46E-06	2.36E-06	Not Detected
2nd week	-1.78E-06	4.27E-06	1.93E-06	Not Detected
3rd week	2.66E-07	4.81E-06	3.21E-06	Not Detected
4th week	-1.54E-06	3.18E-06	2.48E-06	Not Detected
November 2024				
1st week	-1.02E-06	4.58E-06	2.55E-06	Not Detected
2nd week	3.92E-06	5.79E-06	4.03E-06	Not Detected

Table A.7. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{235}U Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	3.81E-07	7.92E-07	1.74E-06	Not Detected
2nd week	-3.26E-07	7.32E-07	2.04E-06	Not Detected
3rd week	7.52E-07	7.55E-07	1.16E-06	Not Detected
4th week	9.43E-08	4.23E-07	1.00E-06	Not Detected
February 2024				
1st week	-9.81E-09	7.79E-07	2.08E-06	Not Detected
2nd week	3.77E-07	1.35E-06	3.25E-06	Not Detected
3rd week	6.09E-07	7.63E-07	1.38E-06	Not Detected
4th week	1.46E-07	8.13E-07	1.97E-06	Not Detected
March 2024				
1st week	5.26E-07	7.98E-07	1.63E-06	Not Detected
2nd week	-1.38E-07	8.18E-07	2.27E-06	Not Detected
3rd week	6.69E-07	1.10E-06	2.47E-06	Not Detected
4th week	3.75E-07	5.74E-07	1.19E-06	Not Detected
April 2024				
1st week	-4.21E-06	2.25E-06	1.10E-06	Not Detected
2nd week	-5.13E-06	2.18E-06	1.39E-06	Not Detected
3rd week	-5.30E-06	2.36E-06	2.79E-06	Not Detected
4th week	-3.89E-06	1.81E-06	1.22E-06	Not Detected
May 2024				
1st week	-4.96E-06	2.20E-06	9.87E-07	Not Detected
2nd week	-4.84E-06	2.25E-06	1.50E-06	Not Detected
3rd week	-4.76E-06	2.20E-06	9.93E-07	Not Detected
4th week	-4.86E-06	2.31E-06	9.33E-07	Not Detected
June 2024				
1st week	-4.47E-06	2.37E-06	2.06E-06	Not Detected
2nd week	-5.43E-06	2.24E-06	2.21E-06	Not Detected
3rd week	-5.28E-06	2.27E-06	2.26E-06	Not Detected
4th week	-3.81E-06	1.76E-06	1.34E-06	Not Detected

Table A.7. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{235}U Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	-1.24E-06	1.08E-06	1.54E-06	Not Detected
2nd week	9.89E-08	1.66E-06	2.62E-06	Not Detected
3rd week	-1.23E-06	1.58E-06	3.33E-06	Not Detected
4th week	-5.13E-07	8.76E-07	1.27E-06	Not Detected
August 2024				
1st week	-5.24E-07	1.41E-06	2.25E-06	Not Detected
2nd week	-6.55E-07	1.33E-06	2.04E-06	Not Detected
3rd week	-6.89E-07	1.26E-06	1.81E-06	Not Detected
4th week	-3.04E-07	1.21E-06	2.30E-06	Not Detected
September 2024				
1st week	-3.82E-07	1.28E-06	1.51E-06	Not Detected
2nd week	-6.96E-07	1.26E-06	1.52E-06	Not Detected
3rd week	-4.27E-08	1.33E-06	1.85E-06	Not Detected
4th week	-9.58E-08	1.07E-06	1.31E-06	Not Detected
October 2024				
1st week	1.11E-06	1.26E-06	1.37E-06	Not Detected
2nd week	1.03E-06	1.26E-06	1.42E-06	Not Detected
3rd week	3.36E-07	1.40E-06	2.57E-06	Not Detected
4th week	-4.20E-07	1.03E-06	2.36E-06	Not Detected
November 2024				
1st week	1.64E-07	1.26E-06	2.21E-06	Not Detected
2nd week	8.39E-07	1.94E-06	3.92E-06	Not Detected

Table A.7. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{238}U Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	-1.06E-06	1.74E-06	2.64E-06	Not Detected
2nd week	-5.68E-08	1.75E-06	2.12E-06	Not Detected
3rd week	1.32E-06	1.86E-06	1.90E-06	Not Detected
4th week	7.43E-07	1.30E-06	1.44E-06	Not Detected
February 2024				
1st week	-1.74E-06	1.90E-06	3.55E-06	Not Detected
2nd week	1.48E-06	2.88E-06	3.69E-06	Not Detected
3rd week	1.63E-07	1.85E-06	2.37E-06	Not Detected
4th week	7.99E-07	1.80E-06	1.83E-06	Not Detected
March 2024				
1st week	-1.76E-06	1.87E-06	3.43E-06	Not Detected
2nd week	-8.99E-07	2.12E-06	3.94E-06	Not Detected
3rd week	7.52E-07	2.17E-06	3.26E-06	Not Detected
4th week	-2.71E-07	1.33E-06	2.11E-06	Not Detected
April 2024				
1st week	-1.09E-04	1.69E-05	1.95E-06	Not Detected
2nd week	-1.17E-04	1.68E-05	3.96E-06	Not Detected
3rd week	-1.16E-04	1.68E-05	2.41E-06	Not Detected
4th week	-9.27E-05	1.36E-05	1.54E-06	Not Detected
May 2024				
1st week	-1.16E-04	1.70E-05	1.33E-06	Not Detected
2nd week	-1.15E-04	1.69E-05	2.62E-06	Not Detected
3rd week	-1.12E-04	1.68E-05	8.02E-07	Not Detected
4th week	-1.19E-04	1.76E-05	1.53E-06	Not Detected
June 2024				
1st week	-1.15E-04	1.69E-05	2.95E-06	Not Detected
2nd week	-1.17E-04	1.68E-05	3.77E-06	Not Detected
3rd week	-1.15E-04	1.67E-05	2.57E-06	Not Detected
4th week	-9.12E-05	1.31E-05	2.29E-06	Not Detected

Table A.7. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{238}U Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	-4.90E-07	4.70E-06	2.32E-06	Not Detected
2nd week	-3.88E-06	4.82E-06	4.08E-06	Not Detected
3rd week	1.61E-06	5.33E-06	4.91E-06	Not Detected
4th week	2.13E-06	3.52E-06	1.63E-06	Not Detected
August 2024				
1st week	1.49E-06	5.07E-06	3.32E-06	Not Detected
2nd week	1.82E-06	5.13E-06	3.08E-06	Not Detected
3rd week	1.96E-06	4.86E-06	2.75E-06	Not Detected
4th week	2.21E-06	4.01E-06	3.42E-06	Not Detected
September 2024				
1st week	3.09E-06	5.10E-06	2.77E-06	Not Detected
2nd week	1.26E-06	5.10E-06	2.79E-03	Not Detected
3rd week	3.98E-06	4.88E-06	3.21E-06	Not Detected
4th week	5.10E-06	4.28E-06	2.15E-06	Not Detected
October 2024				
1st week	2.10E-06	4.35E-06	2.89E-06	Not Detected
2nd week	6.30E-07	4.20E-06	2.14E-06	Not Detected
3rd week	1.15E-06	4.70E-06	4.00E-06	Not Detected
4th week	-2.24E-06	3.08E-06	3.49E-06	Not Detected
November 2024				
1st week	1.41E-06	4.54E-06	2.84E-06	Not Detected
2nd week	2.44E-06	5.53E-06	5.79E-06	Not Detected

Table A.8. Activity concentrations of U isotopes at Station A

Sample Date	^{234}U Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
January 2024				
1st week	-2.60E-03	1.67E-02	2.33E-02	Not Detected
2nd week	-1.12E-03	5.93E-03	5.47E-03	Not Detected
3rd week	-3.14E-03	6.65E-03	9.60E-03	Not Detected
4th week	2.78E-03	6.23E-03	7.23E-03	Not Detected
February 2024				
1st week	-1.53E-02	1.38E-02	2.56E-02	Not Detected
2nd week	1.78E-03	1.19E-02	1.59E-02	Not Detected
3rd week	-9.25E-04	5.41E-03	5.92E-03	Not Detected
4th week	-3.02E-03	8.79E-03	9.30E-03	Not Detected
March 2024				
1st week	-3.42E-03	4.66E-03	7.39E-03	Not Detected
2nd week	-3.08E-03	7.26E-03	1.14E-02	Not Detected
3rd week	3.11E-03	1.01E-02	1.42E-02	Not Detected
4th week	-3.91E-04	3.96E-03	6.46E-03	Not Detected
April 2024				
1st week	-2.90E-01	4.45E-02	4.55E-03	Not Detected
2nd week	-5.27E-01	7.81E-02	1.37E-02	Not Detected
3rd week	-2.96E-01	4.37E-02	5.13E-03	Not Detected
4th week	-1.11E-01	1.65E-02	1.79E-03	Not Detected
May 2024				
1st week	-1.83E-01	2.77E-02	2.11E-03	Not Detected
2nd week	-5.28E-01	7.77E-02	8.78E-03	Not Detected
3rd week	-2.56E-01	3.87E-02	1.91E-03	Not Detected
4th week	-8.96E-01	1.33E-01	1.56E-02	Not Detected
June 2024				
1st week	-1.31E+00	1.96E-01	3.74E-02	Not Detected
2nd week	-2.69E-01	3.97E-02	8.85E-03	Not Detected
3rd week	-3.21E-01	4.65E-02	7.42E-03	Not Detected
4th week	-2.00E-01	2.97E-02	4.24E-03	Not Detected

Table A.8. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{234}U Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
July 2024				
1st week	1.17E-02	2.18E-02	9.01E-03	Not Detected
2nd week	-1.84E-02	1.51E-02	1.07E-02	Not Detected
3rd week	4.52E-04	1.32E-02	9.09E-03	Not Detected
4th week	5.07E-03	7.90E-03	3.25E-03	Not Detected
August 2024				
1st week	9.27E-03	1.36E-02	6.01E-03	Not Detected
2nd week	7.53E-03	1.37E-02	7.19E-03	Not Detected
3rd week	-2.99E-03	1.53E-02	7.52E-03	Not Detected
4th week	9.59E-03	1.04E-02	6.83E-03	Not Detected
September 2024				
1st week	7.19E-03	1.27E-02	5.10E-03	Not Detected
2nd week	1.86E-02	2.54E-02	1.28E-02	Not Detected
3rd week	2.18E-02	2.00E-02	9.39E-03	Not Detected
4th week	2.03E-02	1.59E-02	7.21E-03	Not Detected
October 2024				
1st week	4.49E-03	3.03E-02	1.60E-02	Not Detected
2nd week	-1.17E-02	2.81E-02	1.27E-02	Not Detected
3rd week	9.89E-04	1.79E-02	1.19E-02	Not Detected
4th week	-6.16E-03	1.27E-02	9.89E-03	Not Detected
November 2024				
1st week	-5.78E-03	2.59E-02	1.44E-02	Not Detected
2nd week	1.27E-02	1.88E-02	1.31E-02	Not Detected

Table A.8. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{235}U Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
January 2024				
1st week	3.47E-03	7.22E-03	1.59E-02	Not Detected
2nd week	-1.19E-03	2.66E-03	7.41E-03	Not Detected
3rd week	2.90E-03	2.91E-03	4.49E-03	Not Detected
4th week	4.48E-04	2.01E-03	4.77E-03	Not Detected
February 2024				
1st week	-7.36E-05	5.84E-03	1.56E-02	Not Detected
2nd week	1.61E-03	5.77E-03	1.39E-02	Not Detected
3rd week	1.92E-03	2.41E-03	4.36E-03	Not Detected
4th week	7.90E-04	4.39E-03	1.06E-02	Not Detected
March 2024				
1st week	1.39E-03	2.11E-03	4.30E-03	Not Detected
2nd week	-5.45E-04	3.23E-03	8.96E-03	Not Detected
3rd week	3.12E-03	5.15E-03	1.15E-02	Not Detected
4th week	1.04E-03	1.59E-03	3.30E-03	Not Detected
April 2024				
1st week	-1.15E-02	6.14E-03	3.00E-03	Not Detected
2nd week	-2.47E-02	1.05E-02	6.67E-03	Not Detected
3rd week	-1.42E-02	6.33E-03	7.51E-03	Not Detected
4th week	-4.88E-03	2.27E-03	1.53E-03	Not Detected
May 2024				
1st week	-8.34E-03	3.71E-03	1.66E-03	Not Detected
2nd week	-2.30E-02	1.07E-02	7.14E-03	Not Detected
3rd week	-1.13E-02	5.24E-03	2.36E-03	Not Detected
4th week	-3.79E-02	1.80E-02	7.28E-03	Not Detected
June 2024				
1st week	-5.35E-02	2.84E-02	2.47E-02	Not Detected
2nd week	-1.33E-02	5.47E-03	5.39E-03	Not Detected
3rd week	-1.52E-02	6.52E-03	6.50E-03	Not Detected
4th week	-8.90E-03	4.11E-03	3.12E-03	Not Detected

Table A.8. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{235}U Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
July 2024				
1st week	-5.37E-03	4.65E-03	6.64E-03	Not Detected
2nd week	3.23E-04	5.40E-03	8.55E-03	Not Detected
3rd week	-3.20E-03	4.13E-03	8.67E-03	Not Detected
4th week	-1.14E-03	1.94E-03	2.81E-03	Not Detected
August 2024				
1st week	-1.36E-03	3.65E-03	5.85E-03	Not Detected
2nd week	-1.71E-03	3.47E-03	5.31E-03	Not Detected
3rd week	-2.28E-03	4.15E-03	6.00E-03	Not Detected
4th week	-7.63E-04	3.03E-03	5.76E-03	Not Detected
September 2024				
1st week	-9.50E-04	3.17E-03	3.76E-03	Not Detected
2nd week	-3.28E-03	5.93E-03	7.16E-03	Not Detected
3rd week	-1.71E-04	5.33E-03	7.39E-03	Not Detected
4th week	-3.49E-04	3.89E-03	4.76E-03	Not Detected
October 2024				
1st week	7.52E-03	8.56E-03	9.30E-03	Not Detected
2nd week	6.80E-03	8.31E-03	9.34E-03	Not Detected
3rd week	1.25E-03	5.20E-03	9.54E-03	Not Detected
4th week	-1.68E-03	4.10E-03	9.43E-03	Not Detected
November 2024				
1st week	9.31E-04	7.12E-03	1.25E-02	Not Detected
2nd week	2.73E-03	6.31E-03	1.28E-02	Not Detected

Table A.8. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{238}U Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
January 2024				
1st week	-9.64E-03	1.59E-02	2.40E-02	Not Detected
2nd week	-2.06E-04	6.37E-03	7.70E-03	Not Detected
3rd week	5.07E-03	7.16E-03	7.34E-03	Not Detected
4th week	3.54E-03	6.17E-03	6.83E-03	Not Detected
February 2024				
1st week	-1.31E-02	1.43E-02	2.67E-02	Not Detected
2nd week	6.33E-03	1.23E-02	1.58E-02	Not Detected
3rd week	5.15E-04	5.84E-03	7.47E-03	Not Detected
4th week	4.32E-03	9.70E-03	9.90E-03	Not Detected
March 2024				
1st week	-4.66E-03	4.94E-03	9.06E-03	Not Detected
2nd week	-3.55E-03	8.36E-03	1.56E-02	Not Detected
3rd week	3.50E-03	1.01E-02	1.52E-02	Not Detected
4th week	-7.52E-04	3.70E-03	5.86E-03	Not Detected
April 2024				
1st week	-2.99E-01	4.60E-02	5.33E-03	Not Detected
2nd week	-5.62E-01	8.06E-02	1.90E-02	Not Detected
3rd week	-3.11E-01	4.51E-02	6.48E-03	Not Detected
4th week	-1.16E-01	1.71E-02	1.93E-03	Not Detected
May 2024				
1st week	-1.94E-01	2.85E-02	2.24E-03	Not Detected
2nd week	-5.49E-01	8.03E-02	1.25E-02	Not Detected
3rd week	-2.66E-01	3.99E-02	1.91E-03	Not Detected
4th week	-9.29E-01	1.37E-01	1.19E-02	Not Detected
June 2024				
1st week	-1.38E+00	2.02E-01	3.53E-02	Not Detected
2nd week	-2.86E-01	4.09E-02	9.21E-03	Not Detected
3rd week	-3.29E-01	4.81E-02	7.38E-03	Not Detected
4th week	-2.13E-01	3.06E-02	5.35E-03	Not Detected

Table A.8. Activity concentrations of U isotopes at Station A (continued)

Sample Date	^{238}U Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
July 2024				
1st week	-2.12E-03	2.03E-02	1.00E-02	Not Detected
2nd week	-1.27E-02	1.57E-02	1.33E-02	Not Detected
3rd week	4.19E-03	1.39E-02	1.28E-02	Not Detected
4th week	4.72E-03	7.80E-03	3.61E-03	Not Detected
August 2024				
1st week	3.86E-03	1.32E-02	8.63E-03	Not Detected
2nd week	4.75E-03	1.34E-02	8.04E-03	Not Detected
3rd week	6.48E-03	1.61E-02	9.10E-03	Not Detected
4th week	5.53E-03	1.00E-02	8.57E-03	Not Detected
September 2024				
1st week	7.69E-03	1.27E-02	6.90E-03	Not Detected
2nd week	5.92E-03	2.40E-02	1.31E+01	Not Detected
3rd week	1.59E-02	1.95E-02	1.28E-02	Not Detected
4th week	1.86E-02	1.56E-02	7.84E-03	Not Detected
October 2024				
1st week	1.43E-02	2.96E-02	1.96E-02	Not Detected
2nd week	4.14E-03	2.76E-02	1.41E-02	Not Detected
3rd week	4.28E-03	1.75E-02	1.49E-02	Not Detected
4th week	-8.94E-03	1.23E-02	1.39E-02	Not Detected
November 2024				
1st week	7.97E-03	2.57E-02	1.60E-02	Not Detected
2nd week	7.94E-03	1.80E-02	1.88E-02	Not Detected

Table A.9. Activity concentrations of ^{137}Cs (Bq/m^3) at Station A

Sample Date	^{137}Cs Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	-3.27E-06	6.52E-05	2.19E-04	Not Detected
2nd week	-8.63E-05	3.61E-05	1.23E-04	Not Detected
3rd week	-1.87E-05	2.63E-05	8.93E-05	Not Detected
4th week	3.38E-05	2.14E-05	7.05E-05	Not Detected
February 2024				
1st week	3.18E-05	7.41E-05	2.47E-04	Not Detected
2nd week	-1.56E-04	5.01E-05	1.72E-04	Not Detected
3rd week	-5.95E-06	2.80E-05	9.45E-05	Not Detected
4th week	4.04E-05	3.58E-05	1.19E-04	Not Detected
March 2024				
1st week	-3.15E-06	7.63E-05	2.55E-04	Not Detected
2nd week	-1.16E-04	3.41E-05	1.18E-04	Not Detected
3rd week	-7.50E-05	4.48E-05	1.51E-04	Not Detected
4th week	5.82E-05	2.42E-05	7.87E-05	Not Detected
April 2024				
1st week	-1.30E-04	6.22E-05	2.14E-04	Not Detected
2nd week	-1.22E-04	3.40E-05	1.17E-04	Not Detected
3rd week	-6.20E-05	7.27E-05	2.46E-04	Not Detected
4th week	-6.74E-05	3.20E-05	1.09E-04	Not Detected
May 2024				
1st week	9.25E-05	8.14E-05	2.69E-04	Not Detected
2nd week	-5.51E-05	3.73E-05	1.26E-04	Not Detected
3rd week	9.12E-05	3.31E-05	1.08E-04	Not Detected
4th week	-4.44E-05	6.86E-05	2.32E-04	Not Detected
June 2024				
1st week	-8.33E-05	6.39E-05	2.18E-04	Not Detected
2nd week	-1.24E-04	3.72E-05	1.28E-04	Not Detected
3rd week	-2.83E-06	7.54E-05	2.52E-04	Not Detected
4th week	-7.74E-05	2.93E-05	9.98E-05	Not Detected

Table A.9. Activity concentrations of ^{137}Cs (Bq/m^3) at Station A (continued)

Sample Date	^{137}Cs Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	-3.15E-05	2.15E-05	7.42E-05	Not Detected
2nd week	1.01E-04	3.24E-05	1.05E-04	Not Detected
3rd week	-1.20E-05	6.35E-05	2.14E-04	Not Detected
4th week	-6.26E-05	2.73E-05	9.28E-05	Not Detected
August 2024				
1st week	8.62E-05	3.56E-05	1.16E-04	Not Detected
2nd week	2.98E-05	3.00E-05	9.95E-05	Not Detected
3rd week	-7.87E-05	6.27E-05	2.14E-04	Not Detected
4th week	-6.44E-05	2.31E-05	7.91E-05	Not Detected
September 2024				
1st week	3.37E-05	2.24E-05	7.38E-05	Not Detected
2nd week	4.09E-05	3.15E-05	1.04E-04	Not Detected
3rd week	-1.81E-05	5.55E-05	1.87E-04	Not Detected
4th week	-6.29E-05	2.89E-05	9.83E-05	Not Detected
October 2024				
1st week	8.48E-05	3.32E-05	1.08E-04	Not Detected
2nd week	1.16E-04	3.23E-05	1.04E-04	Not Detected
3rd week	-2.33E-05	6.26E-05	2.11E-04	Not Detected
4th week	-7.76E-05	2.49E-05	8.54E-05	Not Detected
November 2024				
1st week	2.98E-05	2.75E-05	9.12E-05	Not Detected
2nd week	7.17E-05	3.14E-05	1.03E-04	Not Detected

Table A.10. Activity concentrations ^{40}K (Bq/m^3) at Station A

Sample Date	^{40}K Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	4.82E-04	4.34E-04	1.45E-03	Not Detected
2nd week	-1.23E-04	4.16E-04	1.40E-03	Not Detected
3rd week	-1.88E-03	4.64E-04	1.63E-03	Not Detected
4th week	3.67E-04	2.86E-04	9.46E-04	Not Detected
February 2024				
1st week	-7.00E-04	4.37E-04	1.57E-03	Not Detected
2nd week	3.94E-04	6.33E-04	2.11E-03	Not Detected
3rd week	-1.47E-03	4.78E-04	1.66E-03	Not Detected
4th week	1.27E-03	4.12E-04	1.32E-03	Not Detected
March 2024				
1st week	3.69E-04	4.70E-04	1.58E-03	Not Detected
2nd week	1.88E-05	4.20E-04	1.41E-03	Not Detected
3rd week	-1.01E-03	4.60E-04	1.58E-03	Not Detected
4th week	6.93E-04	2.82E-04	9.16E-04	Not Detected
April 2024				
1st week	4.19E-04	4.26E-04	1.43E-03	Not Detected
2nd week	1.56E-04	4.30E-04	1.44E-03	Not Detected
3rd week	1.36E-03	4.45E-04	1.39E-03	Not Detected
4th week	4.04E-04	3.39E-04	1.12E-03	Not Detected
May 2024				
1st week	5.35E-04	4.33E-04	1.44E-03	Not Detected
2nd week	2.26E-04	4.45E-04	1.48E-03	Not Detected
3rd week	-1.91E-03	5.15E-04	1.79E-03	Not Detected
4th week	7.66E-04	4.62E-04	1.52E-03	Not Detected
June 2024				
1st week	-2.16E-04	4.57E-04	1.59E-03	Not Detected
2nd week	2.91E-04	4.22E-04	1.40E-03	Not Detected
3rd week	3.79E-04	4.44E-04	1.49E-03	Not Detected
4th week	4.07E-04	3.48E-04	1.15E-03	Not Detected

Table A.10. Activity concentrations ^{40}K (Bq/m^3) at Station A (continued)

Sample Date	^{40}K Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	-1.55E-03	4.52E-04	1.58E-03	Not Detected
2nd week	1.05E-03	4.10E-04	1.33E-03	Not Detected
3rd week	7.91E-04	4.32E-04	1.41E-03	Not Detected
4th week	7.06E-06	2.86E-04	9.60E-04	Not Detected
August 2024				
1st week	-1.27E-03	4.68E-04	1.62E-03	Not Detected
2nd week	5.84E-04	4.09E-04	1.35E-03	Not Detected
3rd week	4.76E-04	4.22E-04	1.41E-03	Not Detected
4th week	5.13E-04	3.07E-04	1.01E-03	Not Detected
September 2024				
1st week	-7.30E-04	4.79E-04	1.63E-03	Not Detected
2nd week	5.17E-05	4.20E-04	1.41E-03	Not Detected
3rd week	6.83E-04	4.62E-04	1.52E-03	Not Detected
4th week	5.68E-05	3.31E-04	1.11E-03	Not Detected
October 2024				
1st week	-3.11E-04	4.71E-04	1.59E-03	Not Detected
2nd week	4.89E-04	4.03E-04	1.34E-03	Not Detected
3rd week	-2.46E-05	4.54E-04	1.57E-03	Not Detected
4th week	1.72E-04	3.01E-04	1.00E-03	Not Detected
November 2024				
1st week	1.25E-03	5.32E-04	1.73E-03	Not Detected
2nd week	3.13E-04	4.02E-04	1.34E-03	Not Detected

Table A.11. Activity concentrations of ^{60}Co (Bq/m^3) at Station A

Sample Date	^{60}Co Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	5.38E-05	4.98E-05	1.66E-04	Not Detected
2nd week	1.09E-04	2.85E-05	8.99E-05	Not Detected
3rd week	-4.68E-06	2.88E-05	9.82E-05	Not Detected
4th week	2.21E-05	2.28E-05	7.58E-05	Not Detected
February 2024				
1st week	9.55E-05	5.62E-05	1.85E-04	Not Detected
2nd week	1.37E-04	4.07E-05	1.29E-04	Not Detected
3rd week	-3.14E-05	2.74E-05	9.60E-05	Not Detected
4th week	1.50E-05	3.12E-05	1.05E-04	Not Detected
March 2024				
1st week	6.51E-05	4.35E-05	1.43E-04	Not Detected
2nd week	1.05E-04	3.10E-05	9.85E-05	Not Detected
3rd week	-1.64E-05	2.38E-05	8.24E-05	Not Detected
4th week	2.56E-05	2.11E-05	6.99E-05	Not Detected
April 2024				
1st week	6.88E-05	4.34E-05	1.43E-04	Not Detected
2nd week	6.42E-05	3.08E-05	1.00E-04	Not Detected
3rd week	-1.42E-05	4.49E-05	1.55E-04	Not Detected
4th week	6.04E-05	2.30E-05	7.44E-05	Not Detected
May 2024				
1st week	-2.99E-06	4.82E-05	1.66E-04	Not Detected
2nd week	9.16E-05	8.07E-05	2.67E-04	Not Detected
3rd week	-1.60E-05	2.62E-05	9.04E-05	Not Detected
4th week	7.70E-05	4.53E-05	1.49E-04	Not Detected
June 2024				
1st week	7.93E-06	4.11E-05	1.41E-04	Not Detected
2nd week	9.46E-05	3.35E-05	1.08E-04	Not Detected
3rd week	-1.92E-05	4.17E-05	1.46E-04	Not Detected
4th week	5.23E-05	2.95E-05	9.69E-05	Not Detected

Table A.11. Activity concentrations of ^{60}Co (Bq/m^3) at Station A (continued)

Sample Date	^{60}Co Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	-5.12E-06	2.48E-05	8.52E-05	Not Detected
2nd week	1.94E-05	3.01E-05	1.01E-04	Not Detected
3rd week	7.99E-05	4.70E-05	1.54E-04	Not Detected
4th week	4.42E-05	1.86E-05	6.02E-05	Not Detected
August 2024				
1st week	3.03E-05	2.30E-05	7.62E-05	Not Detected
2nd week	2.36E-05	3.10E-05	1.04E-04	Not Detected
3rd week	3.53E-05	4.88E-05	1.65E-04	Not Detected
4th week	5.52E-05	1.88E-05	6.04E-05	Not Detected
September 2024				
1st week	6.79E-06	2.36E-05	8.00E-05	Not Detected
2nd week	4.89E-05	3.06E-05	1.01E-04	Not Detected
3rd week	4.91E-05	4.41E-05	1.47E-04	Not Detected
4th week	7.28E-05	2.25E-05	7.16E-05	Not Detected
October 2024				
1st week	1.06E-05	2.58E-05	8.71E-05	Not Detected
2nd week	2.36E-05	3.02E-05	1.01E-04	Not Detected
3rd week	3.39E-05	4.39E-05	1.48E-04	Not Detected
4th week	2.23E-05	1.94E-05	6.43E-05	Not Detected
November 2024				
1st week	4.33E-05	2.64E-05	8.69E-05	Not Detected
2nd week	9.06E-05	2.96E-05	9.48E-05	Not Detected

Table A.12. Activity concentrations of ^{137}Cs (Bq/g) at Station A

Sample Date	^{137}Cs Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
January 2024				
1st week	-2.98E-02	5.94E-01	2.00E+00	Not Detected
2nd week	-3.13E-01	1.31E-01	4.48E-01	Not Detected
3rd week	-7.21E-02	1.01E-01	3.44E-01	Not Detected
4th week	1.61E-01	1.02E-01	3.35E-01	Not Detected
February 2024				
1st week	2.39E-01	5.56E-01	1.85E+00	Not Detected
2nd week	-6.69E-01	2.14E-01	7.38E-01	Not Detected
3rd week	-1.88E-02	8.84E-02	2.98E-01	Not Detected
4th week	2.18E-01	1.94E-01	6.40E-01	Not Detected
March 2024				
1st week	-8.32E-03	2.02E-01	6.75E-01	Not Detected
2nd week	-4.56E-01	1.35E-01	4.64E-01	Not Detected
3rd week	-3.50E-01	2.09E-01	7.05E-01	Not Detected
4th week	1.62E-01	6.70E-02	2.18E-01	Not Detected
April 2024				
1st week	-3.55E-01	1.70E-01	5.85E-01	Not Detected
2nd week	-5.89E-01	1.63E-01	5.64E-01	Not Detected
3rd week	-1.67E-01	1.95E-01	6.60E-01	Not Detected
4th week	-8.46E-02	4.02E-02	1.36E-01	Not Detected
May 2024				
1st week	1.55E-01	1.37E-01	4.52E-01	Not Detected
2nd week	-2.62E-01	1.77E-01	6.00E-01	Not Detected
3rd week	2.17E-01	7.87E-02	2.56E-01	Not Detected
4th week	-3.46E-01	5.35E-01	1.81E+00	Not Detected
June 2024				
1st week	-9.97E-01	7.65E-01	2.61E+00	Not Detected
2nd week	-3.03E-01	9.08E-02	3.11E-01	Not Detected
3rd week	-8.12E-03	2.17E-01	7.25E-01	Not Detected
4th week	-1.81E-01	6.82E-02	2.33E-01	Not Detected

Table A.12. Activity concentrations of ^{137}Cs (Bq/g) at Station A (continued)

Sample Date	^{137}Cs Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
July 2024				
1st week	-1.36E-01	9.28E-02	3.21E-01	Not Detected
2nd week	3.30E-01	1.06E-01	3.41E-01	Not Detected
3rd week	-3.13E-02	1.65E-01	5.57E-01	Not Detected
4th week	-1.39E-01	6.06E-02	2.06E-01	Not Detected
August 2024				
1st week	2.24E-01	9.24E-02	3.01E-01	Not Detected
2nd week	7.76E-02	7.82E-02	2.59E-01	Not Detected
3rd week	-2.60E-01	2.07E-01	7.07E-01	Not Detected
4th week	-1.61E-01	5.78E-02	1.98E-01	Not Detected
September 2024				
1st week	8.38E-02	5.57E-02	1.84E-01	Not Detected
2nd week	1.92E-01	1.48E-01	4.90E-01	Not Detected
3rd week	-7.23E-02	2.22E-01	7.49E-01	Not Detected
4th week	-2.29E-01	1.05E-01	3.58E-01	Not Detected
October 2024				
1st week	5.77E-01	2.25E-01	7.34E-01	Not Detected
2nd week	7.63E-01	2.12E-01	6.81E-01	Not Detected
3rd week	-8.68E-02	2.33E-01	7.85E-01	Not Detected
4th week	-3.10E-01	9.94E-02	3.41E-01	Not Detected
November 2024				
1st week	1.68E-01	1.56E-01	5.16E-01	Not Detected
2nd week	2.33E-01	1.02E-01	3.34E-01	Not Detected

Table A.13. Activity concentrations of ^{40}K (Bq/g) at Station A

Sample Date	^{40}K Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
January 2024				
1st week	4.39E+00	3.96E+00	1.32E+01	Not Detected
2nd week	-4.46E-01	1.51E+00	5.09E+00	Not Detected
3rd week	-7.25E+00	1.79E+00	6.27E+00	Not Detected
4th week	1.75E+00	1.36E+00	4.50E+00	Not Detected
February 2024				
1st week	-5.25E+00	3.28E+00	1.18E+01	Not Detected
2nd week	1.68E+00	2.71E+00	9.02E+00	Not Detected
3rd week	-4.65E+00	1.51E+00	5.23E+00	Not Detected
4th week	6.84E+00	2.22E+00	7.14E+00	Not Detected
March 2024				
1st week	9.75E-01	1.24E+00	4.18E+00	Not Detected
2nd week	7.42E-02	1.66E+00	5.57E+00	Not Detected
3rd week	-4.71E+00	2.14E+00	7.37E+00	Not Detected
4th week	1.92E+00	7.83E-01	2.54E+00	Not Detected
April 2024				
1st week	1.14E+00	1.16E+00	3.90E+00	Not Detected
2nd week	7.51E-01	2.07E+00	6.91E+00	Not Detected
3rd week	3.66E+00	1.20E+00	3.74E+00	Not Detected
4th week	5.07E-01	4.25E-01	1.41E+00	Not Detected
May 2024				
1st week	8.99E-01	7.28E-01	2.42E+00	Not Detected
2nd week	1.08E+00	2.12E+00	7.06E+00	Not Detected
3rd week	-4.55E+00	1.22E+00	4.25E+00	Not Detected
4th week	5.98E+00	3.60E+00	1.18E+01	Not Detected
June 2024				
1st week	-2.58E+00	5.47E+00	1.91E+01	Not Detected
2nd week	7.11E-01	1.03E+00	3.42E+00	Not Detected
3rd week	1.09E+00	1.28E+00	4.30E+00	Not Detected
4th week	9.49E-01	8.13E-01	2.69E+00	Not Detected

Table A.13. Activity concentrations of ^{40}K (Bq/g) at Station A (continued)

Sample Date	^{40}K Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
July 2024				
1st week	-6.70E+00	1.95E+00	6.81E+00	Not Detected
2nd week	3.44E+00	1.34E+00	4.34E+00	Not Detected
3rd week	2.06E+00	1.13E+00	3.68E+00	Not Detected
4th week	1.56E-02	6.34E-01	2.13E+00	Not Detected
August 2024				
1st week	-3.29E+00	1.22E+00	4.20E+00	Not Detected
2nd week	1.52E+00	1.07E+00	3.52E+00	Not Detected
3rd week	1.58E+00	1.39E+00	4.66E+00	Not Detected
4th week	1.29E+00	7.70E-01	2.53E+00	Not Detected
September 2024				
1st week	-1.82E+00	1.19E+00	4.06E+00	Not Detected
2nd week	2.44E-01	1.98E+00	6.65E+00	Not Detected
3rd week	2.73E+00	1.85E+00	6.10E+00	Not Detected
4th week	2.07E-01	1.21E+00	4.04E+00	Not Detected
October 2024				
1st week	-2.12E+00	3.20E+00	1.08E+01	Not Detected
2nd week	3.22E+00	2.65E+00	8.78E+00	Not Detected
3rd week	-9.15E-02	1.69E+00	5.82E+00	Not Detected
4th week	6.85E-01	1.20E+00	4.01E+00	Not Detected
November 2024				
1st week	7.04E+00	3.01E+00	9.81E+00	Not Detected
2nd week	1.02E+00	1.31E+00	4.36E+00	Not Detected

Table A.14. Activity concentrations of ^{60}Co (Bq/g) at Station A

Sample Date	^{60}Co Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
January 2024				
1st week	4.91E-01	4.54E-01	1.52E+00	Not Detected
2nd week	3.94E-01	1.04E-01	3.26E-01	Not Detected
3rd week	-1.81E-02	1.11E-01	3.79E-01	Not Detected
4th week	1.05E-01	1.08E-01	3.61E-01	Not Detected
February 2024				
1st week	7.16E-01	4.22E-01	1.39E+00	Not Detected
2nd week	5.84E-01	1.74E-01	5.50E-01	Not Detected
3rd week	-9.92E-02	8.66E-02	3.03E-01	Not Detected
4th week	8.11E-02	1.68E-01	5.66E-01	Not Detected
March 2024				
1st week	1.72E-01	1.15E-01	3.79E-01	Not Detected
2nd week	4.14E-01	1.22E-01	3.89E-01	Not Detected
3rd week	-7.65E-02	1.11E-01	3.84E-01	Not Detected
4th week	7.09E-02	5.85E-02	1.94E-01	Not Detected
April 2024				
1st week	1.88E-01	1.18E-01	3.90E-01	Not Detected
2nd week	3.09E-01	1.48E-01	4.83E-01	Not Detected
3rd week	-3.82E-02	1.21E-01	4.18E-01	Not Detected
4th week	7.58E-02	2.89E-02	9.33E-02	Not Detected
May 2024				
1st week	-5.02E-03	8.10E-02	2.80E-01	Not Detected
2nd week	4.36E-01	3.84E-01	1.27E+00	Not Detected
3rd week	-3.80E-02	6.21E-02	2.15E-01	Not Detected
4th week	6.01E-01	3.53E-01	1.16E+00	Not Detected
June 2024				
1st week	9.49E-02	4.92E-01	1.69E+00	Not Detected
2nd week	2.31E-01	8.18E-02	2.64E-01	Not Detected
3rd week	-5.53E-02	1.20E-01	4.18E-01	Not Detected
4th week	1.22E-01	6.89E-02	2.26E-01	Not Detected

Table A.14. Activity concentrations of ^{60}Co (Bq/g) at Station A (continued)

Sample Date	^{60}Co Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
July 2024				
1st week	-2.21E-02	1.07E-01	3.68E-01	Not Detected
2nd week	6.33E-02	9.82E-02	3.29E-01	Not Detected
3rd week	2.08E-01	1.22E-01	4.01E-01	Not Detected
4th week	9.81E-02	4.12E-02	1.34E-01	Not Detected
August 2024				
1st week	7.87E-02	5.98E-02	1.98E-01	Not Detected
2nd week	6.14E-02	8.10E-02	2.71E-01	Not Detected
3rd week	1.17E-01	1.61E-01	5.44E-01	Not Detected
4th week	1.38E-01	4.72E-02	1.52E-01	Not Detected
September 2024				
1st week	1.69E-02	5.88E-02	1.99E-01	Not Detected
2nd week	2.30E-01	1.44E-01	4.73E-01	Not Detected
3rd week	1.97E-01	1.76E-01	5.88E-01	Not Detected
4th week	2.65E-01	8.20E-02	2.61E-01	Not Detected
October 2024				
1st week	7.21E-02	1.75E-01	5.92E-01	Not Detected
2nd week	1.55E-01	1.99E-01	6.64E-01	Not Detected
3rd week	1.26E-01	1.63E-01	5.50E-01	Not Detected
4th week	8.89E-02	7.73E-02	2.56E-01	Not Detected
November 2024				
1st week	2.45E-01	1.50E-01	4.92E-01	Not Detected
2nd week	2.95E-01	9.64E-02	3.08E-01	Not Detected

Table A.15. Activity concentrations of ^{241}Am (Bq/m^3) at Station B

Radionuclide	Sample Date	^{241}Am Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{241}Am	January	1.32E-05	1.44E-06	7.29E-08	Detected
	February				
	March				
	April				
	May				
	June				
	July				
	August				
	September				
	October				
	November				
	December				

Table A.16. Activity concentrations of $^{239+240}Pu$ (Bq/m^3) at Station B

Radionuclide	Sample Date	$^{239+240}Pu$ Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
$^{239+240}Pu$	January	1.49E-07	1.57E-07	2.98E-07	Not detected
	February	3.26E-07	2.61E-07	4.59E-07	Not detected
	March	1.96E-06	4.91E-07	2.60E-07	Detected
	April	3.11E-07	2.50E-07	4.15E-07	Not detected
	May	8.09E-07	3.37E-07	3.60E-07	Detected
	June	1.97E-06	4.72E-07	3.48E-07	Detected
	July	7.47E-07	2.96E-07	2.48E-07	Detected
	August	7.42E-07	2.97E-07	3.07E-07	Detected
	September	5.53E-07	3.24E-07	4.43E-07	Not detected
	October	1.77E-07	1.88E-07	3.29E-07	Not detected
	November	2.65E-07	1.84E-07	2.46E-07	Not detected
	December	8.08E-07	4.45E-07	7.39E-07	Not detected

Table A.17. Activity concentrations of ^{238}Pu (Bq/m^3) at Station B

Radionuclide	Sample Date	^{238}Pu Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}Pu	January	5.02E-08	2.01E-07	5.05E-07	Not detected
	February	9.87E-08	2.37E-07	5.73E-07	Not detected
	March	3.96E-07	2.67E-07	4.49E-07	Not detected
	April	2.09E-07	1.98E-07	3.24E-07	Not detected
	May	2.42E-07	2.57E-07	5.27E-07	Not detected
	June	-9.95E-08	1.57E-07	5.00E-07	Not detected
	July	2.42E-07	1.79E-07	2.50E-07	Not detected
	August	1.55E-07	1.79E-07	3.63E-07	Not detected
	September	1.85E-07	3.71E-07	8.72E-07	Not detected
	October	1.42E-07	1.75E-07	3.30E-07	Not detected
	November	-5.31E-08	1.68E-07	5.00E-07	Not detected
	December	-2.21E-07	2.77E-07	8.67E-07	Not detected

Table A.18. Activity concentrations of ^{241}Am (Bq/g) at Station B

Radionuclide	Sample Date	^{241}Am Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{241}Am	January	4.39E+00	4.80E-01	2.42E-02	Detected
	February				
	March				
	April				
	May				
	June				
	July				
	August				
	September				
	October				
	November				
	December				

Table A.19. Activity concentrations of $^{239+240}$Pu (Bq/g) at Station B

Radionuclide	Sample Date	$^{239+240}$Pu Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
$^{239+240}$Pu	January	4.95E-02	5.23E-02	9.91E-02	Not detected
	February	8.36E-02	6.72E-02	1.18E-01	Not detected
	March	5.96E-01	1.49E-01	7.91E-02	Detected
	April	9.22E-02	7.41E-02	1.23E-01	Not detected
	May	7.20E-02	3.00E-02	3.20E-02	Detected
	June	4.65E+00	1.11E+00	8.19E-01	Detected
	July	4.74E-02	1.88E-02	1.57E-02	Detected
	August	6.64E-02	2.66E-02	2.75E-02	Detected
	September	1.07E-01	6.24E-02	8.54E-02	Not detected
	October	2.46E-01	2.61E-01	4.58E-01	Not detected
	November	3.69E-02	2.57E-02	3.43E-02	Not detected
	December	3.58E+00	1.97E+00	3.27E+00	Not detected

Table A.20. Activity concentrations of ^{238}Pu (Bq/g) at Station B

Radionuclide	Sample Date	^{238}Pu Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{238}Pu	January	1.67E-02	6.68E-02	1.68E-01	Not detected
	February	2.54E-02	6.10E-02	1.47E-01	Not detected
	March	1.20E-01	8.10E-02	1.36E-01	Not detected
	April	6.21E-02	5.86E-02	9.61E-02	Not detected
	May	2.15E-02	2.29E-02	4.69E-02	Not detected
	June	-2.34E-01	3.71E-01	1.18E+00	Not detected
	July	1.53E-02	1.14E-02	1.58E-02	Not detected
	August	1.38E-02	1.60E-02	3.25E-02	Not detected
	September	3.58E-02	7.16E-02	1.68E-01	Not detected
	October	1.98E-01	2.43E-01	4.60E-01	Not detected
	November	-7.41E-03	2.34E-02	6.98E-02	Not detected
	December	-9.80E-01	1.22E+00	3.84E+00	Not detected

Table A.21. Activity concentrations of U isotopes at Station B

Radionuclide	Sample Date	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{234}U	January	7.21E-07	1.19E-06	5.18E-07	Not detected
	February	-9.25E-07	1.16E-06	5.93E-07	Not detected
	March	-2.14E-07	1.17E-06	5.49E-07	Not detected
	April	-5.65E-07	1.07E-06	3.67E-07	Not detected
	May	-1.59E-06	1.28E-06	7.25E-07	Not detected
	June	-1.36E-06	1.03E-06	5.73E-07	Not detected
	July	-5.40E-07	1.05E-06	4.74E-07	Not detected
	August	-8.87E-07	1.04E-06	5.54E-07	Not detected
	September	1.58E-07	1.17E-06	6.64E-07	Not detected
	October	-1.10E-07	1.11E-06	4.68E-07	Not detected
	November	-3.22E-07	1.12E-06	4.77E-07	Not detected
	December	-4.73E-07	9.81E-07	2.78E-07	Not detected
^{235}U	January	5.09E-08	3.09E-07	4.76E-07	Not detected
	February	1.08E-07	3.07E-07	2.89E-07	Not detected
	March	-8.06E-08	3.05E-07	5.00E-07	Not detected
	April	1.97E-09	2.70E-07	3.12E-07	Not detected
	May	-5.51E-08	3.41E-07	4.94E-07	Not detected
	June	-1.53E-07	2.97E-07	5.52E-07	Not detected
	July	1.36E-07	2.99E-07	3.67E-07	Not detected
	August	-4.27E-08	2.80E-07	4.42E-07	Not detected
	September	-1.30E-07	3.24E-07	6.34E-07	Not detected
	October	4.43E-08	2.92E-07	4.05E-07	Not detected
	November	-7.25E-08	2.86E-07	4.65E-07	Not detected
	December	9.12E-08	2.54E-07	2.06E-07	Not detected

Table A.21. Activity concentrations of U isotopes at Station B (continued)

Radionuclide	Sample Date	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}U	January	-7.41E-07	1.14E-06	6.40E-07	Not detected
	February	-1.27E-06	1.22E-06	7.50E-07	Not detected
	March	-5.58E-07	1.21E-06	5.04E-07	Not detected
	April	-1.08E-06	1.12E-06	5.35E-07	Not detected
	May	-2.78E-06	1.32E-06	1.03E-06	Not detected
	June	-1.37E-06	1.10E-06	6.06E-07	Not detected
	July	-6.03E-07	1.12E-06	5.15E-07	Not detected
	August	-1.58E-06	1.07E-06	6.89E-07	Not detected
	September	-1.61E-06	1.13E-06	9.36E-07	Not detected
	October	-3.37E-07	1.16E-06	5.21E-07	Not detected
	November	-1.19E-06	1.14E-06	6.86E-07	Not detected
	December	-7.07E-07	1.03E-06	3.12E-07	Not detected

Table A.22. Activity concentrations of U isotopes at Station B

Radionuclide	Sample Date	Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{234}U	January	2.40E-01	3.96E-01	1.72E-01	Not detected
	February	-2.38E-01	2.98E-01	1.52E-01	Not detected
	March	-6.51E-02	3.55E-01	1.67E-01	Not detected
	April	-1.68E-01	3.19E-01	1.09E-01	Not detected
	May	-1.42E-01	1.14E-01	6.45E-02	Not detected
	June	-3.21E+00	2.42E+00	1.35E+00	Not detected
	July	-3.42E-02	6.68E-02	3.01E-02	Not detected
	August	-7.94E-02	9.30E-02	4.96E-02	Not detected
	September	3.05E-02	2.25E-01	1.28E-01	Not detected
	October	-1.53E-01	1.54E+00	6.52E-01	Not detected
	November	-4.49E-02	1.56E-01	6.66E-02	Not detected
	December	-2.09E+00	4.34E+00	1.23E+00	Not detected

Table A.22. Activity concentrations of U isotopes at Station B (continued)

Radionuclide	Sample Date	Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{235}U	January	1.69E-02	1.03E-01	1.58E-01	Not detected
	February	2.79E-02	7.90E-02	7.43E-02	Not detected
	March	-2.45E-02	9.27E-02	1.52E-01	Not detected
	April	5.84E-04	8.01E-02	9.27E-02	Not detected
	May	-4.90E-03	3.04E-02	4.40E-02	Not detected
	June	-3.61E-01	7.00E-01	1.30E+00	Not detected
	July	8.60E-03	1.90E-02	2.33E-02	Not detected
	August	-3.83E-03	2.51E-02	3.96E-02	Not detected
	September	-2.51E-02	6.26E-02	1.22E-01	Not detected
	October	6.17E-02	4.06E-01	5.64E-01	Not detected
	November	-1.01E-02	3.99E-02	6.48E-02	Not detected
	December	4.04E-01	1.12E+00	9.12E-01	Not detected
^{238}U	January	-2.46E-01	3.79E-01	2.13E-01	Not detected
	February	-3.27E-01	3.14E-01	1.93E-01	Not detected
	March	-1.70E-01	3.68E-01	1.53E-01	Not detected
	April	-3.21E-01	3.32E-01	1.59E-01	Not detected
	May	-2.48E-01	1.17E-01	9.13E-02	Not detected
	June	-3.23E+00	2.59E+00	1.43E+00	Not detected
	July	-3.83E-02	7.10E-02	3.27E-02	Not detected
	August	-1.42E-01	9.55E-02	6.16E-02	Not detected
	September	-3.10E-01	2.18E-01	1.80E-01	Not detected
	October	-4.69E-01	1.62E+00	7.25E-01	Not detected
	November	-1.66E-01	1.58E-01	9.57E-02	Not detected
	December	-3.13E+00	4.58E+00	1.38E+00	Not detected

Table A.23. Activity concentrations of ^{137}Cs (Bq/m^3) at Station B

Radionuclide	Sample Date	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{137}Cs	January	2.42E-05	7.5E-06	2.43E-05	Not detected
	February	4.39E-06	7.64E-06	2.55E-05	Not detected
	March	-6.46E-06	2.03E-05	6.79E-05	Not detected
	April	-2.40E-05	8.13E-06	2.79E-05	Not detected
	May	2.16E-05	8.10E-06	2.63E-05	Not detected
	June	8.82E-06	7.24E-06	2.39E-05	Not detected
	July	5.52E-06	1.52E-05	5.06E-05	Not detected
	August	-1.55E-05	8.48E-06	2.87E-05	Not detected
	September	1.26E-05	7.22E-06	2.37E-05	Not detected
	October	7.02E-06	6.78E-06	2.25E-05	Not detected
	November	-2.48E-06	1.51E-05	5.08E-05	Not detected
	December	-2.21E-05	8.39E-06	2.86E-05	Not detected

Table A.24. Activity concentrations of ^{40}K (Bq/m^3) at Station B

Radionuclide	Sample Date	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{40}K	January	-2.10E-04	1.08E-04	3.69E-04	Not detected
	February	-8.54E-06	9.90E-05	3.34E-04	Not detected
	March	2.63E-04	1.04E-04	3.32E-04	Not detected
	April	1.67E-04	1.02E-04	3.35E-04	Not detected
	May	-1.01E-04	1.34E-04	4.53E-04	Not detected
	June	1.10E-04	9.27E-05	3.07E-04	Not detected
	July	3.97E-05	9.92E-05	3.38E-04	Not detected
	August	6.04E-05	9.65E-05	3.21E-04	Not detected
	September	-1.63E-04	1.09E-04	3.71E-04	Not detected
	October	1.30E-04	9.15E-05	3.02E-04	Not detected
	November	-4.28E-05	1.03E-04	3.59E-04	Not detected
	December	2.27E-04	1.03E-04	3.37E-04	Not detected

Table A.25. Activity concentrations of ^{60}Co (Bq/m^3) at Station B

Radionuclide	Sample Date	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{60}Co	January	5.67E-06	5.90E-06	1.97E-05	Not detected
	February	1.75E-05	8.19E-06	2.67E-05	Not detected
	March	3.91E-06	1.07E-05	3.65E-05	Not detected
	April	9.09E-06	5.78E-06	1.90E-05	Not detected
	May	1.05E-05	7.09E-06	2.34E-05	Not detected
	June	1.16E-05	7.11E-06	2.34E-05	Not detected
	July	2.08E-05	1.14E-05	3.72E-05	Not detected
	August	1.05E-05	5.62E-06	1.84E-05	Not detected
	September	-4.49E-07	6.04E-06	2.06E-05	Not detected
	October	6.77E-06	7.31E-06	2.44E-05	Not detected
	November	1.08E-05	1.07E-05	3.57E-05	Not detected
	December	9.63E-06	5.26E-06	1.72E-05	Not detected

Table A.26. Activity concentrations of ^{137}Cs (Bq/g) at Station B

Radionuclide	Sample Date	Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{137}Cs	January	8.06E+00	2.50E+00	8.08E+00	Not detected
	February	1.13E+00	1.96E+00	6.54E+00	Not detected
	March	-1.96E+00	6.16E+00	2.06E+01	Not detected
	April	-7.13E+00	2.41E+00	8.27E+00	Not detected
	May	1.92E+00	7.21E-01	2.34E+00	Not detected
	June	2.08E+01	1.71E+01	5.64E+01	Not detected
	July	3.51E-01	9.62E-01	3.21E+00	Not detected
	August	-1.39E+00	7.59E-01	2.57E+00	Not detected
	September	2.43E+00	1.39E+00	4.57E+00	Not detected
	October	9.77E+00	9.44E+00	3.13E+01	Not detected
	November	-3.47E-01	2.11E+00	7.09E+00	Not detected
	December	-9.79E+01	3.71E+01	1.27E+02	Not detected

Table A.27. Activity concentrations of ^{40}K (Bq/g) at Station B

Radionuclide	Sample Date	Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{40}K	January	-6.99E+01	3.58E+01	1.23E+02	Not detected
	February	-2.19E+00	2.54E+01	8.59E+01	Not detected
	March	8.00E+01	3.17E+01	1.01E+02	Not detected
	April	4.97E+01	3.02E+01	9.94E+01	Not detected
	May	-8.99E+00	1.19E+01	4.04E+01	Not detected
	June	2.60E+02	2.18E+02	7.23E+02	Not detected
	July	2.52E+00	6.29E+00	2.15E+01	Not detected
	August	5.41E+00	8.64E+00	2.88E+01	Not detected
	September	-3.14E+01	2.10E+01	7.16E+01	Not detected
	October	1.82E+02	1.27E+02	4.20E+02	Not detected
	November	-5.97E+00	1.43E+01	5.00E+01	Not detected
	December	1.01E+03	4.56E+02	1.49E+03	Not detected

Table A.28. Activity concentrations of ^{60}Co (Bq/g) at Station B

Radionuclide	Sample Date	Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{60}Co	January	1.89E+00	1.96E+00	6.54E+00	Not detected
	February	4.50E+00	2.10E+00	6.85E+00	Not detected
	March	1.19E+00	3.25E+00	1.11E+01	Not detected
	April	2.70E+00	1.71E+00	5.64E+00	Not detected
	May	9.35E-01	6.31E-01	2.08E+00	Not detected
	June	2.74E+01	1.67E+01	5.51E+01	Not detected
	July	1.32E+00	7.22E-01	2.36E+00	Not detected
	August	9.39E-01	5.03E-01	1.64E+00	Not detected
	September	-8.65E-02	1.16E+00	3.98E+00	Not detected
	October	9.43E+00	1.02E+01	3.39E+01	Not detected
	November	1.50E+00	1.49E+00	4.98E+00	Not detected
	December	4.26E+01	2.33E+01	7.62E+01	Not detected

Table A.29. Activity concentrations of ^{90}Sr (Bq/m^3) at Station A

Sample Date	^{90}Sr Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
January 2024				
1st week	0.00E+00	0.00E+00	1.54E-04	Not Detected
2nd week	-3.22E-05	9.74E-06	1.60E-04	Not Detected
3rd week	-3.41E-05	1.57E-05	1.75E-04	Not Detected
4th week	-1.64E-05	4.57E-06	1.10E-04	Not Detected
February 2024				
1st week	-2.88E-05	9.09E-06	1.84E-04	Not Detected
2nd week	-9.92E-06	1.54E-06	2.14E-04	Not Detected
3rd week	-2.61E-05	4.90E-06	1.86E-04	Not Detected
4th week	5.33E-06	8.36E-07	1.61E-04	Not Detected
March 2024				
1st week	3.26E-05	4.07E-06	1.74E-04	Not Detected
2nd week	3.65E-05	4.32E-06	1.94E-04	Not Detected
3rd week	-2.13E-06	3.72E-07	2.41E-04	Not Detected
4th week	-7.08E-06	1.45E-06	1.79E-04	Not Detected
April 2024				
1st week	4.07E-05	6.45E-06	1.39E-04	Not Detected
2nd week	3.86E-05	7.19E-06	1.68E-04	Not Detected
3rd week	1.41E-06	7.42E-07	1.79E-04	Not Detected
4th week	2.46E-05	4.99E-06	1.21E-04	Not Detected
May 2024				
1st week	9.81E-06	4.07E-06	1.74E-04	Not Detected
2nd week	3.74E-05	8.11E-06	2.02E-04	Not Detected
3rd week	1.67E-05	4.49E-06	1.36E-04	Not Detected
4th week	2.54E-05	6.40E-06	1.73E-04	Not Detected
June 2024				
1st week	6.32E-06	2.16E-06	1.13E-04	Not Detected
2nd week	9.29E-07	4.46E-07	1.40E-04	Not Detected
3rd week	1.67E-05	3.99E-06	1.25E-04	Not Detected
4th week	2.38E-05	5.19E-06	1.29E-04	Not Detected

Table A.29. Activity concentrations of ^{90}Sr (Bq/m^3) at Station A (continued)

Sample Date	^{90}Sr Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
July 2024				
1st week	-3.65E-06	1.36E-06	8.55E-05	Not Detected
2nd week	1.43E-05	2.38E-06	8.29E-05	Not Detected
3rd week	9.91E-06	1.82E-06	7.71E-05	Not Detected
4th week	-4.98E-07	1.96E-07	7.15E-05	Not Detected
August 2024				
1st week	-3.63E-07	4.78E-08	1.16E-04	Not Detected
2nd week	1.24E-05	3.51E-06	1.04E-04	Not Detected
3rd week	5.52E-06	7.12E-07	1.06E-04	Not Detected
4th week	7.23E-06	1.22E-06	8.68E-05	Not Detected
September 2024				
1st week	3.65E-05	8.98E-06	1.11E-04	Not Detected
2nd week	6.67E-06	2.41E-06	1.18E-04	Not Detected
3rd week	3.30E-05	7.26E-06	1.01E-04	Not Detected
4th week	1.93E-05	3.89E-06	9.14E-05	Not Detected
October 2024				
1st week	4.23E-05	4.14E-06	1.05E-04	Not Detected
2nd week	-1.45E-05	7.74E-06	9.70E-05	Not Detected
3rd week	-3.44E-06	8.58E-03	9.73E-05	Not Detected
4th week	7.76E-07	1.75E-07	6.73E-05	Not Detected
November 2024				
1st week	4.16E-05	3.64E-06	8.75E-05	Not Detected
2nd week	-1.57E-05	1.37E-06	1.44E-04	Not Detected

Table A.30. Activity concentrations of ^{90}Sr (Bq/g) at Station A

Sample Date	^{90}Sr Activity Bq/g	Unc. (2-sig) Bq/g	MDC Bq/g	Status
January 2024				
1st week	0.00E+00	0.00E+00	1.40E+00	Not Detected
2nd week	-1.17E-01	3.54E-02	5.82E-01	Not Detected
3rd week	-1.31E-01	6.06E-02	6.75E-01	Not Detected
4th week	-7.80E-02	2.17E-02	5.25E-01	Not Detected
February 2024				
1st week	-2.16E-01	6.83E-02	1.38E+00	Not Detected
2nd week	-4.24E-02	6.58E-03	9.16E-01	Not Detected
3rd week	-8.22E-02	1.54E-02	5.87E-01	Not Detected
4th week	2.88E-02	4.52E-03	8.70E-01	Not Detected
March 2024				
1st week	8.62E-02	1.08E-02	4.59E-01	Not Detected
2nd week	1.44E-01	1.71E-02	7.68E-01	Not Detected
3rd week	-9.91E-03	1.73E-03	1.12E+00	Not Detected
4th week	-1.97E-02	4.02E-03	4.97E-01	Not Detected
April 2024				
1st week	1.11E-01	1.76E-02	3.80E-01	Not Detected
2nd week	1.86E-01	3.46E-02	8.07E-01	Not Detected
3rd week	3.79E-03	2.00E-03	4.82E-01	Not Detected
4th week	3.09E-02	6.26E-03	1.52E-01	Not Detected
May 2024				
1st week	1.65E-02	6.84E-03	2.92E-01	Not Detected
2nd week	1.78E-01	3.86E-02	9.59E-01	Not Detected
3rd week	3.97E-02	1.07E-02	3.24E-01	Not Detected
4th week	1.99E-01	4.99E-02	1.35E+00	Not Detected
June 2024				
1st week	7.57E-02	2.59E-02	1.35E+00	Not Detected
2nd week	2.27E-03	1.09E-03	3.43E-01	Not Detected
3rd week	4.79E-02	1.15E-02	3.59E-01	Not Detected
4th week	5.56E-02	1.21E-02	3.01E-01	Not Detected

Table A.30. Activity concentrations of ^{90}Sr (Bq/g) at Station A (continued)

Sample Date	^{90}Sr Activity Bq/g	Unc. (2-sig) Bq/g	MDC Bq/g	Status
July 2024				
1st week	-1.58E-02	5.90E-03	3.70E-01	Not Detected
2nd week	4.66E-02	7.76E-03	2.71E-01	Not Detected
3rd week	2.58E-02	4.75E-03	2.01E-01	Not Detected
4th week	-1.10E-03	4.35E-04	1.59E-01	Not Detected
August 2024				
1st week	-9.44E-04	1.24E-04	3.01E-01	Not Detected
2nd week	3.22E-02	9.16E-03	2.72E-01	Not Detected
3rd week	1.82E-02	2.35E-03	3.51E-01	Not Detected
4th week	1.81E-02	3.05E-03	2.18E-01	Not Detected
September 2024				
1st week	9.08E-02	2.23E-02	2.77E-01	Not Detected
2nd week	3.14E-02	1.13E-02	5.56E-01	Not Detected
3rd week	1.32E-01	2.90E-02	4.05E-01	Not Detected
4th week	7.02E-02	1.42E-02	3.33E-01	Not Detected
October 2024				
1st week	2.87E-01	2.82E-02	7.17E-01	Not Detected
2nd week	-9.54E-02	5.09E-02	6.38E-01	Not Detected
3rd week	-1.28E-02	3.19E+01	3.62E-01	Not Detected
4th week	3.10E-03	6.99E-04	2.69E-01	Not Detected
November 2024				
1st week	2.35E-01	2.06E-02	4.95E-01	Not Detected
2nd week	-5.11E-02	4.47E-03	4.70E-01	Not Detected

Table A.31. Activity concentrations of ^{90}Sr (Bq/m^3) at Station B

Radionuclide	Sample Date	^{90}Sr Activity Bq/m^3	Unc.(2-sig) Bq/m^3	MDC Bq/m^3	Status
^{90}Sr	January	2.23E-06	7.33E-07	3.55E-05	Not Detected
	February	5.81E-06	1.19E-06	3.53E-05	Not Detected
	March	8.63E-06	1.33E-06	3.25E-05	Not Detected
	April	4.71E-07	2.05E-07	3.53E-05	Not Detected
	May	1.92E-06	5.01E-07	2.85E-05	Not Detected
	June	1.18E-05	1.23E-06	2.51E-05	Not Detected
	July	2.57E-06	5.59E-07	2.23E-05	Not Detected
	August	5.09E-07	2.09E-07	2.93E-05	Not Detected
	September	8.33E-06	1.30E-06	3.08E-05	Not Detected
	October	-2.45E-06	3.59E-06	3.01E-05	Not Detected
	November	2.09E-06	6.26E-07	2.97E-05	Not Detected
	December	-1.08E-06	7.26E-07	3.11E-05	Not Detected

Table A.32. Activity concentrations of ^{90}Sr (Bq/g) at Station B

Radionuclide	Sample Date	^{90}Sr Activity Bq/g	Unc.(2-sig) Bq/g	MDC Bq/g	Status
^{90}Sr	January	7.40E-01	2.44E-01	1.18E+01	Not Detected
	February	1.49E+00	3.06E-01	9.07E+00	Not Detected
	March	2.62E+00	4.04E-01	9.87E+00	Not Detected
	April	1.40E-01	6.07E-02	1.05E+01	Not Detected
	May	1.71E-01	4.46E-02	2.54E+00	Not Detected
	June	2.79E+01	2.90E+00	5.91E+01	Not Detected
	July	1.63E-01	3.55E-02	1.42E+00	Not Detected
	August	4.56E-02	1.87E-02	2.62E+00	Not Detected
	September	1.61E+00	2.50E-01	5.94E+00	Not Detected
	October	-3.41E+00	5.00E+00	4.19E+01	Not Detected
	November	2.92E-01	8.73E-02	4.14E+00	Not Detected
	December	-4.76E+00	3.21E+00	1.38E+02	Not Detected

APPENDIX B - AIRBORNE PARTICULATE MONITORING

Actinide concentrations at monitoring stations around WIPP

Uranium concentrations at monitoring stations around WIPP

Gamma radionuclide concentrations at monitoring stations around WIPP

Strontium concentrations at monitoring stations around WIPP

Table B.1. Activity concentrations of $^{239+240}$Pu at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
$^{239+240}$Pu	1/19/2024	7.54E-09	7.69E-09	1.58E-08	Not Detected
	3/1/2024	9.54E-09	1.17E-08	2.54E-08	Not Detected
	3/27/2024	2.00E-08	1.15E-08	1.33E-08	Not Detected
	4/26/2024	-5.56E-09	1.42E-08	3.91E-08	Not Detected
	5/24/2024	2.54E-07	2.88E-07	4.68E-07	Not Detected
	6/19/2024	8.28E-09	1.03E-08	2.22E-08	Not Detected
	7/17/2024	1.70E-08	1.12E-08	1.44E-08	Not Detected
	8/8/2024	1.05E-08	1.67E-08	3.83E-08	Not Detected
	8/30/2024	9.20E-09	1.02E-08	2.18E-08	Not Detected
	10/4/2024	3.23E-08	1.72E-08	2.57E-08	Not Detected
	10/25/2024	6.98E-09	1.01E-08	2.21E-08	Not Detected
	11/20/2024	1.27E-08	1.19E-08	2.24E-08	Not Detected

Table B.2. Activity concentrations of ^{241}Am at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{241}Am	1/19/2024	6.35E-09	7.34E-09	1.58E-08	Not Detected
	3/1/2024	6.30E-08	1.78E-07	4.44E-07	Not Detected
	3/27/2024	1.54E-08	1.13E-08	2.06E-08	Not Detected
	4/26/2024	-4.22E-09	5.97E-09	1.98E-08	Not Detected
	5/24/2024	3.44E-09	3.16E-08	8.10E-08	Not Detected
	6/19/2024	9.69E-09	1.54E-08	3.53E-08	Not Detected
	7/17/2024	1.29E-08	1.88E-08	4.26E-08	Not Detected
	8/8/2024	-6.63E-09	1.88E-08	5.08E-08	Not Detected
	8/30/2024	8.56E-09	9.90E-09	2.13E-08	Not Detected
	10/4/2024	6.77E-09	1.51E-08	3.61E-08	Not Detected
	10/25/2024	1.07E-08	1.68E-08	3.81E-08	Not Detected
	11/20/2024	1.97E-08	3.95E-08	9.28E-08	Not Detected

Table B.3. Activity concentrations of ^{238}Pu at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}Pu	1/19/2024	8.38E-10	6.91E-09	1.79E-08	Not Detected
	3/1/2024	3.58E-09	1.09E-08	2.68E-08	Not Detected
	3/27/2024	1.28E-08	1.25E-08	2.48E-08	Not Detected
	4/26/2024	5.56E-09	9.63E-09	2.20E-08	Not Detected
	5/24/2024	7.62E-07	4.82E-07	4.68E-07	Not Detected
	6/19/2024	-8.28E-09	1.14E-08	3.33E-08	Not Detected
	7/17/2024	3.10E-09	1.52E-08	3.80E-08	Not Detected
	8/8/2024	1.35E-08	1.67E-08	3.68E-08	Not Detected
	8/30/2024	8.18E-09	8.69E-09	1.78E-08	Not Detected
	10/4/2024	-3.23E-09	1.21E-08	3.45E-08	Not Detected
	10/25/2024	1.40E-09	1.22E-08	3.13E-08	Not Detected
	11/20/2024	0.00E+00	1.10E-08	2.99E-08	Not Detected

Table B.4. Activity concentrations of $^{239+240}Pu$ at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
$^{239+240}Pu$	1/19/2024	9.40E-09	7.56E-09	1.26E-08	Not Detected
	3/1/2024	8.57E-09	1.01E-08	2.13E-08	Not Detected
	3/27/2024	1.96E-08	1.05E-08	1.14E-08	Not Detected
	4/26/2024	1.82E-08	1.18E-08	2.15E-08	Not Detected
	5/24/2024	1.33E-08	1.09E-08	2.09E-08	Not Detected
	6/19/2024	1.85E-08	8.75E-09	7.16E-09	Detected
	7/17/2024	1.44E-08	1.20E-08	2.28E-08	Not Detected
	8/8/2024	1.42E-08	1.18E-08	2.24E-08	Not Detected
	8/30/2024	2.48E-08	1.00E-08	1.17E-08	Detected
	10/4/2024	1.47E-08	1.43E-08	2.85E-08	Not Detected
	10/25/2024	1.25E-08	9.95E-09	1.81E-08	Not Detected
	11/20/2024	1.58E-08	9.51E-09	1.13E-08	Not Detected

Table B.5. Activity concentrations of ^{241}Am at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{241}Am	1/19/2024	0.00E+00	9.38E-09	2.43E-08	Not Detected
	3/1/2024	-2.59E-08	9.32E-08	2.51E-07	Not Detected
	3/27/2024	-2.81E-09	1.05E-08	2.99E-08	Not Detected
	4/26/2024	3.94E-09	3.25E-08	8.39E-08	Not Detected
	5/24/2024	8.90E-09	1.78E-08	4.18E-08	Not Detected
	6/19/2024	2.25E-09	7.80E-09	1.96E-08	Not Detected
	7/17/2024	2.92E-09	1.31E-08	3.28E-08	Not Detected
	8/8/2024	1.45E-08	1.27E-08	2.48E-08	Not Detected
	8/30/2024	5.27E-08	1.57E-08	2.14E-08	Detected
	10/4/2024	4.05E-08	1.87E-08	1.49E-08	Detected
	10/25/2024	0.00E+00	1.58E-08	4.21E-08	Not Detected
	11/20/2024	4.58E-09	1.12E-08	2.75E-08	Not Detected

Table B.6. Activity concentrations of ^{238}Pu at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}Pu	1/19/2024	6.27E-09	9.35E-09	2.10E-08	Not Detected
	3/1/2024	-7.35E-09	1.25E-08	3.55E-08	Not Detected
	3/27/2024	4.91E-09	1.10E-08	2.61E-08	Not Detected
	4/26/2024	1.01E-09	8.80E-09	2.27E-08	Not Detected
	5/24/2024	8.89E-09	1.09E-08	2.37E-08	Not Detected
	6/19/2024	8.75E-09	6.17E-09	7.16E-09	Not Detected
	7/17/2024	1.31E-09	8.69E-09	2.28E-08	Not Detected
	8/8/2024	1.03E-08	1.15E-08	2.43E-08	Not Detected
	8/30/2024	-3.31E-09	7.40E-09	2.11E-08	Not Detected
	10/4/2024	-1.64E-09	1.82E-08	4.75E-08	Not Detected
	10/25/2024	2.28E-09	8.52E-09	2.14E-08	Not Detected
	11/20/2024	-1.22E-09	9.44E-09	2.60E-08	Not Detected

Table B.7. Activity concentrations of $^{239+240}$Pu at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
$^{239+240}$Pu	1/19/2024	6.44E-09	5.16E-09	9.08E-09	Not Detected
	3/1/2024	-6.92E-09	1.39E-08	3.79E-08	Not Detected
	3/27/2024	2.91E-08	1.39E-08	2.02E-08	Not Detected
	4/26/2024	2.20E-08	1.21E-08	1.92E-08	Not Detected
	5/24/2024	1.90E-08	1.17E-08	1.89E-08	Not Detected
	6/19/2024	1.43E-08	1.28E-08	2.49E-08	Not Detected
	7/17/2024	1.66E-08	1.49E-08	2.89E-08	Not Detected
	8/8/2024	3.85E-08	1.84E-08	2.79E-08	Not Detected
	8/30/2024	1.82E-09	6.83E-09	1.72E-08	Not Detected
	10/4/2024	2.74E-08	1.46E-08	1.59E-08	Not Detected
	10/25/2024	2.05E-08	1.10E-08	1.01E-08	Not Detected
	11/20/2024	1.24E-08	9.96E-09	1.65E-08	Not Detected

Table B.8. Activity concentrations of ^{241}Am at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{241}Am	1/19/2024	2.29E-09	4.03E-09	9.15E-09	Not Detected
	3/1/2024	0.00E+00	5.74E-08	1.50E-07	Not Detected
	3/27/2024	2.89E-08	1.21E-08	8.86E-09	Detected
	4/26/2024	4.29E-09	2.57E-08	6.80E-08	Not Detected
	5/24/2024	9.62E-09	1.13E-08	2.39E-08	Not Detected
	6/19/2024	0.00E+00	1.10E-08	3.00E-08	Not Detected
	7/17/2024	1.50E-09	1.73E-08	4.37E-08	Not Detected
	8/8/2024	7.83E-08	2.76E-08	4.14E-08	Detected
	8/30/2024	4.76E-09	7.86E-09	1.79E-08	Not Detected
	10/4/2024	3.13E-08	1.92E-08	3.10E-08	Not Detected
	10/25/2024	1.83E-08	1.78E-08	3.54E-08	Not Detected
	11/20/2024	1.79E-09	5.07E-09	1.26E-08	Not Detected

Table B.9. Activity concentrations of ^{238}Pu at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}Pu	1/19/2024	0.00E+00	4.07E-09	1.12E-08	Not Detected
	3/1/2024	-1.38E-08	1.39E-08	4.03E-08	Not Detected
	3/27/2024	2.33E-09	6.58E-09	1.64E-08	Not Detected
	4/26/2024	1.10E-09	1.14E-08	2.91E-08	Not Detected
	5/24/2024	-1.19E-09	9.81E-09	2.67E-08	Not Detected
	6/19/2024	1.43E-08	1.07E-08	1.71E-08	Not Detected
	7/17/2024	1.66E-09	1.37E-08	3.53E-08	Not Detected
	8/8/2024	1.78E-08	1.57E-08	3.16E-08	Not Detected
	8/30/2024	-5.47E-09	7.75E-09	2.33E-08	Not Detected
	10/4/2024	0.00E+00	1.60E-08	4.19E-08	Not Detected
	10/25/2024	2.73E-09	5.47E-09	1.27E-08	Not Detected
	11/20/2024	1.38E-09	1.43E-08	3.63E-08	Not Detected

Table B.10. Activity concentrations of ^{241}Am at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{241}Am	1/19/2024	6.75E-09	6.88E-09	1.41E-08	Not Detected
	3/1/2024	2.83E-08	3.41E-08	6.79E-08	Not Detected
	3/27/2024	1.72E-08	1.11E-08	1.82E-08	Not Detected
	4/26/2024	4.83E-15	4.53E-08	1.19E-07	Not Detected
	5/24/2024	3.89E-09	7.27E-09	1.69E-08	Not Detected
	6/19/2024	1.46E-08	1.09E-08	1.93E-08	Not Detected
	7/17/2024	1.91E-08	1.73E-08	3.61E-08	Not Detected
	8/8/2024	-1.97E-09	1.18E-08	3.43E-08	Not Detected
	8/30/2024	4.60E-09	7.14E-09	1.60E-08	Not Detected
	10/4/2024	1.19E-08	1.56E-08	3.42E-08	Not Detected
	10/25/2024	2.54E-08	1.20E-08	9.84E-09	Detected
	11/20/2024	1.40E-09	3.44E-09	8.43E-09	Not Detected

Table B.11. Activity concentrations of $^{239+240}$Pu at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
$^{239+240}$Pu	1/19/2024	0.00E+00	5.99E-09	1.65E-08	Not Detected
	3/1/2024	-2.59E-09	1.10E-08	3.04E-08	Not Detected
	3/27/2024	3.00E-08	1.29E-08	9.60E-09	Detected
	4/26/2024	2.67E-08	1.33E-08	1.79E-08	Not Detected
	5/24/2024	9.74E-09	6.54E-09	1.10E-08	Not Detected
	6/19/2024	3.92E-08	1.53E-08	1.73E-08	Detected
	7/17/2024	2.29E-08	1.22E-08	1.33E-08	Not Detected
	8/8/2024	1.57E-08	1.25E-08	2.27E-08	Not Detected
	8/30/2024	6.07E-09	7.16E-09	1.51E-08	Not Detected
	10/4/2024	2.01E-08	1.88E-08	3.93E-08	Not Detected
	10/25/2024	2.41E-08	1.28E-08	1.91E-08	Not Detected
	11/20/2024	4.93E-09	9.22E-09	2.15E-08	Not Detected

Table B.12. Activity concentrations of ^{238}Pu at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}Pu	1/19/2024	-4.73E-09	6.29E-09	2.02E-08	Not Detected
	3/1/2024	6.47E-09	1.19E-08	2.76E-08	Not Detected
	3/27/2024	3.91E-09	6.91E-09	1.57E-08	Not Detected
	4/26/2024	3.03E-16	7.20E-09	2.02E-08	Not Detected
	5/24/2024	-2.78E-09	3.94E-09	1.31E-08	Not Detected
	6/19/2024	9.80E-09	9.82E-09	1.94E-08	Not Detected
	7/17/2024	3.87E-08	1.53E-08	1.05E-08	Detected
	8/8/2024	4.30E-09	1.31E-08	3.21E-08	Not Detected
	8/30/2024	1.73E-09	4.90E-09	1.22E-08	Not Detected
	10/4/2024	-4.63E-09	1.34E-08	3.78E-08	Not Detected
	10/25/2024	0.00E+00	1.08E-08	2.83E-08	Not Detected
	11/20/2024	1.23E-09	8.88E-09	2.32E-08	Not Detected

Table B.13. Activity concentrations of ^{241}Am at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{241}Am	1/19/2024	6.87E-09	5.73E-09	1.09E-08	Not Detected
	3/1/2024	7.01E-09	2.62E-08	6.59E-08	Not Detected
	3/27/2024	8.22E-09	1.47E-08	3.41E-08	Not Detected
	4/26/2024	2.11E-08	2.24E-08	3.91E-08	Not Detected
	5/24/2024	4.74E-09	9.48E-09	2.23E-08	Not Detected
	6/19/2024	-2.19E-09	8.18E-09	2.33E-08	Not Detected
	7/17/2024	2.78E-08	1.93E-08	3.84E-08	Not Detected
	8/8/2024	4.66E-08	1.87E-08	2.58E-08	Detected
	8/30/2024	5.33E-09	7.12E-09	1.55E-08	Not Detected
	10/4/2024	0.00E+00	1.28E-08	3.37E-08	Not Detected
	10/25/2024	2.81E-08	1.99E-08	3.43E-08	Not Detected
	11/20/2024	0.00E+00	1.13E-08	3.10E-08	Not Detected

Table B.14. Activity concentrations of $^{239+240}$Pu at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
$^{239+240}$Pu	1/19/2024	6.18E-09	4.36E-09	5.06E-09	Not Detected
	3/1/2024	5.70E-09	1.14E-08	2.68E-08	Not Detected
	3/27/2024	1.40E-08	3.62E-08	8.80E-08	Not Detected
	4/26/2024	8.88E-09	1.23E-08	2.78E-08	Not Detected
	5/24/2024	2.46E-08	1.08E-08	8.22E-09	Detected
	6/19/2024	1.68E-08	1.03E-08	1.58E-08	Not Detected
	7/17/2024	1.87E-08	1.19E-08	1.73E-08	Not Detected
	8/8/2024	1.56E-08	1.17E-08	2.07E-08	Not Detected
	8/30/2024	1.21E-08	8.11E-09	1.31E-08	Not Detected
	10/4/2024	1.91E-08	1.28E-08	2.07E-08	Not Detected
	10/25/2024	1.31E-08	1.14E-08	2.24E-08	Not Detected
	11/20/2024	6.17E-09	1.18E-08	2.77E-08	Not Detected

Table B.15. Activity concentrations of ^{238}Pu at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}Pu	1/19/2024	0.00E+00	3.37E-09	9.69E-09	Not Detected
	3/1/2024	-6.84E-09	1.12E-08	3.21E-08	Not Detected
	3/27/2024	1.40E-08	2.48E-08	5.62E-08	Not Detected
	4/26/2024	-1.28E-08	1.06E-08	3.24E-08	Not Detected
	5/24/2024	7.82E-09	6.71E-09	1.04E-08	Not Detected
	6/19/2024	-3.36E-09	6.71E-09	2.10E-08	Not Detected
	7/17/2024	1.44E-08	1.23E-08	2.29E-08	Not Detected
	8/8/2024	1.82E-08	1.33E-08	2.45E-08	Not Detected
	8/30/2024	7.42E-09	7.88E-09	1.62E-08	Not Detected
	10/4/2024	0.00E+00	9.28E-09	2.56E-08	Not Detected
	10/25/2024	3.57E-09	1.37E-08	3.35E-08	Not Detected
	11/20/2024	1.23E-09	9.55E-09	2.48E-08	Not Detected

Table B.16. Activity concentrations of ^{241}Am at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{241}Am	1/19/2024	1.21E-08	8.60E-09	1.62E-08	Not Detected
	3/1/2024	8.94E-09	2.53E-08	6.31E-08	Not Detected
	3/27/2024	1.10E-08	1.25E-08	2.70E-08	Not Detected
	4/26/2024	-4.24E-08	3.42E-08	1.16E-07	Not Detected
	5/24/2024	-7.18E-09	1.25E-08	3.66E-08	Not Detected
	6/19/2024	1.15E-09	1.32E-08	3.34E-08	Not Detected
	7/17/2024	3.62E-09	1.30E-08	3.19E-08	Not Detected
	8/8/2024	8.98E-09	7.27E-09	9.44E-09	Not Detected
	8/30/2024	6.97E-09	8.54E-09	1.86E-08	Not Detected
	10/4/2024	-1.50E-08	1.92E-08	5.48E-08	Not Detected
	10/25/2024	4.69E-09	9.76E-09	2.30E-08	Not Detected
	11/20/2024	-6.13E-09	2.13E-08	6.17E-08	Not Detected

Table B.17. Activity concentrations of $^{239+240}$Pu at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
$^{239+240}$Pu	1/19/2024	1.11E-08	6.38E-09	7.37E-09	Not Detected
	3/1/2024	-3.75E-09	1.20E-08	3.31E-08	Not Detected
	3/27/2024	1.15E-08	1.08E-08	2.16E-08	Not Detected
	4/26/2024	2.25E-08	1.14E-08	1.42E-08	Not Detected
	5/24/2024	2.42E-08	1.29E-08	1.92E-08	Not Detected
	6/19/2024	7.70E-09	8.53E-09	1.75E-08	Not Detected
	7/17/2024	8.63E-09	1.15E-08	2.50E-08	Not Detected
	8/8/2024	1.52E-08	1.02E-08	1.53E-08	Not Detected
	8/30/2024	7.54E-09	7.31E-09	1.46E-08	Not Detected
	10/4/2024	1.19E-08	1.33E-08	2.79E-08	Not Detected
	10/25/2024	1.04E-08	7.31E-09	8.48E-09	Not Detected
	11/20/2024	2.22E-08	1.23E-08	1.38E-08	Not Detected

Table B.18. Activity concentrations of ^{238}Pu at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}Pu	1/19/2024	6.35E-09	6.36E-09	1.26E-08	Not Detected
	3/1/2024	6.26E-09	9.70E-09	2.18E-08	Not Detected
	3/27/2024	3.45E-09	6.09E-09	1.38E-08	Not Detected
	4/26/2024	4.73E-09	7.48E-09	1.67E-08	Not Detected
	5/24/2024	-2.42E-09	1.03E-08	2.84E-08	Not Detected
	6/19/2024	7.87E-16	5.39E-09	1.55E-08	Not Detected
	7/17/2024	2.88E-09	1.68E-08	4.17E-08	Not Detected
	8/8/2024	7.62E-09	1.02E-08	2.21E-08	Not Detected
	8/30/2024	-1.67E-09	5.30E-09	1.58E-08	Not Detected
	10/4/2024	-4.44E-09	1.07E-08	3.16E-08	Not Detected
	10/25/2024	8.06E-09	6.53E-09	8.48E-09	Not Detected
	11/20/2024	0.00E+00	1.83E-08	4.65E-08	Not Detected

Table B.19. Activity concentrations of ^{241}Am at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{241}Am	1/19/2024	1.45E-04	1.67E-04	3.60E-04	Not Detected
	3/1/2024	1.25E-03	3.54E-03	8.81E-03	Not Detected
	3/27/2024	2.14E-04	1.58E-04	2.86E-04	Not Detected
	4/26/2024	-6.10E-05	8.63E-05	2.87E-04	Not Detected
	5/24/2024	6.20E-05	5.68E-04	1.46E-03	Not Detected
	6/19/2024	1.42E-04	2.26E-04	5.18E-04	Not Detected
	7/17/2024	1.53E-04	2.23E-04	5.05E-04	Not Detected
	8/8/2024	-7.35E-05	2.08E-04	5.63E-04	Not Detected
	8/30/2024	1.80E-04	2.09E-04	4.50E-04	Not Detected
	10/4/2024	7.36E-05	1.65E-04	3.92E-04	Not Detected
	10/25/2024	1.75E-04	2.73E-04	6.20E-04	Not Detected
	11/20/2024	3.50E-04	7.00E-04	1.64E-03	Not Detected

Table B.20. Activity concentrations of $^{239+240}Pu$ at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
$^{239+240}Pu$	1/19/2024	1.72E-04	1.75E-04	3.59E-04	Not Detected
	3/1/2024	1.89E-04	2.32E-04	5.04E-04	Not Detected
	3/27/2024	2.78E-04	1.59E-04	1.84E-04	Not Detected
	4/26/2024	-8.04E-05	2.05E-04	5.66E-04	Not Detected
	5/24/2024	1.37E-02	8.66E-03	8.41E-03	Not Detected
	6/19/2024	1.21E-04	1.51E-04	3.26E-04	Not Detected
	7/17/2024	2.02E-04	1.33E-04	1.70E-04	Not Detected
	8/8/2024	1.17E-04	1.86E-04	4.24E-04	Not Detected
	8/30/2024	1.94E-04	2.16E-04	4.59E-04	Not Detected
	10/4/2024	3.52E-04	1.87E-04	2.79E-04	Not Detected
	10/25/2024	1.14E-04	1.64E-04	3.60E-04	Not Detected
	11/20/2024	2.25E-04	2.11E-04	3.97E-04	Not Detected

Table B.21. Activity concentrations of ^{238}Pu at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}Pu	1/19/2024	1.91E-05	1.57E-04	4.06E-04	Not Detected
	3/1/2024	7.10E-05	2.17E-04	5.31E-04	Not Detected
	3/27/2024	1.79E-04	1.73E-04	3.46E-04	Not Detected
	4/26/2024	8.04E-05	1.39E-04	3.19E-04	Not Detected
	5/24/2024	4.57E-03	5.19E-03	8.41E-03	Not Detected
	6/19/2024	-1.21E-04	1.67E-04	4.89E-04	Not Detected
	7/17/2024	3.67E-05	1.80E-04	4.50E-04	Not Detected
	8/8/2024	1.50E-04	1.86E-04	4.08E-04	Not Detected
	8/30/2024	1.72E-04	1.83E-04	3.75E-04	Not Detected
	10/4/2024	-3.52E-05	1.32E-04	3.75E-04	Not Detected
	10/25/2024	2.27E-05	1.98E-04	5.10E-04	Not Detected
	11/20/2024	0.00E+00	1.95E-04	5.29E-04	Not Detected

Table B.22. Activity concentrations of ^{241}Am at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{241}Am	1/19/2024	0.00E+00	2.12E-04	5.50E-04	Not Detected
	3/1/2024	-6.00E-04	2.16E-03	5.80E-03	Not Detected
	3/27/2024	-5.81E-05	2.17E-04	6.19E-04	Not Detected
	4/26/2024	9.28E-05	7.65E-04	1.98E-03	Not Detected
	5/24/2024	1.83E-04	3.66E-04	8.59E-04	Not Detected
	6/19/2024	6.53E-05	2.26E-04	5.69E-04	Not Detected
	7/17/2024	7.87E-05	3.52E-04	8.83E-04	Not Detected
	8/8/2024	3.89E-04	3.40E-04	6.66E-04	Not Detected
	8/30/2024	1.81E-03	5.41E-04	7.38E-04	Detected
	10/4/2024	7.57E-04	3.50E-04	2.79E-04	Detected
	10/25/2024	0.00E+00	4.79E-04	1.28E-03	Not Detected
	11/20/2024	1.35E-04	3.31E-04	8.12E-04	Not Detected

Table B.23. Activity concentrations of $^{239+240}$Pu at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
$^{239+240}$Pu	1/19/2024	2.13E-04	1.71E-04	2.84E-04	Not Detected
	3/1/2024	1.98E-04	2.34E-04	4.93E-04	Not Detected
	3/27/2024	4.06E-04	2.16E-04	2.35E-04	Not Detected
	4/26/2024	4.29E-04	2.79E-04	5.07E-04	Not Detected
	5/24/2024	2.74E-04	2.24E-04	4.30E-04	Not Detected
	6/19/2024	5.37E-04	2.54E-04	2.08E-04	Detected
	7/17/2024	3.88E-04	3.24E-04	6.15E-04	Not Detected
	8/8/2024	3.80E-04	3.17E-04	6.02E-04	Not Detected
	8/30/2024	8.55E-04	3.45E-04	4.02E-04	Detected
	10/4/2024	2.75E-04	2.67E-04	5.33E-04	Not Detected
	10/25/2024	3.80E-04	3.02E-04	5.47E-04	Not Detected
	11/20/2024	4.68E-04	2.81E-04	3.34E-04	Not Detected

Table B.24. Activity concentrations of ^{238}Pu at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}Pu	1/19/2024	1.42E-04	2.12E-04	4.75E-04	Not Detected
	3/1/2024	-1.70E-04	2.89E-04	8.21E-04	Not Detected
	3/27/2024	1.01E-04	2.27E-04	5.40E-04	Not Detected
	4/26/2024	2.38E-05	2.08E-04	5.34E-04	Not Detected
	5/24/2024	1.83E-04	2.24E-04	4.87E-04	Not Detected
	6/19/2024	2.54E-04	1.79E-04	2.08E-04	Not Detected
	7/17/2024	3.53E-05	2.34E-04	6.15E-04	Not Detected
	8/8/2024	2.76E-04	3.10E-04	6.50E-04	Not Detected
	8/30/2024	-1.14E-04	2.55E-04	7.26E-04	Not Detected
	10/4/2024	-3.06E-05	3.41E-04	8.88E-04	Not Detected
	10/25/2024	6.90E-05	2.58E-04	6.49E-04	Not Detected
	11/20/2024	-3.60E-05	2.79E-04	7.66E-04	Not Detected

Table B.25. Activity concentrations of ^{241}Am at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{241}Am	1/19/2024	7.50E-05	1.32E-04	3.00E-04	Not Detected
	3/1/2024	0.00E+00	1.12E-03	2.92E-03	Not Detected
	3/27/2024	4.85E-04	2.04E-04	1.49E-04	Detected
	4/26/2024	8.78E-05	5.27E-04	1.39E-03	Not Detected
	5/24/2024	1.53E-04	1.80E-04	3.80E-04	Not Detected
	6/19/2024	0.00E+00	2.01E-04	5.45E-04	Not Detected
	7/17/2024	3.00E-05	3.45E-04	8.72E-04	Not Detected
	8/8/2024	1.23E-03	4.35E-04	6.52E-04	Detected
	8/30/2024	1.21E-04	1.99E-04	4.54E-04	Not Detected
	10/4/2024	3.17E-04	1.95E-04	3.14E-04	Not Detected
	10/25/2024	3.11E-04	3.02E-04	6.02E-04	Not Detected
	11/20/2024	2.98E-05	8.43E-05	2.10E-04	Not Detected

Table B.26. Activity concentrations of $^{239+240}$Pu at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
$^{239+240}$Pu	1/19/2024	2.11E-04	1.69E-04	2.98E-04	Not Detected
	3/1/2024	-1.35E-04	2.70E-04	7.38E-04	Not Detected
	3/27/2024	4.88E-04	2.33E-04	3.40E-04	Not Detected
	4/26/2024	4.50E-04	2.48E-04	3.92E-04	Not Detected
	5/24/2024	3.03E-04	1.86E-04	3.00E-04	Not Detected
	6/19/2024	2.60E-04	2.33E-04	4.52E-04	Not Detected
	7/17/2024	3.31E-04	2.97E-04	5.77E-04	Not Detected
	8/8/2024	6.07E-04	2.90E-04	4.40E-04	Not Detected
	8/30/2024	4.62E-05	1.73E-04	4.35E-04	Not Detected
	10/4/2024	2.77E-04	1.48E-04	1.61E-04	Not Detected
	10/25/2024	3.48E-04	1.87E-04	1.71E-04	Not Detected
	11/20/2024	2.06E-04	1.66E-04	2.75E-04	Not Detected

Table B.27. Activity concentrations of ^{238}Pu at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}Pu	1/19/2024	0.00E+00	1.34E-04	3.68E-04	Not Detected
	3/1/2024	-2.70E-04	2.70E-04	7.85E-04	Not Detected
	3/27/2024	3.90E-05	1.10E-04	2.75E-04	Not Detected
	4/26/2024	2.25E-05	2.34E-04	5.95E-04	Not Detected
	5/24/2024	-1.89E-05	1.56E-04	4.24E-04	Not Detected
	6/19/2024	2.60E-04	1.95E-04	3.12E-04	Not Detected
	7/17/2024	3.31E-05	2.73E-04	7.06E-04	Not Detected
	8/8/2024	2.80E-04	2.48E-04	4.98E-04	Not Detected
	8/30/2024	-1.39E-04	1.96E-04	5.89E-04	Not Detected
	10/4/2024	0.00E+00	1.63E-04	4.25E-04	Not Detected
	10/25/2024	4.65E-05	9.30E-05	2.16E-04	Not Detected
	11/20/2024	2.29E-05	2.38E-04	6.05E-04	Not Detected

Table B.28. Activity concentrations of ^{241}Am at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{241}Am	1/19/2024	1.17E-04	1.19E-04	2.44E-04	Not Detected
	3/1/2024	3.87E-04	4.67E-04	9.30E-04	Not Detected
	3/27/2024	1.46E-04	9.39E-05	1.55E-04	Not Detected
	4/26/2024	4.43E-11	4.16E-04	1.09E-03	Not Detected
	5/24/2024	3.99E-05	7.47E-05	1.74E-04	Not Detected
	6/19/2024	2.38E-04	1.78E-04	3.15E-04	Not Detected
	7/17/2024	2.56E-04	2.32E-04	4.83E-04	Not Detected
	8/8/2024	-2.16E-05	1.30E-04	3.77E-04	Not Detected
	8/30/2024	8.89E-05	1.38E-04	3.10E-04	Not Detected
	10/4/2024	1.22E-04	1.59E-04	3.49E-04	Not Detected
	10/25/2024	4.04E-04	1.92E-04	1.57E-04	Detected
	11/20/2024	2.44E-05	5.98E-05	1.46E-04	Not Detected

Table B.29. Activity concentrations of $^{239+240}$Pu at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
$^{239+240}$Pu	1/19/2024	0.00E+00	1.03E-04	2.85E-04	Not Detected
	3/1/2024	-3.54E-05	1.50E-04	4.16E-04	Not Detected
	3/27/2024	2.55E-04	1.09E-04	8.15E-05	Detected
	4/26/2024	2.45E-04	1.22E-04	1.65E-04	Not Detected
	5/24/2024	1.00E-04	6.71E-05	1.13E-04	Not Detected
	6/19/2024	6.41E-04	2.49E-04	2.83E-04	Detected
	7/17/2024	3.06E-04	1.63E-04	1.78E-04	Not Detected
	8/8/2024	1.73E-04	1.37E-04	2.49E-04	Not Detected
	8/30/2024	1.17E-04	1.38E-04	2.91E-04	Not Detected
	10/4/2024	2.05E-04	1.92E-04	4.01E-04	Not Detected
	10/25/2024	3.83E-04	2.04E-04	3.04E-04	Not Detected
	11/20/2024	8.56E-05	1.60E-04	3.73E-04	Not Detected

Table B.30. Activity concentrations of ^{238}Pu at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}Pu	1/19/2024	-8.18E-05	1.09E-04	3.49E-04	Not Detected
	3/1/2024	8.86E-05	1.63E-04	3.78E-04	Not Detected
	3/27/2024	3.32E-05	5.86E-05	1.33E-04	Not Detected
	4/26/2024	2.78E-12	6.60E-05	1.85E-04	Not Detected
	5/24/2024	-2.86E-05	4.04E-05	1.34E-04	Not Detected
	6/19/2024	1.60E-04	1.61E-04	3.18E-04	Not Detected
	7/17/2024	5.17E-04	2.04E-04	1.41E-04	Detected
	8/8/2024	4.71E-05	1.44E-04	3.52E-04	Not Detected
	8/30/2024	3.35E-05	9.47E-05	2.36E-04	Not Detected
	10/4/2024	-4.72E-05	1.37E-04	3.86E-04	Not Detected
	10/25/2024	0.00E+00	1.71E-04	4.50E-04	Not Detected
	11/20/2024	2.14E-05	1.54E-04	4.03E-04	Not Detected

Table B.31. Activity concentrations of ^{241}Am at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{241}Am	1/19/2024	3.09E-04	2.58E-04	4.90E-04	Not Detected
	3/1/2024	2.89E-04	1.08E-03	2.72E-03	Not Detected
	3/27/2024	2.52E-04	4.50E-04	1.04E-03	Not Detected
	4/26/2024	4.21E-04	4.48E-04	7.82E-04	Not Detected
	5/24/2024	8.08E-05	1.62E-04	3.80E-04	Not Detected
	6/19/2024	-5.03E-05	1.88E-04	5.36E-04	Not Detected
	7/17/2024	5.33E-04	3.71E-04	7.36E-04	Not Detected
	8/8/2024	1.01E-03	4.05E-04	5.57E-04	Detected
	8/30/2024	1.39E-04	1.85E-04	4.03E-04	Not Detected
	10/4/2024	0.00E+00	1.88E-04	4.94E-04	Not Detected
	10/25/2024	6.23E-04	4.41E-04	7.60E-04	Not Detected
	11/20/2024	0.00E+00	2.78E-04	7.64E-04	Not Detected

Table B.32. Activity concentrations of $^{239+240}$Pu at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
$^{239+240}$Pu	1/19/2024	2.79E-04	1.96E-04	2.28E-04	Not Detected
	3/1/2024	2.35E-04	4.70E-04	1.10E-03	Not Detected
	3/27/2024	4.30E-04	1.11E-03	2.70E-03	Not Detected
	4/26/2024	1.77E-04	2.46E-04	5.56E-04	Not Detected
	5/24/2024	4.19E-04	1.84E-04	1.40E-04	Detected
	6/19/2024	3.86E-04	2.37E-04	3.63E-04	Not Detected
	7/17/2024	3.60E-04	2.29E-04	3.33E-04	Not Detected
	8/8/2024	3.38E-04	2.52E-04	4.47E-04	Not Detected
	8/30/2024	3.14E-04	2.11E-04	3.40E-04	Not Detected
	10/4/2024	2.80E-04	1.88E-04	3.04E-04	Not Detected
	10/25/2024	2.90E-04	2.53E-04	4.96E-04	Not Detected
	11/20/2024	1.52E-04	2.91E-04	6.81E-04	Not Detected

Table B.33. Activity concentrations of ^{238}Pu at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}Pu	1/19/2024	0.00E+00	1.52E-04	4.37E-04	Not Detected
	3/1/2024	-2.82E-04	4.61E-04	1.32E-03	Not Detected
	3/27/2024	4.30E-04	7.59E-04	1.72E-03	Not Detected
	4/26/2024	-2.56E-04	2.13E-04	6.48E-04	Not Detected
	5/24/2024	1.33E-04	1.14E-04	1.77E-04	Not Detected
	6/19/2024	-7.73E-05	1.55E-04	4.85E-04	Not Detected
	7/17/2024	2.77E-04	2.36E-04	4.39E-04	Not Detected
	8/8/2024	3.94E-04	2.88E-04	5.30E-04	Not Detected
	8/30/2024	1.93E-04	2.05E-04	4.20E-04	Not Detected
	10/4/2024	0.00E+00	1.36E-04	3.75E-04	Not Detected
	10/25/2024	7.91E-05	3.03E-04	7.43E-04	Not Detected
	11/20/2024	3.04E-05	2.35E-04	6.11E-04	Not Detected

Table B.34. Activity concentrations of ^{241}Am at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{241}Am	1/19/2024	2.80E-04	1.98E-04	3.73E-04	Not Detected
	3/1/2024	1.89E-04	5.36E-04	1.33E-03	Not Detected
	3/27/2024	1.66E-04	1.88E-04	4.07E-04	Not Detected
	4/26/2024	-6.17E-04	4.97E-04	1.68E-03	Not Detected
	5/24/2024	-9.44E-05	1.65E-04	4.81E-04	Not Detected
	6/19/2024	2.51E-05	2.89E-04	7.30E-04	Not Detected
	7/17/2024	8.19E-05	2.94E-04	7.21E-04	Not Detected
	8/8/2024	2.05E-04	1.66E-04	2.16E-04	Not Detected
	8/30/2024	2.09E-04	2.56E-04	5.55E-04	Not Detected
	10/4/2024	-2.41E-04	3.07E-04	8.78E-04	Not Detected
	10/25/2024	1.24E-04	2.57E-04	6.07E-04	Not Detected
	11/20/2024	-1.60E-04	5.56E-04	1.61E-03	Not Detected

Table B.35. Activity concentrations of $^{239+240}$Pu at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
$^{239+240}$Pu	1/19/2024	2.56E-04	1.47E-04	1.70E-04	Not Detected
	3/1/2024	-7.95E-05	2.54E-04	7.00E-04	Not Detected
	3/27/2024	1.73E-04	1.63E-04	3.26E-04	Not Detected
	4/26/2024	3.27E-04	1.66E-04	2.07E-04	Not Detected
	5/24/2024	3.18E-04	1.69E-04	2.52E-04	Not Detected
	6/19/2024	1.68E-04	1.87E-04	3.82E-04	Not Detected
	7/17/2024	1.95E-04	2.60E-04	5.66E-04	Not Detected
	8/8/2024	3.49E-04	2.33E-04	3.49E-04	Not Detected
	8/30/2024	2.26E-04	2.19E-04	4.36E-04	Not Detected
	10/4/2024	1.90E-04	2.13E-04	4.47E-04	Not Detected
	10/25/2024	2.73E-04	1.93E-04	2.23E-04	Not Detected
	11/20/2024	5.81E-04	3.23E-04	3.60E-04	Not Detected

Table B.36. Activity concentrations of ^{238}Pu at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}Pu	1/19/2024	1.47E-04	1.47E-04	2.91E-04	Not Detected
	3/1/2024	1.32E-04	2.05E-04	4.61E-04	Not Detected
	3/27/2024	5.19E-05	9.16E-05	2.08E-04	Not Detected
	4/26/2024	6.88E-05	1.09E-04	2.43E-04	Not Detected
	5/24/2024	-3.18E-05	1.35E-04	3.74E-04	Not Detected
	6/19/2024	1.72E-11	1.18E-04	3.39E-04	Not Detected
	7/17/2024	6.50E-05	3.79E-04	9.43E-04	Not Detected
	8/8/2024	1.74E-04	2.33E-04	5.06E-04	Not Detected
	8/30/2024	-5.01E-05	1.59E-04	4.72E-04	Not Detected
	10/4/2024	-7.12E-05	1.71E-04	5.06E-04	Not Detected
	10/25/2024	2.12E-04	1.72E-04	2.23E-04	Not Detected
	11/20/2024	0.00E+00	4.77E-04	1.22E-03	Not Detected

Table B.37. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{234}U	1/19/2024	3.80E-06	4.80E-07	2.88E-07	Detected
	3/1/2024	4.18E-06	5.97E-07	5.31E-07	Detected
	3/27/2024	8.07E-06	1.05E-06	5.97E-07	Detected
	4/26/2024	5.08E-06	7.97E-07	1.15E-06	Detected
	5/24/2024	1.09E-05	1.52E-06	8.05E-07	Detected
	6/19/2024	4.99E-06	9.04E-07	1.52E-06	Detected
	7/17/2024	4.91E-06	8.05E-07	1.14E-06	Detected
	8/8/2024	5.72E-06	8.82E-07	1.12E-06	Detected
	8/30/2024	7.23E-07	5.93E-07	1.36E-06	Not Detected
	10/4/2024	1.07E-06	1.29E-06	2.97E-06	Not Detected
	10/25/2024	5.08E-06	7.44E-07	7.58E-07	Detected
	11/20/2024	2.34E-06	3.77E-07	5.32E-07	Detected
^{235}U	1/19/2024	2.90E-07	7.85E-08	9.92E-08	Detected
	3/1/2024	2.72E-07	1.07E-07	1.62E-07	Detected
	3/27/2024	3.98E-07	1.43E-07	2.08E-07	Detected
	4/26/2024	3.51E-07	1.71E-07	3.34E-07	Not Detected
	5/24/2024	8.54E-07	2.38E-07	2.17E-07	Detected
	6/19/2024	4.16E-07	1.97E-07	3.84E-07	Not Detected
	7/17/2024	3.25E-07	1.58E-07	2.95E-07	Not Detected
	8/8/2024	2.39E-07	1.49E-07	2.95E-07	Not Detected
	8/30/2024	-4.67E-08	1.62E-07	3.95E-07	Not Detected
	10/4/2024	-6.43E-08	3.58E-07	8.64E-07	Not Detected
	10/25/2024	2.44E-07	1.30E-07	2.41E-07	Not Detected
	11/20/2024	2.06E-07	8.51E-08	1.55E-07	Not Detected

Table B.37. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}U	1/19/2024	9.92E-08	4.38E-07	2.69E-07	Not Detected
	3/1/2024	3.49E-06	5.18E-07	5.05E-07	Detected
	3/27/2024	7.29E-06	9.57E-07	5.57E-07	Detected
	4/26/2024	4.61E-06	7.44E-07	1.09E-06	Detected
	5/24/2024	9.34E-06	1.34E-06	8.11E-07	Detected
	6/19/2024	3.86E-06	8.28E-07	1.53E-06	Detected
	7/17/2024	4.28E-06	7.42E-07	1.12E-06	Detected
	8/8/2024	4.88E-06	7.97E-07	1.09E-06	Detected
	8/30/2024	6.35E-07	5.80E-07	1.33E-06	Not Detected
	10/4/2024	2.23E-07	1.25E-06	2.91E-06	Not Detected
	10/25/2024	4.71E-06	6.97E-07	7.11E-07	Detected
	11/20/2024	2.23E-06	3.62E-07	5.15E-07	Detected

Table B.38. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{234}U	1/19/2024	5.00E-06	6.42E-07	4.84E-07	Detected
	3/1/2024	3.53E-06	5.29E-07	5.70E-07	Detected
	3/27/2024	4.37E-06	6.03E-07	5.46E-07	Detected
	4/26/2024	2.97E-06	4.32E-07	4.65E-07	Detected
	5/24/2024	2.76E-06	7.84E-07	1.61E-06	Detected
	6/19/2024	-2.97E-07	8.11E-07	1.91E-06	Not Detected
	7/17/2024	1.92E-06	5.15E-07	1.00E-06	Detected
	8/8/2024	2.19E-06	5.18E-07	9.41E-07	Detected
	8/30/2024	5.60E-08	4.85E-07	1.13E-06	Not Detected
	10/4/2024	2.28E-06	5.00E-07	8.86E-07	Detected
	10/25/2024	3.32E-06	5.23E-07	6.09E-07	Detected
	11/20/2024	1.59E-06	3.93E-07	7.70E-07	Detected
^{235}U	1/19/2024	3.73E-07	1.13E-07	1.64E-07	Detected
	3/1/2024	3.40E-07	1.18E-07	1.71E-07	Detected
	3/27/2024	2.70E-07	1.16E-07	2.02E-07	Not Detected
	4/26/2024	2.13E-07	8.48E-08	1.39E-07	Not Detected
	5/24/2024	1.53E-07	1.84E-07	4.16E-07	Not Detected
	6/19/2024	6.10E-08	2.04E-07	4.81E-07	Not Detected
	7/17/2024	1.40E-07	1.22E-07	2.62E-07	Not Detected
	8/8/2024	2.61E-07	1.32E-07	2.42E-07	Not Detected
	8/30/2024	6.77E-09	1.39E-07	3.34E-07	Not Detected
	10/4/2024	1.01E-07	1.18E-07	2.78E-07	Not Detected
	10/25/2024	2.48E-07	1.13E-07	1.93E-07	Not Detected
	11/20/2024	2.37E-07	1.13E-07	2.26E-07	Not Detected

Table B.38. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}U	1/19/2024	4.55E-06	5.91E-07	4.50E-07	Detected
	3/1/2024	3.28E-06	4.99E-07	5.46E-07	Detected
	3/27/2024	3.90E-06	5.48E-07	5.09E-07	Detected
	4/26/2024	2.72E-06	4.04E-07	4.43E-07	Detected
	5/24/2024	1.79E-06	7.45E-07	1.62E-06	Not Detected
	6/19/2024	-7.02E-07	8.18E-07	1.93E-06	Not Detected
	7/17/2024	1.85E-06	5.02E-07	9.77E-07	Detected
	8/8/2024	2.01E-06	4.96E-07	9.17E-07	Detected
	8/30/2024	-5.88E-08	4.73E-07	1.11E-06	Not Detected
	10/4/2024	1.75E-06	4.56E-07	8.70E-07	Detected
	10/25/2024	3.25E-06	5.08E-07	5.75E-07	Detected
	11/20/2024	1.36E-06	3.70E-07	7.44E-07	Detected

Table B.39. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{234}U	1/19/2024	3.14E-06	4.21E-07	3.24E-07	Detected
	3/1/2024	3.68E-06	5.00E-07	4.49E-07	Detected
	3/27/2024	5.53E-06	7.02E-07	4.36E-07	Detected
	4/26/2024	4.22E-06	5.71E-07	5.03E-07	Detected
	5/24/2024	5.87E-06	9.11E-07	1.30E-06	Detected
	6/19/2024	3.68E-06	8.74E-07	1.67E-06	Detected
	7/17/2024	3.14E-06	6.57E-07	1.13E-06	Detected
	8/8/2024	4.45E-06	7.47E-07	1.05E-06	Detected
	8/30/2024	9.23E-14	5.97E-13	1.40E-12	Not Detected
	10/4/2024	5.27E-06	1.18E-06	2.24E-06	Detected
	10/25/2024	5.38E-06	7.65E-07	6.86E-07	Detected
	11/20/2024	4.03E-06	6.47E-07	9.85E-07	Detected
^{235}U	1/19/2024	2.28E-07	7.65E-08	1.12E-07	Detected
	3/1/2024	2.67E-07	8.99E-08	1.34E-07	Detected
	3/27/2024	3.04E-07	1.01E-07	1.48E-07	Detected
	4/26/2024	3.21E-07	1.04E-07	1.51E-07	Detected
	5/24/2024	2.80E-07	1.80E-07	3.32E-07	Not Detected
	6/19/2024	1.92E-07	2.13E-07	4.25E-07	Not Detected
	7/17/2024	4.61E-07	1.75E-07	2.93E-07	Not Detected
	8/8/2024	3.65E-07	1.59E-07	2.77E-07	Not Detected
	8/30/2024	-1.10E-07	4.74E-08	4.07E-13	Not Detected
	10/4/2024	1.18E-07	3.10E-07	6.55E-07	Not Detected
	10/25/2024	2.37E-07	1.25E-07	2.27E-07	Not Detected
	11/20/2024	3.11E-07	1.54E-07	2.89E-07	Not Detected

Table B.39. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}U	1/19/2024	2.71E-06	3.72E-07	3.02E-07	Detected
	3/1/2024	3.05E-06	4.32E-07	4.29E-07	Detected
	3/27/2024	4.92E-06	6.33E-07	4.08E-07	Detected
	4/26/2024	3.41E-06	4.85E-07	4.82E-07	Detected
	5/24/2024	4.50E-06	8.02E-07	1.31E-06	Detected
	6/19/2024	3.35E-06	8.60E-07	1.69E-06	Detected
	7/17/2024	2.97E-06	6.35E-07	1.11E-06	Detected
	8/8/2024	3.96E-06	6.95E-07	1.02E-06	Detected
	8/30/2024	2.17E-13	5.87E-13	1.37E-12	Not Detected
	10/4/2024	4.82E-06	1.13E-06	2.19E-06	Detected
	10/25/2024	4.50E-06	6.66E-07	6.49E-07	Detected
	11/20/2024	3.50E-06	5.95E-07	9.52E-07	Detected

Table B.40. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{234}U	1/19/2024	5.32E-06	6.72E-07	3.22E-07	Detected
	3/1/2024	6.72E-06	8.86E-07	5.27E-07	Detected
	3/27/2024	6.66E-06	8.10E-07	5.04E-07	Detected
	4/26/2024	8.68E-06	1.09E-06	5.23E-07	Detected
	5/24/2024	3.25E-06	1.29E-06	2.82E-06	Not Detected
	6/19/2024	5.50E-06	7.60E-07	6.45E-07	Detected
	7/17/2024	3.93E-06	6.67E-07	1.02E-06	Detected
	8/8/2024	-1.16E-05	4.33E-06	9.84E-06	Not Detected
	8/30/2024	-1.95E-06	1.03E-06	2.38E-06	Not Detected
	10/4/2024	2.19E-06	1.27E-06	2.88E-06	Not Detected
	10/25/2024	5.45E-06	7.56E-07	6.98E-07	Detected
	11/20/2024	2.22E-06	1.02E-06	1.35E-06	Not Detected
^{235}U	1/19/2024	2.43E-07	8.18E-08	1.16E-07	Detected
	3/1/2024	4.68E-07	1.41E-07	1.81E-07	Detected
	3/27/2024	3.73E-07	1.13E-07	1.73E-07	Detected
	4/26/2024	8.88E-07	1.87E-07	1.61E-07	Detected
	5/24/2024	4.44E-07	3.34E-07	7.12E-07	Not Detected
	6/19/2024	3.40E-07	1.19E-07	1.67E-07	Detected
	7/17/2024	3.06E-07	1.40E-07	2.61E-07	Not Detected
	8/8/2024	-3.78E-07	1.06E-06	2.50E-06	Not Detected
	8/30/2024	-3.29E-07	2.87E-07	6.87E-07	Not Detected
	10/4/2024	-1.00E-07	3.66E-07	8.41E-07	Not Detected
	10/25/2024	3.18E-07	1.31E-07	2.21E-07	Not Detected
	11/20/2024	1.40E-07	2.28E-07	4.58E-07	Not Detected

Table B.40. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}U	1/19/2024	4.94E-06	6.26E-07	2.98E-07	Detected
	3/1/2024	6.29E-06	8.36E-07	5.11E-07	Detected
	3/27/2024	6.07E-06	7.45E-07	4.70E-07	Detected
	4/26/2024	7.71E-06	9.76E-07	5.01E-07	Detected
	5/24/2024	1.83E-06	1.25E-06	2.86E-06	Not Detected
	6/19/2024	5.07E-06	7.15E-07	6.50E-07	Detected
	7/17/2024	3.37E-06	6.14E-07	9.94E-07	Detected
	8/8/2024	-1.18E-05	4.25E-06	9.64E-06	Not Detected
	8/30/2024	-2.63E-06	1.02E-06	2.33E-06	Not Detected
	10/4/2024	1.40E-06	1.23E-06	2.82E-06	Not Detected
	10/25/2024	4.48E-06	6.48E-07	6.56E-07	Detected
	11/20/2024	1.96E-06	9.42E-07	1.31E-06	Not Detected

Table B.41. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{234}U	1/19/2024	1.82E-06	2.76E-07	3.22E-07	Detected
	3/1/2024	1.94E-06	3.52E-07	5.14E-07	Detected
	3/27/2024	1.24E-06	2.01E-07	2.20E-08	Detected
	4/26/2024	1.33E-06	1.64E-07	1.51E-08	Detected
	5/24/2024	5.11E-06	7.97E-07	1.11E-06	Detected
	6/19/2024	2.38E-06	3.94E-07	5.58E-07	Detected
	7/17/2024	2.99E-06	5.86E-07	9.90E-07	Detected
	8/8/2024	2.00E-06	5.82E-07	1.14E-06	Detected
	8/30/2024	5.14E-07	5.40E-07	1.24E-06	Not Detected
	10/4/2024	1.91E-06	9.39E-07	2.09E-06	Not Detected
	10/25/2024	4.96E-06	7.32E-07	9.20E-07	Detected
	11/20/2024	2.42E-06	4.31E-07	6.98E-07	Detected
^{235}U	1/19/2024	1.03E-07	5.74E-08	1.10E-07	Not Detected
	3/1/2024	1.73E-07	8.75E-08	1.59E-07	Not Detected
	3/27/2024	4.42E-08	3.35E-08	5.85E-08	Not Detected
	4/26/2024	1.12E-07	2.63E-08	8.62E-09	Detected
	5/24/2024	2.84E-07	1.64E-07	2.83E-07	Not Detected
	6/19/2024	2.10E-07	8.47E-08	1.44E-07	Not Detected
	7/17/2024	2.87E-07	1.37E-07	2.58E-07	Not Detected
	8/8/2024	1.31E-07	1.40E-07	3.07E-07	Not Detected
	8/30/2024	-1.55E-07	1.54E-07	3.63E-07	Not Detected
	10/4/2024	-1.60E-07	2.66E-07	6.11E-07	Not Detected
	10/25/2024	1.18E-07	1.51E-07	2.88E-07	Not Detected
	11/20/2024	1.37E-07	1.06E-07	2.04E-07	Not Detected

Table B.41. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}U	1/19/2024	1.45E-06	2.36E-07	3.01E-07	Detected
	3/1/2024	1.76E-06	3.29E-07	4.89E-07	Detected
	3/27/2024	1.10E-06	1.84E-07	6.34E-08	Detected
	4/26/2024	1.24E-06	1.54E-07	1.65E-08	Detected
	5/24/2024	4.77E-06	7.70E-07	1.12E-06	Detected
	6/19/2024	2.01E-06	3.63E-07	5.63E-07	Detected
	7/17/2024	2.87E-06	5.69E-07	9.67E-07	Detected
	8/8/2024	1.76E-06	5.56E-07	1.11E-06	Detected
	8/30/2024	3.05E-07	5.24E-07	1.22E-06	Not Detected
	10/4/2024	1.55E-06	9.08E-07	2.04E-06	Not Detected
	10/25/2024	4.06E-06	6.36E-07	8.63E-07	Detected
	11/20/2024	2.10E-06	3.99E-07	6.76E-07	Detected

Table B.42. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{234}U	1/19/2024	3.97E-06	5.09E-07	3.75E-07	Detected
	3/1/2024	3.23E-06	4.73E-07	5.14E-07	Detected
	3/27/2024	6.29E-06	7.98E-07	6.13E-07	Detected
	4/26/2024	6.55E-06	8.59E-07	5.80E-07	Detected
	5/24/2024	6.48E-06	1.00E-06	1.45E-06	Detected
	6/19/2024	3.59E-06	6.71E-07	1.12E-06	Detected
	7/17/2024	2.61E-06	5.51E-07	9.57E-07	Detected
	8/8/2024	2.38E-06	5.14E-07	9.14E-07	Detected
	8/30/2024	5.54E-07	4.94E-07	1.13E-06	Not Detected
	10/4/2024	-1.25E-06	1.19E-06	2.80E-06	Not Detected
	10/25/2024	2.95E-06	4.65E-07	5.53E-07	Detected
	11/20/2024	2.42E-06	4.58E-07	7.90E-07	Detected
^{235}U	1/19/2024	1.75E-07	7.43E-08	1.30E-07	Not Detected
	3/1/2024	2.66E-07	9.98E-08	1.61E-07	Detected
	3/27/2024	2.95E-07	1.19E-07	2.07E-07	Not Detected
	4/26/2024	5.10E-07	1.45E-07	1.82E-07	Detected
	5/24/2024	3.34E-07	1.99E-07	3.71E-07	Not Detected
	6/19/2024	1.04E-07	1.44E-07	2.86E-07	Not Detected
	7/17/2024	2.76E-07	1.37E-07	2.56E-07	Not Detected
	8/8/2024	1.57E-07	1.15E-07	2.39E-07	Not Detected
	8/30/2024	-1.12E-07	1.44E-07	3.31E-07	Not Detected
	10/4/2024	-4.60E-07	3.39E-07	8.15E-07	Not Detected
	10/25/2024	1.54E-07	9.34E-08	1.81E-07	Not Detected
	11/20/2024	1.22E-07	1.15E-07	2.33E-07	Not Detected

Table B.42. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{238}U	1/19/2024	3.33E-06	4.38E-07	3.50E-07	Detected
	3/1/2024	3.05E-06	4.50E-07	4.89E-07	Detected
	3/27/2024	5.78E-06	7.40E-07	5.72E-07	Detected
	4/26/2024	5.81E-06	7.75E-07	5.54E-07	Detected
	5/24/2024	5.19E-06	8.99E-07	1.46E-06	Detected
	6/19/2024	3.07E-06	6.36E-07	1.14E-06	Detected
	7/17/2024	2.31E-06	5.22E-07	9.35E-07	Detected
	8/8/2024	1.78E-06	4.64E-07	8.92E-07	Detected
	8/30/2024	3.69E-07	4.80E-07	1.11E-06	Not Detected
	10/4/2024	-1.55E-06	1.17E-06	2.74E-06	Not Detected
	10/25/2024	2.80E-06	4.43E-07	5.19E-07	Detected
	11/20/2024	1.76E-06	4.03E-07	7.64E-07	Detected

Table B.43. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{234}U	1/19/2024	8.65E-02	1.09E-02	6.56E-03	Detected
	3/1/2024	8.30E-02	1.18E-02	1.05E-02	Detected
	3/27/2024	1.12E-01	1.46E-02	8.31E-03	Detected
	4/26/2024	7.35E-02	1.15E-02	1.66E-02	Detected
	5/24/2024	1.95E-01	2.74E-02	1.45E-02	Detected
	6/19/2024	7.32E-02	1.33E-02	2.22E-02	Detected
	7/17/2024	5.82E-02	9.54E-03	1.35E-02	Detected
	8/8/2024	6.34E-02	9.77E-03	1.24E-02	Detected
	8/30/2024	1.52E-02	1.25E-02	2.86E-02	Not Detected
	10/4/2024	1.16E-02	1.40E-02	3.23E-02	Not Detected
	10/25/2024	8.28E-02	1.21E-02	1.23E-02	Detected
	11/20/2024	4.15E-02	6.67E-03	9.42E-03	Detected
^{235}U	1/19/2024	6.61E-03	1.79E-03	2.26E-03	Detected
	3/1/2024	5.40E-03	2.12E-03	3.22E-03	Detected
	3/27/2024	5.54E-03	1.99E-03	2.89E-03	Detected
	4/26/2024	5.08E-03	2.47E-03	4.84E-03	Not Detected
	5/24/2024	1.54E-02	4.29E-03	3.90E-03	Detected
	6/19/2024	6.10E-03	2.89E-03	5.64E-03	Not Detected
	7/17/2024	3.85E-03	1.87E-03	3.50E-03	Not Detected
	8/8/2024	2.65E-03	1.65E-03	3.27E-03	Not Detected
	8/30/2024	-9.84E-04	3.41E-03	8.32E-03	Not Detected
	10/4/2024	-7.00E-04	3.89E-03	9.40E-03	Not Detected
	10/25/2024	3.97E-03	2.12E-03	3.92E-03	Not Detected
	11/20/2024	3.66E-03	1.51E-03	2.75E-03	Not Detected

Table B.43. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}U	1/19/2024	2.26E-03	9.97E-03	6.12E-03	Not Detected
	3/1/2024	6.92E-02	1.03E-02	1.00E-02	Detected
	3/27/2024	1.01E-01	1.33E-02	7.75E-03	Detected
	4/26/2024	6.67E-02	1.08E-02	1.58E-02	Detected
	5/24/2024	1.68E-01	2.41E-02	1.46E-02	Detected
	6/19/2024	5.66E-02	1.21E-02	2.25E-02	Detected
	7/17/2024	5.08E-02	8.79E-03	1.32E-02	Detected
	8/8/2024	5.41E-02	8.83E-03	1.21E-02	Detected
	8/30/2024	1.34E-02	1.22E-02	2.80E-02	Not Detected
	10/4/2024	2.42E-03	1.36E-02	3.17E-02	Not Detected
	10/25/2024	7.67E-02	1.13E-02	1.16E-02	Detected
	11/20/2024	3.95E-02	6.41E-03	9.12E-03	Detected

Table B.44. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{234}U	1/19/2024	1.13E-01	1.45E-02	1.09E-02	Detected
	3/1/2024	8.17E-02	1.22E-02	1.32E-02	Detected
	3/27/2024	9.03E-02	1.25E-02	1.13E-02	Detected
	4/26/2024	6.99E-02	1.02E-02	1.10E-02	Detected
	5/24/2024	5.68E-02	1.61E-02	3.31E-02	Detected
	6/19/2024	-8.63E-03	2.35E-02	5.53E-02	Not Detected
	7/17/2024	5.17E-02	1.39E-02	2.69E-02	Detected
	8/8/2024	5.88E-02	1.39E-02	2.52E-02	Detected
	8/30/2024	1.93E-03	1.67E-02	3.91E-02	Not Detected
	10/4/2024	4.27E-02	9.36E-03	1.66E-02	Detected
	10/25/2024	1.01E-01	1.58E-02	1.85E-02	Detected
	11/20/2024	4.69E-02	1.16E-02	2.27E-02	Detected
^{235}U	1/19/2024	8.44E-03	2.55E-03	3.71E-03	Detected
	3/1/2024	7.87E-03	2.72E-03	3.96E-03	Detected
	3/27/2024	5.59E-03	2.39E-03	4.18E-03	Not Detected
	4/26/2024	5.02E-03	2.00E-03	3.27E-03	Not Detected
	5/24/2024	3.15E-03	3.77E-03	8.55E-03	Not Detected
	6/19/2024	1.77E-03	5.92E-03	1.40E-02	Not Detected
	7/17/2024	3.78E-03	3.30E-03	7.06E-03	Not Detected
	8/8/2024	7.01E-03	3.53E-03	6.48E-03	Not Detected
	8/30/2024	2.33E-04	4.78E-03	1.15E-02	Not Detected
	10/4/2024	1.89E-03	2.21E-03	5.20E-03	Not Detected
	10/25/2024	7.52E-03	3.41E-03	5.86E-03	Not Detected
	11/20/2024	6.98E-03	3.33E-03	6.66E-03	Not Detected

Table B.44. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}U	1/19/2024	1.03E-01	1.34E-02	1.02E-02	Detected
	3/1/2024	7.59E-02	1.15E-02	1.26E-02	Detected
	3/27/2024	8.06E-02	1.13E-02	1.05E-02	Detected
	4/26/2024	6.42E-02	9.52E-03	1.04E-02	Detected
	5/24/2024	3.69E-02	1.53E-02	3.34E-02	Not Detected
	6/19/2024	-2.04E-02	2.37E-02	5.59E-02	Not Detected
	7/17/2024	4.98E-02	1.35E-02	2.63E-02	Detected
	8/8/2024	5.38E-02	1.33E-02	2.46E-02	Detected
	8/30/2024	-2.03E-03	1.63E-02	3.83E-02	Not Detected
	10/4/2024	3.27E-02	8.53E-03	1.63E-02	Detected
	10/25/2024	9.85E-02	1.54E-02	1.74E-02	Detected
	11/20/2024	4.02E-02	1.09E-02	2.20E-02	Detected

Table B.45. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{234}U	1/19/2024	1.03E-01	1.38E-02	1.06E-02	Detected
	3/1/2024	7.16E-02	9.75E-03	8.75E-03	Detected
	3/27/2024	9.28E-02	1.18E-02	7.32E-03	Detected
	4/26/2024	8.64E-02	1.17E-02	1.03E-02	Detected
	5/24/2024	9.33E-02	1.45E-02	2.07E-02	Detected
	6/19/2024	6.69E-02	1.59E-02	3.04E-02	Detected
	7/17/2024	6.28E-02	1.31E-02	2.26E-02	Detected
	8/8/2024	7.02E-02	1.18E-02	1.65E-02	Detected
	8/30/2024	2.34E-09	1.51E-08	3.54E-08	Not Detected
	10/4/2024	5.34E-02	1.19E-02	2.27E-02	Detected
	10/25/2024	9.14E-02	1.30E-02	1.17E-02	Detected
	11/20/2024	6.71E-02	1.08E-02	1.64E-02	Detected
^{235}U	1/19/2024	7.49E-03	2.51E-03	3.67E-03	Detected
	3/1/2024	5.21E-03	1.75E-03	2.60E-03	Detected
	3/27/2024	5.10E-03	1.70E-03	2.49E-03	Detected
	4/26/2024	6.58E-03	2.13E-03	3.09E-03	Detected
	5/24/2024	4.45E-03	2.86E-03	5.27E-03	Not Detected
	6/19/2024	3.49E-03	3.87E-03	7.72E-03	Not Detected
	7/17/2024	9.21E-03	3.50E-03	5.85E-03	Not Detected
	8/8/2024	5.76E-03	2.50E-03	4.37E-03	Not Detected
	8/30/2024	-2.78E-03	1.20E-03	1.03E-08	Not Detected
	10/4/2024	1.19E-03	3.14E-03	6.65E-03	Not Detected
	10/25/2024	4.03E-03	2.12E-03	3.86E-03	Not Detected
	11/20/2024	5.17E-03	2.57E-03	4.81E-03	Not Detected

Table B.45. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}U	1/19/2024	8.91E-02	1.22E-02	9.90E-03	Detected
	3/1/2024	5.94E-02	8.42E-03	8.36E-03	Detected
	3/27/2024	8.26E-02	1.06E-02	6.85E-03	Detected
	4/26/2024	6.98E-02	9.92E-03	9.87E-03	Detected
	5/24/2024	7.16E-02	1.27E-02	2.09E-02	Detected
	6/19/2024	6.10E-02	1.56E-02	3.08E-02	Detected
	7/17/2024	5.94E-02	1.27E-02	2.21E-02	Detected
	8/8/2024	6.24E-02	1.10E-02	1.61E-02	Detected
	8/30/2024	5.50E-09	1.49E-08	3.47E-08	Not Detected
	10/4/2024	4.89E-02	1.15E-02	2.22E-02	Detected
	10/25/2024	7.65E-02	1.13E-02	1.10E-02	Detected
	11/20/2024	5.83E-02	9.89E-03	1.59E-02	Detected

Table B.46. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{234}U	1/19/2024	9.19E-02	1.16E-02	5.56E-03	Detected
	3/1/2024	9.21E-02	1.21E-02	7.22E-03	Detected
	3/27/2024	5.66E-02	6.88E-03	4.28E-03	Detected
	4/26/2024	7.97E-02	9.98E-03	4.80E-03	Detected
	5/24/2024	3.33E-02	1.32E-02	2.90E-02	Not Detected
	6/19/2024	9.00E-02	1.24E-02	1.05E-02	Detected
	7/17/2024	5.26E-02	8.92E-03	1.36E-02	Detected
	8/8/2024	-1.28E-01	4.75E-02	1.08E-01	Not Detected
	8/30/2024	-3.76E-02	1.98E-02	4.60E-02	Not Detected
	10/4/2024	2.24E-02	1.30E-02	2.94E-02	Not Detected
	10/25/2024	8.67E-02	1.20E-02	1.11E-02	Detected
	11/20/2024	3.87E-02	1.77E-02	2.35E-02	Not Detected
^{235}U	1/19/2024	4.20E-03	1.41E-03	2.00E-03	Detected
	3/1/2024	6.41E-03	1.93E-03	2.49E-03	Detected
	3/27/2024	3.17E-03	9.63E-04	1.47E-03	Detected
	4/26/2024	8.15E-03	1.71E-03	1.48E-03	Detected
	5/24/2024	4.56E-03	3.43E-03	7.31E-03	Not Detected
	6/19/2024	5.57E-03	1.95E-03	2.74E-03	Detected
	7/17/2024	4.10E-03	1.87E-03	3.50E-03	Not Detected
	8/8/2024	-4.14E-03	1.16E-02	2.74E-02	Not Detected
	8/30/2024	-6.36E-03	5.55E-03	1.33E-02	Not Detected
	10/4/2024	-1.02E-03	3.73E-03	8.58E-03	Not Detected
	10/25/2024	5.06E-03	2.09E-03	3.52E-03	Not Detected
	11/20/2024	2.44E-03	3.97E-03	7.96E-03	Not Detected

Table B.46. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}U	1/19/2024	8.53E-02	1.08E-02	5.15E-03	Detected
	3/1/2024	8.62E-02	1.14E-02	7.00E-03	Detected
	3/27/2024	5.16E-02	6.32E-03	3.99E-03	Detected
	4/26/2024	7.07E-02	8.96E-03	4.60E-03	Detected
	5/24/2024	1.88E-02	1.29E-02	2.93E-02	Not Detected
	6/19/2024	8.30E-02	1.17E-02	1.06E-02	Detected
	7/17/2024	4.51E-02	8.22E-03	1.33E-02	Detected
	8/8/2024	-1.30E-01	4.66E-02	1.06E-01	Not Detected
	8/30/2024	-5.08E-02	1.96E-02	4.51E-02	Not Detected
	10/4/2024	1.43E-02	1.26E-02	2.88E-02	Not Detected
	10/25/2024	7.13E-02	1.03E-02	1.04E-02	Detected
	11/20/2024	3.41E-02	1.64E-02	2.27E-02	Not Detected

Table B.47. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at from Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{234}U	1/19/2024	8.19E-02	1.24E-02	1.45E-02	Detected
	3/1/2024	7.98E-02	1.45E-02	2.12E-02	Detected
	3/27/2024	3.80E-02	6.15E-03	6.74E-04	Detected
	4/26/2024	2.65E-02	3.28E-03	3.01E-04	Detected
	5/24/2024	8.72E-02	1.36E-02	1.88E-02	Detected
	6/19/2024	5.48E-02	9.07E-03	1.28E-02	Detected
	7/17/2024	5.75E-02	1.12E-02	1.90E-02	Detected
	8/8/2024	4.33E-02	1.26E-02	2.46E-02	Detected
	8/30/2024	1.34E-02	1.40E-02	3.23E-02	Not Detected
	10/4/2024	2.81E-02	1.38E-02	3.06E-02	Not Detected
	10/25/2024	1.10E-01	1.62E-02	2.04E-02	Detected
	11/20/2024	5.95E-02	1.06E-02	1.72E-02	Detected
^{235}U	1/19/2024	4.65E-03	2.59E-03	4.94E-03	Not Detected
	3/1/2024	7.12E-03	3.61E-03	6.54E-03	Not Detected
	3/27/2024	1.35E-03	1.02E-03	1.79E-03	Not Detected
	4/26/2024	2.24E-03	5.24E-04	1.72E-04	Detected
	5/24/2024	4.84E-03	2.80E-03	4.83E-03	Not Detected
	6/19/2024	4.83E-03	1.95E-03	3.31E-03	Not Detected
	7/17/2024	5.51E-03	2.63E-03	4.95E-03	Not Detected
	8/8/2024	2.82E-03	3.03E-03	6.64E-03	Not Detected
	8/30/2024	-4.03E-03	4.01E-03	9.43E-03	Not Detected
	10/4/2024	-2.35E-03	3.90E-03	8.98E-03	Not Detected
	10/25/2024	2.62E-03	3.34E-03	6.39E-03	Not Detected
	11/20/2024	3.37E-03	2.62E-03	5.03E-03	Not Detected

Table B.47. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}U	1/19/2024	6.53E-02	1.06E-02	1.36E-02	Detected
	3/1/2024	7.27E-02	1.36E-02	2.02E-02	Detected
	3/27/2024	3.37E-02	5.62E-03	1.94E-03	Detected
	4/26/2024	2.47E-02	3.09E-03	3.29E-04	Detected
	5/24/2024	8.13E-02	1.31E-02	1.91E-02	Detected
	6/19/2024	4.64E-02	8.36E-03	1.30E-02	Detected
	7/17/2024	5.51E-02	1.09E-02	1.86E-02	Detected
	8/8/2024	3.81E-02	1.20E-02	2.40E-02	Detected
	8/30/2024	7.94E-03	1.36E-02	3.16E-02	Not Detected
	10/4/2024	2.27E-02	1.33E-02	3.00E-02	Not Detected
	10/25/2024	9.00E-02	1.41E-02	1.91E-02	Detected
	11/20/2024	5.17E-02	9.83E-03	1.66E-02	Detected

Table B.48. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{234}U	1/19/2024	9.16E-02	1.17E-02	8.66E-03	Detected
	3/1/2024	6.84E-02	1.00E-02	1.09E-02	Detected
	3/27/2024	9.47E-02	1.20E-02	9.23E-03	Detected
	4/26/2024	9.54E-02	1.25E-02	8.44E-03	Detected
	5/24/2024	8.53E-02	1.32E-02	1.91E-02	Detected
	6/19/2024	7.85E-02	1.47E-02	2.45E-02	Detected
	7/17/2024	5.89E-02	1.25E-02	2.16E-02	Detected
	8/8/2024	5.44E-02	1.18E-02	2.09E-02	Detected
	8/30/2024	1.66E-02	1.48E-02	3.39E-02	Not Detected
	10/4/2024	-2.01E-02	1.91E-02	4.49E-02	Not Detected
	10/25/2024	7.78E-02	1.23E-02	1.46E-02	Detected
	11/20/2024	6.34E-02	1.20E-02	2.07E-02	Detected
^{235}U	1/19/2024	4.03E-03	1.71E-03	2.99E-03	Not Detected
	3/1/2024	5.64E-03	2.11E-03	3.41E-03	Detected
	3/27/2024	4.43E-03	1.79E-03	3.12E-03	Not Detected
	4/26/2024	7.42E-03	2.11E-03	2.65E-03	Detected
	5/24/2024	4.40E-03	2.62E-03	4.89E-03	Not Detected
	6/19/2024	2.27E-03	3.14E-03	6.24E-03	Not Detected
	7/17/2024	6.24E-03	3.10E-03	5.78E-03	Not Detected
	8/8/2024	3.60E-03	2.63E-03	5.46E-03	Not Detected
	8/30/2024	-3.36E-03	4.30E-03	9.90E-03	Not Detected
	10/4/2024	-7.37E-03	5.43E-03	1.31E-02	Not Detected
	10/25/2024	4.05E-03	2.46E-03	4.76E-03	Not Detected
	11/20/2024	3.19E-03	3.00E-03	6.09E-03	Not Detected

Table B.48. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{238}U	1/19/2024	7.67E-02	1.01E-02	8.07E-03	Detected
	3/1/2024	6.46E-02	9.52E-03	1.03E-02	Detected
	3/27/2024	8.70E-02	1.11E-02	8.61E-03	Detected
	4/26/2024	8.46E-02	1.13E-02	8.06E-03	Detected
	5/24/2024	6.82E-02	1.18E-02	1.92E-02	Detected
	6/19/2024	6.72E-02	1.39E-02	2.48E-02	Detected
	7/17/2024	5.23E-02	1.18E-02	2.11E-02	Detected
	8/8/2024	4.08E-02	1.06E-02	2.04E-02	Detected
	8/30/2024	1.10E-02	1.44E-02	3.32E-02	Not Detected
	10/4/2024	-2.49E-02	1.87E-02	4.40E-02	Not Detected
	10/25/2024	7.39E-02	1.17E-02	1.37E-02	Detected
	11/20/2024	4.59E-02	1.05E-02	2.00E-02	Detected

Table B.49. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{137}Cs	1/19/2024	2.52E-07	3.01E-07	9.98E-07	Not Detected
	3/1/2024	4.92E-07	4.73E-07	1.57E-06	Not Detected
	3/27/2024	-1.80E-06	1.22E-06	4.16E-06	Not Detected
	4/26/2024	-1.69E-06	4.65E-07	1.61E-06	Not Detected
	5/24/2024	4.89E-07	3.42E-07	1.13E-06	Not Detected
	6/19/2024	-1.75E-06	9.32E-07	3.20E-06	Not Detected
	7/17/2024	1.05E-06	6.09E-07	2.00E-06	Not Detected
	8/8/2024	1.62E-06	1.19E-06	3.91E-06	Not Detected
	8/30/2024	-3.97E-08	4.05E-07	1.35E-06	Not Detected
	10/4/2024	-1.10E-06	1.37E-06	4.63E-06	Not Detected
	10/25/2024	-1.55E-06	5.99E-07	2.05E-06	Not Detected
	11/20/2024	-7.29E-07	3.76E-07	1.28E-06	Not Detected
^{60}Co	1/19/2024	1.11E-07	2.32E-07	7.84E-07	Not Detected
	3/1/2024	-2.62E-07	4.48E-07	1.53E-06	Not Detected
	3/27/2024	7.59E-07	7.45E-07	2.49E-06	Not Detected
	4/26/2024	1.10E-07	1.96E-07	6.69E-07	Not Detected
	5/24/2024	2.82E-07	3.67E-07	1.23E-06	Not Detected
	6/19/2024	1.69E-06	6.39E-07	2.04E-06	Not Detected
	7/17/2024	4.73E-07	5.92E-07	1.98E-06	Not Detected
	8/8/2024	8.82E-07	9.03E-07	3.03E-06	Not Detected
	8/30/2024	3.10E-07	2.83E-07	9.43E-07	Not Detected
	10/4/2024	1.25E-06	7.89E-07	2.60E-06	Not Detected
	10/25/2024	9.47E-07	4.57E-07	1.49E-06	Not Detected
	11/20/2024	1.01E-06	2.98E-07	9.49E-07	Not Detected

Table B.49. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{40}K	1/19/2024	-1.67E-05	4.30E-06	1.49E-05	Not Detected
	3/1/2024	4.23E-06	5.79E-06	1.93E-05	Not Detected
	3/27/2024	5.06E-05	1.03E-05	3.14E-05	Detected
	4/26/2024	-3.34E-06	5.17E-06	1.75E-05	Not Detected
	5/24/2024	-1.66E-05	6.43E-06	2.22E-05	Not Detected
	6/19/2024	5.15E-06	6.73E-06	2.27E-05	Not Detected
	7/17/2024	5.16E-05	9.28E-06	2.89E-05	Detected
	8/8/2024	2.63E-05	9.23E-06	2.93E-05	Not Detected
	8/30/2024	-1.71E-05	4.95E-06	1.73E-05	Not Detected
	10/4/2024	3.37E-05	9.41E-06	2.90E-05	Not Detected
	10/25/2024	2.42E-05	8.20E-06	2.66E-05	Not Detected
	11/20/2024	1.62E-05	5.15E-06	1.66E-05	Not Detected

Table B.50. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{137}Cs	1/19/2024	2.61E-07	2.99E-07	9.93E-07	Not Detected
	3/1/2024	2.29E-07	9.09E-07	3.04E-06	Not Detected
	3/27/2024	-1.79E-06	4.29E-07	1.50E-06	Not Detected
	4/26/2024	1.67E-06	4.32E-07	1.38E-06	Not Detected
	5/24/2024	9.94E-09	4.01E-07	1.35E-06	Not Detected
	6/19/2024	1.00E-06	3.47E-07	1.12E-06	Not Detected
	7/17/2024	8.53E-07	4.47E-07	1.47E-06	Not Detected
	8/8/2024	-1.51E-07	7.66E-07	2.55E-06	Not Detected
	8/30/2024	7.89E-07	3.44E-07	1.12E-06	Not Detected
	10/4/2024	1.18E-06	5.13E-07	1.68E-06	Not Detected
	10/25/2024	1.08E-06	4.29E-07	1.40E-06	Not Detected
	11/20/2024	3.95E-07	2.55E-07	8.40E-07	Not Detected
^{60}Co	1/19/2024	3.25E-07	3.15E-07	1.05E-06	Not Detected
	3/1/2024	6.69E-07	7.28E-07	2.44E-06	Not Detected
	3/27/2024	1.14E-07	1.36E-07	4.68E-07	Not Detected
	4/26/2024	4.29E-07	3.25E-07	1.07E-06	Not Detected
	5/24/2024	4.66E-07	4.13E-07	1.37E-06	Not Detected
	6/19/2024	-4.23E-08	2.94E-07	1.00E-06	Not Detected
	7/17/2024	4.37E-07	3.88E-07	1.29E-06	Not Detected
	8/8/2024	1.14E-06	4.31E-07	1.39E-06	Not Detected
	8/30/2024	6.00E-07	3.08E-07	1.01E-06	Not Detected
	10/4/2024	3.21E-07	4.08E-07	1.37E-06	Not Detected
	10/25/2024	2.04E-07	3.47E-07	1.17E-06	Not Detected
	11/20/2024	2.01E-07	1.76E-07	5.84E-07	Not Detected

Table B.50. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{40}K	1/19/2024	3.41E-05	5.05E-06	1.54E-05	Detected
	3/1/2024	2.25E-05	6.61E-06	2.05E-05	Not Detected
	3/27/2024	-8.75E-06	5.01E-06	1.73E-05	Not Detected
	4/26/2024	1.64E-05	6.63E-06	2.16E-05	Not Detected
	5/24/2024	1.72E-05	5.69E-06	1.83E-05	Not Detected
	6/19/2024	-2.30E-06	6.01E-06	2.02E-05	Not Detected
	7/17/2024	2.61E-05	8.68E-06	2.81E-05	Not Detected
	8/8/2024	2.93E-05	7.71E-06	2.47E-05	Not Detected
	8/30/2024	2.50E-05	4.80E-06	1.50E-05	Detected
	10/4/2024	1.84E-05	8.56E-06	2.80E-05	Not Detected
	10/25/2024	3.33E-05	7.94E-06	2.54E-05	Detected
	11/20/2024	1.71E-05	4.03E-06	1.29E-05	Detected

Table B.51. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{137}Cs	1/19/2024	-2.48E-07	5.75E-07	1.94E-06	Not Detected
	3/1/2024	-1.04E-06	5.00E-07	1.70E-06	Not Detected
	3/27/2024	1.26E-06	4.13E-07	1.34E-06	Not Detected
	4/26/2024	-1.83E-07	4.16E-07	1.40E-06	Not Detected
	5/24/2024	9.64E-08	9.43E-07	3.16E-06	Not Detected
	6/19/2024	1.21E-06	5.60E-07	1.83E-06	Not Detected
	7/17/2024	5.39E-07	5.24E-07	1.74E-06	Not Detected
	8/8/2024	1.18E-06	4.98E-07	1.62E-06	Not Detected
	8/30/2024	-8.36E-08	7.99E-07	2.68E-06	Not Detected
	10/4/2024	1.67E-06	6.87E-07	2.24E-06	Not Detected
	10/25/2024	1.41E-06	4.66E-07	1.50E-06	Not Detected
	11/20/2024	4.15E-07	7.18E-07	2.39E-06	Not Detected
^{60}Co	1/19/2024	-2.26E-07	4.20E-07	1.47E-06	Not Detected
	3/1/2024	8.77E-07	5.49E-07	1.81E-06	Not Detected
	3/27/2024	4.95E-08	3.65E-07	1.24E-06	Not Detected
	4/26/2024	1.45E-06	4.35E-07	1.38E-06	Not Detected
	5/24/2024	8.48E-07	5.95E-07	1.97E-06	Not Detected
	6/19/2024	1.48E-07	5.22E-07	1.76E-06	Not Detected
	7/17/2024	7.97E-07	5.30E-07	1.75E-06	Not Detected
	8/8/2024	2.82E-07	5.03E-07	1.69E-06	Not Detected
	8/30/2024	3.06E-07	4.92E-07	1.66E-06	Not Detected
	10/4/2024	7.87E-07	6.20E-07	2.06E-06	Not Detected
	10/25/2024	4.54E-07	4.73E-07	1.58E-06	Not Detected
	11/20/2024	7.70E-07	3.90E-07	1.27E-06	Not Detected

Table B.51. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{40}K	1/19/2024	1.87E-05	4.66E-06	1.44E-05	Not Detected
	3/1/2024	1.50E-05	6.43E-06	2.10E-05	Not Detected
	3/27/2024	3.45E-05	7.65E-06	2.44E-05	Detected
	4/26/2024	1.16E-08	5.32E-06	1.79E-05	Not Detected
	5/24/2024	1.94E-05	6.32E-06	1.98E-05	Not Detected
	6/19/2024	3.24E-05	8.52E-06	2.72E-05	Not Detected
	7/17/2024	2.53E-05	7.46E-06	2.39E-05	Not Detected
	8/8/2024	1.93E-05	9.70E-06	3.18E-05	Not Detected
	8/30/2024	9.29E-06	5.00E-06	1.63E-05	Not Detected
	10/4/2024	3.03E-05	8.88E-06	2.84E-05	Not Detected
	10/25/2024	2.03E-05	7.38E-06	2.39E-05	Not Detected
	11/20/2024	1.16E-05	4.32E-06	1.38E-05	Not Detected

Table B.52. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{137}Cs	1/19/2024	-1.06E-06	3.07E-07	1.06E-06	Not Detected
	3/1/2024	1.34E-06	4.26E-07	1.37E-06	Not Detected
	3/27/2024	7.91E-07	4.54E-07	1.49E-06	Not Detected
	4/26/2024	1.06E-07	9.75E-07	3.27E-06	Not Detected
	5/24/2024	-1.98E-06	4.80E-07	1.67E-06	Not Detected
	6/19/2024	-6.40E-07	8.95E-07	3.03E-06	Not Detected
	7/17/2024	1.01E-06	1.12E-06	3.72E-06	Not Detected
	8/8/2024	1.32E-06	5.67E-07	1.85E-06	Not Detected
	8/30/2024	7.51E-07	3.16E-07	1.03E-06	Not Detected
	10/4/2024	-1.37E-06	1.24E-06	4.21E-06	Not Detected
	10/25/2024	4.20E-07	1.05E-06	3.49E-06	Not Detected
	11/20/2024	8.20E-07	2.31E-07	7.42E-07	Not Detected
^{60}Co	1/19/2024	5.37E-07	2.42E-07	7.86E-07	Not Detected
	3/1/2024	2.81E-08	3.78E-07	1.28E-06	Not Detected
	3/27/2024	8.65E-07	4.69E-07	1.54E-06	Not Detected
	4/26/2024	2.54E-07	6.65E-07	2.26E-06	Not Detected
	5/24/2024	1.70E-07	1.45E-07	4.90E-07	Not Detected
	6/19/2024	-1.70E-08	5.79E-07	2.00E-06	Not Detected
	7/17/2024	9.33E-07	6.92E-07	2.30E-06	Not Detected
	8/8/2024	1.32E-06	5.21E-07	1.68E-06	Not Detected
	8/30/2024	5.61E-07	3.07E-07	1.01E-06	Not Detected
	10/4/2024	-5.20E-08	7.93E-07	2.73E-06	Not Detected
	10/25/2024	7.19E-07	6.38E-07	2.13E-06	Not Detected
	11/20/2024	2.41E-07	1.89E-07	6.28E-07	Not Detected

Table B.52. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{40}K	1/19/2024	1.20E-05	4.11E-06	1.33E-05	Not Detected
	3/1/2024	-1.71E-06	6.79E-06	2.28E-05	Not Detected
	3/27/2024	4.88E-05	7.22E-06	2.20E-05	Detected
	4/26/2024	1.52E-05	6.56E-06	2.11E-05	Not Detected
	5/24/2024	-6.46E-06	5.35E-06	1.83E-05	Not Detected
	6/19/2024	2.44E-05	6.52E-06	2.00E-05	Not Detected
	7/17/2024	2.21E-05	7.79E-06	2.47E-05	Not Detected
	8/8/2024	1.42E-05	7.36E-06	2.41E-05	Not Detected
	8/30/2024	1.76E-05	4.30E-06	1.36E-05	Not Detected
	10/4/2024	1.95E-05	9.12E-06	2.96E-05	Not Detected
	10/25/2024	3.54E-05	7.40E-06	2.21E-05	Detected
	11/20/2024	-1.34E-05	3.70E-06	1.29E-05	Not Detected

Table B.53. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{137}Cs	1/19/2024	3.99E-07	2.35E-07	7.72E-07	Not Detected
	3/1/2024	3.70E-07	4.53E-07	1.50E-06	Not Detected
	3/27/2024	-2.22E-07	8.11E-07	2.73E-06	Not Detected
	4/26/2024	-5.93E-07	5.22E-07	1.76E-06	Not Detected
	5/24/2024	7.90E-07	5.44E-07	1.79E-06	Not Detected
	6/19/2024	-1.41E-06	3.80E-07	1.32E-06	Not Detected
	7/17/2024	-6.48E-07	6.45E-07	2.17E-06	Not Detected
	8/8/2024	-5.35E-07	1.04E-06	3.52E-06	Not Detected
	8/30/2024	-1.05E-06	3.53E-07	1.21E-06	Not Detected
	10/4/2024	-1.16E-06	6.00E-07	2.04E-06	Not Detected
	10/25/2024	-4.16E-07	5.45E-07	1.83E-06	Not Detected
	11/20/2024	-2.45E-07	5.33E-07	1.79E-06	Not Detected
^{60}Co	1/19/2024	1.77E-07	2.26E-07	7.55E-07	Not Detected
	3/1/2024	6.92E-07	4.21E-07	1.38E-06	Not Detected
	3/27/2024	6.61E-07	6.26E-07	2.09E-06	Not Detected
	4/26/2024	8.15E-07	3.02E-07	9.70E-07	Not Detected
	5/24/2024	2.96E-07	3.91E-07	1.31E-06	Not Detected
	6/19/2024	1.38E-07	1.16E-07	3.92E-07	Not Detected
	7/17/2024	1.45E-06	4.97E-07	1.60E-06	Not Detected
	8/8/2024	7.41E-07	7.20E-07	2.41E-06	Not Detected
	8/30/2024	-7.98E-08	9.42E-08	3.49E-07	Not Detected
	10/4/2024	1.57E-07	3.47E-07	1.17E-06	Not Detected
	10/25/2024	8.34E-07	3.44E-07	1.11E-06	Not Detected
	11/20/2024	1.44E-07	3.49E-07	1.19E-06	Not Detected

Table B.53. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{40}K	1/19/2024	-4.97E-07	4.14E-06	1.39E-05	Not Detected
	3/1/2024	1.63E-06	5.55E-06	1.86E-05	Not Detected
	3/27/2024	3.41E-05	7.28E-06	2.22E-05	Detected
	4/26/2024	2.35E-05	6.04E-06	1.93E-05	Not Detected
	5/24/2024	-1.60E-05	7.19E-06	2.46E-05	Not Detected
	6/19/2024	-5.60E-06	4.40E-06	1.51E-05	Not Detected
	7/17/2024	2.84E-05	7.93E-06	2.55E-05	Not Detected
	8/8/2024	1.20E-05	7.69E-06	2.53E-05	Not Detected
	8/30/2024	-4.90E-06	3.52E-06	1.21E-05	Not Detected
	10/4/2024	2.35E-05	7.64E-06	2.47E-05	Not Detected
	10/25/2024	1.68E-05	6.25E-06	2.03E-05	Not Detected
	11/20/2024	7.20E-06	3.54E-06	1.15E-05	Not Detected

Table B.54. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{137}Cs	1/19/2024	6.33E-07	2.71E-07	8.83E-07	Not Detected
	3/1/2024	-1.04E-06	8.61E-07	2.93E-06	Not Detected
	3/27/2024	-1.39E-06	3.87E-07	1.34E-06	Not Detected
	4/26/2024	1.20E-06	4.07E-07	1.32E-06	Not Detected
	5/24/2024	1.12E-06	4.81E-07	1.57E-06	Not Detected
	6/19/2024	-1.08E-06	4.31E-07	1.47E-06	Not Detected
	7/17/2024	3.57E-07	5.04E-07	1.67E-06	Not Detected
	8/8/2024	-1.08E-06	5.84E-07	1.98E-06	Not Detected
	8/30/2024	-1.08E-07	2.33E-07	7.91E-07	Not Detected
	10/4/2024	-1.46E-06	1.17E-06	3.97E-06	Not Detected
	10/25/2024	4.98E-07	3.22E-07	1.06E-06	Not Detected
	11/20/2024	-5.15E-07	4.53E-07	1.54E-06	Not Detected
^{60}Co	1/19/2024	4.81E-07	2.93E-07	9.62E-07	Not Detected
	3/1/2024	8.77E-07	7.08E-07	2.35E-06	Not Detected
	3/27/2024	-5.38E-08	1.40E-07	5.07E-07	Not Detected
	4/26/2024	1.76E-07	3.67E-07	1.23E-06	Not Detected
	5/24/2024	8.52E-07	4.54E-07	1.49E-06	Not Detected
	6/19/2024	5.03E-07	2.39E-07	7.74E-07	Not Detected
	7/17/2024	3.18E-08	4.28E-07	1.46E-06	Not Detected
	8/8/2024	1.63E-06	4.98E-07	1.59E-06	Not Detected
	8/30/2024	5.51E-08	2.45E-07	8.32E-07	Not Detected
	10/4/2024	7.57E-07	7.50E-07	2.51E-06	Not Detected
	10/25/2024	1.12E-06	3.76E-07	1.20E-06	Not Detected
	11/20/2024	1.93E-07	3.38E-07	1.15E-06	Not Detected

Table B.54. (continued)

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc. (2σ) Bq/m^3	MDC Bq/m^3	Status
^{40}K	1/19/2024	2.09E-05	4.07E-06	1.27E-05	Detected
	3/1/2024	1.46E-05	6.58E-06	2.13E-05	Not Detected
	3/27/2024	-7.33E-06	4.42E-06	1.53E-05	Not Detected
	4/26/2024	1.90E-05	7.47E-06	2.43E-05	Not Detected
	5/24/2024	3.03E-05	6.86E-06	2.17E-05	Detected
	6/19/2024	1.14E-05	5.73E-06	1.88E-05	Not Detected
	7/17/2024	-1.42E-05	7.50E-06	2.57E-05	Not Detected
	8/8/2024	2.01E-05	7.40E-06	2.40E-05	Not Detected
	8/30/2024	-1.60E-08	4.87E-06	1.63E-05	Not Detected
	10/4/2024	1.92E-05	7.77E-06	2.49E-05	Not Detected
	10/25/2024	2.05E-05	7.34E-06	2.38E-05	Not Detected
	11/20/2024	9.95E-06	3.45E-06	1.09E-05	Not Detected

Table B.55. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{137}Cs	1/19/2024	5.73E-03	6.85E-03	2.27E-02	Not Detected
	3/1/2024	9.76E-03	9.38E-03	3.11E-02	Not Detected
	3/27/2024	-2.50E-02	1.70E-02	5.79E-02	Not Detected
	4/26/2024	-2.45E-02	6.73E-03	2.33E-02	Not Detected
	5/24/2024	8.80E-03	6.16E-03	2.03E-02	Not Detected
	6/19/2024	-2.57E-02	1.37E-02	4.69E-02	Not Detected
	7/17/2024	1.25E-02	7.22E-03	2.37E-02	Not Detected
	8/8/2024	1.80E-02	1.31E-02	4.34E-02	Not Detected
	8/30/2024	-8.37E-04	8.52E-03	2.85E-02	Not Detected
	10/4/2024	-1.20E-02	1.49E-02	5.03E-02	Not Detected
	10/25/2024	-2.52E-02	9.76E-03	3.33E-02	Not Detected
	11/20/2024	-1.29E-02	6.67E-03	2.27E-02	Not Detected
^{60}Co	1/19/2024	2.53E-03	5.28E-03	1.78E-02	Not Detected
	3/1/2024	-5.20E-03	8.89E-03	3.04E-02	Not Detected
	3/27/2024	1.06E-02	1.04E-02	3.47E-02	Not Detected
	4/26/2024	1.59E-03	2.83E-03	9.67E-03	Not Detected
	5/24/2024	5.08E-03	6.60E-03	2.21E-02	Not Detected
	6/19/2024	2.49E-02	9.37E-03	2.99E-02	Not Detected
	7/17/2024	5.60E-03	7.02E-03	2.34E-02	Not Detected
	8/8/2024	9.77E-03	1.00E-02	3.35E-02	Not Detected
	8/30/2024	6.54E-03	5.97E-03	1.99E-02	Not Detected
	10/4/2024	1.36E-02	8.58E-03	2.82E-02	Not Detected
	10/25/2024	1.54E-02	7.44E-03	2.43E-02	Not Detected
	11/20/2024	1.79E-02	5.28E-03	1.68E-02	Not Detected

Table B.55. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{40}K	1/19/2024	-3.79E-01	9.78E-02	3.40E-01	Not Detected
	3/1/2024	8.39E-02	1.15E-01	3.83E-01	Not Detected
	3/27/2024	7.05E-01	1.44E-01	4.36E-01	Detected
	4/26/2024	-4.84E-02	7.47E-02	2.54E-01	Not Detected
	5/24/2024	-2.98E-01	1.16E-01	3.99E-01	Not Detected
	6/19/2024	7.56E-02	9.88E-02	3.33E-01	Not Detected
	7/17/2024	6.12E-01	1.10E-01	3.42E-01	Detected
	8/8/2024	2.92E-01	1.02E-01	3.24E-01	Not Detected
	8/30/2024	-3.60E-01	1.04E-01	3.64E-01	Not Detected
	10/4/2024	3.66E-01	1.02E-01	3.16E-01	Not Detected
	10/25/2024	3.94E-01	1.33E-01	4.32E-01	Not Detected
	11/20/2024	2.87E-01	9.12E-02	2.94E-01	Not Detected

Table B.56. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{137}Cs	1/19/2024	5.90E-03	6.76E-03	2.25E-02	Not Detected
	3/1/2024	5.30E-03	2.10E-02	7.04E-02	Not Detected
	3/27/2024	-3.71E-02	8.87E-03	3.10E-02	Not Detected
	4/26/2024	3.94E-02	1.02E-02	3.27E-02	Not Detected
	5/24/2024	2.04E-04	8.24E-03	2.77E-02	Not Detected
	6/19/2024	2.91E-02	1.01E-02	3.26E-02	Not Detected
	7/17/2024	2.30E-02	1.20E-02	3.95E-02	Not Detected
	8/8/2024	-4.04E-03	2.05E-02	6.85E-02	Not Detected
	8/30/2024	2.72E-02	1.19E-02	3.87E-02	Not Detected
	10/4/2024	2.21E-02	9.60E-03	3.13E-02	Not Detected
	10/25/2024	3.27E-02	1.30E-02	4.24E-02	Not Detected
	11/20/2024	1.17E-02	7.53E-03	2.48E-02	Not Detected
^{60}Co	1/19/2024	7.34E-03	7.12E-03	2.37E-02	Not Detected
	3/1/2024	1.55E-02	1.68E-02	5.65E-02	Not Detected
	3/27/2024	2.36E-03	2.81E-03	9.68E-03	Not Detected
	4/26/2024	1.01E-02	7.65E-03	2.53E-02	Not Detected
	5/24/2024	9.59E-03	8.49E-03	2.82E-02	Not Detected
	6/19/2024	-1.23E-03	8.53E-03	2.92E-02	Not Detected
	7/17/2024	1.18E-02	1.04E-02	3.47E-02	Not Detected
	8/8/2024	3.06E-02	1.15E-02	3.72E-02	Not Detected
	8/30/2024	2.07E-02	1.06E-02	3.47E-02	Not Detected
	10/4/2024	6.01E-03	7.63E-03	2.56E-02	Not Detected
	10/25/2024	6.18E-03	1.05E-02	3.54E-02	Not Detected
	11/20/2024	5.93E-03	5.19E-03	1.72E-02	Not Detected

Table B.56. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{40}K	1/19/2024	7.70E-01	1.14E-01	3.49E-01	Detected
	3/1/2024	5.21E-01	1.53E-01	4.75E-01	Not Detected
	3/27/2024	-1.81E-01	1.04E-01	3.58E-01	Not Detected
	4/26/2024	3.88E-01	1.56E-01	5.09E-01	Not Detected
	5/24/2024	3.53E-01	1.17E-01	3.76E-01	Not Detected
	6/19/2024	-6.68E-02	1.75E-01	5.88E-01	Not Detected
	7/17/2024	7.04E-01	2.34E-01	7.57E-01	Not Detected
	8/8/2024	7.87E-01	2.07E-01	6.62E-01	Not Detected
	8/30/2024	8.63E-01	1.65E-01	5.16E-01	Detected
	10/4/2024	3.43E-01	1.60E-01	5.23E-01	Not Detected
	10/25/2024	1.01E+00	2.41E-01	7.70E-01	Detected
	11/20/2024	5.06E-01	1.19E-01	3.80E-01	Detected

Table B.57. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{137}Cs	1/19/2024	-8.15E-03	1.89E-02	6.35E-02	Not Detected
	3/1/2024	-2.03E-02	9.74E-03	3.32E-02	Not Detected
	3/27/2024	2.11E-02	6.94E-03	2.24E-02	Not Detected
	4/26/2024	-3.74E-03	8.52E-03	2.87E-02	Not Detected
	5/24/2024	1.53E-03	1.50E-02	5.02E-02	Not Detected
	6/19/2024	2.21E-02	1.02E-02	3.33E-02	Not Detected
	7/17/2024	1.08E-02	1.05E-02	3.47E-02	Not Detected
	8/8/2024	1.86E-02	7.85E-03	2.56E-02	Not Detected
	8/30/2024	-2.12E-03	2.02E-02	6.78E-02	Not Detected
	10/4/2024	1.69E-02	6.97E-03	2.27E-02	Not Detected
	10/25/2024	2.39E-02	7.92E-03	2.56E-02	Not Detected
	11/20/2024	6.90E-03	1.20E-02	3.97E-02	Not Detected
^{60}Co	1/19/2024	-7.41E-03	1.38E-02	4.82E-02	Not Detected
	3/1/2024	1.71E-02	1.07E-02	3.52E-02	Not Detected
	3/27/2024	8.31E-04	6.12E-03	2.08E-02	Not Detected
	4/26/2024	2.96E-02	8.90E-03	2.82E-02	Not Detected
	5/24/2024	1.35E-02	9.45E-03	3.12E-02	Not Detected
	6/19/2024	2.69E-03	9.49E-03	3.20E-02	Not Detected
	7/17/2024	1.59E-02	1.06E-02	3.49E-02	Not Detected
	8/8/2024	4.44E-03	7.93E-03	2.66E-02	Not Detected
	8/30/2024	7.76E-03	1.25E-02	4.21E-02	Not Detected
	10/4/2024	7.98E-03	6.29E-03	2.08E-02	Not Detected
	10/25/2024	7.72E-03	8.04E-03	2.68E-02	Not Detected
	11/20/2024	1.28E-02	6.49E-03	2.11E-02	Not Detected

Table B.57. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{40}K	1/19/2024	6.13E-01	1.53E-01	4.71E-01	Not Detected
	3/1/2024	2.91E-01	1.25E-01	4.08E-01	Not Detected
	3/27/2024	5.79E-01	1.28E-01	4.09E-01	Detected
	4/26/2024	2.38E-04	1.09E-01	3.67E-01	Not Detected
	5/24/2024	3.08E-01	1.00E-01	3.15E-01	Not Detected
	6/19/2024	5.89E-01	1.55E-01	4.94E-01	Not Detected
	7/17/2024	5.06E-01	1.49E-01	4.77E-01	Not Detected
	8/8/2024	3.03E-01	1.53E-01	5.01E-01	Not Detected
	8/30/2024	2.35E-01	1.27E-01	4.14E-01	Not Detected
	10/4/2024	3.08E-01	9.00E-02	2.88E-01	Not Detected
	10/25/2024	3.46E-01	1.25E-01	4.06E-01	Not Detected
	11/20/2024	1.93E-01	7.19E-02	2.29E-01	Not Detected

Table B.58. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{137}Cs	1/19/2024	-1.83E-02	5.30E-03	1.83E-02	Not Detected
	3/1/2024	1.83E-02	5.83E-03	1.88E-02	Not Detected
	3/27/2024	6.72E-03	3.86E-03	1.27E-02	Not Detected
	4/26/2024	9.75E-04	8.95E-03	3.00E-02	Not Detected
	5/24/2024	-2.03E-02	4.92E-03	1.72E-02	Not Detected
	6/19/2024	-1.05E-02	1.46E-02	4.95E-02	Not Detected
	7/17/2024	1.36E-02	1.50E-02	4.97E-02	Not Detected
	8/8/2024	1.45E-02	6.22E-03	2.03E-02	Not Detected
	8/30/2024	1.45E-02	6.10E-03	1.99E-02	Not Detected
	10/4/2024	-1.39E-02	1.27E-02	4.30E-02	Not Detected
	10/25/2024	6.68E-03	1.66E-02	5.55E-02	Not Detected
	11/20/2024	1.43E-02	4.02E-03	1.29E-02	Not Detected
^{60}Co	1/19/2024	9.28E-03	4.18E-03	1.36E-02	Not Detected
	3/1/2024	3.85E-04	5.18E-03	1.76E-02	Not Detected
	3/27/2024	7.35E-03	3.98E-03	1.31E-02	Not Detected
	4/26/2024	2.33E-03	6.10E-03	2.08E-02	Not Detected
	5/24/2024	1.75E-03	1.49E-03	5.03E-03	Not Detected
	6/19/2024	-2.77E-04	9.46E-03	3.26E-02	Not Detected
	7/17/2024	1.25E-02	9.26E-03	3.07E-02	Not Detected
	8/8/2024	1.45E-02	5.72E-03	1.85E-02	Not Detected
	8/30/2024	1.08E-02	5.93E-03	1.94E-02	Not Detected
	10/4/2024	-5.30E-04	8.09E-03	2.79E-02	Not Detected
	10/25/2024	1.14E-02	1.02E-02	3.39E-02	Not Detected
	11/20/2024	4.20E-03	3.29E-03	1.09E-02	Not Detected

Table B.58. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{40}K	1/19/2024	2.07E-01	7.10E-02	2.30E-01	Not Detected
	3/1/2024	-2.34E-02	9.30E-02	3.13E-01	Not Detected
	3/27/2024	4.14E-01	6.13E-02	1.87E-01	Detected
	4/26/2024	1.40E-01	6.02E-02	1.93E-01	Not Detected
	5/24/2024	-6.64E-02	5.49E-02	1.88E-01	Not Detected
	6/19/2024	3.99E-01	1.07E-01	3.28E-01	Not Detected
	7/17/2024	2.95E-01	1.04E-01	3.30E-01	Not Detected
	8/8/2024	1.56E-01	8.07E-02	2.64E-01	Not Detected
	8/30/2024	3.40E-01	8.30E-02	2.62E-01	Not Detected
	10/4/2024	1.99E-01	9.31E-02	3.02E-01	Not Detected
	10/25/2024	5.64E-01	1.18E-01	3.51E-01	Detected
	11/20/2024	-2.33E-01	6.44E-02	2.24E-01	Not Detected

Table B.59. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{137}Cs	1/19/2024	1.80E-02	1.06E-02	3.48E-02	Not Detected
	3/1/2024	1.53E-02	1.86E-02	6.19E-02	Not Detected
	3/27/2024	-6.80E-03	2.48E-02	8.36E-02	Not Detected
	4/26/2024	-1.18E-02	1.04E-02	3.51E-02	Not Detected
	5/24/2024	1.35E-02	9.28E-03	3.06E-02	Not Detected
	6/19/2024	-3.24E-02	8.76E-03	3.05E-02	Not Detected
	7/17/2024	-1.24E-02	1.24E-02	4.16E-02	Not Detected
	8/8/2024	-1.16E-02	2.25E-02	7.60E-02	Not Detected
	8/30/2024	-2.74E-02	9.19E-03	3.15E-02	Not Detected
	10/4/2024	-1.71E-02	8.81E-03	2.99E-02	Not Detected
	10/25/2024	-9.22E-03	1.21E-02	4.05E-02	Not Detected
	11/20/2024	-6.03E-03	1.31E-02	4.42E-02	Not Detected
^{60}Co	1/19/2024	7.98E-03	1.02E-02	3.40E-02	Not Detected
	3/1/2024	2.85E-02	1.73E-02	5.70E-02	Not Detected
	3/27/2024	2.03E-02	1.92E-02	6.39E-02	Not Detected
	4/26/2024	1.63E-02	6.04E-03	1.94E-02	Not Detected
	5/24/2024	5.04E-03	6.66E-03	2.23E-02	Not Detected
	6/19/2024	3.19E-03	2.68E-03	9.02E-03	Not Detected
	7/17/2024	2.79E-02	9.55E-03	3.06E-02	Not Detected
	8/8/2024	1.60E-02	1.56E-02	5.20E-02	Not Detected
	8/30/2024	-2.07E-03	2.45E-03	9.08E-03	Not Detected
	10/4/2024	2.30E-03	5.09E-03	1.72E-02	Not Detected
	10/25/2024	1.85E-02	7.61E-03	2.46E-02	Not Detected
	11/20/2024	3.54E-03	8.60E-03	2.93E-02	Not Detected

Table B.59. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{40}K	1/19/2024	-2.24E-02	1.86E-01	6.25E-01	Not Detected
	3/1/2024	6.73E-02	2.29E-01	7.68E-01	Not Detected
	3/27/2024	1.04E+00	2.23E-01	6.79E-01	Detected
	4/26/2024	4.70E-01	1.21E-01	3.86E-01	Not Detected
	5/24/2024	-2.73E-01	1.23E-01	4.19E-01	Not Detected
	6/19/2024	-1.29E-01	1.01E-01	3.48E-01	Not Detected
	7/17/2024	5.45E-01	1.52E-01	4.89E-01	Not Detected
	8/8/2024	2.59E-01	1.66E-01	5.48E-01	Not Detected
	8/30/2024	-1.28E-01	9.17E-02	3.15E-01	Not Detected
	10/4/2024	3.46E-01	1.12E-01	3.62E-01	Not Detected
	10/25/2024	3.73E-01	1.38E-01	4.49E-01	Not Detected
	11/20/2024	1.77E-01	8.70E-02	2.83E-01	Not Detected

Table B.60. Activity concentrations of ^{137}Cs, ^{60}Co, and ^{40}K at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{137}Cs	1/19/2024	1.46E-02	6.25E-03	2.04E-02	Not Detected
	3/1/2024	-2.20E-02	1.82E-02	6.21E-02	Not Detected
	3/27/2024	-2.09E-02	5.82E-03	2.02E-02	Not Detected
	4/26/2024	1.75E-02	5.92E-03	1.92E-02	Not Detected
	5/24/2024	1.47E-02	6.32E-03	2.06E-02	Not Detected
	6/19/2024	-2.37E-02	9.42E-03	3.22E-02	Not Detected
	7/17/2024	8.06E-03	1.14E-02	3.78E-02	Not Detected
	8/8/2024	-2.46E-02	1.34E-02	4.53E-02	Not Detected
	8/30/2024	-3.23E-03	6.97E-03	2.37E-02	Not Detected
	10/4/2024	-2.33E-02	1.88E-02	6.37E-02	Not Detected
	10/25/2024	1.31E-02	8.50E-03	2.80E-02	Not Detected
	11/20/2024	-1.35E-02	1.19E-02	4.04E-02	Not Detected
^{60}Co	1/19/2024	1.11E-02	6.75E-03	2.22E-02	Not Detected
	3/1/2024	1.86E-02	1.50E-02	4.98E-02	Not Detected
	3/27/2024	-8.10E-04	2.10E-03	7.64E-03	Not Detected
	4/26/2024	2.56E-03	5.33E-03	1.80E-02	Not Detected
	5/24/2024	1.12E-02	5.98E-03	1.96E-02	Not Detected
	6/19/2024	1.10E-02	5.22E-03	1.69E-02	Not Detected
	7/17/2024	7.18E-04	9.67E-03	3.29E-02	Not Detected
	8/8/2024	3.74E-02	1.14E-02	3.63E-02	Not Detected
	8/30/2024	1.65E-03	7.34E-03	2.49E-02	Not Detected
	10/4/2024	1.21E-02	1.20E-02	4.03E-02	Not Detected
	10/25/2024	2.94E-02	9.90E-03	3.17E-02	Not Detected
	11/20/2024	5.06E-03	8.83E-03	3.00E-02	Not Detected

Table B.60. (continued)

Radionuclide	Sample Date 2024	Activity Bq/g	Unc. (2σ) Bq/g	MDC Bq/g	Status
^{40}K	1/19/2024	4.82E-01	9.39E-02	2.93E-01	Detected
	3/1/2024	3.10E-01	1.39E-01	4.50E-01	Not Detected
	3/27/2024	-1.10E-01	6.66E-02	2.30E-01	Not Detected
	4/26/2024	2.76E-01	1.09E-01	3.54E-01	Not Detected
	5/24/2024	3.98E-01	9.03E-02	2.85E-01	Detected
	6/19/2024	2.49E-01	1.25E-01	4.10E-01	Not Detected
	7/17/2024	-3.20E-01	1.69E-01	5.80E-01	Not Detected
	8/8/2024	4.59E-01	1.69E-01	5.49E-01	Not Detected
	8/30/2024	-4.78E-04	1.46E-01	4.88E-01	Not Detected
	10/4/2024	3.08E-01	1.25E-01	3.99E-01	Not Detected
	10/25/2024	5.40E-01	1.93E-01	6.28E-01	Not Detected
	11/20/2024	2.60E-01	9.01E-02	2.85E-01	Not Detected

Table B.61. Activity concentrations of ^{90}Sr (Bq/m^3) at Onsite Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{90}Sr	1/19/2024	3.42E-08	1.07E-08	1.10E-06	Not Detected
	3/1/2024	7.68E-07	2.07E-07	3.53E-06	Not Detected
	3/27/2024	-2.68E-07	3.04E-07	2.10E-06	Not Detected
	4/26/2024	5.22E-07	1.19E-07	2.01E-06	Not Detected
	5/24/2024	-5.19E-06	9.59E-07	0.00E+00	Not Detected
	6/19/2024	-9.88E-09	4.79E-09	1.49E-06	Not Detected
	7/17/2024	-9.12E-07	7.36E-08	2.62E-06	Not Detected
	8/8/2024	-1.61E-06	1.69E-07	2.34E-06	Not Detected
	8/30/2024	9.94E-08	2.45E-08	1.28E-06	Not Detected
	10/4/2024	-1.07E-07	5.85E-08	2.20E-06	Not Detected
	10/25/2024	1.38E-07	3.46E-08	1.46E-06	Not Detected
	11/20/2024	6.02E-07	5.53E-08	2.65E-06	Not Detected

Table B.62. Activity concentrations of ^{90}Sr (Bq/g) at Onsite Station

Radionuclide	Sample Date 2024	^{90}Sr Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{90}Sr	1/19/2024	7.78E-04	2.44E-04	2.49E-02	Not Detected
	3/1/2024	1.52E-02	4.10E-03	7.01E-02	Not Detected
	3/27/2024	-3.73E-03	4.24E-03	2.92E-02	Not Detected
	4/26/2024	7.55E-03	1.72E-03	2.91E-02	Not Detected
	5/24/2024	-9.33E-02	1.73E-02	0.00E+00	Not Detected
	6/19/2024	-1.45E-04	7.02E-05	2.19E-02	Not Detected
	7/17/2024	-1.08E-02	8.73E-04	3.10E-02	Not Detected
	8/8/2024	-1.78E-02	1.88E-03	2.59E-02	Not Detected
	8/30/2024	2.09E-03	5.17E-04	2.69E-02	Not Detected
	10/4/2024	-1.17E-03	6.36E-04	2.39E-02	Not Detected
	10/25/2024	2.25E-03	5.63E-04	2.38E-02	Not Detected
	11/20/2024	1.07E-02	9.79E-04	4.69E-02	Not Detected

Table B.63. Activity concentrations of ^{90}Sr (Bq/m^3) at Near Field Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{90}Sr	1/19/2024	3.70E-08	1.36E-08	1.31E-06	Not Detected
	3/1/2024	1.88E-07	9.62E-08	1.67E-06	Not Detected
	3/27/2024	6.79E-09	2.16E-09	1.48E-06	Not Detected
	4/26/2024	4.27E-07	1.23E-07	2.09E-06	Not Detected
	5/24/2024	-3.19E-09	2.09E-09	2.03E-06	Not Detected
	6/19/2024	-2.03E-07	6.19E-08	1.38E-06	Not Detected
	7/17/2024	-1.57E-05	1.17E-06	6.46E-05	Not Detected
	8/8/2024	-1.33E-06	1.32E-07	2.27E-06	Not Detected
	8/30/2024	-7.33E-09	2.67E-09	9.86E-07	Not Detected
	10/4/2024	1.17E-07	3.39E-08	2.30E-06	Not Detected
	10/25/2024	6.29E-08	1.89E-08	1.19E-06	Not Detected
	11/20/2024	1.19E-06	7.40E-08	1.77E-06	Not Detected

Table B.64. Activity concentrations of ^{90}Sr (Bq/g) at Near Field Station

Radionuclide	Sample Date 2024	^{90}Sr Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{90}Sr	1/19/2024	8.36E-04	3.09E-04	2.96E-02	Not Detected
	3/1/2024	4.35E-03	2.22E-03	3.86E-02	Not Detected
	3/27/2024	1.40E-04	4.47E-05	3.06E-02	Not Detected
	4/26/2024	1.01E-02	2.89E-03	4.92E-02	Not Detected
	5/24/2024	-6.56E-05	4.30E-05	4.18E-02	Not Detected
	6/19/2024	-5.90E-03	1.80E-03	4.01E-02	Not Detected
	7/17/2024	-4.22E-01	3.14E-02	1.74E+00	Not Detected
	8/8/2024	-3.56E-02	3.53E-03	6.09E-02	Not Detected
	8/30/2024	-2.53E-04	9.20E-05	3.40E-02	Not Detected
	10/4/2024	2.18E-03	6.35E-04	4.29E-02	Not Detected
	10/25/2024	1.91E-03	5.73E-04	3.61E-02	Not Detected
	11/20/2024	3.51E-02	2.18E-03	5.23E-02	Not Detected

Table B.65. Activity concentrations of ^{90}Sr (Bq/m^3) at Cactus Flats Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{90}Sr	1/19/2024	6.48E-08	1.94E-08	1.18E-06	Not Detected
	3/1/2024	4.89E-07	1.00E-07	1.65E-06	Not Detected
	3/27/2024	-2.71E-08	1.25E-08	2.23E-06	Not Detected
	4/26/2024	3.45E-07	6.77E-08	1.10E-06	Not Detected
	5/24/2024	1.63E-07	5.10E-08	1.88E-06	Not Detected
	6/19/2024	2.02E-07	6.66E-08	2.47E-06	Not Detected
	7/17/2024	-1.02E-06	8.62E-08	2.34E-06	Not Detected
	8/8/2024	7.65E-07	4.02E-08	2.87E-06	Not Detected
	8/30/2024	8.07E-08	2.23E-08	1.24E-06	Not Detected
	10/4/2024	-1.26E-08	4.93E-09	2.53E-06	Not Detected
	10/25/2024	2.28E-07	6.04E-08	2.04E-06	Not Detected
	11/20/2024	2.00E-07	2.56E-08	2.61E-06	Not Detected

Table B.66. Activity concentrations of ^{90}Sr (Bq/g) at Cactus Flats Station

Radionuclide	Sample Date 2024	^{90}Sr Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{90}Sr	1/19/2024	2.13E-03	6.37E-04	3.88E-02	Not Detected
	3/1/2024	9.53E-03	1.96E-03	3.21E-02	Not Detected
	3/27/2024	-4.55E-04	2.09E-04	3.74E-02	Not Detected
	4/26/2024	7.06E-03	1.39E-03	2.26E-02	Not Detected
	5/24/2024	2.58E-03	8.11E-04	2.98E-02	Not Detected
	6/19/2024	3.68E-03	1.21E-03	4.49E-02	Not Detected
	7/17/2024	-2.03E-02	1.72E-03	4.68E-02	Not Detected
	8/8/2024	1.21E-02	6.34E-04	4.52E-02	Not Detected
	8/30/2024	2.04E-03	5.66E-04	3.14E-02	Not Detected
	10/4/2024	-1.28E-04	5.00E-05	2.57E-02	Not Detected
	10/25/2024	3.87E-03	1.03E-03	3.47E-02	Not Detected
	11/20/2024	3.32E-03	4.27E-04	4.34E-02	Not Detected

Table B.67. Activity concentrations of ^{90}Sr (Bq/m^3) at Loving Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{90}Sr	1/19/2024	1.25E-08	4.49E-09	1.12E-06	Not Detected
	3/1/2024	4.58E-07	1.31E-07	2.17E-06	Not Detected
	3/27/2024	4.78E-07	8.27E-08	2.19E-06	Not Detected
	4/26/2024	1.86E-07	6.70E-08	1.12E-06	Not Detected
	5/24/2024	5.50E-08	2.16E-08	1.29E-06	Not Detected
	6/19/2024	4.41E-07	9.02E-08	2.24E-06	Not Detected
	7/17/2024	-3.17E-08	1.63E-09	1.72E-06	Not Detected
	8/8/2024	-2.61E-06	5.98E-07	2.38E-06	Not Detected
	8/30/2024	5.40E-09	1.48E-09	7.83E-07	Not Detected
	10/4/2024	-2.11E-08	8.40E-09	1.99E-06	Not Detected
	10/25/2024	4.59E-07	7.13E-08	1.61E-06	Not Detected
	11/20/2024	8.29E-08	1.20E-08	2.30E-06	Not Detected

Table B.68. Activity concentrations of ^{90}Sr (Bq/g) at Loving Station

Radionuclide	Sample Date 2024	^{90}Sr Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{90}Sr	1/19/2024	2.16E-04	7.76E-05	1.94E-02	Not Detected
	3/1/2024	6.27E-03	1.79E-03	2.98E-02	Not Detected
	3/27/2024	4.06E-03	7.03E-04	1.86E-02	Not Detected
	4/26/2024	1.71E-03	6.15E-04	1.03E-02	Not Detected
	5/24/2024	5.64E-04	2.22E-04	1.32E-02	Not Detected
	6/19/2024	7.21E-03	1.48E-03	3.67E-02	Not Detected
	7/17/2024	-4.24E-04	2.17E-05	2.31E-02	Not Detected
	8/8/2024	-2.87E-02	6.55E-03	2.61E-02	Not Detected
	8/30/2024	1.04E-04	2.85E-05	1.51E-02	Not Detected
	10/4/2024	-2.15E-04	8.57E-05	2.03E-02	Not Detected
	10/25/2024	7.30E-03	1.13E-03	2.56E-02	Not Detected
	11/20/2024	1.44E-03	2.09E-04	4.00E-02	Not Detected

Table B.69. Activity concentrations of ^{90}Sr (Bq/m^3) at Carlsbad Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{90}Sr	1/19/2024	3.87E-08	1.35E-08	1.22E-06	Not Detected
	3/1/2024	6.97E-07	1.32E-07	2.20E-06	Not Detected
	3/27/2024	-1.47E-07	1.35E-07	2.00E-06	Not Detected
	4/26/2024	1.97E-07	9.62E-08	1.62E-06	Not Detected
	5/24/2024	9.73E-08	4.04E-08	2.16E-06	Not Detected
	6/19/2024	-2.92E-07	3.29E-07	2.02E-06	Not Detected
	7/17/2024	2.72E-07	1.26E-08	1.12E-06	Not Detected
	8/8/2024	2.64E-07	1.35E-08	2.20E-06	Not Detected
	8/30/2024	-1.01E-07	6.88E-08	8.65E-07	Not Detected
	10/4/2024	-1.43E-08	5.81E-09	2.17E-06	Not Detected
	10/25/2024	3.18E-07	1.15E-07	5.67E-06	Not Detected
	11/20/2024	-2.08E-07	4.08E-08	2.46E-06	Not Detected

Table B.70. Activity concentrations of ^{90}Sr (Bq/g) at Carlsbad Station

Radionuclide	Sample Date 2024	^{90}Sr Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{90}Sr	1/19/2024	1.74E-03	6.07E-04	5.50E-02	Not Detected
	3/1/2024	2.87E-02	5.44E-03	9.05E-02	Not Detected
	3/27/2024	-4.49E-03	4.15E-03	6.14E-02	Not Detected
	4/26/2024	3.94E-03	1.92E-03	3.24E-02	Not Detected
	5/24/2024	1.66E-03	6.89E-04	3.69E-02	Not Detected
	6/19/2024	-6.72E-03	7.57E-03	4.65E-02	Not Detected
	7/17/2024	5.22E-03	2.42E-04	2.15E-02	Not Detected
	8/8/2024	5.70E-03	2.92E-04	4.75E-02	Not Detected
	8/30/2024	-2.63E-03	1.79E-03	2.25E-02	Not Detected
	10/4/2024	-2.10E-04	8.53E-05	3.19E-02	Not Detected
	10/25/2024	7.04E-03	2.54E-03	1.26E-01	Not Detected
	11/20/2024	-5.12E-03	1.00E-03	6.05E-02	Not Detected

Table B.71. Activity concentrations of ^{90}Sr (Bq/m^3) at East Tower Station

Radionuclide	Sample Date 2024	Activity Bq/m^3	Unc.(2σ) Bq/m^3	MDC Bq/m^3	Status
^{90}Sr	1/19/2024	-8.38E-08	4.66E-08	1.07E-06	Not Detected
	3/1/2024	-1.93E-06	8.82E-07	2.21E-06	Not Detected
	3/27/2024	5.22E-07	7.80E-08	1.93E-06	Not Detected
	4/26/2024	5.31E-07	1.17E-07	1.95E-06	Not Detected
	5/24/2024	-3.06E-08	1.62E-08	1.52E-06	Not Detected
	6/19/2024	3.41E-07	7.17E-08	1.86E-06	Not Detected
	7/17/2024	-1.92E-06	2.32E-07	1.85E-06	Not Detected
	8/8/2024	-1.15E-06	1.01E-07	2.29E-06	Not Detected
	8/30/2024	-9.83E-08	6.05E-08	9.10E-07	Not Detected
	10/4/2024	3.71E-07	6.01E-08	1.72E-06	Not Detected
	10/25/2024	1.53E-07	4.40E-08	1.62E-06	Not Detected
	11/20/2024	-1.58E-07	2.46E-08	7.48E-07	Not Detected

Table B.72. Activity concentrations of ^{90}Sr (Bq/g) at East Tower Station

Radionuclide	Sample Date 2024	^{90}Sr Activity Bq/g	Unc.(2σ) Bq/g	MDC Bq/g	Status
^{90}Sr	1/19/2024	-1.93E-03	1.08E-03	2.46E-02	Not Detected
	3/1/2024	-4.08E-02	1.87E-02	4.68E-02	Not Detected
	3/27/2024	7.86E-03	1.17E-03	2.90E-02	Not Detected
	4/26/2024	7.73E-03	1.71E-03	2.84E-02	Not Detected
	5/24/2024	-4.02E-04	2.13E-04	1.99E-02	Not Detected
	6/19/2024	7.45E-03	1.57E-03	4.06E-02	Not Detected
	7/17/2024	-4.33E-02	5.23E-03	4.19E-02	Not Detected
	8/8/2024	-2.62E-02	2.31E-03	5.25E-02	Not Detected
	8/30/2024	-2.94E-03	1.81E-03	2.72E-02	Not Detected
	10/4/2024	5.95E-03	9.64E-04	2.76E-02	Not Detected
	10/25/2024	4.04E-03	1.16E-03	4.27E-02	Not Detected
	11/20/2024	-4.14E-03	6.44E-04	1.96E-02	Not Detected

APPENDIX C - RADIONUCLIDE CONCENTRATIONS IN SOIL SAMPLES

Actinide concentrations in soil

Uranium concentrations in soil

Gamma radionuclide concentrations in soil

Strontium concentrations in soil

Table C.1. Activity concentrations of ^{241}Am, $^{239+240}$Pu, and ^{238}Pu (Bq/kg) in soil samples

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{241}Am	A-1	5/21/2024	5.97E-02	1.82E-01	4.46E-01	Not Detected
	A-2	5/22/2024	5.62E-02	1.59E-01	3.96E+00	Not Detected
	A-3	5/22/2024	0.00E+00	1.80E-01	4.84E-01	Not Detected
	A-4	5/22/2024	-4.88E-02	2.58E-01	7.74E-01	Not Detected
	A-5	6/4/2024	2.23E-01	2.19E-01	3.29E-01	Not Detected
	A-6	6/4/2024	6.30E-02	1.26E-01	2.96E-01	Not Detected
	A-7	6/5/2024	1.68E-01	1.54E-01	2.96E-01	Not Detected
	A-8	5/21/2024	1.63E-01	1.80E-01	3.69E-01	Not Detected
	A-8 Dup	5/21/2024	2.07E-02	1.49E-01	3.89E-01	Not Detected
	B-1	5/21/2024	1.47E-01	1.56E-01	3.19E-01	Not Detected
	B-2	5/21/2024	1.03E-01	1.45E-01	3.09E-01	Not Detected
	B-3	5/22/2024	0.00E+00	1.46E-01	3.80E-01	Not Detected
	B-4	5/22/2024	1.88E-01	2.08E-01	4.26E-01	Not Detected
	B-5	6/4/2024	1.38E-01	1.85E-01	4.02E-01	Not Detected
	B-6	6/5/2024	2.72E-01	2.55E-01	4.79E-01	Not Detected
	B-6 Dup	6/5/2024	1.05E-01	1.86E-01	4.22E-01	Not Detected
	B-7	6/5/2024	1.62E-01	2.83E-01	6.52E-01	Not Detected
	B-8	5/21/2024	3.32E-01	3.53E-01	7.23E-01	Not Detected
	C-1	6/20/2024	3.19E-01	1.64E-01	1.74E-01	Not Detected
	C-2	9/20/2024	-1.22E-01	2.44E-01	7.15E-01	Not Detected
	C-2 Dup	9/20/2024	2.14E-01	1.61E-01	1.97E-01	Not Detected
	C-3	9/20/2024	2.34E-01	1.75E-01	2.99E-01	Not Detected
	C-4	9/4/2024	2.33E-01	3.46E-01	7.81E-01	Not Detected
	C-5	9/4/2024	2.83E-01	2.00E-01	3.45E-01	Not Detected
	C-6	9/4/2024	1.01E-01	1.04E-01	2.04E-01	Not Detected
	C-7	6/20/2024	2.91E-02	2.10E-01	5.47E-01	Not Detected
	C-8	6/20/2024	-6.83E-02	1.88E-01	5.35E-01	Not Detected
	D-1	6/20/2024	4.47E-02	1.55E-01	3.90E-01	Not Detected
	D-2	6/20/2024	1.33E-01	1.05E-01	1.54E-01	Not Detected
	D-3	9/20/2024	7.19E-02	1.76E-01	4.23E-01	Not Detected
	D-4	9/4/2024	1.33E-01	1.25E-01	2.34E-01	Not Detected

Table C.1. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{241}Am	D-5	9/4/2024	3.83E-02	1.79E-01	4.50E-01	Not Detected
	D-6	9/4/2024	6.83E-02	1.81E-01	4.35E-01	Not Detected
	D-7	6/20/2024	1.37E-01	1.41E-01	2.76E-01	Not Detected
	D-7 Dup	6/20/2024	1.40E-01	1.05E-01	1.29E-01	Not Detected
	D-8	6/20/2024	8.48E-02	1.70E-01	3.99E-01	Not Detected
	WIPP-1	3/21/2024	2.03E-01	1.63E-01	3.14E-01	Not Detected
	WIPP-2	3/21/2024	2.83E-02	2.33E-01	6.03E-01	Not Detected
	WIPP-3	3/21/2024	6.33E-02	8.44E-02	1.55E-01	Not Detected
	WIPP-3-Dup	3/21/2024	1.56E-01	1.24E-01	2.25E-01	Not Detected
$^{239+240}$Pu	A-1	5/21/2024	4.40E-02	8.81E-02	2.07E-01	Not Detected
	A-2	5/22/2024	2.21E-01	2.09E-01	3.42E-01	Not Detected
	A-3	5/22/2024	7.38E-02	7.82E-02	1.37E-01	Not Detected
	A-4	5/22/2024	2.67E-01	1.44E-01	1.89E-01	Not Detected
	A-5	6/4/2024	2.21E-01	1.22E-01	1.37E-01	Not Detected
	A-6	6/4/2024	1.57E-01	1.03E-01	1.32E-01	Not Detected
	A-7	6/5/2024	7.49E-01	1.16E+00	2.61E+00	Not Detected
	A-8	5/21/2024	1.38E-01	1.41E-01	2.89E-01	Not Detected
	A-8 Dup	5/21/2024	2.74E-01	1.26E-01	1.01E-01	Detected
	B-1	5/21/2024	2.15E-01	1.37E-01	1.99E-01	Not Detected
	B-2	5/21/2024	7.85E-02	1.36E-01	3.11E-01	Not Detected
	B-3	5/22/2024	2.71E-01	1.54E-01	2.39E-01	Not Detected
	B-4	5/22/2024	2.08E-01	1.32E-01	1.39E-01	Not Detected
	B-5	6/4/2024	7.29E-02	1.26E-01	2.89E-01	Not Detected
	B-6	6/5/2024	3.45E-01	1.67E-01	1.68E-01	Detected
	B-6 Dup	6/5/2024	3.61E-01	1.95E-01	2.55E-01	Not Detected
	B-7	6/5/2024	2.61E-01	2.38E-01	4.92E-01	Not Detected
	B-8	5/21/2024	4.73E-02	2.84E-01	7.49E-01	Not Detected
	C-1	6/20/2024	2.02E-01	1.12E-01	1.25E-01	Not Detected
	C-2	9/20/2024	1.67E-01	1.42E-01	2.65E-01	Not Detected
	C-2 Dup	9/20/2024	7.14E-02	1.18E-01	2.69E-01	Not Detected

Table C.1. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
$^{239+240}$Pu	C-3	9/20/2024	4.78E-01	1.92E-01	2.65E-01	Detected
	C-4	9/4/2024	1.36E-01	1.27E-01	2.55E-01	Not Detected
	C-5	9/4/2024	2.36E-01	1.32E-01	1.77E-01	Not Detected
	C-6	9/4/2024	8.70E-02	9.18E-02	1.74E-01	Not Detected
	C-7	6/20/2024	2.33E-01	1.48E-01	2.15E-01	Not Detected
	C-8	6/20/2024	2.30E-01	1.41E-01	2.16E-01	Not Detected
	D-1	6/20/2024	2.48E-01	1.23E-01	1.28E-01	Not Detected
	D-2	6/20/2024	2.07E-01	1.12E-01	1.46E-01	Not Detected
	D-3	9/20/2024	1.10E-01	1.04E-01	1.89E-01	Not Detected
	D-4	9/4/2024	2.25E-01	1.20E-01	1.10E-01	Not Detected
	D-5	9/4/2024	1.48E-01	1.39E-01	2.78E-01	Not Detected
	D-6	9/4/2024	2.39E-01	1.34E-01	1.79E-01	Not Detected
	D-7	6/20/2024	1.06E-01	1.10E-01	2.14E-01	Not Detected
	D-7 Dup	6/20/2024	1.64E-01	1.08E-01	1.39E-01	Not Detected
	D-8	6/20/2024	1.45E-01	1.09E-01	1.75E-01	Not Detected
	WIPP-1	3/21/2024	7.76E-02	9.32E-02	1.86E-01	Not Detected
	WIPP-2	3/21/2024	1.23E-01	9.87E-02	1.64E-01	Not Detected
	WIPP-3	3/21/2024	0.00E+00	7.90E-02	2.22E-01	Not Detected
	WIPP-3-Dup	3/21/2024	7.39E-02	9.81E-02	2.09E-01	Not Detected
^{238}Pu	A-1	5/21/2024	5.87E-02	1.25E-01	2.95E-01	Not Detected
	A-2	5/22/2024	1.11E-01	2.85E-01	6.93E-01	Not Detected
	A-3	5/22/2024	1.03E-01	8.87E-02	1.37E-01	Not Detected
	A-4	5/22/2024	-3.75E-09	7.70E-02	2.22E-01	Not Detected
	A-5	6/4/2024	1.32E-01	9.77E-02	1.37E-01	Not Detected
	A-6	6/4/2024	7.13E-02	1.18E-01	2.68E-01	Not Detected
	A-7	6/5/2024	0.00E+00	1.12E+00	3.01E+00	Not Detected
	A-8	5/21/2024	1.38E-01	1.27E-01	2.44E-01	Not Detected
	A-8 Dup	5/21/2024	1.23E-01	1.06E-01	1.93E-01	Not Detected

Table C.1. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{238}Pu	B-1	5/21/2024	9.92E-02	1.55E-01	3.52E-01	Not Detected
	B-2	5/21/2024	2.16E-01	1.80E-01	3.42E-01	Not Detected
	B-3	5/22/2024	-3.01E-02	1.41E-01	3.84E-01	Not Detected
	B-4	5/22/2024	-1.89E-02	1.47E-01	4.04E-01	Not Detected
	B-5	6/4/2024	1.09E-01	1.46E-01	3.17E-01	Not Detected
	B-6	6/5/2024	1.27E-01	1.41E-01	2.88E-01	Not Detected
	B-6 Dup	6/5/2024	2.33E-01	1.53E-01	1.97E-01	Not Detected
	B-7	6/5/2024	1.20E-01	1.50E-01	3.18E-01	Not Detected
	B-8	5/21/2024	1.42E-01	3.41E-01	8.23E-01	Not Detected
	C-1	6/20/2024	8.09E-02	1.27E-01	2.87E-01	Not Detected
	C-2	9/20/2024	8.35E-02	1.11E-01	2.36E-01	Not Detected
	C-2 Dup	9/20/2024	1.71E-01	1.28E-01	2.27E-01	Not Detected
	C-3	9/20/2024	8.44E-02	1.05E-01	2.23E-01	Not Detected
	C-4	9/4/2024	2.71E-02	6.65E-02	1.63E-01	Not Detected
	C-5	9/4/2024	8.84E-02	1.10E-01	2.34E-01	Not Detected
	C-6	9/4/2024	7.25E-02	9.63E-02	2.05E-01	Not Detected
	C-7	6/20/2024	1.25E-01	1.64E-01	3.60E-01	Not Detected
	C-8	6/20/2024	7.67E-02	1.19E-01	2.67E-01	Not Detected
	D-1	6/20/2024	1.10E-01	1.10E-01	2.18E-01	Not Detected
	D-2	6/20/2024	6.09E-02	8.08E-02	1.72E-01	Not Detected
	D-3	9/20/2024	3.15E-02	1.18E-01	2.96E-01	Not Detected
	D-4	9/4/2024	8.99E-02	7.94E-02	1.10E-01	Not Detected
	D-5	9/4/2024	5.90E-02	1.02E-01	2.34E-01	Not Detected
	D-6	9/4/2024	2.99E-02	1.20E-01	3.00E-01	Not Detected
	D-7	6/20/2024	7.60E-02	1.18E-01	2.65E-01	Not Detected
	D-7 Dup	6/20/2024	5.97E-02	1.03E-01	2.37E-01	Not Detected

Table C.1. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{238}Pu	D-8	6/20/2024	1.31E-01	9.66E-02	1.35E-01	Not Detected
	WIPP-1	3/21/2024	1.57E-02	1.44E-01	3.68E-01	Not Detected
	WIPP-2	3/21/2024	4.14E-02	6.17E-02	1.28E-01	Not Detected
	WIPP-3	3/21/2024	-5.64E-02	1.13E-01	3.32E-01	Not Detected
	WIPP-3-Dup	3/21/2024	0.00E+00	7.31E-02	2.11E-01	Not Detected

Table C.2. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U (Bq/kg) in soil samples

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{234}U	A-1	5/21/2024	1.22E+01	1.56E+00	3.03E-01	Detected
	A-2	5/22/2024	9.71E+00	1.39E+00	3.48E-01	Detected
	A-3	5/22/2024	8.80E+00	1.18E+00	1.04E-01	Detected
	A-4	5/22/2024	1.01E+01	1.37E+00	2.53E-01	Detected
	A-5	6/4/2024	1.12E+01	1.47E+00	1.39E-01	Detected
	A-6	6/4/2024	9.69E+00	1.31E+00	1.18E-01	Detected
	A-7	6/5/2024	1.13E+01	1.46E+00	2.25E-01	Detected
	A-8	5/21/2024	1.66E+01	2.10E+00	2.01E-01	Detected
	A-8 Dup	5/21/2024	1.13E+01	1.45E+00	1.27E-01	Detected
	B-1	5/21/2024	1.51E+01	1.94E+00	2.46E-01	Detected
	B-2	5/21/2024	1.49E+01	1.92E+00	2.99E-01	Detected
	B-3	5/22/2024	1.62E+01	2.01E+00	2.39E-01	Detected
	B-4	5/22/2024	1.45E+01	1.87E+00	3.18E-01	Detected
	B-5	6/4/2024	2.18E+01	2.66E+00	1.50E-01	Detected
	B-6	6/5/2024	1.38E+01	1.77E+00	2.68E-01	Detected
	B-6 Dup	6/5/2024	1.33E+01	1.75E+00	4.46E-01	Detected
	B-7	6/5/2024	1.48E+01	1.96E+00	1.86E-01	Detected
	B-8	5/21/2024	1.54E+01	2.12E+00	1.78E-01	Detected
	C-1	6/20/2024	1.41E+01	1.70E+00	8.30E-02	Detected
	C-2	9/20/2024	1.07E+01	1.39E+00	1.07E-01	Detected
	C-2 Dup	9/20/2024	1.30E+01	1.63E+00	1.62E-01	Detected
	C-3	9/20/2024	1.43E+01	1.78E+00	1.30E-01	Detected
	C-4	9/4/2024	1.22E+01	1.52E+00	1.55E-01	Detected
	C-5	9/4/2024	1.06E+01	1.39E+00	2.93E-01	Detected
	C-6	9/4/2024	1.83E+01	2.22E+00	2.31E-01	Detected
	C-7	6/20/2024	1.06E+01	1.40E+00	1.17E-01	Detected
	C-8	6/20/2024	1.51E+01	1.87E+00	2.57E-01	Detected
	D-1	6/20/2024	1.31E+01	1.65E+00	1.03E-01	Detected
	D-2	6/20/2024	1.20E+01	1.51E+00	1.93E-01	Detected
	D-3	9/20/2024	1.00E+01	1.32E+00	1.05E-01	Detected
	D-4	9/4/2024	1.14E+01	1.46E+00	1.30E-01	Detected

Table C.2. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{234}U	D-5	9/4/2024	1.10E+01	1.41E+00	1.58E-01	Detected
	D-6	9/4/2024	9.21E+00	1.21E+00	2.57E-01	Detected
	D-7	6/20/2024	9.29E+00	1.21E+00	1.99E-01	Detected
	D-7 Dup	6/20/2024	1.01E+01	1.31E+00	3.09E-01	Detected
	D-8	6/20/2024	9.00E+00	1.25E+00	2.71E-01	Detected
	WIPP-1	3/21/2024	8.22E+00	1.27E+00	3.45E-01	Detected
	WIPP-2	3/21/2024	1.05E+01	1.46E+00	1.77E-01	Detected
	WIPP-3	3/21/2024	1.00E+01	1.46E+00	3.06E-01	Detected
	WIPP-3-Dup	3/21/2024	1.08E+01	1.52E+00	2.33E-01	Detected
^{235}U	A-1	5/21/2024	5.79E-01	2.38E-01	3.05E-01	Detected
	A-2	5/22/2024	3.95E-01	2.35E-01	3.48E-01	Not Detected
	A-3	5/22/2024	5.23E-01	2.22E-01	2.77E-01	Detected
	A-4	5/22/2024	4.53E-01	2.18E-01	2.78E-01	Not Detected
	A-5	6/4/2024	6.28E-01	2.32E-01	1.71E-01	Detected
	A-6	6/4/2024	5.35E-01	2.21E-01	1.84E-01	Detected
	A-7	6/5/2024	5.07E-01	2.02E-01	1.62E-01	Detected
	A-8	5/21/2024	5.98E-01	2.59E-01	3.27E-01	Detected
	A-8 Dup	5/21/2024	6.07E-01	2.28E-01	2.38E-01	Detected
	B-1	5/21/2024	1.06E+00	3.45E-01	3.42E-01	Detected
	B-2	5/21/2024	9.75E-01	3.29E-01	3.36E-01	Detected
	B-3	5/22/2024	7.23E-01	2.47E-01	1.37E-01	Detected
	B-4	5/22/2024	9.17E-01	3.22E-01	3.63E-01	Detected
	B-5	6/4/2024	1.18E+00	3.46E-01	2.81E-01	Detected
	B-6	6/5/2024	1.08E+00	3.28E-01	1.94E-01	Detected
	B-6 Dup	6/5/2024	7.63E-01	2.78E-01	1.65E-01	Detected
	B-7	6/5/2024	1.43E+00	4.11E-01	1.82E-01	Detected
	B-8	5/21/2024	9.57E-01	3.75E-01	3.59E-01	Detected
	C-1	6/20/2024	8.06E-01	2.39E-01	1.96E-01	Detected
	C-2	9/20/2024	4.30E-01	1.95E-01	2.15E-01	Detected
	C-2 Dup	9/20/2024	7.00E-01	2.38E-01	2.00E-01	Detected

Table C.2. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{235}U	C-3	9/20/2024	7.74E-01	2.69E-01	3.00E-01	Detected
	C-4	9/4/2024	6.51E-01	2.24E-01	1.91E-01	Detected
	C-5	9/4/2024	3.42E-01	1.69E-01	1.67E-01	Detected
	C-6	9/4/2024	8.45E-01	2.77E-01	2.54E-01	Detected
	C-7	6/20/2024	5.67E-01	2.45E-01	3.10E-01	Detected
	C-8	6/20/2024	8.20E-01	2.75E-01	2.57E-01	Detected
	D-1	6/20/2024	7.28E-01	2.43E-01	1.61E-01	Detected
	D-2	6/20/2024	6.60E-01	2.16E-01	1.39E-01	Detected
	D-3	9/20/2024	3.70E-01	1.81E-01	2.12E-01	Not Detected
	D-4	9/4/2024	7.10E-01	2.50E-01	2.44E-01	Detected
	D-5	9/4/2024	6.16E-01	2.20E-01	1.95E-01	Detected
	D-6	9/4/2024	4.89E-01	1.89E-01	1.47E-01	Detected
	D-7	6/20/2024	4.95E-01	1.98E-01	2.18E-01	Detected
	D-7 Dup	6/20/2024	4.87E-01	1.96E-01	1.95E-01	Detected
	D-8	6/20/2024	7.15E-01	2.83E-01	3.34E-01	Detected
	WIPP-1	3/21/2024	4.53E-01	2.65E-01	3.79E-01	Not Detected
	WIPP-2	3/21/2024	3.99E-01	2.29E-01	3.31E-01	Not Detected
	WIPP-3	3/21/2024	6.69E-01	3.42E-01	5.38E-01	Not Detected
	WIPP-3-Dup	3/21/2024	7.67E-01	2.92E-01	2.23E-01	Detected
^{238}U	A-1	5/21/2024	1.24E+01	1.58E+00	1.70E-01	Detected
	A-2	5/22/2024	1.00E+01	1.42E+00	2.81E-01	Detected
	A-3	5/22/2024	8.71E+00	1.17E+00	1.31E-01	Detected
	A-4	5/22/2024	9.57E+00	1.30E+00	1.91E-01	Detected
	A-5	6/4/2024	1.13E+01	1.48E+00	2.10E-01	Detected
	A-6	6/4/2024	9.28E+00	1.26E+00	2.26E-01	Detected
	A-7	6/5/2024	1.02E+01	1.33E+00	2.24E-01	Detected
	A-8	5/21/2024	1.54E+01	1.97E+00	2.35E-01	Detected
	A-8 Dup	5/21/2024	1.17E+01	1.50E+00	2.37E-01	Detected
	B-1	5/21/2024	1.59E+01	2.04E+00	3.03E-01	Detected
	B-2	5/21/2024	1.52E+01	1.95E+00	3.65E-01	Detected

Table C.2. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{238}U	B-3	5/22/2024	1.49E+01	1.86E+00	2.82E-01	Detected
	B-4	5/22/2024	1.42E+01	1.84E+00	3.78E-01	Detected
	B-5	6/4/2024	3.43E+01	4.03E+00	2.55E-01	Detected
	B-6	6/5/2024	1.45E+01	1.84E+00	3.38E-01	Detected
	B-6 Dup	6/5/2024	1.25E+01	1.66E+00	3.16E-01	Detected
	B-7	6/5/2024	1.55E+01	2.03E+00	3.16E-01	Detected
	B-8	5/21/2024	1.60E+01	2.18E+00	3.83E-01	Detected
	C-1	6/20/2024	1.49E+01	1.79E+00	1.95E-01	Detected
	C-2	9/20/2024	1.06E+01	1.38E+00	2.04E-01	Detected
	C-2 Dup	9/20/2024	1.30E+01	1.62E+00	1.62E-01	Detected
	C-3	9/20/2024	1.39E+01	1.74E+00	1.67E-01	Detected
	C-4	9/4/2024	1.16E+01	1.46E+00	1.81E-01	Detected
	C-5	9/4/2024	1.06E+01	1.38E+00	1.74E-01	Detected
	C-6	9/4/2024	1.72E+01	2.10E+00	1.07E-01	Detected
	C-7	6/20/2024	1.12E+01	1.46E+00	1.46E-01	Detected
	C-8	6/20/2024	1.45E+01	1.80E+00	2.33E-01	Detected
	D-1	6/20/2024	1.30E+01	1.63E+00	1.97E-01	Detected
	D-2	6/20/2024	1.26E+01	1.57E+00	2.11E-01	Detected
	D-3	9/20/2024	9.36E+00	1.25E+00	2.01E-01	Detected
	D-4	9/4/2024	1.20E+01	1.53E+00	1.68E-01	Detected
	D-5	9/4/2024	1.10E+01	1.41E+00	1.84E-01	Detected
	D-6	9/4/2024	1.07E+01	1.37E+00	1.53E-01	Detected
	D-7	6/20/2024	9.76E+00	1.25E+00	9.18E-02	Detected
	D-7 Dup	6/20/2024	9.70E+00	1.26E+00	2.47E-01	Detected
	D-8	6/20/2024	9.27E+00	1.28E+00	2.04E-01	Detected
	WIPP-1	3/21/2024	8.59E+00	1.31E+00	3.44E-01	Detected
	WIPP-2	3/21/2024	1.09E+01	1.51E+00	1.76E-01	Detected
	WIPP-3	3/21/2024	9.32E+00	1.38E+00	3.42E-01	Detected
	WIPP-3-Dup	3/21/2024	1.13E+01	1.58E+00	4.74E-01	Detected

Table C.3. Activity concentrations of ^{137}Cs, ^{40}K, and ^{60}Co (Bq/kg) in soil samples

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{137}Cs	A-1	5/21/2024	3.70E-01	6.85E-02	2.19E-01	Detected
	A-2	5/22/2024	1.50E+00	7.59E-02	2.08E-01	Detected
	A-3	5/22/2024	9.65E-01	6.91E-02	2.03E-01	Detected
	A-4	5/22/2024	1.53E+00	1.35E-01	4.07E-01	Detected
	A-5	6/4/2024	6.54E-01	1.17E-01	3.73E-01	Detected
	A-6	6/4/2024	3.68E-01	5.58E-02	1.77E-01	Detected
	A-7	6/5/2024	2.37E+00	8.70E-02	2.08E-01	Detected
	A-8	5/21/2024	9.44E-01	7.11E-02	2.13E-01	Detected
	A-8 Dup	5/21/2024	2.48E+00	1.01E-01	2.63E-01	Detected
	B-1	5/21/2024	9.90E-01	6.54E-02	1.88E-01	Detected
	B-2	5/21/2024	8.10E-01	6.38E-02	1.89E-01	Detected
	B-3	5/22/2024	2.57E+00	9.51E-02	2.41E-01	Detected
	B-4	5/22/2024	1.67E+00	9.04E-02	2.59E-01	Detected
	B-5	6/4/2024	3.80E-01	5.68E-02	1.79E-01	Detected
	B-6	6/5/2024	2.04E+00	1.54E-01	4.59E-01	Detected
	B-6 Dup	6/5/2024	2.03E+00	1.40E-01	4.12E-01	Detected
	B-7	6/5/2024	2.99E+00	9.09E-02	2.17E-01	Detected
	B-8	5/21/2024	1.38E+00	7.35E-02	2.11E-01	Detected
	C-1	6/20/2024	2.23E+00	9.75E-02	2.63E-01	Detected
	C-2	9/20/2024	5.96E-01	7.57E-02	2.38E-01	Detected
	C-2 Dup	9/20/2024	-1.72E-01	1.12E-01	3.77E-01	Not Detected
	C-3	9/20/2024	4.41E+00	1.92E-01	5.23E-01	Detected
	C-4	9/4/2024	2.97E+00	9.29E-02	2.24E-01	Detected
	C-5	9/4/2024	2.06E+00	8.38E-02	2.14E-01	Detected
	C-6	9/4/2024	4.04E-01	8.18E-02	2.63E-01	Detected
	C-7	6/20/2024	2.07E+00	8.09E-02	2.14E-01	Detected
	C-8	6/20/2024	3.25E+00	1.12E-01	2.75E-01	Detected
	D-1	6/20/2024	7.71E-04	8.68E-03	3.07E-02	Not Detected
	D-2	6/20/2024	2.28E+00	1.60E-01	4.77E-01	Detected
	D-3	9/20/2024	1.45E+00	7.35E-02	2.08E-01	Detected
	D-4	9/4/2024	3.66E+00	1.07E-01	2.31E-01	Detected

Table C.3. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{137}Cs	D-5	9/4/2024	2.19E+00	1.74E-01	5.30E-01	Detected
	D-6	9/4/2024	2.59E+00	1.05E-01	2.81E-01	Detected
	D-7	6/20/2024	3.62E-01	1.28E-01	4.17E-01	Not Detected
	D-7 Dup	6/20/2024	1.37E+00	7.47E-02	2.13E-01	Detected
	D-8	6/20/2024	4.47E-01	1.37E-01	4.46E-01	Not Detected
	WIPP-1	3/21/2024	1.06E+00	6.84E-02	1.98E-01	Detected
	WIPP-2	3/21/2024	2.10E+00	9.86E-02	2.77E-01	Detected
	WIPP-3	3/21/2024	2.88E-01	1.21E-01	3.95E-01	Not Detected
	WIPP-3-Dup	3/21/2024	8.73E-01	6.99E-02	2.12E-01	Detected
^{40}K	A-1	5/21/2024	2.09E+02	4.93E+00	2.24E+00	Detected
	A-2	5/22/2024	1.52E+02	6.09E+00	2.84E+00	Detected
	A-3	5/22/2024	1.68E+02	4.03E+00	2.13E+00	Detected
	A-4	5/22/2024	1.93E+02	5.14E+00	5.26E+00	Detected
	A-5	6/4/2024	1.63E+02	4.44E+00	4.89E+00	Detected
	A-6	6/4/2024	1.67E+02	3.91E+00	1.90E+00	Detected
	A-7	6/5/2024	1.72E+02	6.89E+00	3.49E+00	Detected
	A-8	5/21/2024	2.36E+02	5.44E+00	2.13E+00	Detected
	A-8 Dup	5/21/2024	1.96E+02	7.91E+00	4.78E+00	Detected
	B-1	5/21/2024	2.13E+02	8.44E+00	2.94E+00	Detected
	B-2	5/21/2024	1.79E+02	7.15E+00	2.93E+00	Detected
	B-3	5/22/2024	2.31E+02	5.43E+00	2.47E+00	Detected
	B-4	5/22/2024	2.24E+02	5.26E+00	2.34E+00	Detected
	B-5	6/4/2024	1.70E+02	4.08E+00	2.20E+00	Detected
	B-6	6/5/2024	1.56E+02	4.36E+00	5.31E+00	Detected
	B-6 Dup	6/5/2024	1.66E+02	4.48E+00	4.78E+00	Detected
	B-7	6/5/2024	2.46E+02	5.62E+00	2.00E+00	Detected
	B-8	5/21/2024	2.03E+02	4.68E+00	1.95E+00	Detected
	C-1	6/20/2024	2.75E+02	1.08E+01	2.53E+00	Detected
	C-2	9/20/2024	1.43E+02	3.51E+00	2.39E+00	Detected
	C-2 Dup	9/20/2024	1.55E+02	4.30E+00	5.29E+00	Detected

Table C.3. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{40}K	C-3	9/20/2024	2.23E+02	5.83E+00	5.83E+00	Detected
	C-4	9/4/2024	1.79E+02	4.18E+00	1.95E+00	Detected
	C-5	9/4/2024	1.38E+02	5.54E+00	2.66E+00	Detected
	C-6	9/4/2024	6.91E+01	1.98E+00	2.72E+00	Detected
	C-7	6/20/2024	1.99E+02	4.61E+00	1.91E+00	Detected
	C-8	6/20/2024	2.34E+02	9.31E+00	3.83E+00	Detected
	D-1	6/20/2024	1.84E+02	4.81E+00	4.12E+00	Detected
	D-2	6/20/2024	1.77E+02	4.75E+00	5.13E+00	Detected
	D-3	9/20/2024	1.80E+02	4.19E+00	1.97E+00	Detected
	D-4	9/4/2024	1.73E+02	6.89E+00	2.85E+00	Detected
	D-5	9/4/2024	2.05E+02	5.44E+00	5.60E+00	Detected
	D-6	9/4/2024	2.19E+02	5.17E+00	2.55E+00	Detected
	D-7	6/20/2024	1.89E+02	5.05E+00	5.17E+00	Detected
	D-7 Dup	6/20/2024	2.40E+02	5.52E+00	2.19E+00	Detected
	D-8	6/20/2024	1.41E+02	4.01E+00	5.12E+00	Detected
	WIPP-1	3/21/2024	1.81E+02	7.17E+00	2.07E+00	Detected
	WIPP-2	3/21/2024	2.48E+02	5.77E+00	2.41E+00	Detected
	WIPP-3	3/21/2024	2.02E+02	5.28E+00	5.07E+00	Detected
	WIPP-3-Dup	3/21/2024	2.49E+02	5.70E+00	2.02E+00	Detected
^{60}Co	A-1	5/21/2024	9.42E-02	5.71E-02	1.88E-01	Not Detected
	A-2	5/22/2024	2.05E-02	4.04E-02	1.35E-01	Not Detected
	A-3	5/22/2024	6.47E-02	4.32E-02	1.42E-01	Not Detected
	A-4	5/22/2024	9.09E-02	6.57E-02	2.17E-01	Not Detected
	A-5	6/4/2024	-7.24E-02	6.29E-02	2.19E-01	Not Detected
	A-6	6/4/2024	5.57E-02	4.05E-02	1.34E-01	Not Detected
	A-7	6/5/2024	-1.37E-02	4.08E-02	1.38E-01	Not Detected
	A-8	5/21/2024	1.00E-01	4.81E-02	1.57E-01	Not Detected
	A-8 Dup	5/21/2024	3.26E-02	5.51E-02	1.83E-01	Not Detected
	B-1	5/21/2024	1.25E-01	5.63E-02	1.84E-01	Not Detected
	B-2	5/21/2024	8.21E-03	4.07E-02	1.37E-01	Not Detected

Table C.3. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{60}Co	B-3	5/22/2024	2.33E-02	5.69E-02	1.90E-01	Not Detected
	B-4	5/22/2024	8.62E-02	4.71E-02	1.55E-01	Not Detected
	B-5	6/4/2024	7.00E-02	4.98E-02	1.64E-01	Not Detected
	B-6	6/5/2024	2.84E-02	6.73E-02	2.27E-01	Not Detected
	B-6 Dup	6/5/2024	3.64E-02	6.23E-02	2.09E-01	Not Detected
	B-7	6/5/2024	6.82E-02	4.02E-02	1.32E-01	Not Detected
	B-8	5/21/2024	2.75E-04	5.10E-02	1.70E-01	Not Detected
	C-1	6/20/2024	8.48E-02	4.96E-02	1.63E-01	Not Detected
	C-2	9/20/2024	7.83E-02	4.47E-02	1.47E-01	Not Detected
	C-2 Dup	9/20/2024	-2.61E-02	6.63E-02	2.26E-01	Not Detected
	C-3	9/20/2024	5.04E-02	7.26E-02	2.43E-01	Not Detected
	C-4	9/4/2024	1.07E-01	4.29E-02	1.39E-01	Not Detected
	C-5	9/4/2024	1.92E-02	3.65E-02	1.22E-01	Not Detected
	C-6	9/4/2024	1.57E-02	5.08E-02	1.70E-01	Not Detected
	C-7	6/20/2024	5.73E-02	4.03E-02	1.33E-01	Not Detected
	C-8	6/20/2024	-4.49E-02	5.69E-02	1.92E-01	Not Detected
	D-1	6/20/2024	-2.34E-03	9.14E-03	3.41E-02	Not Detected
	D-2	6/20/2024	1.25E-01	7.51E-02	2.47E-01	Not Detected
	D-3	9/20/2024	4.76E-02	4.73E-02	1.57E-01	Not Detected
	D-4	9/4/2024	-5.37E-03	3.82E-02	1.29E-01	Not Detected
	D-5	9/4/2024	5.38E-02	7.07E-02	2.37E-01	Not Detected
	D-6	9/4/2024	3.48E-02	6.44E-02	2.14E-01	Not Detected
	D-7	6/20/2024	2.17E-01	1.10E-01	3.62E-01	Not Detected
	D-7 Dup	6/20/2024	4.91E-02	4.02E-02	1.33E-01	Not Detected
	D-8	6/20/2024	1.20E-01	6.92E-02	2.27E-01	Not Detected
	WIPP-1	3/21/2024	2.16E-02	4.67E-02	1.56E-01	Not Detected
	WIPP-2	3/21/2024	7.42E-02	6.55E-02	2.16E-01	Not Detected
	WIPP-3	3/21/2024	4.39E-02	7.85E-02	2.63E-01	Not Detected
	WIPP-3-Dup	3/21/2024	1.31E-01	5.00E-02	1.63E-01	Not Detected

Table C.4. Activity concentration of ^{90}Sr (Bq/kg) in soil samples

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{90}Sr	A-1	5/21/2024	2.02E+01	2.46E+00	4.20E+01	Not Detected
	A-2	5/22/2024	2.06E+01	3.44E+00	6.34E+01	Not Detected
	A-3	5/22/2024	1.04E+01	1.76E+00	3.23E+01	Not Detected
	A-4	5/22/2024	9.24E+00	1.63E+00	3.06E+01	Not Detected
	A-5	6/4/2024	5.80E+00	1.48E+00	3.07E+01	Not Detected
	A-6	6/4/2024	-4.51E+00	3.81E+00	4.41E+01	Not Detected
	A-7	6/5/2024	3.33E+00	1.39E+00	3.37E+01	Not Detected
	A-8	5/21/2024	1.19E+01	4.31E+00	8.70E+01	Not Detected
	A-8 Dup	5/21/2024	2.33E+01	4.66E+00	8.63E+01	Not Detected
	B-1	5/21/2024	-6.17E+00	6.82E-01	2.16E+01	Not Detected
	B-2	5/21/2024	-2.30E+01	4.85E+00	3.96E+01	Not Detected
	B-3	5/22/2024	-9.88E+00	1.45E+00	1.88E+01	Not Detected
	B-4	5/22/2024	-2.14E+01	5.71E+00	2.97E+01	Not Detected
	B-5	6/4/2024	-3.40E+01	8.37E+01	4.63E+01	Not Detected
	B-6	6/5/2024	-3.02E+01	1.48E+01	4.11E+01	Not Detected
	B-6 Dup	6/5/2024	-2.81E+01	9.87E+00	3.83E+01	Not Detected
	B-7	6/5/2024	-3.55E+01	1.25E+01	5.52E+01	Not Detected
	B-8	5/21/2024	-2.20E+01	4.22E+00	2.87E+01	Not Detected
	C-1	6/20/2024	-3.13E-01	1.20E-01	1.99E+01	Not Detected
	C-2	9/20/2024	1.22E+00	3.25E-01	2.05E+01	Not Detected
	C-2 Dup	9/20/2024	1.65E+01	1.35E+00	2.42E+01	Not Detected
	C-3	9/20/2024	1.57E+00	4.56E-01	2.15E+01	Not Detected
	C-4	9/4/2024	4.41E+00	8.64E-01	2.38E+01	Not Detected
	C-5	9/4/2024	2.76E-02	1.24E-02	1.66E+01	Not Detected
	C-6	9/4/2024	-7.15E-01	4.24E-01	1.93E+01	Not Detected
	C-7	6/20/2024	2.21E+00	6.12E-01	2.63E+01	Not Detected
	C-8	6/20/2024	-7.22E-01	4.12E-01	2.27E+01	Not Detected
	D-1	6/20/2024	1.42E-01	1.81E-01	1.91E+01	Not Detected
	D-2	6/20/2024	2.03E+00	1.56E+00	5.21E+01	Not Detected
	D-3	9/20/2024	1.85E+03	9.22E+03	5.49E+01	Not Detected

Table C.4. (continued)

Radionuclide	Grid Node	Sampling Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{90}Sr	D-4	9/4/2024	-4.75E+00	6.81E+00	5.56E+01	Not Detected
	D-5	9/4/2024	1.01E+01	1.80E+00	6.77E+01	Not Detected
	D-6	9/4/2024	-2.53E+00	9.47E+03	6.10E+01	Not Detected
	D-7	6/20/2024	8.21E+00	1.32E+00	4.80E+01	Not Detected
	D-7 Dup	6/20/2024	1.19E+01	1.85E+00	6.03E+01	Not Detected
	D-8	6/20/2024	-2.38E+00	1.15E+00	3.17E+01	Not Detected
	WIPP-1	3/21/2024	5.42E+00	9.30E-01	5.67E+01	Not Detected
	WIPP-2	3/21/2024	-4.27E+00	3.14E+00	2.11E+01	Not Detected
	WIPP-3	3/21/2024	-3.14E+00	1.36E+00	3.03E+01	Not Detected
	WIPP-3-Dup	3/21/2024	-3.90E-01	9.37E-02	1.84E+01	Not Detected

APPENDIX D - RADIONUCLIDE CONCENTRATIONS IN SURFACE WATER SAMPLES

Actinide concentrations in surface water

Uranium concentrations in surface water

Gamma radionuclide concentrations in surface water

Strontium concentrations in surface water

Table D.1. Actinide concentrations in surface water

Radionuclide	Location	Activity Bq/L	Unc (2σ) (Bq/L)	MDC (Bq/L)	Status
^{241}Am	Hill Tank	8.90E-05	2.14E-04	5.17E-04	Not Detected
	Noya Tank	5.23E-04	3.75E-04	7.24E-04	Not Detected
	Pierce Canyon	1.05E-04	1.66E-04	3.71E-04	Not Detected
	Pierce Canyon (Dup)	3.15E-04	1.90E-04	1.93E-04	Not Detected
	Lake Carlsbad (Shallow)	8.16E-05	1.96E-04	4.74E-04	Not Detected
	Lake Carlsbad (Deep)	1.32E-04	2.18E-04	4.98E-04	Not Detected
	Red Bluff (Shallow)	2.46E-04	2.32E-04	4.83E-04	Not Detected
	Red Bluff (Deep)	1.26E-04	1.33E-04	2.34E-04	Not Detected
	Brantley Lake (Shallow)	1.31E-04	2.28E-04	5.26E-04	Not Detected
	Brantley Lake (Deep)	1.33E-04	1.54E-04	3.13E-04	Not Detected
	Brantley Lake (Shallow, Dup)	3.39E-04	2.08E-04	3.19E-04	Not Detected
	Brantley Lake (Deep, Dup)	3.58E-04	2.69E-04	5.26E-04	Not Detected
$^{239+240}$Pu	Hill Tank	9.57E-05	1.17E-04	2.22E-04	Not Detected
	Noya Tank	2.72E-04	1.92E-04	2.22E-04	Not Detected
	Pierce Canyon	1.12E-04	2.09E-04	4.86E-04	Not Detected
	Pierce Canyon (Dup)	1.91E-04	1.55E-04	2.01E-04	Not Detected
	Lake Carlsbad (Shallow)	2.75E-05	2.13E-04	5.52E-04	Not Detected
	Lake Carlsbad (Deep)	1.94E-04	2.00E-04	3.90E-04	Not Detected
	Red Bluff (Shallow)	3.02E-04	1.92E-04	2.79E-04	Not Detected
	Red Bluff (Deep)	2.30E-04	2.06E-04	4.00E-04	Not Detected
	Brantley Lake (Shallow)	2.14E-05	1.77E-04	4.56E-04	Not Detected
	Brantley Lake (Deep)	1.26E-04	1.80E-04	4.05E-04	Not Detected
	Brantley Lake (Shallow, Dup)	1.82E-04	1.26E-04	1.69E-04	Not Detected

	Brantley Lake (Deep, Dup)	1.06E-04	2.70E-04	6.49E-04	Not Detected

Table D.1. (continued)

Radionuclide	Location	Activity Bq/L	Unc (2σ) (Bq/L)	MDC (Bq/L)	Status
^{238}Pu	Hill Tank	4.79E-05	1.79E-04	4.50E-04	Not Detected
	Noya Tank	1.51E-04	1.81E-04	3.62E-04	Not Detected
	Pierce Canyon	-1.12E-04	2.23E-04	6.55E-04	Not Detected
	Pierce Canyon (Dup)	2.73E-05	1.45E-04	3.85E-04	Not Detected
	Lake Carlsbad (Shallow)	8.24E-05	1.82E-04	4.36E-04	Not Detected
	Lake Carlsbad (Deep)	1.38E-04	1.84E-04	3.90E-04	Not Detected
	Red Bluff (Shallow)	1.86E-04	1.86E-04	3.68E-04	Not Detected
	Red Bluff (Deep)	4.83E-04	2.65E-04	4.33E-04	Not Detected
	Brantley Lake (Shallow)	1.28E-04	1.92E-04	4.30E-04	Not Detected
	Brantley Lake (Deep)	1.80E-04	1.91E-04	4.05E-04	Not Detected
	Brantley Lake (Shallow, Dup)	2.54E-04	1.71E-04	2.88E-04	Not Detected
	Brantley Lake (Deep, Dup)	1.59E-04	1.98E-04	4.20E-04	Not Detected

Table D.2. Uranium concentrations in surface water

Radionuclide	Location	Activity Bq/L	Unc (2σ) (Bq/L)	MDC (Bq/L)	Status
^{234}U	Hill Tank	1.47E-02	2.04E-03	5.25E-04	Detected
	Noya Tank	4.25E-02	5.25E-03	1.97E-04	Detected
	Pierce Canyon	2.25E-01	2.58E-02	2.41E-04	Detected
	Pierce Canyon (Dup)	2.23E-01	2.46E-02	2.62E-04	Detected
	Lake Carlsbad (Shallow)	9.97E-02	1.14E-02	2.22E-04	Detected
	Lake Carlsbad (Deep)	1.03E-01	1.19E-02	4.54E-04	Detected
	Red Bluff (Shallow)	2.79E-01	3.05E-02	6.12E-04	Detected
	Red Bluff (Deep)	2.77E-01	3.00E-02	1.55E-04	Detected
	Brantley Lake (Shallow)	8.40E-02	9.64E-03	4.65E-04	Detected
	Brantley Lake (Deep)	9.91E-02	1.17E-02	4.27E-04	Detected
	Brantley Lake (Shallow, Dup)	7.90E-02	9.02E-03	4.53E-04	Detected
	Brantley Lake (Deep, Dup)	9.11E-02	1.03E-02	1.93E-04	Detected
^{235}U	Hill Tank	6.08E-04	2.93E-04	2.82E-04	Detected
	Noya Tank	1.52E-03	4.84E-04	2.43E-04	Detected
	Pierce Canyon	5.26E-03	1.02E-03	2.98E-04	Detected
	Pierce Canyon (Dup)	5.43E-03	9.66E-04	1.98E-04	Detected
	Lake Carlsbad (Shallow)	2.63E-03	6.39E-04	3.55E-04	Detected
	Lake Carlsbad (Deep)	2.25E-03	6.01E-04	2.99E-04	Detected
	Red Bluff (Shallow)	7.51E-03	1.26E-03	2.27E-04	Detected
	Red Bluff (Deep)	7.70E-03	1.22E-03	3.13E-04	Detected
	Brantley Lake (Shallow)	2.60E-03	6.71E-04	4.65E-04	Detected
	Brantley Lake (Deep)	3.86E-03	9.79E-04	8.26E-04	Detected
	Brantley Lake (Shallow, Dup)	2.31E-03	6.19E-04	4.52E-04	Detected
	Brantley Lake (Deep, Dup)	2.36E-03	6.37E-04	5.14E-04	Detected

Table D.2. (continued)

Radionuclide	Location	Activity Bq/L	Unc (2σ) (Bq/L)	MDC (Bq/L)	Status
^{238}U	Hill Tank	1.08E-02	1.59E-03	3.46E-04	Detected
	Noya Tank	3.08E-02	3.92E-03	1.96E-04	Detected
	Pierce Canyon	1.07E-01	1.25E-02	3.65E-04	Detected
	Pierce Canyon (Dup)	1.08E-01	1.21E-02	3.78E-04	Detected
	Lake Carlsbad (Shallow)	4.41E-02	5.28E-03	2.86E-04	Detected
	Lake Carlsbad (Deep)	4.68E-02	5.67E-03	3.66E-04	Detected
	Red Bluff (Shallow)	1.32E-01	1.46E-02	4.33E-04	Detected
	Red Bluff (Deep)	1.33E-01	1.46E-02	3.33E-04	Detected
	Brantley Lake (Shallow)	4.14E-02	4.98E-03	3.75E-04	Detected
	Brantley Lake (Deep)	4.99E-02	6.21E-03	4.99E-04	Detected
	Brantley Lake (Shallow, Dup)	4.03E-02	4.81E-03	4.11E-04	Detected
	Brantley Lake (Deep, Dup)	4.44E-02	5.26E-03	2.43E-04	Detected

Table D.3. Gamma emitting radionuclides in surface water

Radionuclide	Location	Activity Bq/L	Unc (2σ) (Bq/L)	MDC (Bq/L)	Status
^{137}Cs	Hill Tank	1.30E-02	9.86E-03	3.25E-02	Not Detected
	Noya Tank	1.66E-02	1.43E-02	4.72E-02	Not Detected
	Pierce Canyon	-1.82E-04	1.88E-02	1.88E-02	Not Detected
	Pierce Canyon (Dup)	-9.19E-03	9.58E-03	3.27E-02	Not Detected
	Lake Carlsbad (Shallow)	-2.10E-02	1.27E-02	4.32E-02	Not Detected
	Lake Carlsbad (Deep)	-2.27E-05	1.32E-02	4.44E-02	Not Detected
	Red Bluff (Shallow)	4.53E-03	1.60E-02	5.32E-02	Not Detected
	Red Bluff (Deep)	4.39E-02	1.60E-02	5.17E-02	Not Detected
	Brantley Lake (Shallow)	8.25E-03	1.04E-02	3.46E-02	Not Detected
	Brantley Lake (Deep)	2.38E-02	1.30E-02	4.24E-02	Not Detected
	Brantley Lake (Shallow, Dup)	4.88E-03	1.11E-02	3.71E-02	Not Detected
	Brantley Lake (Deep, Dup)	4.08E-03	1.17E-02	3.93E-02	Not Detected
^{60}Co	Hill Tank	2.49E-02	1.28E-02	4.19E-02	Not Detected
	Noya Tank	1.15E-02	1.32E-02	4.39E-02	Not Detected
	Pierce Canyon	-3.55E-03	1.13E-02	3.87E-02	Not Detected
	Pierce Canyon (Dup)	2.42E-02	1.26E-02	4.14E-02	Not Detected
	Lake Carlsbad (Shallow)	-1.51E-03	1.06E-02	3.61E-02	Not Detected
	Lake Carlsbad (Deep)	1.00E-03	1.23E-02	4.15E-02	Not Detected
	Red Bluff (Shallow)	5.82E-03	9.46E-03	3.18E-02	Not Detected
	Red Bluff (Deep)	-4.38E-03	1.25E-02	4.26E-02	Not Detected
	Brantley Lake (Shallow)	-4.44E-03	1.06E-02	3.60E-02	Not Detected
	Brantley Lake (Deep)	1.12E-02	1.19E-02	3.98E-02	Not Detected
	Brantley Lake (Shallow, Dup)	1.93E-02	1.02E-02	3.35E-02	Not Detected
	Brantley Lake (Deep, Dup)	-5.59E-03	1.04E-02	3.58E-02	Not Detected

Table D.3. Gamma emitting radionuclides in surface water (continued)

Radionuclide	Location	Activity Bq/L	Unc (2σ) (Bq/L)	MDC (Bq/L)	Status
^{40}K	Hill Tank	-2.93E-01	1.86E-01	6.32E-01	Not Detected
	Noya Tank	4.98E+00	5.15E-01	5.15E-01	Detected
	Pierce Canyon	-1.84E-01	1.44E-01	4.95E-01	Not Detected
	Pierce Canyon (Dup)	9.71E-02	1.49E-01	4.95E-01	Not Detected
	Lake Carlsbad (Shallow)	-3.34E-01	1.48E-01	5.12E-01	Not Detected
	Lake Carlsbad (Deep)	1.95E-01	1.70E-01	5.59E-01	Not Detected
	Red Bluff (Shallow)	-3.04E-01	1.48E-01	5.13E-01	Not Detected
	Red Bluff (Deep)	1.97E+00	2.82E-01	6.67E-01	Detected
	Brantley Lake (Shallow)	-1.54E-01	1.56E-01	5.33E-01	Not Detected
	Brantley Lake (Deep)	1.87E-01	1.70E-01	5.61E-01	Not Detected
	Brantley Lake (Shallow, Dup)	1.45E-01	1.26E-01	4.17E-01	Not Detected
	Brantley Lake (Deep, Dup)	-2.93E-01	1.86E-01	6.32E-01	Not Detected

Table D.4. Strontium concentration in surface water

Radionuclide	Location	Activity Bq/L	Unc (2σ) (Bq/L)	MDC (Bq/L)	Status
^{90}Sr	Hill Tank	1.92E-03	4.37E-04	4.35E-02	Not Detected
	Noya Tank	3.74E-03	8.69E-04	6.68E-02	Not Detected
	Pierce Canyon	9.66E-03	1.20E-03	3.39E-02	Not Detected
	Pierce Canyon (Dup)	5.25E-03	7.80E-04	2.68E-02	Not Detected
	Lake Carlsbad (Shallow)	1.07E-03	2.26E-04	2.36E-02	Not Detected
	Lake Carlsbad (Deep)	1.13E-03	2.42E-04	2.42E-02	Not Detected
	Red Bluff (Shallow)	1.85E-08	4.47E-09	3.46E-02	Not Detected
	Red Bluff (Deep)	2.47E-08	3.92E-09	2.26E-02	Not Detected
	Brantley Lake (Shallow)	2.91E-08	4.65E-09	2.65E-02	Not Detected

	Brantley Lake (Deep)	8.48E-09	1.88E-09	2.49E-02	Not Detected
	Brantley Lake (Shallow, Dup)	3.22E-09	1.05E-09	3.33E-02	Not Detected
	Brantley Lake (Deep, Dup)	9.14E-08	9.83E-09	3.43E-02	Not Detected

APPENDIX E - RADIONUCLIDE CONCENTRATIONS IN DRINKING WATER

Actinide concentrations in drinking water

Uranium concentrations in drinking water

Gamma radionuclide concentrations in drinking water

Strontium concentrations in drinking water

Table E.1. Actinide concentrations in drinking water

Radionuclide	Location	Activity Bq/L	Unc (2σ) (Bq/L)	MDC (Bq/L)	Status
^{241}Am	Sheep Draw	-2.32E-05	1.91E-04	5.21E-04	Not Detected
	Loving	7.77E-05	1.23E-04	2.74E-04	Not Detected
	Malaga	4.71E-05	1.76E-04	4.43E-04	Not Detected
	Otis	1.20E-04	1.14E-04	2.07E-04	Not Detected
	Hobbs	1.08E-04	8.76E-05	1.14E-04	Not Detected
	Hobbs Dup	1.82E-05	9.65E-05	2.57E-04	Not Detected
	PRV-4	-7.10E-05	1.23E-04	3.78E-04	Not Detected
$^{239+240}$Pu	Sheep Draw	1.38E-05	9.94E-05	2.59E-04	Not Detected
	Loving	1.45E-05	6.47E-05	1.74E-04	Not Detected
	Malaga	3.62E-05	1.26E-04	3.15E-04	Not Detected
	Otis	-1.95E-04	1.43E-04	4.48E-04	Not Detected
	Hobbs	-7.24E-05	1.12E-04	3.40E-04	Not Detected
	Hobbs Dup	4.32E-05	8.64E-05	2.03E-04	Not Detected
	PRV-4	-8.41E-05	1.26E-04	3.70E-04	Not Detected
^{238}Pu	Sheep Draw	9.65E-05	1.07E-04	2.19E-04	Not Detected
	Loving	0.00E+00	1.08E-04	2.91E-04	Not Detected
	Malaga	9.05E-05	2.20E-04	5.25E-04	Not Detected
	Otis	-1.53E-04	1.70E-04	4.87E-04	Not Detected
	Hobbs	-1.30E-04	1.33E-04	4.08E-04	Not Detected
	Hobbs Dup	-1.44E-05	1.04E-04	2.89E-04	Not Detected
	PRV-4	2.80E-05	9.71E-05	2.44E-04	Not Detected

Table E.2. Uranium concentration in drinking water

Radionuclide	Location	Activity Bq/L	Unc (2σ) (Bq/L)	MDC (Bq/L)	Status
^{234}U	Sheep Draw	2.67E-02	3.20E-03	3.03E-04	Detected
	Loving	7.65E-02	8.65E-03	2.93E-04	Detected
	Malaga	1.77E-01	2.06E-02	2.07E-04	Detected
	Otis	1.21E-01	1.36E-02	2.68E-04	Detected
	Hobbs	9.57E-02	1.07E-02	1.13E-04	Detected
	Hobbs Dup	9.74E-02	1.11E-02	1.55E-04	Detected
	PRV-4	5.68E-02	6.55E-03	1.62E-04	Detected
^{235}U	Sheep Draw	4.77E-04	2.13E-04	2.99E-04	Not Detected
	Loving	1.24E-03	3.08E-04	1.77E-04	Detected
	Malaga	3.60E-03	6.95E-04	2.56E-04	Detected
	Otis	2.57E-03	4.93E-04	1.44E-04	Detected
	Hobbs	2.30E-03	4.51E-04	1.39E-04	Detected
	Hobbs Dup	2.31E-03	4.75E-04	3.00E-04	Detected
	PRV-4	1.21E-03	3.16E-04	1.22E-04	Detected
^{238}U	Sheep Draw	1.06E-02	1.40E-03	2.73E-04	Detected
	Loving	2.36E-02	2.81E-03	3.35E-04	Detected
	Malaga	6.70E-02	7.97E-03	2.06E-04	Detected
	Otis	4.41E-02	5.11E-03	3.19E-04	Detected
	Hobbs	4.15E-02	4.78E-03	1.71E-04	Detected
	Hobbs Dup	4.34E-02	5.08E-03	1.81E-04	Detected
	PRV-4	2.02E-02	2.48E-03	2.34E-04	Detected

Table E.3. Gamma emitting radionuclides in drinking water

Radionuclide	Location	Activity Bq/L	Unc(2σ) (Bq/L)	MDC (Bq/L)	Status
^{137}Cs	Sheep Draw	1.30E-02	9.86E-03	3.25E-02	Not Detected
	Loving	8.98E-03	1.35E-02	4.49E-02	Not Detected
	Malaga	-2.88E-02	1.27E-02	4.36E-02	Not Detected
	Otis	-8.59E-03	1.39E-02	4.68E-02	Not Detected
	Hobbs	-2.57E-02	1.40E-02	4.77E-02	Not Detected
	Hobbs Dup	1.84E-02	1.31E-02	4.31E-02	Not Detected
	PRV-4	2.85E-02	2.05E-02	6.76E-02	Not Detected
^{60}Co	Sheep Draw	2.49E-02	1.28E-02	4.19E-02	Not Detected
	Loving	1.40E-02	1.27E-02	4.21E-02	Not Detected
	Malaga	-4.00E-03	9.97E-03	3.41E-02	Not Detected
	Otis	-1.21E-02	1.29E-02	4.42E-02	Not Detected
	Hobbs	9.93E-04	1.13E-02	3.83E-02	Not Detected
	Hobbs Dup	-2.70E-03	1.26E-02	4.28E-02	Not Detected
	PRV-4	1.07E-02	1.45E-02	4.87E-02	Not Detected
^{40}K	Sheep Draw	4.70E-01	1.61E-01	5.16E-01	Not Detected
	Loving	2.46E-01	1.72E-01	5.63E-01	Not Detected
	Malaga	3.96E-02	1.45E-01	4.88E-01	Not Detected
	Otis	3.45E-01	1.83E-01	5.92E-01	Not Detected
	Hobbs	-1.27E-01	1.43E-01	4.90E-01	Not Detected
	Hobbs Dup	2.30E-01	1.67E-01	5.47E-01	Not Detected
	PRV-4	-2.74E-01	2.48E-01	8.50E-01	Not Detected

Table E.4. ^{90}Sr concentrations in drinking water

Radionuclide	Location	Activity Bq/L	Unc(2σ) (Bq/L)	MDC (Bq/L)	Status
^{90}Sr	Sheep Draw	-4.23E-03	1.50E-03	1.96E-02	Not Detected
	Loving	3.72E-04	5.97E-05	1.89E-02	Not Detected
	Malaga	-4.72E-03	3.63E-03	1.61E-02	Not Detected
	Otis	-9.11E-04	1.69E-04	1.43E-02	Not Detected
	Hobbs	-4.46E-03	3.53E-03	1.08E-02	Not Detected
	Hobbs Dup	-2.92E-03	6.52E-04	1.25E-02	Not Detected
	PRV-4	-4.93E-03	2.84E-03	1.74E-02	Not Detected

APPENDIX F - RADIONUCLIDE CONCENTRATIONS IN SEDIMENT SAMPLES

Actinide concentrations in sediment

Uranium concentrations in sediment

Gamma radionuclide concentrations in sediment

Strontium concentrations in sediment

Table F.1. Activity concentrations of ^{241}Am, $^{239+240}Pu$, and ^{238}Pu (Bq/Kg) in sediments

Radionuclides	Location	Sample Date	Activity Bq/Kg	Unc. (2σ) Bq/Kg	MDC Bq/Kg	Status
^{241}Am	Lake Carlsbad	11/21/2024	-2.94E-02	1.17E-01	3.29E-01	Not Detected
	Red Bluff	11/26/2024	1.73E-01	1.39E-01	2.44E-01	Not Detected
	Brantley Lake	12/4/2024	1.32E-01	1.47E-01	3.10E-01	Not Detected
	Brantley Lake Dup	12/4/2024	1.80E-01	1.15E-01	1.96E-01	Not Detected
$^{239+240}Pu$	Lake Carlsbad	11/21/2024	6.23E-02	1.61E-01	3.91E-01	Not Detected
	Red Bluff	11/26/2024	2.76E-01	1.30E-01	1.28E-01	Detected
	Brantley Lake	12/4/2024	6.23E-02	1.61E-01	3.91E-01	Not Detected
	Brantley Lake Dup	12/4/2024	6.43E-02	1.11E-01	2.55E-01	Not Detected
^{238}Pu	Lake Carlsbad	11/21/2024	1.25E-01	1.56E-01	3.31E-01	Not Detected
	Red Bluff	11/26/2024	9.69E-02	9.99E-02	1.95E-01	Not Detected
	Brantley Lake	12/4/2024	7.71E-02	7.56E-02	1.13E-01	Not Detected
	Brantley Lake Dup	12/4/2024	8.07E-02	1.25E-01	2.81E-01	Not Detected

Dup = duplicate

Table F.2. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U (Bq/Kg) in sediments

Radionuclides	Location	Sample Date	Activity Bq/Kg	Unc. (2σ) Bq/Kg	MDC Bq/Kg	Status
^{234}U	Lake Carlsbad	11/21/2024	4.78E+01	6.03E+00	7.07E-01	Detected
	Red Bluff	11/26/2024	1.16E+02	1.32E+01	4.44E-01	Detected
	Brantley Lake	12/4/2024	3.39E+01	4.10E+00	3.63E-01	Detected
	Brantley Lake Dup	12/4/2024	3.17E+01	3.90E+00	2.89E-01	Detected
^{235}U	Lake Carlsbad	11/21/2024	2.38E+00	6.58E-01	2.73E-01	Detected
	Red Bluff	11/26/2024	3.36E+00	6.74E-01	2.16E-01	Detected
	Brantley Lake	12/4/2024	1.62E+00	4.52E-01	3.77E-01	Detected
	Brantley Lake Dup	12/4/2024	1.50E+00	4.49E-01	3.56E-01	Detected
^{238}U	Lake Carlsbad	11/21/2024	2.98E+01	3.94E+00	5.22E-01	Detected
	Red Bluff	11/26/2024	6.39E+01	7.39E+00	4.79E-01	Detected
	Brantley Lake	12/4/2024	2.77E+01	3.41E+00	3.61E-01	Detected
	Brantley Lake Dup	12/4/2024	2.68E+01	3.35E+00	4.56E-01	Detected

Dup = duplicate

Table F.3. Activity concentrations of ^{137}Cs, ^{40}K, and ^{60}Co (Bq/Kg) in sediments

Radionuclides	Location	Sample Date	Activity Bq/Kg	Unc. (2σ) Bq/Kg	MDC Bq/Kg	Status
^{137}Cs	Lake Carlsbad	11/21/2024	1.81E+00	1.35E-01	4.06E-01	Detected
	Red Bluff	11/26/2024	2.91E+00	2.60E-01	7.97E-01	Detected
	Brantley Lake	12/4/2024	3.21E-01	7.30E-02	2.36E-01	Detected
	Brantley Lake Dup	12/4/2024	8.82E-01	9.90E-02	3.09E-01	Detected
^{40}K	Lake Carlsbad	11/21/2024	3.20E+02	7.63E+00	4.11E+00	Detected
	Red Bluff	11/26/2024	4.34E+02	1.10E+01	9.53E+00	Detected
	Brantley Lake	12/4/2024	4.41E+02	9.95E+00	2.68E+00	Detected
	Brantley Lake Dup	12/4/2024	4.52E+02	1.77E+01	3.78E+00	Detected
^{60}Co	Lake Carlsbad	11/21/2024	1.52E-01	9.85E-02	3.24E-01	Not Detected
	Red Bluff	11/26/2024	-1.34E-01	1.80E-01	6.07E-01	Not Detected
	Brantley Lake	12/4/2024	1.17E-01	5.97E-02	1.96E-01	Not Detected
	Brantley Lake Dup	12/4/2024	5.70E-02	6.50E-02	2.16E-01	Not Detected

Dup = duplicate

Table F.4. Activity concentrations of ^{90}Sr (Bq/kg) in sediments

Radionuclide	Location	Sample Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{90}Sr	Lake Carlsbad	11/21/2024	2.44E+00	2.96E-01	1.28E+01	Not Detected
	Red Bluff	11/26/2024	-6.73E-01	1.46E-01	1.27E+01	Not Detected
	Brantley Lake	12/4/2024	5.14E+00	4.82E-01	1.36E+01	Not Detected
	Brantley Lake Dup	12/4/2024	1.31E+00	2.23E-01	1.50E+01	Not Detected

APPENDIX G - RADIONUCLIDE CONCENTRATIONS IN VEGETATION SAMPLES

Actinide concentrations in vegetation

Uranium concentrations in vegetation

Gamma radionuclide concentrations in vegetation

Strontium concentrations in vegetatio

Table G.1. Activity concentrations of ^{241}Am, $^{239+240}Pu$, and ^{238}Pu (Bq/Kg) in vegetation samples

Radionuclides	Location	Sample Date	Activity Bq/Kg	Unc. (2σ) Bq/Kg	MDC Bq/Kg	Status
^{241}Am	Near Field	12/12/2024	1.48E-02	1.19E-02	2.09E-02	Not Detected
	Near Field-Dup	12/12/2024	0.00E+00	1.22E-02	3.19E-02	Not Detected
	Cactus Flats	12/12/2024	2.76E-02	1.38E-02	1.99E-02	Not Detected
	Loving	12/12/2024	1.89E-02	1.16E-02	1.77E-02	Not Detected
	Carlsbad	12/12/2024	1.10E-02	7.75E-03	9.01E-03	Not Detected
	East Tower	12/27/2024	4.98E-03	1.17E-02	2.79E-02	Not Detected
$^{239+240}Pu$	Near Field	12/12/2024	2.70E-02	1.48E-02	2.11E-02	Not Detected
	Near Field-Dup	12/12/2024	6.82E-03	5.40E-03	7.91E-03	Not Detected
	Cactus Flats	12/12/2024	6.28E-03	5.45E-03	9.43E-03	Not Detected
	Loving	12/12/2024	9.40E-03	6.66E-03	1.10E-02	Not Detected
	Carlsbad	12/12/2024	3.32E-03	9.39E-03	2.34E-02	Not Detected
	East Tower	12/27/2024	1.10E-02	6.68E-03	9.43E-03	Not Detected
^{238}Pu	Near Field	12/12/2024	1.20E-02	1.04E-02	1.80E-02	Not Detected
	Near Field-Dup	12/12/2024	5.11E-03	6.38E-03	1.35E-02	Not Detected
	Cactus Flats	12/12/2024	2.36E-03	8.46E-03	2.08E-02	Not Detected
	Loving	12/12/2024	-7.83E-04	8.14E-03	2.14E-02	Not Detected
	Carlsbad	12/12/2024	1.49E-02	1.29E-02	2.34E-02	Not Detected
	East Tower	12/27/2024	1.10E-02	7.04E-03	1.11E-02	Not Detected

Dup = duplicate

Table G.2. Activity concentrations of ^{234}U, ^{235}U, and ^{238}U (Bq/Kg) in vegetation samples

Radionuclides	Location	Sample Date	Activity Bq/Kg	Unc. (2σ) Bq/Kg	MDC Bq/Kg	Status
^{234}U	Near Field	12/12/2024	1.12E+00	1.31E-01	1.44E-02	Detected
	Near Field-Dup	12/12/2024	3.67E+00	4.03E-01	1.65E-02	Detected
	Cactus Flats	12/12/2024	2.70E+00	3.01E-01	6.00E-03	Detected
	Loving	12/12/2024	3.19E+00	3.57E-01	1.26E-02	Detected
	Carlsbad	12/12/2024	6.52E-01	8.09E-02	5.97E-03	Detected
	East Tower	12/27/2024	3.21E+00	3.53E-01	8.18E-03	Detected
^{235}U	Near Field	12/12/2024	5.89E-02	1.48E-02	5.56E-03	Detected
	Near Field-Dup	12/12/2024	2.05E-01	3.45E-02	8.05E-03	Detected
	Cactus Flats	12/12/2024	1.36E-01	2.56E-02	9.57E-03	Detected
	Loving	12/12/2024	1.62E-01	2.99E-02	8.28E-03	Detected
	Carlsbad	12/12/2024	4.04E-02	1.25E-02	9.52E-03	Detected
	East Tower	12/27/2024	1.42E-01	2.70E-02	1.33E-02	Detected
^{238}U	Near Field	12/12/2024	1.04E+00	1.22E-01	1.06E-02	Detected
	Near Field-Dup	12/12/2024	3.56E+00	3.91E-01	1.78E-02	Detected
	Cactus Flats	12/12/2024	2.66E+00	2.97E-01	7.72E-03	Detected
	Loving	12/12/2024	3.04E+00	3.40E-01	1.25E-02	Detected
	Carlsbad	12/12/2024	6.46E-01	8.01E-02	7.69E-03	Detected
	East Tower	12/27/2024	3.10E+00	3.42E-01	9.56E-03	Detected

Dup = duplicate

Table G.3. Activity concentrations of ^{137}Cs, ^{40}K, and ^{60}Co (Bq/kg) in vegetation samples

Radionuclides	Location	Sample Date	Activity Bq/kg	Unc. (2σ) Bq/kg	MDC Bq/kg	Status
^{137}Cs	Near Field	12/12/2024	2.93E-01	3.26E-01	1.08E+00	Not Detected
	Near Field-Dup	12/12/2024	-3.85E-01	3.18E-01	1.09E+00	Not Detected
	Cactus Flats	12/12/2024	6.10E-01	5.23E-01	1.73E+00	Not Detected
	Loving	12/12/2024	6.26E-01	4.33E-01	1.43E+00	Not Detected
	Carlsbad	12/12/2024	2.04E+00	6.92E-01	2.23E+00	Not Detected
	East Tower	12/27/2024	2.22E-01	4.70E-01	1.57E+00	Not Detected
^{40}K	Near Field	12/12/2024	3.01E+02	1.64E+01	2.34E+01	Detected
	Near Field-Dup	12/12/2024	1.65E+02	1.08E+01	2.14E+01	Detected
	Cactus Flats	12/12/2024	2.73E+02	1.83E+01	3.88E+01	Detected
	Loving	12/12/2024	2.06E+02	1.24E+01	2.20E+01	Detected
	Carlsbad	12/12/2024	2.61E+02	1.87E+01	4.25E+01	Detected
	East Tower	12/27/2024	1.99E+02	1.56E+01	3.72E+01	Detected
^{60}Co	Near Field	12/12/2024	1.32E-01	3.23E-01	1.09E+00	Not Detected
	Near Field-Dup	12/12/2024	1.59E-01	3.58E-01	1.20E+00	Not Detected
	Cactus Flats	12/12/2024	-9.03E-02	4.83E-01	1.66E+00	Not Detected
	Loving	12/12/2024	3.33E-01	3.46E-01	1.15E+00	Not Detected
	Carlsbad	12/12/2024	6.03E-01	5.49E-01	1.83E+00	Not Detected
	East Tower	12/27/2024	-1.73E-01	4.93E-01	1.69E+00	Not Detected

Dup = duplicate

Table G.4. Activity concentrations of ^{90}Sr (Bq/Kg) in vegetation samples

Radionuclide	Location	Sample Date	Activity Bq/Kg	Unc. (2σ) Bq/Kg	MDC Bq/Kg	Status
^{90}Sr	Near Field	12/12/2024	1.43E+00	8.18E-02	1.81E+00	Not Detected
	Near Field-Dup	12/12/2024	1.37E+00	8.14E-02	1.90E+00	Not Detected
	Cactus Flats	12/12/2024	9.29E-01	7.15E-02	2.20E+00	Not Detected
	Loving	12/12/2024	4.49E-01	3.99E-02	1.67E+00	Not Detected
	Carlsbad	12/12/2024	-2.01E-01	-4.65E-02	8.52E-01	Not Detected
	East Tower	12/27/2024	1.07E+00	7.38E-02	1.97E+00	Not Detected

Dup = duplicate

APPENDIX H - *IN-VIVO* RESULTS

Average MDA of Lung Detector through December 2024

Average MDA of Whole-Body counting detector December 2024

Demographic Characteristics of the LDBC population through December 2024

LDBC results greater than the decision limits (L_C) through December 2024

Table H.1. 2024 Apex In -vivo System's Average MDAs (nCi) of Lung detector group

Radionuclide	Energy (keV)	MDA (nCi) as a function of Chest Wall Thickness (CWT in cm)							
		1.6 cm		2.22 cm		3.01 cm		3.33 cm	
		Avg	1-stdev	Avg	1-stdev	Avg	1-stdev	Avg	1-stdev
^{241}Am	59.5	0.16	0.03	0.17	0.05	0.23	0.06	0.21	0.04
^{144}Ce	133.5	0.52	0.11	0.55	0.15	0.70	0.19	0.74	0.23
^{252}Cf	19.2	19	6	33	12	77	27	121	32
^{244}Cm	18.1	19	5	34	11	97	35	144	36
^{155}Eu	105.3	0.25	0.04	0.28	0.07	0.39	0.09	0.38	0.12
^{237}Np	86.5	0.43	0.10	0.47	0.14	0.67	0.23	0.65	0.25
^{238}Pu	17.1	19	5	38	11	117	42	187	48
^{239}Pu	17.1	47	12	96	28	274	79	464	118
^{240}Pu	17.1	19	5	38	11	108	31	182	47
^{242}Pu	17.1	22	6	45	13	130	37	220	56
^{226}Ra	186.1	1.89	0.46	1.96	0.60	2.41	0.71	2.56	0.83
^{232}Th via ^{212}Pb	238.6	0.13	0.01	0.14	0.02	0.19	0.01	0.18	0.05
^{232}Th	59	23	2	28	3	38	4	43	3
^{232}Th via ^{228}Th [a]	84.3	3.31	0.17	4.05	0.26	5.52	0.04	5.15	1.75
^{233}U	441.5	0.63	0.05	0.74	0.10	0.90	0.11	0.87	0.21
^{235}U [b]	185.7	0.12	0.03	0.12	0.04	0.16	0.05	0.16	0.05
Nat U via ^{234}Th [c]	63.3	1.48	0.31	1.62	0.47	2.37	0.71	2.29	0.84

Note: MDA Averages are obtained from 2022-2024.

[a] Radionuclide used to indicate natural thorium.

[b] Radionuclide used to indicate enriched uranium.

[c] Radionuclide used to indicate natural uranium or depleted uranium.

Table H.1. (continued)

Radionuclide	Energy (keV)	MDA (nCi) as a function of Chest Wall Thickness (CWT in cm)							
		4.18 cm		5.1 cm		6.0 cm		7.5 cm	
		Avg	1-stdev	Avg	1-stdev	Avg	1-stdev	Avg	1-stdev
^{241}Am	59.5	0.35	0.09	0.55	0.09	0.77	0.14	1.32	0.24
^{144}Ce	133.5	0.98	0.27	1.44	0.30	1.89	0.41	2.93	0.64
^{252}Cf	19.2	267	90	767	153	2086	484	10168	2175
^{244}Cm	18.1	348	113	1110	222	3363	801	19488	4463
^{155}Eu	105.3	0.51	0.13	0.78	0.14	1.05	0.20	1.71	0.34
^{237}Np	86.5	0.91	0.28	1.40	0.34	1.94	0.51	3.22	0.87
^{238}Pu	17.1	508	158	1834	411	6331	1671	44997	12025
^{239}Pu	17.1	1263	394	4562	1022	15752	4157	111953	29918
^{240}Pu	17.1	496	155	1792	402	6188	1633	43982	11753
^{242}Pu	17.1	599	187	2162	484	7465	1970	53057	14179
^{226}Ra	186.1	3.23	0.95	4.60	1.00	5.86	1.31	8.6	1.9
^{232}Th via ^{212}Pb	238.6	0.25	0.01	0.37	0.08	0.47	0.10	0.70	0.15
^{232}Th	59	58	4	80	5	112	6	192	9
^{232}Th via ^{228}Th [a]	84.3	8.04	0.36	10.9	0.3	15.1	0.7	25.4	1.4
^{233}U	441.5	1.16	0.11	1.41	0.13	1.65	0.17	2.0	0.2
^{235}U [b]	185.7	0.20	0.06	0.28	0.06	0.36	0.08	0.5	0.1
Nat U via ^{234}Th [c]	63.3	3.24	0.96	5.09	1.07	7.1	1.6	12.1	2.8

Note: MDA Avg. are obtained from 2022-2024.

[a] Radionuclide used to indicate natural thorium.

[b] Radionuclide used to indicate enriched uranium.

[c] Radionuclide used to indicate natural uranium or depleted uranium.

Table H.2. 2024 Apex In-vivo System's Average MDAs (nCi) of Whole-Body detector group

Radionuclide	Energy (keV)	Average (nCi)	1-stdev
Ba-133	356.0	0.68	0.20
Ba-140	537.3	1.36	0.32
Ce-141	145.4	0.99	0.22
Co-58	810.8	0.34	0.10
Co-60	1332.5	0.33	0.09
Cr-51	320.1	4.00	1.07
Cs-134	604.7	0.48	0.13
Cs-137	661.7	0.40	0.09
Eu-152	344.3	1.43	0.40
Eu-154	1274.4	1.02	0.22
Eu-155	105.3	2.29	0.56
Fe-59	1099.2	0.65	0.17
I-131	364.5	0.46	0.11
I-133	529.9	0.39	0.09
Ir-192	316.5	0.48	0.12
Mn-54	834.8	0.34	0.10
Ru-103	497.1	0.40	0.09
Ru-106	621.9	3.40	0.87
Sb-125	427.9	1.24	0.31
Th-I(Ac)	911.2	1.21	0.29
Y-88	898.0	0.37	0.09
Zn-65	1115.5	0.85	0.22
Zr-95	756.7	0.60	0.16

Note: MDA Avg. are obtained from 2022-2024.

Table H.3. Demographic Characteristics of the LDBC population during 1997 – 2024

Characteristics		Voluntary Participants		2000[a]		2024[b] Estimates	
		Baseline	Operational	NM	US	NM	US
Sex	Male	56.2% (52.2% to 61.9%)[c]	43.3% (40.5% to 46.0%)[c]	49.2%	49.1%	49.8%	49.5%
	Female	43.8% (38.6% to 48.3%)	56.7% (54.0% to 59.5%)	50.8%	50.9%	50.2%	50.5%
Ethnicity	Hispanic	13.4% (9.5% to 16.3%)	24.3% (21.9 % to 26.7%)	42.1%	12.5%	49.1%	20.0%
	All others	86.6% (83.3% to 90.9%)	75.7% (73.3% to 78.1%)	57.9%	87.5%	50.9%	80.0%
Age 65 years or over		16.70%[d]	35.3% (32.6 % to 37.9%)	11.7%	12.4%	20.2%	18.0%
Currently or previously classified as a radiation worker		4.0%[d]	9.8 % (8.1% to 11.4%)	NA	NA	NA	NA
Consumption of wild game within 3 months prior to count		16.4%[d]	21.8 % (19.5 % to 24.1%)	NA	NA	NA	NA
Medical treatment other than X-rays using radionuclides		9%[d]	5.6 % (4.3 % to 6.9%)	NA	NA	NA	NA
European/Japan travel within 2 years prior to the count		4%[d]	4.6% (3.4% to 5.8%)	NA	NA	NA	NA
Current smoker		13.9%[d]	13.2% (11.3% to 15.1%)	N/A	N/A	12.2%[e]	9.9%[f]

[a] 2000 Census data for US and NM
https://www2.census.gov/library/publications/2001/dec/2kh00.pdf (accessed on 10/10/2025).
https://usa.ipums.org/usa/resources/voliii/pubdocs/2000/c2kprof00-nm.pdf (accessed on 10/10/2025).
[b] 2024 Census data for US and NM
US: https://www.census.gov/data/tables/time-series/demo/popest/2020s-national-detail.html (accessed on 10/13/2025)
NM: https://www.census.gov/data/tables/time-series/demo/popest/2020s-state-detail.html (accessed on 10/13/2025)

[c] Values in parentheses are margin of error representing the 95% confidence interval of the observed percentage.
[d] Margin of error cannot be quoted due to small sample size.
[e] % Adult smoking in NM (2023 data)
https://www.cdc.gov/tobacco/stateandcommunity/state-fact-sheets/index.htm#NM (accessed on 10/16/2025)
[f] % Adult smoking in US
https://www.cdc.gov/nchs/fastats/smoking.htm (accessed on 10/16/2025)

Table H.4. LDBC results greater than the decision limits (L_C) through December 2024

Radionuclides	*In-Vivo* count type	Baseline counts (N = 366) % of results ≥ L_C[a]	Operational counts (N = 1237) % of results ≥ L_C[a]
^{241}Am	Lung	5.2 (4.0 to 6.4)[b]	4.3 (3.2 to 5.4)[b]
^{144}Ce	Lung	4.6 (3.5 to 5.7)	4.9 (3.7 to 6.1)
^{252}Cf	Lung	4.1 (3.1 to 5.1)	5.9 (4.5 to 7.2)
^{244}Cm	Lung	5.7 (4.5 to 7.0)	5.0 (3.8 to 6.3)
^{155}Eu	Lung	7.1 (5.8 to 8.4)	5.0 (3.8 to 6.3)
^{237}Np	Lung	3.6 (2.6 to 4.5)	4.0 (2.9 to 5.1)
^{210}Pb	Lung	4.4 (3.3 to 5.4)	5.9 (4.6 to 7.3)
Pu-Isotopes [c]	Lung	5.7 (4.5 to 7.0)	5 (3.7 to 6.2)
^{232}Th via ^{212}Pb [d]	Lung	34.2 (31.7 to 36.6)	31.3 (28.8 to 33.9)
^{232}Th	Lung	4.9 (3.8 to 6.0)	5.9 (4.5 to 7.2)
^{232}Th via ^{228}Th	Lung	4.1 (3.1 to 5.1)	4.7 (3.5 to 5.9)
^{233}U	Lung	5.7 (4.5 to 7.0)	9.2 (7.6 to 10.8)
^{235}U / ^{226}Ra [e]	Lung	10.7 (9.0 to 12.3)	10.7 (9.0 to 12.5)
^{238}U	Lung	5.2 (4.0 to 6.4)	5.3 (4 to 6.5)
^{133}Ba	Whole Body	3.6 (2.6 to 4.5)	3.2 (2.2 to 4.2)
^{140}Ba	Whole Body	5.2 (4.0 to 6.4)	3.9 (2.8 to 5)
^{141}Ce	Whole Body	3.6 (2.6 to 4.5)	4.6 (3.5 to 5.8)
^{58}Co	Whole Body	4.4 (3.3 to 5.4)	3.7 (2.7 to 4.8)
^{60}Co [d]	Whole Body	54.6 (52.0 to 57.2)	21.3 (19.0 to 23.6)
^{51}Cr	Whole Body	5.7 (4.5 to 7.0)	4.6 (3.4 to 5.7)
^{134}Cs	Whole Body	1.6 (1.0 to 2.3)	3.4 (2.4 to 4.4)
^{137}Cs	Whole Body	28.4 (26.1 to 30.8)	16.6 (14.5 to 18.7)
^{152}Eu	Whole Body	7.4 (6.0 to 8.7)	5.4 (4.2 to 6.7)
^{154}Eu	Whole Body	3.8 (2.8 to 4.8)	3.7 (2.6 to 4.7)
^{155}Eu	Whole Body	3.8 (2.8 to 4.8)	4 (2.9 to 5.1)
^{59}Fe	Whole Body	3.8 (2.8 to 4.8)	5.6 (4.3 to 6.9)
^{131}I	Whole Body	5.2 (4.0 to 6.4)	4.5 (3.3 to 5.6)
^{133}I	Whole Body	3.3 (2.3 to 4.2)	4.1 (3 to 5.2)
^{192}Ir	Whole Body	4.1 (3.1 to 5.1)	4.2 (3.1 to 5.4)
^{40}K	Whole Body	100.0	100.0
^{54}Mn [d]	Whole Body	12.3 (10.6 to 14.0)	12.5 (10.7 to 14.4)
^{103}Ru	Whole Body	2.2 (1.4 to 3.0)	1.8 (1 to 2.5)
^{106}Ru	Whole Body	4.4 (3.3 to 5.4)	4.4 (3.2 to 5.5)
^{125}Sb	Whole Body	5.2 (4.0 to 6.4)	4.5 (3.3 to 5.6)
^{232}Th via ^{228}Ac	Whole Body	34.7 (32.2 to 37.2)	26.4 (23.9 to 28.8)
^{88}Y	Whole Body	7.7 (6.3 to 9.0)	6.7 (5.3 to 8.2)
^{95}Zr	Whole Body	6.6 (5.3 to 7.9)	4.2 (3.1 to 5.4)

[a] N = number of individuals. Baseline counts include only the initial counts during this baseline period.
[b] Values in parentheses are margin of error representing the 95% confidence interval of the observed percentage.
[c] $^{238-240, 242}$Pu isotopes are identified as a group, denoted as Pu-Isotopes by the software.
[d] These radionuclides are present in the shield background, so they are expected to be detected periodically.
[e] Refer to the Results and Discussion section.

APPENDIX I - NON-RADIOLOGICAL MONITORING

Detection limits of different methods

Weekly composite concentrations of selected anions (ng/m^3) at Station A
Weekly composite concentrations of selected cations (ng/m^3) at Station A

Monthly composite concentrations of selected anions (ng/m^3) at Station B
Monthly composite concentrations of selected cations (ng/m^3) at Station B

Weekly composite concentrations of selected metals (ng/m^3) at Station A
Monthly composite concentrations of selected metals (ng/m^3) at Station B

Concentrations of selected anion concentrations (ng/m^3) in ambient air at Near Field
Concentrations of selected cation concentrations (ng/m^3) in ambient air at Near Field

Concentrations of selected anion concentrations (ng/m^3) in ambient air at Cactus Flats
Concentrations of selected cation concentrations (ng/m^3) in ambient air at Cactus Flats

Summary of metal concentrations (µg/L) in drinking water samples
Selected anion concentrations (mg/L) in drinking water samples
Selected cation concentrations (mg/L) in drinking water samples
Summaries of other analyses performed on drinking water samples

Summary of metal concentrations (µg/L) in surface water samples
Selected anion concentrations (mg/L) in surface water samples
Selected cation concentrations (mg/L) in surface water samples
Summaries of other analyses performed on surface water samples

Table I.1. Summary of sample type, analytes, methods, and detection limits used for non-radioactive analyses in 2024

Sample Type	Detection method	Method/ Parameters	Analytes of Interest	Detection Limits* (µg/L)
Drinking Water	ICP-MS	Metals analysis (EPA 200.8)	Ag, As, Ba, Be, Cd, Cr, Ni, Pb, Sb, Se, Tl, V	Varies by element**
Drinking Water	ICP-MS	Mercury (EPA 200.8)	Hg	0.052
Drinking Water	IC	Anions (EPA 300.0)	Cl^-, NO_3^-, PO_4^{3-}, SO_4^{2-}	1.3 – 6.0
Drinking Water	IC	Cations (ASTM Standard D6919-09)	Ca^{2+}, Mg^{2+}, K^+, Na^+	4.8 – 87.6
Surface Water	ICP-MS	Metals analysis (EPA 200.8)	Ag, As, Ba, Be, Cd, Cr, Ni, Pb, Sb, Se, Tl, V	Varies by element**
Surface Water	ICP-MS	Mercury (EPA 200.8)	Hg	0.112
Surface Water	IC	Anions (EPA 300.0)	Cl^-, NO_3^-, PO_4^{3-}, SO_4^{2-}	1.3 – 10.7
Surface Water	IC	Cations (ASTM Standard D6919-09)	Ca^{2+}, Mg^{2+}, K^+, Na^+	4.6 – 57.5
Station A and B filters	ICP-MS	Metals analysis (EPA 200.8)	Al Cd Mg Pb Si Th U	93.1 0.36 60.3 0.052 318.3 0.039 0.007
Station A and B filters	IC	Anions (EPA 300.0)	Cl^-, NO_3^-, PO_4^{3-}, SO_4^{2-}	1.28 – 678.0
Station A and B filters	IC	Cations (ASTM Standard D6919-09)	NH_4^+, Ca^{2+}, Mg^{2+}, K^+, Na^+	5.04 – 79.0
Whatman 41 filters	IC	Anions (EPA 300.0)	Cl^-, NO_3^-, PO_4^{3-}, SO_4^{2-}	4.04 – 1952.0
Whatman 41 filters	IC	Cations (ASTM Standard D6919-09)	Ca^{2+}, Mg^{2+}, K^+, Na^+	2.69 – 628.0

* Detection limits are determined/updated annually.

** Current MDC values for individual metals are included in the results section of this chapter.

Table I.2. Concentrations of selected anions (ng/m^3) in 2024 weekly composites from Station A

Sample Start Date	Chloride	Nitrate	Phosphate	Sulfate
01/01/24	9.13E+04	2.22E+02	<MDL	1.27E+04
01/08/24	1.30E+05	1.73E+02	<MDL	1.28E+04
01/15/24	1.39E+05	2.38E+02	<MDL	1.01E+04
01/22/24	1.87E+05	1.51E+02	<MDL	2.59E+04
02/01/24	1.06E+05	<MDL	<MDL	1.81E+04
02/08/24	1.72E+05	<MDL	<MDL	1.53E+04
02/15/24	4.47E+05	4.32E+01	<MDL	5.02E+04
02/22/24	2.32E+05	9.49E+01	<MDL	2.81E+04
03/01/24	1.32E+05	1.23E+02	<MDL	1.57E+04
03/08/24	2.08E+05	1.64E+02	<MDL	1.31E+04
03/15/24	1.14E+05	1.04E+02	<MDL	1.87E+04
03/22/24	9.28E+04	1.90E+02	<MDL	1.99E+04
04/01/24	2.57E+05	1.15E+02	<MDL	2.96E+04
04/08/24	2.52E+05	1.24E+02	<MDL	3.56E+04
04/15/24	2.24E+05	1.17E+02	<MDL	2.04E+04
04/22/24	2.27E+05	1.32E+02	<MDL	1.31E+04
05/01/24	2.30E+05	1.62E+02	<MDL	1.42E+04
05/08/24	2.06E+05	1.95E+02	<MDL	1.18E+04
05/15/24	1.97E+05	1.07E+02	<MDL	1.20E+04
05/22/24	2.90E+05	1.32E+02	<MDL	1.38E+04
06/01/24	8.09E+04	1.69E+02	<MDL	7.63E+03
06/08/24	1.50E+05	<MDL	<MDL	1.10E+04
06/15/24	7.11E+04	1.13E+02	<MDL	7.89E+03
06/22/24	7.39E+04	1.44E+02	<MDL	9.74E+03
07/01/24	7.48E+04	6.09E+01	5.50E+01	9.19E+03
07/08/24	1.23E+05	<MDL	<MDL	9.99E+03
07/15/24	2.81E+04	2.55E+01	3.53E+01	5.88E+03
07/22/24	2.16E+04	<MDL	<MDL	5.24E+03
08/01/24	4.44E+04	1.24E+02	<MDL	9.68E+03
08/08/24	3.64E+04	<MDL	<MDL	8.98E+03
08/15/24	3.92E+04	1.00E+02	<MDL	1.15E+04
08/22/24	3.08E+04	1.10E+02	<MDL	7.15E+03

Table I.2. Concentrations of selected anions (ng/m^3) in 2024 weekly composites from Station A (continued)

Sample Start Date	Chloride	Nitrate	Phosphate	Sulfate
09/01/24	2.10E+04	<MDL	<MDL	5.05E+03
09/08/24	4.58E+04	<MDL	<MDL	1.25E+04
09/15/24	2.28E+04	<MDL	<MDL	6.18E+03
09/22/24	3.58E+04	<MDL	<MDL	8.58E+03
10/01/24	2.32E+04	1.56E+02	<MDL	5.28E+03
10/21/24	2.23E+04	<MDL	<MDL	7.78E+03
10/22/24	5.16E+04	1.33E+02	<MDL	1.54E+04
11/01/24	1.18E+05	8.83E+01	<MDL	1.33E+04
11/08/24	6.48E+04	1.14E+02	<MDL	4.03E+04
NOTE: Filters were not received for the following periods: 10/08/2024 – 10/20/2024, 11/15/2024 – 12/31/2024.				

Table I.3. Concentrations of selected cations (ng/m^3) in 2024 weekly composites from Station A

Sample Date	Sodium	Ammonium	Magnesium	Potassium	Calcium
01/01/24	6.28E+04	<MDL	1.22E+03	1.21E+03	5.68E+03
01/08/24	8.56E+04	<MDL	2.97E+02	1.10E+03	5.34E+03
01/15/24	9.25E+04	<MDL	9.08E+02	9.40E+02	4.37E+03
01/22/24	1.25E+05	<MDL	2.68E+02	1.20E+03	1.10E+04
02/01/24	6.88E+04	<MDL	4.50E+02	1.56E+03	7.43E+03
02/08/24	1.13E+05	<MDL	3.60E+02	1.81E+03	5.70E+03
02/15/24	3.21E+05	<MDL	2.92E+03	5.07E+03	1.82E+04
02/22/24	1.56E+05	<MDL	2.06E+03	3.22E+03	1.07E+04
03/01/24	8.76E+04	<MDL	2.76E+02	1.19E+03	6.19E+03
03/08/24	1.40E+05	<MDL	5.00E+02	1.40E+03	5.40E+03
03/15/24	7.45E+04	<MDL	1.76E+03	2.03E+03	8.40E+03
03/22/24	6.06E+04	<MDL	2.48E+02	1.07E+03	8.98E+03
04/01/24	1.70E+05	<MDL	4.91E+02	1.99E+03	1.16E+04
04/08/24	1.68E+05	<MDL	5.08E+02	2.03E+03	1.32E+04
04/15/24	1.52E+05	<MDL	4.15E+02	1.49E+03	7.59E+03
04/22/24	1.54E+05	<MDL	3.94E+02	1.43E+03	4.23E+03
05/01/24	1.55E+05	<MDL	9.34E+02	1.59E+03	4.49E+03
05/08/24	1.38E+05	<MDL	8.76E+02	1.53E+03	3.87E+03
05/15/24	1.31E+05	<MDL	2.01E+03	<MDL	4.16E+03
05/22/24	1.91E+05	<MDL	9.97E+02	1.71E+03	4.25E+03
06/01/24	5.54E+04	<MDL	2.69E+02	1.05E+03	2.48E+03
06/08/24	1.00E+05	<MDL	1.33E+02	1.24E+03	3.29E+03
06/15/24	4.73E+04	<MDL	7.30E+02	<MDL	3.13E+03
06/22/24	4.97E+04	<MDL	2.36E+02	<MDL	3.90E+03
07/01/24	4.96E+04	<MDL	6.87E+02	8.70E+02	3.91E+03
07/08/24	8.23E+04	<MDL	8.61E+02	1.55E+03	3.30E+03
07/15/24	1.80E+04	<MDL	4.91E+02	8.38E+02	2.47E+03
07/22/24	1.39E+04	<MDL	4.11E+02	8.74E+02	2.01E+03
08/01/24	2.94E+04	<MDL	3.12E+02	3.16E+02	4.09E+03
08/08/24	5.03E+04	<MDL	1.73E+02	3.40E+02	7.10E+03
08/15/24	2.58E+04	<MDL	3.10E+02	4.16E+02	5.19E+03
08/22/24	2.11E+04	<MDL	3.33E+02	5.19E+02	3.08E+03

Table I.3. Concentrations of selected cations (ng/m^3) in 2024 weekly composites from Station A (continued)

Sample Date	Sodium	Ammonium	Magnesium	Potassium	Calcium
09/01/24	1.42E+04	<MDL	2.97E+02	2.55E+02	2.18E+03
09/08/24	3.09E+04	<MDL	4.56E+02	9.31E+02	4.94E+03
09/15/24	1.61E+04	<MDL	1.50E+02	1.05E+02	2.50E+03
09/22/24	2.35E+04	<MDL	2.75E+02	4.70E+02	4.00E+03
10/01/24	1.55E+04	<MDL	6.41E+02	6.82E+02	2.88E+03
10/21/24	1.44E+04	<MDL	<MDL	8.65E+02	3.00E+03
10/22/24	3.41E+04	<MDL	5.91E+02	1.23E+03	6.57E+03
11/01/24	7.97E+04	<MDL	9.17E+02	1.59E+03	4.47E+03
11/08/24	4.20E+04	<MDL	1.99E+03	3.86E+03	1.46E+04
NOTE: Filters were not received for the following periods: 10/08/2024 – 10/20/2024, 11/15/2024 – 12/31/2024.					

Table I.4. Concentrations of selected anions (ng/m^3) in 2024 monthly composites from Station B

Sample Date	Chloride ng/m^3	Nitrate ng/m^3	Phosphate ng/m^3	Sulfate ng/m^3
January	7.18E+02	<MDL	<MDL	2.02E+02
February	6.69E+02	<MDL	<MDL	1.87E+02
March	6.05E+02	<MDL	<MDL	1.70E+02
April	6.02E+02	<MDL	<MDL	1.89E+02
May	7.62E+02	<MDL	<MDL	2.10E+02
June	7.05E+02	<MDL	<MDL	2.09E+02
July	6.80E+02	<MDL	<MDL	2.06E+02
August	6.55E+02	<MDL	<MDL	2.02E+02
September	9.05E+02	<MDL	<MDL	2.15E+02
October	6.42E+02	<MDL	<MDL	1.99E+02
November	7.26E+02	<MDL	<MDL	1.79E+02
December	6.40E+02	<MDL	<MDL	1.87E+02
NOTE: None.				

Table I.5. Concentrations of selected cations (ng/m^3) in 2024 monthly composites from Station B

Sample Start Date	Sodium	Ammonium	Magnesium	Potassium	Calcium
January	3.03E+01	<MDL	<MDL	7.28E+01	2.13E+02
February	2.95E+00	<MDL	<MDL	9.23E+01	2.63E+02
March	<MDL	<MDL	4.59E+01	<MDL	1.22E+02
April	<MDL	<MDL	<MDL	<MDL	2.53E+02
May	<MDL	<MDL	<MDL	6.77E+01	3.21E+02
June	4.06E+00	<MDL	<MDL	1.08E+02	3.05E+02
July	1.90E+01	<MDL	<MDL	1.15E+02	3.23E+02
August	1.28E+01	<MDL	<MDL	1.26E+02	3.10E+02
September	1.87E+02	<MDL	<MDL	1.85E+02	2.90E+02
October	<MDL	<MDL	<MDL	1.39E+02	3.02E+02
November	7.46E+01	<MDL	<MDL	2.31E+02	2.48E+02
December	<MDL	<MDL	<MDL	1.06E+02	2.33E+02
NOTE: None.					

Table I.6. Concentrations of selected metals (ng/m^3) in weekly composites from Station A in 2024

Sample Date	Aluminum	Cadmium	Lead	Magnesium	Silica	Thorium	Uranium
01/01/24	3.541E+02	7.771E-01	1.734E+00	2.872E+03	1.555E+03	3.915E-02	4.171E-02
01/08/24	6.487E+02	5.299E-01	3.190E+00	2.736E+03	2.072E+03	9.054E-02	5.364E-02
01/15/24	4.620E+02	5.456E-01	2.409E+00	2.053E+03	1.609E+03	5.537E-02	4.556E-02
01/22/24	4.158E+02	6.172E-01	5.892E+00	2.511E+03	1.588E+03	4.713E-02	5.793E-02
02/01/24	6.351E+02	8.106E-01	5.713E+00	3.627E+03	2.158E+03	7.739E-02	6.772E-02
02/08/24	4.292E+02	7.309E-01	1.183E+01	3.240E+03	1.502E+03	5.033E-02	4.989E-02
02/15/24	8.788E+02	5.618E-01	1.043E+01	5.282E+03	2.541E+03	1.368E-01	1.152E-01
02/22/24	6.300E+02	6.838E-01	1.791E+01	3.394E+03	2.061E+03	9.390E-02	7.676E-02
03/01/24	4.911E+02	5.307E-01	1.263E+01	2.637E+03	1.631E+03	6.812E-02	5.148E-02
03/08/24	6.495E+02	5.516E-01	8.971E+00	4.285E+03	2.212E+03	8.853E-02	7.748E-02
03/15/24	4.502E+02	5.334E-01	3.785E+00	3.632E+03	1.625E+03	5.826E-02	7.277E-02
03/22/24	6.182E+02	5.604E-01	9.250E+00	2.362E+03	2.046E+03	1.026E-01	6.682E-02
04/01/24	6.791E+02	7.853E-01	7.430E+00	3.647E+03	2.234E+03	9.813E-02	7.241E-02
04/08/24	6.778E+02	6.987E-01	1.087E+01	4.150E+03	2.227E+03	9.454E-02	8.553E-02
04/15/24	5.603E+02	5.565E-01	1.187E+01	2.874E+03	1.825E+03	8.021E-02	5.916E-02
04/22/24	5.142E+02	5.874E-01	4.997E+00	2.704E+03	1.763E+03	7.748E-02	4.822E-02
05/01/24	5.117E+02	5.208E-01	1.210E+01	2.514E+03	1.621E+03	6.229E-02	3.815E-02
05/08/24	4.334E+02	5.742E-01	9.238E+00	2.307E+03	1.500E+03	5.420E-02	3.375E-02
05/15/24	5.090E+02	4.701E-01	1.282E+01	2.428E+03	1.717E+03	6.618E-02	4.018E-02
05/22/24	5.284E+02	4.942E-01	6.109E+00	2.521E+03	1.738E+03	7.442E-02	3.861E-02
06/01/24	3.139E+02	5.935E-01	6.843E+00	1.659E+03	1.065E+03	3.676E-02	2.895E-02
06/08/24	2.258E+02	6.707E-01	5.133E+00	1.440E+03	9.632E+02	2.715E-02	2.097E-02
06/15/24	2.370E+02	5.775E-01	6.594E+00	1.495E+03	9.498E+02	3.127E-02	2.445E-02
06/22/24	1.638E+02	7.371E-01	7.160E+00	1.522E+03	8.948E+02	2.150E-02	2.361E-02
07/01/24	3.206E+02	4.341E-01	1.118E+00	1.075E+03	9.859E+02	4.241E-02	2.528E-02
07/08/24	3.219E+02	6.244E-01	2.546E+00	1.586E+03	1.160E+03	3.827E-02	2.791E-02
07/15/24	3.411E+02	4.473E-01	2.757E+00	1.003E+03	1.068E+03	4.412E-02	2.425E-02
07/22/24	1.832E+02	5.486E-01	7.338E+00	8.801E+02	8.351E+02	2.538E-02	1.753E-02
08/01/24	4.589E+02	5.226E-01	7.291E+00	9.930E+02	1.549E+03	5.367E-02	2.887E-02
08/08/24	2.394E+02	7.449E-01	8.626E+00	9.246E+02	1.554E+03	2.903E-02	2.188E-02
08/15/24	2.026E+02	5.152E-01	4.268E+00	8.952E+02	1.048E+03	2.489E-02	2.612E-02
08/22/24	2.027E+02	5.797E-01	2.482E+00	8.906E+02	1.098E+03	2.602E-02	2.082E-02

Table I.6. Concentrations of selected metals (ng/m^3) in weekly composites from Station A in 2024 (continued)

Sample Date	Aluminum	Cadmium	Lead	Magnesium	Silica	Thorium	Uranium
09/01/24	7.966E+01	4.626E-01	8.993E+00	7.731E+02	4.818E+02	<MDL	1.240E-02
09/08/24	2.437E+02	6.601E-01	5.731E+00	1.454E+03	1.037E+03	2.741E-02	3.066E-02
09/15/24	1.089E+02	5.464E-01	7.662E+00	6.476E+02	5.802E+02	<MDL	1.430E-02
09/22/24	1.773E+02	4.899E-01	4.191E+00	8.626E+02	7.677E+02	2.219E-02	2.157E-02
10/01/24	3.234E+02	4.510E-01	3.283E+00	1.283E+03	1.222E+03	3.990E-02	3.641E-02
10/21/24	<MDL	1.232E+00	1.926E+00	7.822E+02	2.294E+03	<MDL	1.578E-02
10/22/24	3.366E+02	3.605E-01	2.918E+00	1.602E+03	1.198E+03	4.268E-02	4.864E-02
11/01/24	3.041E+02	3.517E-01	2.860E+00	1.928E+03	1.075E+03	3.785E-02	3.989E-02
11/08/24	3.651E+02	4.125E-01	2.858E+00	3.750E+03	1.226E+03	4.513E-02	1.021E-01
NOTE: Filters were not received for the following periods: 10/08/2024 – 10/20/2024, 11/15/2024 – 12/31/2024.							

Table I.7. Concentrations of selected metals (ng/m^3) in 2024 monthly composites from Station B

Sample Date	Aluminum	Cadmium	Lead	Magnesium	Silica	Thorium	Uranium
January	6.40E+01	3.95E-01	1.14E-01	4.63E+01	5.33E+02	<MDC	<MDC
February	<MDC	3.81E-01	1.52E-01	4.55E+01	4.34E+02	<MDC	<MDC
March	<MDC	3.86E-01	1.15E-01	<MDC	3.77E+02	<MDC	<MDC
April	6.98E+01	4.22E-01	1.37E-01	4.48E+01	4.20E+02	1.09E-02	4.61E-03
May	7.36E+01	4.28E-01	1.21E-01	4.89E+01	4.91E+02	<MDC	<MDC
June	6.39E+01	4.40E-01	1.44E-01	4.59E+01	3.88E+02	<MDC	<MDC
July	<MDC	4.08E-01	2.28E-01	4.20E+01	3.48E+02	<MDC	<MDC
August	<MDC	3.99E-01	1.49E-01	4.83E+01	3.60E+02	<MDC	<MDC
September	<MDC	4.41E-01	1.83E-01	4.23E+01	3.35E+02	<MDC	<MDC
October	<MDC	3.77E-01	1.62E-01	4.67E+01	3.87E+02	<MDC	4.62E-03
November	<MDC	3.81E-01	1.22E-01	<MDC	3.04E+02	<MDC	<MDC
December	<MDC	3.80E-01	1.07E-01	<MDC	3.15E+02	<MDC	<MDC

NOTE: None.

Table I.8. Concentrations of anions in ambient air (µg/m^3) at Near Field

Start Date	Chloride	Nitrate	Phosphate	Sulfate
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
07/17/24	1.51E-01	2.11E+00	<MDL	2.07E+00
08/08/24	1.66E-01	1.60E+00	3.63E-03	2.15E+00
08/30/24	2.90E-01	3.10E+00	1.71E-02	3.04E+00
10/04/24	6.18E-01	2.70E+00	6.30E-03	2.21E+00
10/25/24	9.20E-01	2.41E+00	4.37E-03	2.09E+00
11/20/24	5.51E-01	2.79E+00	2.67E-03	1.82E+00

Table I.9. Concentrations of cations in ambient air (µg/m^3) at Near Field

Start Date	Sodium	Magnesium	Potassium	Calcium
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	1.24E+00	2.33E-02	5.45E-02	3.04E-01
05/24/24	1.71E+00	1.96E-02	5.31E-02	4.12E-01
06/19/24	1.01E+00	6.04E-02	5.04E-02	3.35E-01
07/17/24	1.52E+00	5.90E-02	8.83E-02	2.79E-01
08/08/24	1.42E+00	6.51E-02	7.71E-02	3.64E-01
08/30/24	1.40E+00	5.07E-02	8.61E-02	2.24E-01
10/04/24	1.60E+00	9.50E-02	1.23E-01	5.26E-01
10/25/24	1.35E+00	6.82E-02	9.73E-02	5.27E-01
11/20/24	1.47E+00	8.71E-02	1.49E-01	5.19E-01

Table I.10. Concentrations of anions in ambient air (µg/m^3) at Cactus Flats

Start Date	Chloride	Nitrate	Phosphate	Sulfate
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	2.07E+00	2.63E-03	2.20E+00
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
07/17/24	7.09E-02	2.08E+00	<MDL	2.04E+00
08/08/24	6.79E-02	1.36E+00	2.86E-03	1.65E+00
08/30/24	1.15E-01	2.74E+00	1.45E-02	2.80E+00
10/04/24	4.54E-01	2.32E+00	<MDL	2.17E+00
10/25/24	1.15E-01	8.41E-01	<MDL	8.05E-01
11/20/24	2.72E-01	2.56E+00	1.34E-03	1.70E+00

Table I.11. Concentrations of cations in ambient air (µg/m^3) at Cactus Flats

Start Date	Sodium	Magnesium	Potassium	Calcium
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	1.53E+00	2.11E-02	4.18E-02	2.78E-01
05/24/24	1.84E+00	9.65E-02	1.05E-01	3.79E-01
06/19/24	1.34E+00	5.85E-02	5.40E-02	2.53E-01
07/17/24	1.84E+00	5.41E-02	8.34E-02	2.15E-01
08/08/24	1.12E+00	4.40E-02	5.75E-02	1.89E-01
08/30/24	1.38E+00	4.19E-02	6.69E-02	1.16E-01
10/04/24	1.72E+00	8.40E-02	9.48E-02	4.03E-01
10/25/24	1.36E+00	5.81E-02	7.55E-02	2.39E-01
11/20/24	1.49E+00	5.75E-02	7.98E-02	2.26E-01

Table I.12. Summary of metal concentrations (µg/L) measured in drinking water for 2024

Metals	Carlsbad (Sheep Draw) Conc.	Loving Conc.	Double Eagle (PRV4) Conc.	Hobbs Conc.	Otis Conc.	Malaga Conc.
Ag	7.19E-02	<MDC	2.00E-01	<MDC	<MDC	<MDC
Al	3.43E+00	2.04E+00	3.55E+00	2.11E+00	4.18E+00	6.74E+00
As	7.69E-01	1.72E+00	7.82E+00	8.42E+00	1.87E+00	2.62E+00
Ba	7.25E+01	3.39E+01	1.02E+02	5.64E+01	1.66E+01	1.34E+01
Be	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ca	7.44E+04	8.80E+04	5.44E+04	1.13E+05	2.34E+05	4.43E+05
Cd	5.42E-03	<MDC	<MDC	1.31E-02	<MDC	<MDC
Ce	3.10E-03	<MDC	<MDC	<MDC	<MDC	<MDC
Co	1.35E-01	1.64E-01	9.89E-02	2.01E-01	4.03E-01	7.01E-01
Cr	1.41E+00	2.40E+00	1.31E+00	1.79E+00	2.12E+00	1.81E+00
Cu	2.63E+00	3.10E+00	1.64E+00	4.72E+00	5.03E+00	3.57E+00
Dy	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Er	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Eu	1.86E-02	8.17E-03	2.51E-02	<MDC	<MDC	<MDC
Fe	2.80E+02	3.32E+02	2.34E+02	1.05E+03	1.02E+03	1.73E+03
Gd	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Hg	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
K	1.30E+03	1.90E+03	2.96E+03	2.74E+03	2.86E+03	3.99E+03
La	4.46E-03	<MDC	<MDC	<MDC	<MDC	<MDC
Li	7.43E+00	2.13E+01	2.06E+01	3.72E+01	4.32E+01	6.44E+01
Mg	3.47E+04	3.91E+04	1.13E+04	2.71E+04	7.69E+04	1.32E+05
Mn	4.99E-01	3.01E-02	1.08E+00	1.24E+00	6.79E-02	4.45E-01
Mo	1.36E+00	1.67E+00	1.93E+00	2.72E+00	3.47E+00	4.00E+00
Na	2.60E+04	2.58E+04	3.48E+04	5.59E+04	8.73E+04	1.94E+05
Nd	3.23E-03	<MDC	<MDC	<MDC	<MDC	<MDC
Ni	3.38E+00	3.88E+00	2.43E+00	5.45E+00	1.12E+01	1.85E+01
P	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Pb	3.14E-01	2.26E-01	4.70E-01	1.24E+00	<MDC	2.36E-01

Conc. = concentration

Table I.12. Summary of metal concentrations (µg/L) measured in drinking water for 2024 (continued)

Metals	Carlsbad (Sheep Draw) Conc.	Loving Conc.	Double Eagle (PRV4) Conc.	Hobbs Conc.	Otis Conc.	Malaga Conc.
Pr	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Sb	3.22E-02	3.41E-02	3.43E-02	6.71E-02	4.56E-02	4.34E-02
Sc	1.84E+00	2.92E+00	4.82E+00	7.42E+00	3.26E+00	3.17E+00
Se	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Si	6.29E+03	9.89E+03	1.65E+04	2.60E+04	1.04E+04	1.05E+04
Sr	3.49E+02	8.33E+02	5.93E+02	1.28E+03	2.91E+03	5.80E+03
Th	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Tl	1.09E-01	<MDC	1.23E-02	2.13E-02	<MDC	<MDC
U	8.22E-01	1.94E+00	1.71E+00	3.77E+00	3.83E+00	5.67E+00
V	3.79E+00	1.16E+01	3.17E+01	3.16E+01	1.04E+01	7.93E+00
Zn	8.28E+00	4.95E+00	6.81E+00	3.81E+01	2.66E+01	8.69E+00
Conc. = concentration						

Table I.13. Summary of anion concentrations (mg/L) measured in drinking water for 2024

Anion	Carlsbad (Sheep Draw) Conc.	Loving Conc.	Double Eagle (PRV4) Conc.	Hobbs Conc.	Otis Conc.	Malaga Conc.
Fluoride	3.45E-01	4.77E-01	8.90E-01	1.25E+00	7.70E-01	8.30E-01
Chloride	3.73E+01	4.02E+01	3.39E+01	1.19E+02	2.31E+02	6.46E+02
Nitrate	4.60E+00	2.03E+01	1.35E+01	2.17E+01	1.80E+01	1.57E+01
Sulfate	9.26E+01	1.25E+02	3.94E+01	1.47E+02	5.55E+02	9.92E+02
Conc. = concentration						

Table I.14. Summary of cation concentrations (mg/L) measured in drinking water for 2024

Cation	Carlsbad (Sheep Draw) Conc.	Loving Conc.	Double Eagle (PRV4) Conc.	Hobbs Conc.	Otis Conc.	Malaga Conc.
Calcium	7.42E+01	9.01E+01	5.22E+01	1.11E+02	2.40E+02	4.58E+02
Magnesium	3.00E+01	3.43E+01	9.85E+00	2.13E+01	6.22E+01	1.16E+02
Potassium	<MDL	<MDL	3.65E+00	<MDL	<MDL	<MDL
Sodium	2.64E+01	2.62E+01	3.51E+01	5.73E+01	8.79E+01	2.06E+02
Conc. = concentration						

Table I.15. Summary of specific gravity measured in drinking water samples for 2024

Location	SG $_{T/4°C}$
Carlsbad (Sheep Draw)	0.995
Loving	0.996
Double Eagle PRV4	0.996
Hobbs	0.996
Otis	0.997
Malaga	0.997

Table I.16. Summary of pH measurements conducted on drinking water samples for 2024

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

Table I.17. Summary of conductivities measured in drinking water samples for 2024

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

Table I.18. Summary of total organic carbon (TOC) measured in drinking water samples for 2024

Location	TOC mg/L
Carlsbad (Sheep Draw)	1.231
Loving	0.7142
Double Eagle PRV4	0.5095
Hobbs	1.114
Otis	0.5344
Malaga	0.7121

Table I.19. Summary of total dissolved solids (TDS) and total suspended solids (TSS) measured in drinking water samples for 2024

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

Table I.20. Metal concentrations (µg/L) in regional surface water for 2024

Metals	Lake Carlsbad (shallow) Conc.	Lake Carlsbad (deep) Conc.	Brantley Lake (shallow) Conc.	Brantley Lake (deep) Conc.	Red Bluff (shallow) Conc.	Red Bluff (deep) Conc.
Ag	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Al	2.48E+01	2.94E+01	1.35E+02	1.62E+02	<MDC	<MDC
As	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ba	1.62E+01	1.63E+01	1.20E+02	1.17E+02	8.18E+01	8.62E+01
Be	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ca	3.42E+05	3.39E+05	3.03E+05	3.38E+05	9.81E+05	9.98E+05
Cd	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ce	<MDC	<MDC	4.96E-01	2.17E-01	<MDC	<MDC
Co	<MDC	<MDC	<MDC	6.32E-01	<MDC	<MDC
Cr	7.72E+00	7.92E+00	6.90E+00	6.57E+00	3.31E+01	3.98E+01
Cu	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Dy	<MDC	<MDC	3.33E-01	<MDC	<MDC	<MDC
Er	3.30E-02	<MDC	3.13E-01	<MDC	<MDC	<MDC
Eu	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Fe	1.17E+03	1.34E+03	1.06E+03	1.24E+03	4.73E+03	4.11E+03
Gd	<MDC	<MDC	3.40E-01	<MDC	<MDC	<MDC
Hg	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
K	4.92E+03	4.92E+03	8.48E+03	8.31E+03	4.15E+04	4.11E+04
La	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Li	3.88E+01	3.90E+01	2.50E+01	3.09E+01	1.71E+02	1.67E+02
Mg	1.08E+05	1.10E+05	6.75E+04	8.44E+04	4.40E+05	4.45E+05
Mn	<MDC	<MDC	8.31E+00	1.26E+01	4.24E+01	4.27E+01
Mo	3.18E+00	<MDC	3.33E+00	<MDC	<MDC	<MDC
Na	3.72E+05	3.73E+05	2.97E+05	4.05E+05	2.09E+06	2.17E+06
Nd	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Ni	1.36E+01	1.41E+01	1.28E+01	1.43E+01	<MDC	<MDC
P	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Pb	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Pr	<MDC	<MDC	3.51E-01	<MDC	<MDC	<MDC
Sb	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Sc	1.28E+00	1.67E+00	1.36E+00	1.34E+00	2.10E+00	2.18E+00
Se	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC

Table I. 20. Metal concentrations (µg/L) in regional surface water for 2024 (continued)

Metals	Lake Carlsbad (shallow) Conc.	Lake Carlsbad (deep) Conc.	Brantley Lake (shallow) Conc.	Brantley Lake (deep) Conc.	Red Bluff (shallow) Conc.	Red Bluff (deep) Conc.
Si	6.60E+03	6.79E+03	5.33E+03	5.71E+03	5.98E+03	6.40E+03
Sr	4.65E+03	4.08E+03	3.78E+03	4.14E+03	1.36E+04	
Th	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
Tl	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC
U	3.22E+00	3.18E+00	2.92E+00	3.26E+00	9.39E+00	9.61E+00
V	6.10E+00	6.24E+00	6.17E+00	5.78E+00	9.95E+00	1.26E+01
Zn	<MDC	<MDC	<MDC	<MDC	<MDC	<MDC

Conc. = concentration

Table I.21. Metal concentrations (µg/L) in supplemental surface water locations for 2024

Metals	Hill Tank Conc.	Noya Tank Conc.	Pierce Canyon Conc.
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

Table I.21. Metal concentrations (µg/L) in supplemental surface water locations for 2024 (continued)

Metals	Hill Tank Conc.	Noya Tank Conc.	Red Tank Conc.
Si	6.56E+03	2.91E+04	4.67E+03
Sr	3.13E+02	9.98E+02	8.50E+03
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
Conc. = concentration			

Table I.22. Selected anion concentrations (mg/L) in regional surface water for 2024

Anion	Lake Carlsbad (shallow) Conc.	Lake Carlsbad (deep) Conc.	Brantley Lake (shallow) Conc.	Brantley Lake (deep) Conc.	Red Bluff (shallow) Conc.	Red Bluff (deep) Conc.
Fluoride	7.10E-01	7.45E-01	4.40E-01	4.70E-01	1.28E+00	1.28E+00
Chloride	6.13E+02	6.39E+02	5.33E+02	7.15E+02	3.71E+03	3.69E+03
Nitrate	4.11E+00	4.11E+00	1.39E+00	1.61E+00	<MDL	<MDL
Sulfate	1.04E+03	1.08E+03	8.83E+02	9.96E+02	3.70E+03	3.68E+03
Conc. = concentration						

Table I.23. Selected anion concentrations (mg/L) in supplemental surface water locations for 2024

Anion	Hill Tank Conc.	Noya Tank Conc.	Pierce Canyon Conc.
Fluoride	1.52E-01	4.21E-01	8.60E-01
Chloride	4.54E+00	4.46E+01	1.69E+03
Nitrate	5.60E-01	<MDL	4.06E+00
Sulfate	1.38E+01	6.44E+00	1.77E+03
Conc. = concentration			

Table I.24. Selected cation concentrations (mg/L) in regional surface water for 2024

Cation	Lake Carlsbad (shallow) Conc.	Lake Carlsbad (deep) Conc.	Brantley Lake (shallow) Conc.	Brantley Lake (deep) Conc.	Red Bluff (shallow) Conc.	Red Bluff (deep) Conc.
Calcium	3.53E+02	3.54E+02	3.26E+02	3.65E+02	9.56E+02	9.95E+02
Magnesium	1.18E+02	1.19E+02	7.75E+01	9.44E+01	5.65E+02	5.62E+02
Potassium	2.19E+01	2.14E+01	2.26E+01	2.40E+01	1.71E+02	1.85E+02
Sodium	3.94E+02	3.99E+02	3.23E+02	4.35E+02	2.18E+03	2.20E+03
Conc. = concentration						

Table I.25. Selected cation concentrations (mg/L) in supplemental surface water locations for 2024

Cation	Hill Tank Conc.	Noya Tank Conc.	Pierce Canyon Conc.
Calcium	6.75E+01	2.13E+02	5.68E+02
Magnesium	8.91E+00	1.55E+01	2.12E+02
Potassium	2.44E+01	4.25E+01	4.16E+01
Sodium	2.41E+00	1.28E+01	9.76E+02
Conc. = concentration			

Table I.26. Summary of specific gravity measured in surface water samples for 2024

Location	SG $_{T/4°C}$
Lake Carlsbad (Shallow)	1.001
Lake Carlsbad (Deep)	0.999
Brantley Lake (Shallow)	1.001
Brantley Lake (Deep)	0.998
Red Bluff (Shallow)	1.004
Red Bluff (Deep)	1.005
Hill Tank	0.987
Noya Tank	0.980
Pierce Canyon	0.983

Table I.27. Summary of pH measurements conducted on surface water samples for 2024

Location	pH @ 20.3°C
Lake Carlsbad (Shallow)	8.22
Lake Carlsbad (Deep)	8.32
Brantley Lake (Shallow)	8.43
Brantley Lake (Deep)	8.36
Red Bluff (Shallow)	8.25
Red Bluff (Deep)	8.24
Hill Tank	8.782
Noya Tank	8.180
Pierce Canyon	8.338

Table I.28. Summary of conductivities measured in surface water samples for 2024

Location	Conductivity mS/cm	Temperature (°C)
Lake Carlsbad (Shallow)	3.88	21.5
Lake Carlsbad (Deep)	3.94	21.5
Brantley Lake (Shallow)	3.15	19.3
Brantley Lake (Deep)	3.90	19.4
Red Bluff (Shallow)	14.55	20.3
Red Bluff (Deep)	14.70	19.9
Hill Tank	0.456	20.0
Noya Tank	0.533	20.3
Pierce Canyon	9.83	19.9

Table I.29. Summary of total organic carbon (TOC) in surface water samples for 2024

Location	TOC mg/L
Lake Carlsbad (Shallow)	1.875
Lake Carlsbad (Deep)	1.527
Brantley Lake (Shallow)	4.741
Brantley Lake (Deep)	4.711
Red Bluff (Shallow)	10.43
Red Bluff (Deep)	10.33
Hill Tank	14.66
Noya Tank	115.0
Pierce Canyon	5.665

Table I.30. Summary of Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) in surface water samples for 2024

Location	TDS mg/L	TSS mg/L
Lake Carlsbad (Shallow)	3040.00	80.00
Lake Carlsbad (Deep)	2240.00	N.D.
Brantley Lake (Shallow)	2080.00	320.00
Brantley Lake (Deep)	2280.00	40.00
Red Bluff (Shallow)	11840.00	N.D.
Red Bluff (Deep)	10680.00	40.00
Hill Tank	160.00	140.00
Noya Tank	460.00	520.00
Pierce Canyon	5620.00	220.00
N.D. = Not-detect		

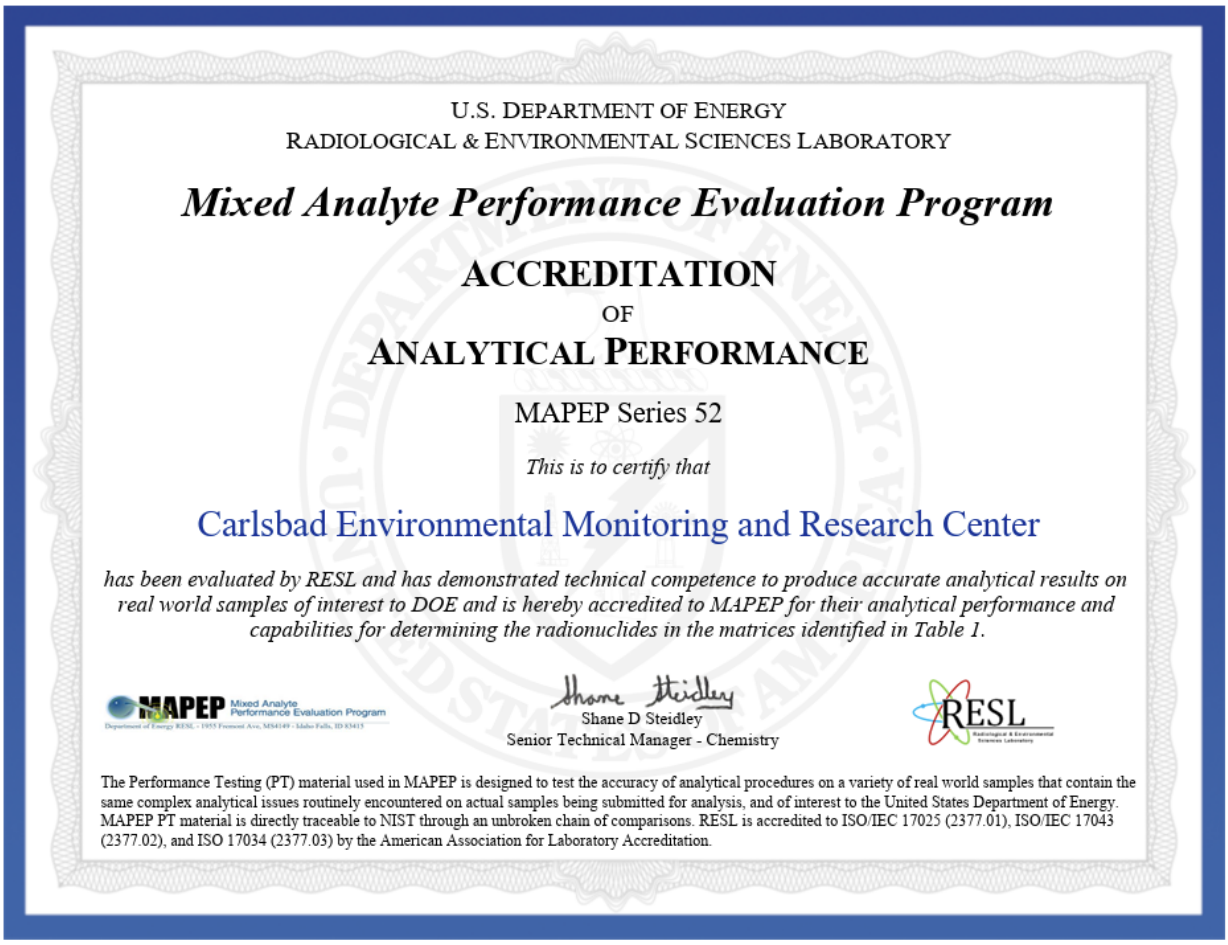
APPENDIX J - RADIOCHEMISTRY INTERCOMPARISON, ICP-MS PERFORMANCE, ENVIRONMENTAL CHEMISTRY PROFICIENCY

MAPEP radiochemistry intercomparison program test results

Daily performance tests for ICP-MS

Environmental chemistry proficiency test results for metal analyses, mercury, inorganic anions, and cations

Table J.1. Radiochemistry MAPEP certificate



U.S. DEPARTMENT OF ENERGY
RADIOLOGICAL & ENVIRONMENTAL SCIENCES LABORATORY

Mixed Analyte Performance Evaluation Program

ACCREDITATION
OF
ANALYTICAL PERFORMANCE

MAPEP Series 52

This is to certify that

Carlsbad Environmental Monitoring and Research Center

has been evaluated by RESL and has demonstrated technical competence to produce accurate analytical results on real world samples of interest to DOE and is hereby accredited to MAPEP for their analytical performance and capabilities for determining the radionuclides in the matrices identified in Table 1.

MAPEP Mixed Analyte Performance Evaluation Program

Shane D Steidley
Senior Technical Manager - Chemistry

RESL

The Performance Testing (PT) material used in MAPEP is designed to test the accuracy of analytical procedures on a variety of real world samples that contain the same complex analytical issues routinely encountered on actual samples being submitted for analysis, and of interest to the United States Department of Energy. MAPEP PT material is directly traceable to NIST through an unbroken chain of comparisons. RESL is accredited to ISO/IEC 17025 (2377.01), ISO/IEC 17043 (2377.02), and ISO 17034 (2377.03) by the American Association for Laboratory Accreditation.

U.S. DEPARTMENT OF ENERGY
MIXED ANALYTE PERFORMANCE
EVALUATION PROGRAM

TABLE 1
CERTIFICATE OF ACCREDITATION
MAPEP Series 52

Carlsbad Environmental Monitoring and Research Center
has successfully passed blind Performance Testing in the following categories

I. Radiological

Analyte	GrF	MaS	MaW	RdF	RdV	Procedure Used
Americium-241		☑	☑	☑	☑	None specified
Cesium-137		☑	☑	☑	☑	None specified
Cobalt-60		☑	☑	☑	☑	None specified
Gross alpha	☑					None specified
Gross beta	☑					None specified
Plutonium-238		☑	☑	☑	☑	None specified
Plutonium-239/240		☑	☑	☑	☑	None specified
Potassium-40		☑	☑			None specified
Strontium-90			☑	☑		None specified
Uranium-234		☑	☑	☑	☑	None specified
Uranium-238		☑	☑	☑	☑	None specified

Table J.2. Radiochemistry MAPEP Series 52 Results

MAPEP Mixed Analyte Performance Evaluation Program

Department of Energy RESL - 1955 Fremont Ave, MS4149 - Idaho Falls, ID 83415

Laboratory Results For MAPEP Series 52
MAPEP-25-GrF52: Gross alpha/beta air filter
(CMRC01) Carlsbad Environmental Monitoring and Research Center
1400 University Dr.
Carlsbad, NM 88220

Radiological

Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag	Units
Gross alpha	8.584E-2	0.255	A		-66.3	0.077 - 0.434	2.908E-3	A	Bq/sample
Gross beta	9.892E-1	0.894	A		10.6	0.447 - 1.341	1.309E-2	N	Bq/sample

Radiological

Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag	Units
Americium-241	4.25E+01	39.8	A		6.8	27.9 - 51.7	2.75E+00	A	Bq/kg
Cesium-134	NR	519	N	(25)		363 - 675			Bq/kg
Cesium-137	5.27E+02	442	A		19.2	309 - 575	4.02E+00	N	Bq/kg
Cobalt-57	NR	1000	N	(25)		700 - 1300			Bq/kg
Cobalt-60	7.20E+02	626	A		15.0	438 - 814	6.13E+00	N	Bq/kg
Iron-55	NR	1090				763 - 1417			Bq/kg
Manganese-54	NR	1080	N	(25)		756 - 1404			Bq/kg
Nickel-63	NR	1560				1092 - 2028			Bq/kg
Plutonium-238	4.27E+01	33.3	W		28.2	23.3 - 43.3	2.84E+00	A	Bq/kg
Plutonium-239/240	4.41E+01	40.1	A		10.0	28.1 - 52.1	2.90E+00	A	Bq/kg
Potassium-40	5.73E+02	511	A		12.1	358 - 664	7.12E+00	N	Bq/kg
Strontium-90	4.88E+02	727	N		-32.9	509 - 945	9.58E+00	N	Bq/kg
Technetium-99	NR	725				508 - 943			Bq/kg
Thorium-228	NR	44.4				31.1 - 57.7			Bq/kg
Thorium-230	NR	47.0				32.9 - 61.1			Bq/kg
Thorium-232	NR	41.4				29.0 - 53.8			Bq/kg
Uranium-234	3.50E+01	35.9	A		-2.5	25.1 - 46.7	2.98E+00	A	Bq/kg
Uranium-238	6.72E+01	69	A		-2.6	48 - 90	5.07E+00	A	Bq/kg
Zinc-65	NR	776	N	(25)		543 - 1009			Bq/kg

Radiological

Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag	Units
Americium-241	5.51E-01	0.559	A		-1.4	0.391 - 0.727	2.53E-02	A	Bq/L
Cesium-134	NR		N	(11)		False Positive Test			Bq/L
Cesium-137	6.87E+00	6.9	A		-0.4	4.8 - 9.0	1.41E-01	A	Bq/L
Cobalt-57	NR	30.9	N	(25)		21.6 - 40.2			Bq/L
Cobalt-58	NR	37.7				26.4 - 49.0			Bq/L
Cobalt-60	2.72E-01	0.29	A			Sensitivity Evaluation	1.17E-02		Bq/L
Hydrogen-3	NR	191				134 - 248			Bq/L
Iron-55	NR	25.5				17.9 - 33.2			Bq/L
Manganese-54	NR		N	(11)		False Positive Test			Bq/L
Nickel-63	NR	38.9				27.2 - 50.6			Bq/L
Plutonium-238	3.46E-03	0.0081	A	(17)		Sensitivity Evaluation	1.81E-03		Bq/L
Plutonium-239/240	5.78E-01	0.569	A		1.6	0.398 - 0.740	3.40E-02	A	Bq/L
Potassium-40	3.19E+01	30.3	A		5.3	21.2 - 39.4	7.49E-01	A	Bq/L
Radium-226	NR	0.437				0.306 - 0.568			Bq/L
Strontium-90	2.49E+00	2.82	A		-11.7	1.97 - 3.67	3.27E-02	N	Bq/L
Technetium-99	NR	6.34				4.44 - 8.24			Bq/L
Uranium-234	4.98E-01	0.535	A		-6.9	0.375 - 0.696	3.53E-02	A	Bq/L
Uranium-238	5.29E-01	0.548	A		-3.5	0.384 - 0.712	3.74E-02	A	Bq/L
Zinc-65	NR	26.7	N	(25)		18.7 - 34.7			Bq/L

Table J.2. Radiochemistry MAPEP Series 52 Results (continued)

Radiological

Analyte	Result	Ref Value	Flag	Notes	Bias (%)	Acceptance Range	Unc Value	Unc Flag	Units
Americium-241	6.53E-02	0.0728	A		-10.3	0.0510 - 0.0946	3.70E-03	A	Bq/sample
Cesium-134	NR					False Positive Test			Bq/sample
Cesium-137	8.03E-01	0.707	A		13.6	0.495 - 0.919	2.39E-02	A	Bq/sample
Cobalt-57	NR	3.40				2.38 - 4.42			Bq/sample
Cobalt-60	2.66E-02		A			False Positive Test	1.08E-02		Bq/sample
Manganese-54	NR	2.72				1.90 - 3.54			Bq/sample
Plutonium-238	8.30E-02	0.0734	A		13.1	0.0514 - 0.0954	4.83E-03	A	Bq/sample
Plutonium-239/240	7.32E-04	0.00026	A	(17)		Sensitivity Evaluation	3.05E-04		Bq/sample
Strontium-90	5.49E-01	0.370	N		48.4	0.259 - 0.481	1.07E-02	N	Bq/sample
Uranium-234	2.12E-01	0.208	A		1.9	0.146 - 0.270	1.34E-02	A	Bq/sample
Uranium-238	2.08E-01	0.214	A		-2.8	0.150 - 0.278	1.32E-02	A	Bq/sample
Zinc-65	NR	1.87				1.31 - 2.43			Bq/sample

Notes:

(11) = False Positive Test, Result Not Reported
(17) = NOT DETECTED - reported a statistically zero result
(25) = Result not reported with other gamma results

Table J.3. Daily performance tests (ICP-MS)

	Acceptable Ranges	01/05/2024			12/16/2024		
	Criteria for Net Intensity Mean of 3 replicate readings	Measured Intensity Mean	RSD	Performance Evaluation	Measured Mean Intensity	RSD	Performance Evaluation
Be	>4,500	5,523.4	3.1	Acceptable	6,200.3	1.5	Acceptable
In	>80,000	97,293.6	1.5	Acceptable	152,142.7	1.5	Acceptable
U	>60,000	101,249.6	1.8	Acceptable	122,467.4	1.4	Acceptable
CeO	≤3%	2.10%	N/A	Acceptable	2.3%	N/A	Acceptable
Ce++	≤3%	1.80%	N/A	Acceptable	0.8%	N/A	Acceptable
Bkgd	≤3	0.067	N/A	Acceptable	0.033	N/A	Acceptable

RSD = Relative Standard Deviation

Table J.4. Environmental chemistry proficiency test results for mercury (A), cations (B), and inorganic anions (C)

ERA
A Waters Company

WS-331 Final Evaluation Report

(A)

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	

ERA
A Waters Company

WS-330 Final Evaluation Report

(B)

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	

ERA
A Waters Company

WS-332 Final Evaluation Report

(C)

Adrienne Chancellor
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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	

Table J.5. Environmental chemistry proficiency test results for metal analyses

ERA
A Waters Company

WS-332 Final Evaluation Report

Adrienne Chancellor
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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	

All analytes are included in ERA's A2LA accreditation. Lab Code: 1539-01