TENNESSEE DEPARTMENT
OF
ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
OAK RIDGE OFFICE

ENVIRONMENTAL MONITORING REPORT
For Work to be Performed:
July 1, 2023, through June 30, 2024

July 2025

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ACRONYMS

A	ANOVA	Analysis of variance in statistics
	ARARs	Agency for Toxic Substances and Disease Registry
	As	arsenic (metal)
	ASER	*Annual Site Environmental Report* (*ASER),* Calendar Year, DOE
	ATSDR	Agency for Toxic Substances and Disease Registry
	AWQC	Ambient Water Quality Criteria
B	Ba	barium (metal)
	Background site	reference site: background site located outside of a 5-mile radius of
	--	potential impact from the Oak Ridge Reservation
	BCK	Bear Creek Station or Bear Creek Kilometer
	BCAP	Bear Creek Assessment Project
	BC/BCK/BCV	Bear Creek/Bear Creek kilometer or station/Bear Creek Valley
	BCBGs	Bear Creek Burial Grounds
	Be-7	beryllium-7 (metal)
	Benthic Life	Organisms that live on or in the streambed (aquatic insects,
	--	amphibians, spiders, worms, etc.)
	Bi-214	bismuth-214
	BMP	best management practice
C	CAA	Clean Air Act
	CBSQG	Consensus Based Sediment Quality Guidelines
	CC/CCK	Clear Creek/Clear Creek kilometer (background stream)
	Cd	cadmium (metal)
	CEC	Civil and Environmental Consultants
	CERCLA	*The Comprehensive Environmental Response, Compensation, and*
	--	*Liability Act* (commonly known as Superfund) enacted by Congress
	--	on December 11, 1980.
	CFR	Code of Federal Regulations
	Co-60	cobalt-60
	COC	Chain of Custody
	COCs	Contaminants of Concern
	COND	conductivity
	Cr_6	Hexavalent Chromium (metal)
	CR/CRK	Clinch River/Clinch River kilometer
	Cs-137	cesium-137 (metal)
	CSU	Combined Standard Uncertainty
	Cu	copper (metal)

D	D&D	Decontamination and Decommissioning
	DO	Dissolved oxygen
	DOE	US Department of Energy
	DoR	Division of Remediation
	DOR-OR	Division of Remediation – Oak Ridge
	DWR	Division of Water Resources
E	EFPC/EFK	East Fork Poplar Creek/East Fork Poplar Creek Kilometer
	EMDF	Environmental Management Disposal Facility
	EMP	Environmental Monitoring Plan
	EMR	Environmental Monitoring Report
	EMWMF	Environmental Management Waste Management Facility
	EPA	US Environmental Protection Agency
	EPT	*Ephemeroptera* (mayflies*), Plecoptera (*stoneflies*), and*
	--	*Trichoptera (*caddisflies*)*
	%EPT – Cheum	Percent EPT - Cheumatopsyche (tolerant Trichoptera)
	ETTP	East Tennessee Technology Park (formerly K-25)
F	FCAP	Filled Coal Ash Pond
	FCK	First Creek, within ORNL campus
	FDA	Food and Drug Administration (Federal)
	FFA	Federal Facility Agreement
	FY	Fiscal year, which for TDEC is from July 1 to June 30
G	GC/GCK	Grassy Creek, Grassy Creek kilometer
	GCN	greatest conservation need
H	HAZWOPER	Hazardous Waste Operations and Emergency Response
	H-3	tritium
	HAs	Health Advisory Values
	HCl	hydrochloric acid
	HFIR	High Flux Isotope Reactor
	Hg	mercury (metal)
	HgT	total mercury (metal)
	HQ	Hazard Quotient (noncarcinogenic risk equations)
	HNO_3	nitric acid
	HRE	Homogeneous Reactor Experiment

I	I-129/131	iodine-129, iodine-131
	IACUC	Institutional Animal Care and Use Committee
	IC25	Inhibition Concentration 25% reduction in survival, growth and
	--	reproduction of test organism
	ISM	Incremental Sampling Methodology
	ITRC	Interstate Technology Regulatory Council
J	J values	Result Less than MQL but greater than or equal to MDL
K	K-25	Former site of Gaseous Diffusion Plant closed in 1987, now ETTP
	K-40	potassium-40
L	LLW	Low-level radioactive waste
	LSC	Liquid Scintillation Counting
M	MB/MBK	Mill Branch/Mill Branch kilometer (background stream)
	MCL	Maximum Contaminant Limit see NPDWR
	MDC	Minimum Detectable Concentration
	MDL	Minimum Detection Limit
	MeHg	methylmercury
	MH	manhole 1 (MH-1), manhole 2 (MH-2) at Y-12
	MIK	Mitchell Branch/Mitchell Branch kilometer
	MQL	Minimum Quantification Limit
	MQL	Method Quantification Limit
	MSRE	Molten Salt Reactor Experiment
N	NaI	sodium iodide (used in gamma scintillator probe)
	NBG	North Boundary Greenway
	NEON	National Ecological Observatory Network
	Ni	nickel (metal)
	NNSA	National Nuclear Safety Administration
	NAREL	National Air and Radiation Environmental Laboratory (EPA)
	NCBI	North Carolina Biotic Index
	NESHAPS	National Emissions Standards for Hazardous Air Pollutants
	NNSA	National Nuclear Safety Administration
	NOAA	National Oceanic and Atmospheric Administration
	NORM	Naturally Occurring Radioactive Materials
	NPDES	National Pollution Elimination System permit
	NRC	Nuclear Regulatory Commission

	NSC	National Security Complex, Y-12
	NSDWR	National Secondary Drinking Water Regulations
	NT	Northwest Tributary (NT-5 to NT-12), Bear Creek tributaries
	NT-5	Bear Creek Northwest Tributary Number 5 at EMWMF
	NTU	Nephelometric turbidity units, used for measurement
	NUREG	NRC Regulation
O	OF-200 MTF	Outfall 200 Mercury Treatment Facility at Y-12
	ORAU	Oak Ridge Associated Universities
	OREIS	Oak Ridge Environmental Information System
	ORNL	Oak Ridge National Laboratory, also known as X-10
	ORP	Oxygen Reduction Potential
	ORR	Oak Ridge Reservation
	OSL	Optically Stimulated Luminescence Dosimeter
	%OC	Percent *Oligochaeta* and *Chironomidae*
P	Pb	lead, Pb-212/214
	PC/PCK/PCM	Poplar Creek/Poplar Creek kilometer/Poplar Creek mile
	PCBs	Polychlorinated Biphenyls
	PEC	Probable Effects Concentration
	POP	Persistent Organic Pollutants
	PPE	Personal Protective Equipment
	PRGs	Preliminary Remediation Goals
	Pu	plutonium-238/239/240 (transuranic isotope)
Q	QA/QC	Quality Assurance/Quality Control
	QAPP	Quality Assurance Project Plan
	QEC	Quality Environmental Containers (Beaver, WI)
R	Ra	radium
	RADCON	Radiation Control Program
	RBC	Risk-based Assessment
	RCS	Roving Creel Survey
	RER	Remedial Effectiveness Report
	ROD	Record of Decision
	RSLs	Regional Screening Levels
S	SAP	Sampling and Analysis Plan
	SF	stream discharge flume

	SOP	Standard Operating Procedure
	Sr-90	strontium-90
	SRS	Southern Research Station
	Station	A specific location where environmental sampling or monitoring
	--	takes place.
	SU	standard units
	SWSA	Solid Waste Storage Area
T	T&E species	State- or Federal-listed threatened and endangered species as
	--	protected under the Endangered Species Act of 1973.
	TECs	Threshold Effects Concentrations
	TENORM	Technically Enhanced Naturally Occurring Radioactive Materials
	TR	Target Risk
	Tc-99	technetium-99
	TDEC	Tennessee Department of Environment and Conservation
	TDEC-DoR	TDEC - Division of Remediation
	TDH	Tennessee Department of Health
	TDH-NEL	Tennessee Dept. of Health - Nashville Environmental Laboratory
	Th	thorium-228/230/232
	THQ	Target Hazard Quotient
	Tl-208	thallium-208
	TMI	Tennessee Macroinvertebrate Index
	TNUTOL	Total Nutrient Tolerant
	TN AWQC	State of Tennessee Ambient Water Quality Criteria
	TWQC	Tennessee Water Quality Criteria
	TWRA	Tennessee Wildlife Resources Agency
U	U	Result is less than Method Detection Limit (MDL)
	U-234/235/238	uranium-234/235/238
	UEFPC/UEFK	Upper East Fork Poplar Creek/Upper East Fork Creek Kilometer
	USDI	US Department of the Interior
W	WAC	Waste Acceptance Criteria
	WDNR	Wisconsin Department of Natural Resources
	WOC/WC/WCK	Whiteoak Creek/ White Oak Creek/White Oak Creek kilometer
X	X-10	Historical name, renamed Oak Ridge National Lab (ORNL)
Y	Y-12	Y-12 National Security Complex (Building 9213, 9219, 9723-28)

UNITS OF MEASURE AND THEIR ABBREVIATIONS

°C	degrees Celsius/Centigrade
μS/cm	micro-Siemens per centimeter
mV	millivolts
DO	amount of gaseous (O_2) dissolved in water
pH	scale of acidity from 0 to 14
pg/L	picograms per liter (1.0E-9 mg/L)
μg/L	micrograms per liter (parts per billion)
mg/L	milligrams per liter (parts per million)
ng/g	nanograms per gram (parts per billion)
μg/g	micrograms per gram (parts per million)
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
millirem	A millirem is one thousandth of a rem
rem	A rem is the unit of effective absorbed dose of ionizing radiation in human tissue, equivalent to one roentgen of X-rays
mrem	Abbreviation for millirem which is a unit of absorbed radiation dose

EXECUTIVE SUMMARY

The Tennessee Department of Environment and Conservation, Division of Remediation, Oak Ridge Office (TDEC DoR-OR), provides the annual *Environmental Monitoring Report* (EMR), for fiscal year 2024 (FY24) with a period of performance from July 1, 2023, through June 30, 2024. This report is submitted as a comprehensive report of DoR-OR's monitoring and assessment activities across the Oak Ridge Reservation (ORR) in accordance with the terms of both the *Environmental Surveillance and Oversight Agreement* (ESOA), as well as in support of activities being conducted under the *Federal Facility Agreement (FFA)*.

TDEC DoR-OR performs independent monitoring and verification sampling as well as conducting oversight of current US Department of Energy (DOE) activities across the ORR to confirm comparable DOE monitoring results, to support environmental restoration decisions, to evaluate performance of existing remedies, and to investigate the extent and movement of legacy contamination. Independent monitoring and oversight are conducted to assure the residents of Tennessee that DOE's active operations and clean-up work are being performed in a manner that is protective of human health and the environment.

This independent State of Tennessee monitoring program is designed to assess current conditions for ORR related environmental media (i.e., air, surface water, soil, sediment, ground water, drinking water, and biota including food crops, fish and wildlife, and biological systems). Much of the data collected verifies or supplement's DOE's data sets. This State-led program is intended to provide independent assessment, where necessary, for potential emissions of any materials (i.e. hazardous, toxic, chemical, or radiological) from the ORR to its surrounding environment and to support efficient State protectiveness reviews.

This FY24 EMR presents the results of 20 independent projects proposed in the FY24 *Environmental Monitoring Plan* (EMP). Project focus areas included, Air Monitoring, Biological Monitoring, Landfill Monitoring, Radiological Monitoring, Sediment Monitoring, Stormwater/Water Discharge Monitoring, Surface Water Monitoring, and Watershed Assessment (Holistic) Monitoring.

State monitoring during FY24 was effective in confirming DOE sampling results showing regulatory compliance for environmental media including air, precipitation, surface water, etc. These projects were also instrumental in gathering further data to support future State assessment of ecological health, resource usage, and potential impairment of other impacts to environmental systems.

Final report summaries for FY24 are listed under media monitoring type as follows:

I. Air Monitoring:

1. Fugitive Radiological Air Emissions

The project team independently sampled air at 14 ORR locations. Air samples were screened for radiological emissions, which may have originated from ORR remedial actions and/or waste disposal activities. All data were evaluated for compliance within Federal Regulatory Standards. The main goal was to identify any particulate air emissions that might have had the potential to cause a member of the public to receive an effective dose greater than 10 millirem (mrem) per year. The average annual concentrations, minus background, for all sites, were below the federal standards for each isotope measured in FY24, indicating no significant impact on public health or the environment.

2. RadNet Air

RadNet is a national program funded by the US Environmental Protection Agency (EPA). The RadNet program monitors the air, precipitation, and drinking water across the US to track radiation in the environment. DoR-OR participated in the RadNet Air program in FY24 with four air samplers, including: two stations at Y-12 and two at ORNL. In FY24, none of the ORR gross beta results exceeded the screening level (1.0 pCi/m^3). All the data during FY24 were well below the level of concern. None of the results indicated that activities on the ORR posed a significant impact on the environment or public health.

3. RadNet Precipitation

As mentioned above, RadNet is a national program funded by the EPA. TDEC supports the precipitation monitoring portion of the program at three (3) air monitoring stations on the ORR, and one (1) background reference station. The RadNet precipitation stations were co-located with Fugitive Air samplers, two at ORNL and one at Y-12. For this period of performance (May 2023 through April 2024), RadNet Precipitation results for the ORR stations were below detection limits or below the regulatory limits used for drinking water for all analyses. As such, no indication of impact on the environment or public health from ORR emissions was identified.

II. Biological Monitoring:

1. Benthic Macroinvertebrate Health

Aquatic macroinvertebrate species serve as both quantitative and qualitative indicators to assess biotic responses to environmental stressors (Holt, 2010). This project consisted of benthic macroinvertebrate monitoring to ascertain the current stream health of the primary ORR exit-pathway streams. The overall biodiversity of a sample, plus the assemblage of sensitive indicator taxa, help to quantify stream health. These stream statistics were compared to previous sampling years and to corresponding DOE monitoring data.

Since the 1980s, the health of benthic macroinvertebrate communities across the ORR has improved, though many benthic communities are still impaired compared to communities in reference streams. Two Y-12 streams (EFPC and BC) continued to show impairment at their headwaters, which are located near DOE facilities and industrial activities. Impairment was documented in benthic macroinvertebrate communities throughout EFPC. Communities in the downstream reaches of BC were similar to those in reference streams. Of note, benthic macroinvertebrate communities at BCK 7.6, near the EMDF site, showed a significant decline in TMI scores, suggesting increased impairment at that location when compared to TMI scores previously documented in 2021. White Oak Creek (WOC) scored similarly to previous years. First Creek (FCK), a WOC tributary, was sampled by TDEC to support the White Oak Creek Assessment Project, and results indicate impairment of this tributary. As identified in the past 10 years, all WOC and WOC tributary sites continue to be impaired in comparison with the WCK 6.8 reference site. Mitchell Branch, impacted by historical contamination at ETTP, has shown increased impairment in recent years, which may be associated with ongoing soils work in the area. Notably, the Mitchell Branch upstream reference site, MIK 1.43, showed significant impairment in 2022. Because MIK 1.43 may no longer be a suitable upstream reference site, because of changing site conditions, TDEC sampled MIK 1.16. TMI scores at this new site were comparable to the 10-year average TMI score for MIK 1.43, suggesting MIK 1.16 is potentially a comparable reference location. Neither location in MIK, based on TMI score, is passing bio criteria guidelines, and both Mitchell Branch locations continue to display impairment based on benthic macroinvertebrate community metrics.

2. ORR Roving Creel Survey

The project team documented angling efforts at four key areas where impaired ORR watersheds drain into publicly accessible waters. Public outreach surveys were used to assess risk from exposure of fisherman to ORR contamination through recreational use of the waterways immediately adjacent to the ORR. For FY24, DoR-OR staff surveyed fishermen at four stream confluence areas:

1) White Oak Lake – Clinch River Confluence (WOL-CR)
2) Poplar Creek – Clinch River Confluence (PC-CR)
3) East Fork Poplar Creek – Poplar Creek Confluence (EFPC-PC)
4) Grassy Creek – Clinch River Confluence (GC-CR)

The fourth confluence (GC-CR) was added after noting angler activity in this area in previous FYs and because of periodic detections of elevated Cs-137 in sediments samples collected from this region within the last several years.

The scope of this monitoring effort continued to include recreational surveys along the North Boundary Greenway, to support understanding of possible human exposure risks in the recreational areas adjacent to ORR exit pathway streams.

Angler interviews showed that the WOL-CR confluence was the most popular among anglers and most of these anglers were “locals” from either Anderson County or an adjacent county (84%). Thirty-three percent (33%) of surveyed anglers reported that they do consume fish caught in the project areas. Most recreators that participated in the recreational surveys along the NBG in FY24 reported their primary recreational activities along the NBG were walking and biking. Around 5% of NBG survey participants reported fishing in the streams accessible from the greenway, but all reported “No,” during this FY, to consuming fish from this area.

3. Contaminant (Mercury) Uptake in Biota – Lower East Fork Poplar Creek

Mercury and other legacy contaminants have the potential to bioaccumulate in biota impacted by contaminated ORR water resources (e.g., streams, stormwater, groundwater, etc.). In FY24, to better understand the pathways of bioaccumulative transfer of mercury and other contaminants, this DoR-OR project consisted of sampling songbird eggs, adult flying insects, spiders, and snakes. These assessments will guide future discussions on site specific conceptual site model details and ecological risk of the assessment areas in future work.

Biota data results were compared to available DOE biota datasets in OREIS. The Hg, MeHg, and radiological analytical data results were normalized to account for differences in body mass, where applicable, among and between species. Total Hg vs. MeHg graphs and figures were generated to compare among sites on the ORR and reference sites, and when possible, total Hg and MeHg concentrations and additional contaminants were compared among feeding guilds: insectivores, omnivores, herbivores, carnivores.

FY24 results included: Methylmercury was detected in Eastern bluebird eggs at the highest levels in Zone 2 of LEFPC at 0.347 mg/kg. Adult flying insects and spiders collected from LEFPC had mercury concentrations higher than the EPA fish tissue criterion (0.3 mg/kg, for reference) in all zones with zones 1 and 3 also having methylmercury concentrations exceeding the EPA tissue criterion. Spiders also bioaccumulated higher concentrations of cadmium (Cd), and adult flying insects accumulated higher concentrations of arsenic (As), compared to other heavy metals analyzed in each sample type. PCB concentrations were highest at upstream sites in flying insects and spiders, and PCBs were not detected in Freel’s Bend. During this POP, two snakeskin sheds were collected, one Eastern Racer and one Eastern Rat Snake, and by chance one Redbelly Snake carcass was also found and analyzed. Both sheds had mercury levels exceeding the EPA Hg tissue criterion for fish consumption (0.3 ppm). The Redbelly Snake, found in Zone 3, had a much lower mercury concentration.

4. Terrestrial Invertebrate (Ground Beetle) Community Health

Mercury has been found at elevated levels throughout the ORR and continued to be a contaminant of concern (COC) especially in East Fork Poplar Creek (EFPC). EFPC is an ORR exit pathway stream, whose headwaters originate within the Y-12 campus and are fed by surface water runoff and groundwater that has been in contact with mercury-contaminated structures. Similar to the above referenced project, this project also focused on assessing ecological health in these impacted areas, by assessing terrestrial invertebrate communities with significant focus on ground beetles as bioindicator species. Results assisted in the understanding of bioaccumulation and contaminant migration in the terrestrial food web and provided data to support ongoing discussions and evaluations of ecological protectiveness.

Terrestrial invertebrate diversity metrics including *abundance*, *species richness, Shannon Diversity,* and *Simpson Diversity* were calculated across the represented sampling zones. All community metrics showed greatest abundance and diversity displaying a spatial trend with lowest diversity closest to Y-12 discharges. *Mean Individual Biomass* (MIB), a measure of individual body size as a function of body length, was calculated as an alternative metric of ground beetle health, which relates to potential physiological effects of contaminant exposure, such as lower growth rates. During the chemical analyses, higher concentrations of MeHg (methylmercury) were found in spiders and detritivores (secondary consumers). Conversely, higher concentrations of HgT (total mercury) were seen in worms. Ground beetles, which occupy several trophic levels as both primary and secondary consumers, align with spiders and detritivores with more moderate concentrations of MeHg compared to HgT.

Overall, in the EFPC Watershed, HgT and MeHg were found at high concentration at multiple trophic levels. Reproduction and growth could be negatively impacted at these levels. The diversity trend is similar to other contaminants in other biota, with ground beetles having higher diversity downstream and less diversity in the highly impacted upstream sites. Combining community diversity and physiological metrics appears to be a useful path forward as a qualitative bioindicator of ecological impacts to the floodplains of ORR exit pathway streams.

5. Radiological Uptake in Food Crops

The project assessed possible radiological impacts of DOE ORR activities on food crops grown by local farmers and gardeners. While this project mirrors a similar DOE project, DoR-OR sampling was conducted independently to verify DOE sample results. During the FY24 POP, this project collected vegetables, hay, and backyard chicken egg (an alternative to milk) samples within a five-mile radius of the ORR. Milk samples were not available in FY23/FY24. For each type of sample, a corresponding background location outside the study area was analyzed to establish background (i.e. reference) levels. The TDEC DoR-OR FY23 vegetable, hay, and milk sampling results were similar to the corresponding DOE data from the current DOE Annual Site Environmental Report (ASER), and did not indicate impacts of radionuclide concentrations in food crops in the areas surrounding the ORR.

III. Groundwater Monitoring:

Offsite Groundwater Monitoring Project

Offsite groundwater downgradient of the ORR is monitored by both the TDEC DoR-OR and the DOE. The purpose of TDEC's DoR-OR *Offsite Groundwater Monitoring Project* is to evaluate protectiveness of human health and the environment at through monitoring groundwater offsite the ORR, that citizens may use for drinking water sources. Delineation of the nature and extent of groundwater contamination is incomplete in many areas of the ORR (DOE, 2022b). Groundwater decisions have been deferred to later records of decision. Until that work is complete, DoR-OR will continue to support this *Offsite Groundwater Monitoring Project.*

In FY24, offsite private wells and springs were sampled in the Bear Creek Valley Offsite subarea to the south and west of Y-12 and in the Eastern Offsite subarea to the northeast of Y-12. In total, nine wells and six springs were sampled and analyzed for VOCs, gross alpha and beta, inorganics, and metals. Twelve samples were also tested for isotopic uranium. No detections of constituents were identified above action levels at any sampled location during this period of performance. VOCs were detected at very low levels in one private water well (SYN-120), and TCE was identified at concentrations just above the detection limit at Cattail Spring.

IV. Landfill Monitoring

1. EMDF Surface Water Monitoring

For FY24, TDEC DOR-OR continued to analyze surface water samples for a range of chemicals, radionuclides, and collected water quality parameters to characterize conditions prior to major construction and operation of the planned Environmental Management Disposal Facility (EMDF). Given the presence of other significant sources of contamination upgradient in Bear Creek Valley (e.g. Bear Creek Burial Grounds), defensible pre-construction data is important for understanding whether contamination detected in the future has been released from EMDF or is attributable to other sources. This benchmark data will directly support DoR-OR's assessments and evaluations of site conditions post construction.

In FY24, seven stations were monitored. Monthly water quality measurements were taken in FY24, and all measurements fell within ranges consistent with background levels. Analytical results for radionuclide analyses indicate low activities, with none exceeding EPA Regional Screening Levels (RSLs). Most measured metals concentrations were below regulatory criteria, with some exceptions: arsenic concentrations, while generally low, exceeded AWQC at SF-1 and SF-6, and lead concentrations at SF-1 were approaching the AWQC chronic threshold.

2. EMWMF Surface Water Monitoring

Contaminated materials from the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) remediation activities on the ORR are approved for disposal in the Environmental Management Waste Management Facility (EMWMF), if waste meets acceptance criteria. There have been concerns identified in the past that landfill associated contaminants could have the potential to migrate from the facility into the environment. For example, contaminants might leach out via ground and surface waters and travel offsite in concentrations above agreed-upon limits. DoR-OR independently monitors the water resources at the EMWMF, along with evaluating DOE's on-going sampling activities at the site. These efforts provide independent assurance to the public that DOE operations at the EMWMF are, and remain, protective of public health and the environment, and that DOE continues to adhere to remedial action objectives, ARARs in the ROD, and release criteria defined in the 2017 EMWMF SAP/QAPP.

In FY24, there were eight surface water sites (including the V-WEIR, Underdrain, and surface water/tributaries impacted by EMWMF) where water quality parameters and analytical grab samples were collected. Additionally, at two sites, turbidity was measured by In-Situ probes. EMWMF discharges and surface water conditions showed variations in (1) the wet versus the dry season, and (2) following new waste disposals. The EMWMF-3 (V-WEIR) site periodically increased in conductivity measurements. On the other hand, the EMWMF-2 (Underdrain) site showed muted and delayed shifts in conductivity as compared to EMWMF-3.

After a DOE data review, TDEC noted that DOE observed elevated isotopic uranium concentrations in EMWMF-3 (V-WEIR) discharges between October 2023 and February 2024. These elevated concentrations may have been influenced by new waste lots placed into the EMWMF landfill; however, TDEC noted that DOE's data suggest steady or decreasing trends in isotopic uranium concentrations from EMWMF-2 (Underdrain) discharges at that same time. In FY24 it was noted that lower volumes of non-stormwater (i.e., effluent releases from ponds and tanks) were discharged than in previous years. This may be related to less total precipitation in FY24.

V. Radiological Monitoring

1. Haul Road Surveys

Since 2004, TDEC DoR-OR has periodically surveyed the Haul Road and all associated landfill access roads utilized by DOE to transport waste to the landfills from the site. Surveys of these

ORR routes corresponded with planned and active waste hauling operations. These periodic, non-exhaustive surveys are performed as an independent verification of DOE's best management practices for waste management on the ORR.

A total of eight survey events were conducted in FY24, with one anomalous item found along transit routes. That item was scanned by both TDEC and DOE personnel and was not found to be radiologically contaminated.

2. Ambient Gamma Radiation monitoring

The *Ambient Gamma Radiation Monitoring Project* is an ongoing TDEC project (formerly called *Real Time Measurement of Gamma Radiation*) that measures concentrations of ambient gamma radiation in real time, at five locations across the ORR. The areas assessed during this period of performance included: the EMWMF, ORNL Building 3026, the Radioisotope Development Laboratory (Isotope Row), the Molten Salt Reactor Experiment (MSRE), the Spallation Neutron Source (SNS), and the Fort Loudoun Dam background location east of Lenoir City. These monitors allow for the assessment of conditions at locations where gamma emissions have been known to fluctuate substantially over relatively short periods of time. TDEC's monitoring at these locations is ongoing, and data provides independent verification of DOE's sampling and risk assessment procedures.

During FY24, while three monitored locations exceeded dose measured at the background location, no monitored location exceeded the 2 mrem limit for any single-hour period.

3. Surplus Sales Verification

At the request of either Y-12 or ORNL's Excess Properties Sales Group, DoR-OR provides staff to provided verification surveys of auction items for radiological contamination. These supplemental scans provide an additional measure in the release process to assure no contaminated items are sold to the public. There were three requests during FY24. All surveyed items were within free release limits.

VI. Surface Water Monitoring:

1. Ambient Surface Water Parameters

The TDEC-DoR-OR *Ambient Surface Water Parameter Project* was first implemented in 2005 to supplement DOE's monitoring effort by helping to measure physical water quality parameters of several streams that exit the ORR. By measuring water quality parameters (e.g. conductivity, dissolved oxygen, pH, turbidity, and temperature), a basic understanding of stream health and positive or negative trends can be gained. Monitoring efforts from this project have been ongoing for nearly 19 years and provide a baseline from which to determine significant changes in water quality, both positive and negative. In turn, these data help to distinguish potential impacts from DOE activities. For FY24, DoR-OR continued this monitoring effort and measured stream water quality parameters monthly to establish and build upon a database of parameters for three (3) ORR exit-pathway streams (Bear Creek, East Fork Poplar Creek, Mitchell Branch) and one (1) background stream (Mill Branch).

In FY24, all measurements were within the *State of Tennessee Water Quality Criteria* (TDEC, 2019). Significant findings were identified for conductivity, where values were high but decreasing over time at BCK 12.3, and conductivity appears to be steadily increasing at EFK 23.4. Dissolved oxygen was significantly low relative to other streams at MIK 0.1. Turbidity also yielded elevated readings at BCK 7.6.

2. Ambient Surface Water & Shallow Groundwater Sampling

While legacy waste across the ORR may be responsible for a larger percentage of contamination to surface water, current projects and processes at these sites also have the potential to significantly contribute to and exacerbate overall surface water contamination. To monitor for potential ongoing contamination in waterways, regardless of contributor, the DoR-OR *Ambient Surface Water Sampling Project* has been implemented each year since 1993. For FY24 DoR-OR focused on continued monitoring of surface water in the Clinch River (CR), monitoring of surface water in Upper East Fork Poplar Creek (UEFPC) to evaluate potential impacts from a proposed D&D project, and monitoring of surface water and shallow floodplain groundwater in East Fork Poplar Creek (EFPC).

For FY24, the Clinch River was sampled for metals and radionuclides at the same locations sampled by DOE for their annual site evaluation report. All metals and radionuclides were low to non-detects at the sampled locations. These findings are consistent with DOE's results and provides an external quality control to their required sampling.

EFPC was monitored along all reaches of the stream from the headwaters in UEFPC to lower EFPC (LEFPC). In UEFPC, surface water conditions were monitored immediately adjacent to the proposed D&D activities at the mercury-contaminated Alpha-2 Complex. General water chemistry was evaluated along with mercury concentrations. Mercury trends at the sampled interval showed higher concentrations during winter months. On average, mercury yielded 0.41 μg/L throughout the year. The highest mercury concentrations were identified in UEFPC, with concentrations up to 15 times more than the Mercury AWQC of 0.051 ug/L for fish and aquatic life. In general, the surface water of EFPC was found to be impacted by nitrate, phosphorus, and mercury. Uranium and alpha activity, while they do not have AWQCs, were also elevated and may have a negative impact on the stream environment. For all contaminants sampled, the highest concentrations were found within the Y-12 area and decrease downstream.

3. White Oak Creek Surface Water Radionuclides

This monitoring project continued to focus on impacts from ongoing radiological inputs, specifically Sr-90, to White Oak Creek (WOC), WOC tributaries (Homogeneous Reactor Tributary-3, Melton Branch, and Fifth Creek), and any associated impacts to the Clinch River. Monitoring WOC provides TDEC DoR-OR better understanding of contributions to CR from this exit pathway and may provide insights into protection of human health and the environment.

Water quality parameters were measured, and surface water grab samples were collected on a quarterly basis. Samples were analyzed for Sr-90, isotopic uranium, isotopic plutonium, and gamma isotopes. During FY24, gamma isotopes, including Cs-137, were infrequently observed. Isotopic uranium activity was below the EPA drinking water standard of 30 pCi/L at each location sampled. Sr-90 concentrations increased with distance downstream, and all sites, except for the reference site at WCK 6.8, had Sr-90 concentrations measured above the EPA drinking water standard of 8 pCi/L used for reference in this project. HRT-3 had the highest measured Sr-90 activities, followed by WCK 2.3 and CRK 33.5 (both downstream of HRT-3). MEK 0.3 had one of the lowest measured Sr-90 activities during FY24. While Sr-90 measured at the point of compliance at CRK 32 is below regulatory criteria, elevated Sr-90 at CRK 33.5 indicates there remain continued impacts to the Clinch River.

4. CERCLA Site Investigation

During FY24, TDEC DOR-OR performed stormwater sampling to evaluate DOE's management of stormwater run-off and erosion controls, and use of associated BMPs, at D&D sites with potential for mobilization of legacy CERCLA contaminants. DoR-OR initiated a stormwater investigation on selected D&D sites during the three states of demolition (i.e. pre-demolition, demolition, post-demolition), focusing on (1) the quantification of the water quality of stormwater runoff, (2) the identification of potential pollution sources, and (3) the evaluation of the BMPs' effectiveness. Surface water samples were collected at five different locations associated with planned or ongoing D&D within the Y-12 and ORNL campuses. Samples were submitted for analysis of major cations and anions, total and dissolved metals, and radionuclides. In addition, this project conducted pre-construction sampling of stormwater turbidity at locations upstream and downstream of the EMDF site, with a focus on determining how construction activities affect the degree of turbidity in stormwater runoff.

Overall, contaminants of concern were measured at low levels or not detected in grab samples collected from Alpha-2 and Building 2523 at Y-12 and ORNL, respectively. When compared to DOE's comparable sampling at nearby locations, the results were similar. At the EMDF site, turbidity was variable throughout the monitoring period, with measurements ranging from <2 NTUs to approximately 43 NTUs, all below the EPA turbidity benchmark for streams affected by construction activities. Use of BMPs to manage stormwater and erosion at construction and D&D sites will continue to be monitored on the ORR in the future.

VII. Sediment Monitoring

Suspended Sediment Sampling

The *Suspended Sediment Project* focused on monitoring stream health in ORR exit-pathway streams: East Fork Poplar Creek (EFPC) and Bear Creek (BC). This project fills a sampling gap in DOE monitoring by testing the sediment suspended within the water column of these streams. Contaminants may attach to the sediment grains (mobile and entrained in the water column), which actively move through the water column and away from the site. Historically, suspended sediment samples have identified mercury and uranium results in EFPC above the associated residential use soil risk limit used as reference for this project.

In FY24, sediment samples were collected at East Fork Poplar Creek (EFK 23.4, EFK 2.2), Bear Creek (BCK 7.6, BCK 3.3), and at a tributary to Bear Creek, Northwest Tributary-5 (NT-5). Mill Branch, a tributary of EFPC, is used as a background stream (MBK 1.6). Composite sediment samples were analyzed for radiological constituents and metals. Analytical results were compared to the *Consensus-Based Sediment Quality Guidelines (CBSQGs)* using the Probable Effect Concentration (PEC) for metals; radiological activities were compared to the EPA PRGs or to background concentrations.

Concentrations of all analyzed metals were elevated in sediments from EFPC and BC compared to sediments from the background location at Mill Branch. The primary exception to this trend was mercury in sediment collected from BCK 3.3, which was comparable to mercury concentrations in Mill Branch. While EFK 23.4 and BCK 7.6 consistently tended to have the highest concentrations of metals during FY24, with the exception of uranium metal at BCK 7.6, all metals concentrations were below screening levels.

VIII. Watershed Assessments (Holistic) Monitoring:

TDEC DoR-OR completes comprehensive watershed assessments to provide the citizens of the State of Tennessee a comprehensive evaluation of the watershed at a given point in time. This project assesses the interconnectedness of all the environmental media over an entire watershed. The holistic understanding of all possible contaminants and their multiple inputs into one watershed, allows for the prioritization of remediation project goals and supports planning to protect human health and the environment. Previously, DoR-OR completed holistic evaluation of the Bear Creek watershed. FY24 holistic watershed assessment efforts were focused on the East Fork Poplar Creek watershed.

East Fork Poplar Creek Assessment Project (EFPCAP) Phase 2:

The headwaters of EFPC are located within Y-12 where mercury (Hg) and uranium (U), among other contaminants, are a concern. Upon completion, the EFPCAP will serve as a comprehensive evaluation of these COCs and the ecological health of this entire watershed. To accomplish this holistic assessment, the EFPCAP has been organized into several progressive phases. While a comprehensive report will be provided at the conclusion of the assessment incorporating all phases of work scope, this section of this report addresses soils work conducted during Phase 2 of this project.

Soil samples were collected at five sites, in total, on EFPC (i.e., EFK 21.8, EFK 18.5, EFK 13.8, EFK 6.3, and EFK 2.2) and at one background location, Clear Creek (CCK 1.6). PCBs were detected in EFPC soil samples and were at concentrations less than the EPA risk-based screening levels (SLs) for residential soil under direct contact exposure. However, PCBs did exceed a groundwater soil screening level (GW SSL), which could indicate a risk of PCBs leaching into groundwater sources. Several PFAS compounds were detected in the LEFPC floodplain soils as well, including perfluorononanoic acid (PFNA), perfluorooctanesulfonic acid (PFOS), and perfluorooctanoic acid (PFOA), and were detected at concentrations that exceed at least one SL. Arsenic and mercury concentrations exceeded SLs at all LEFPC sites. Cadmium and uranium metal concentrations in EFPC floodplain soils were less than the SLs at all EFPC soil sampling locations but exceeded risk-based GW SSLs. Mercury contamination in EFPC floodplain soils has been studied extensively by DOE, and these TDEC data reinforce those similar past DOE findings. While conditions may have improved over time, this data indicates that there is likely still work needed to fully address remaining contamination that could negatively impact human health and the environment in the EFPC watershed.

Appendix A: Supplemental Sampling:

As reflected in the Contractual Section of the FFA Budget Narrative in the FY24 Annual Grant Application, sampling and monitoring are occasionally conducted in addition to projects planned within the published EMP. This sampling is conducted in response to new information, to assist in the State’s required independent oversight, or to evaluate the effectiveness of completed remedies. Those results are included in Appendix A. During FY24 this additional work included:

1) PCB Sampling of Treated Wastewater
2) Whole Effluent Toxicity (WET) Testing at NT-8
3) Filled Coal Ash Pond (FCAP) Engineered Wetland Monitoring
4) EMDF Baseline Sampling
5) Sampling for VOCs in BCV

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1.0 INTRODUCTION

1.1 PURPOSE OF THE ENVIRONMENTAL MONITORING REPORT (EMR)

The Tennessee Department of Environment and Conservation, Division of Remediation, Oak Ridge Office (TDEC DoR-OR), provides the annual *Environmental Monitoring Report* (EMR) for fiscal year 2024 (FY24) with a period of performance from July 1, 2023, through June 30, 2024.

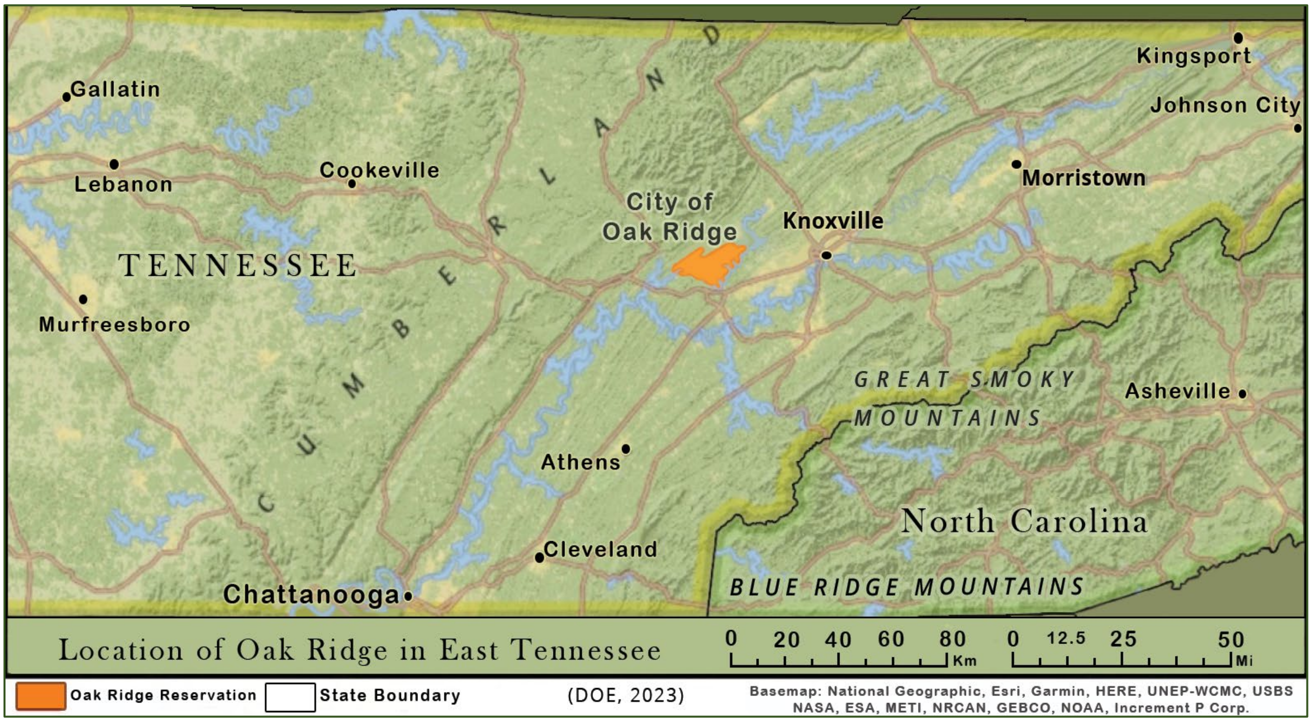

Figure 1.1.1: Location of Oak Ridge in East Tennessee

All projects defined in this EMR are found to be consistent with the NCP and are intentionally designed to comply with the administrative and operational requirements of the *Environmental Surveillance and Oversight Agreement* (ESOA) and, additionally, in support of the *Federal Facility Agreement (FFA*). DoR-OR monitoring of current and upcoming DOE ORR activities is outlined in the ESOA, while the monitoring of DOE's legacy contamination management is addressed in the FFA.

DoR-OR works collaboratively co-sampling and conducting oversight of field actions with the Office of Science, National Nuclear Safety Administration (NNSA), and DOE Environmental Management and their contractors. All collected data is available to the public, including to DOE or EPA for triparty consideration, where appropriate. State sampling is conducted by DoR-OR to support comparison and correlation of results with DOE's monitoring programs. DoR-OR's monitoring program is intentionally designed and reviewed annually to (1) support active and ongoing environmental restoration decisions, to (2) help evaluate the performance of existing remedies, and to (3) make effective decisions going forward. These DoR-OR monitoring projects have been key to the State's success in this role. Project data analyses enable the State to provide decisions effectively and efficiently for the FFA CERCLA projects as well as to verify protectiveness to Tennesseans regarding active processes conducted at the ORR under the ESOA work scopes.

Regarding the TDEC's primary focus on ensuring protectiveness of human health and the environment within Tennessee, all DoR-OR environmental monitoring is performed to meet this mission statement. All work outlined in this monitoring plan will be performed in accordance with the *TDEC DoR-OR Technical Standard Operating Procedures* (SOPs).

Under Federal Guidelines, and to fulfill TDEC mission goals, stakeholder interests take a priority in project planning (Table 1.1.1). The key Stakeholders for this EMP include:

Table 1.1.1: Stakeholders

Stakeholders	
Citizens of Tennessee (Tennesseans)	External
Tennessee Department of Environment and Conservation (TDEC)	External and Internal
Local Governments	External
DOE and Contractors	External

1.2 Objective

The overarching objective of the DoR-OR, as outlined in this EMR, is to perform State led environmental monitoring as well as evaluate monitoring data for State oversight of current DOE activities throughout the Oak Ridge Reservation (ORR). Comparable DoR-OR monitoring results will be used to confirm yearly DOE data, as published in the ASER. This comparison will be used to gauge the performance of existing DOE remedies, and to investigate movement of legacy contamination in selected areas to evaluate the efficacy of DOE best management practices (BMPs).

The DoR-OR data will be used to corroborate existing State assessment data and, if necessary, to augment DOE's separate environmental monitoring datasets. DoR-OR project teams collect data in areas where there is a higher potential for ORR emissions of any materials (i.e. hazardous, toxic, chemical, or radiological) which could impact the surrounding biota. The environmental media and COCs to be sampled during FY25 are listed below in Table 1.2.1.

Tables 1.2.1: Types of Monitoring

Project Areas	Medium/Media	COCs *(Possible Assessments)*
Air	Particulates on Air Filters Particulates in Precipitation	**Radiological Materials:** Gamma spectrometry Uranium-234/235/238 Strontium (Sr-89/90) Technetium (Tc-99) Transuranic isotopes, Others **Chemical Pollutants:** PCBs and Pesticides VOCs and SVOCs Nitrates/Nitrates Nutrients **Mixed Waste** **Mercury** **Other Metals:** Chromium Arsenic Cadmium Uranium
Biota	Benthic Macroinvertebrate Taxa Fish Tissue Sampling [DOE data] Fathead Minnow and Water Flea - Biotoxicity Fish Consumption (Creel Surveys) Food Products (Vegetables/Milk/Eggs/Hay) Terrestrial Invertebrates Bird eggs, flying insects, by-catch	
Groundwater	Wells and Springs	
Landfill	Surface water Stormwater Groundwater Soil Sediment	
Radiological	Haul Road – dropped waste Gamma (Air Samplers) Surplus Equipment Sales	
Surface Water	Surface Water Parameters Stream Water Sampling Shallow Floodplain Groundwater Stormwater Sampling	
Soil	Landfill Samples Floodplain Samples	
Sediment	Suspended Sediment Sediment (landfill runoff)	
Watershed (*Holistic)*	All Samples from Projects in Watershed	

1.3 The Oak Ridge Reservation (ORR)

The ORR is comprised of three major campuses:

- **ORNL**: Oak Ridge National Lab (Formerly X-10)
- **Y-12**: Y-12 National Security Complex
- **ETTP**: East Tennessee Technology Park (Formerly K-25)

ORNL currently conducts leading-edge research in advanced materials, alternative fuels, climate change, and supercomputing. Previous and ongoing ORNL research has been responsible for producing a fair amount of industrial waste. The following is a list of projects and processes that have been the source of accidental releases of contaminants into the environment:

- fuel reprocessing
- isotopes production
- waste management
- radioisotope applications
- reactor developments
- multi-program laboratory operations

Y-12 continues to be vital to maintaining the safety, security, and effectiveness of the U.S. nuclear weapons stockpile and reducing the global threat posed by nuclear proliferation and terrorism. As with ORNL, Y-12 operational processes have also resulted in the accidental release of radionuclides and hazardous chemicals into the environment. Additionally, as D&D remedial activities move forward, legacy contaminants may be disturbed and migrate into the surrounding environment.

ETTP, in contrast, has undergone a transition from a gaseous diffusion facility into an industrial technology park. Remediation activities continue and have reduced the amounts of legacy contaminants. DOE recently released portions of this area back to the local government and now private businesses operate facilities in this region of the ORR.

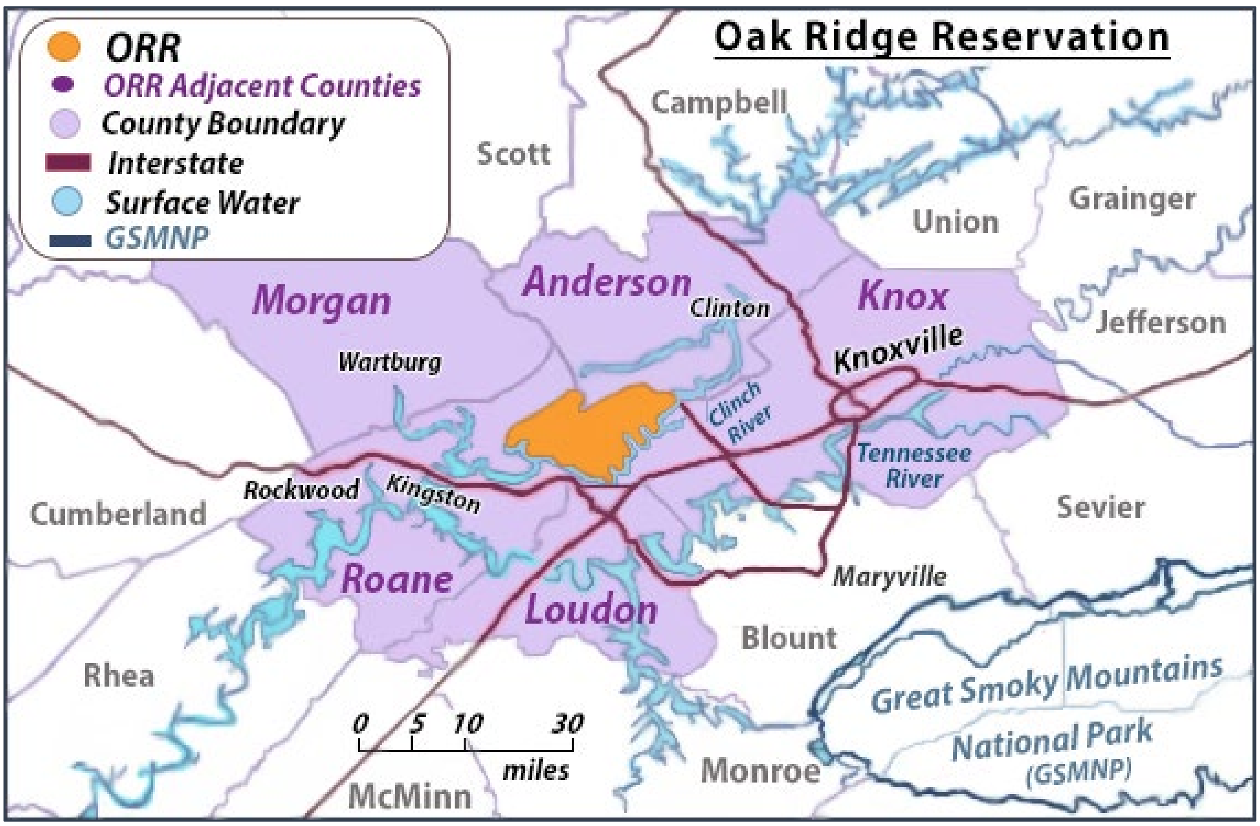

Figure1.3.1: Location of the ORR in Relation to Surrounding Counties

1.3.1 Geography of the ORR Area

Located in the Big Valley of East Tennessee, between the Cumberland Mountains and the Great Smoky Mountains, the ORR is partially bordered to the southeast and southwest by the Clinch River. The Reservation is in the southwest corner of Anderson County and the northeast region of Roane County, having one section within the boundaries of the City of Oak Ridge. Counties adjacent to the reservation include Knox, Loudon, and Morgan Counties. Knox County resides east of Anderson County and is just across the Clinch River from the ORR. Also, portions of Meigs and Rhea counties reside immediately downstream from the ORR on the Tennessee River. The nearest cities to the ORR include Oak Ridge, Oliver Springs, Clinton, Kingston, Harriman, Farragut, and Lenoir City. The nearest metropolitan area, Knoxville, lies approximately 20 miles to the east.

The ORR encompasses approximately 32,500 acres of mostly contiguous land of alternating ridges and valleys in a southwest-to-northeast orientation. This section of the Valley and Ridge Province is a zone of complex geologic deposits dominated by a series of thrust faults. Sandstone, limestone, and dolomite form the underlying structure of the ridges, which themselves are relatively resistant to erosion. Weaker shales and more soluble carbonate rocks form a less stable basin for the valleys. Also, valley wind currents can differ substantially in speed and direction from the winds at higher elevations along the ridges.

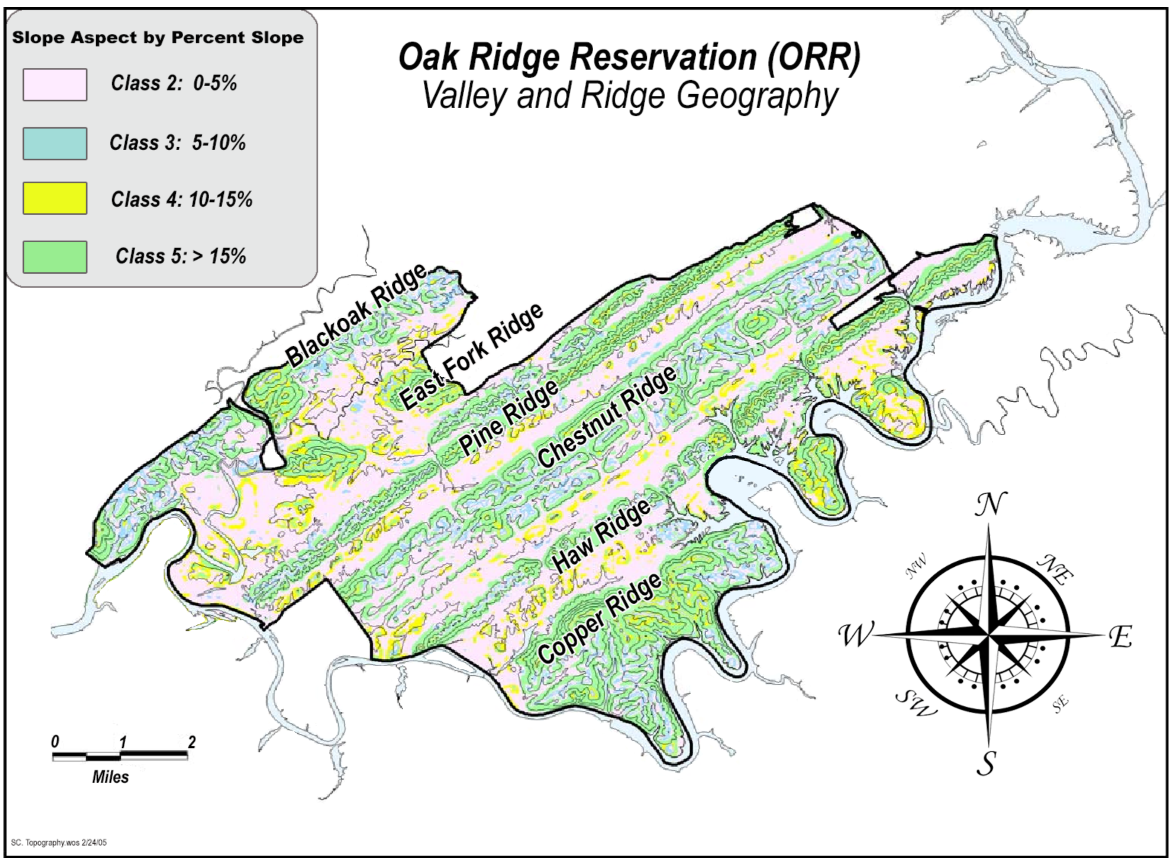

Figure 1.3.1.1: ORR Ridges (Southwest-to-Northeast Orientation)

1.3.2 Climate of the ORR Area

The climate of the ORR region is classified as humid and subtropical. Local climate is characterized by a wide range of seasonal temperature changes between the summer and winter months. According to DOE (DOE, 2024),

> *Total precipitation during 2023 as measured at meteorological tower (MT)2* [at ORNL] *was 1200 mm (47.2 in.), which is 15 percent below the 30-year average of 1417.8 mm* (DOE, 2024).

The topography of this region of the Great Valley of East Tennessee is shaped by the Ridge-and-Valley physiography, the Cumberland Plateau, and two mountain chains. These major landscape features also affect the wind flow regimes of Eastern Tennessee. Both topography and climate are major factors in determining the potential for migration of contaminated media away from the ORR and into the surrounding areas.

1.3.3 Population of the ORR Area

More than one million Tennesseans reside in the counties immediately surrounding the ORR. Knoxville, in Knox County, is the only major metropolitan area near Oak Ridge. Excluding Knoxville, land use is semi-rural and made up of residences, small farms, and pastures. Popular recreation includes fishing, hunting, boating, water skiing, and swimming.

1.4 Tennessee's Commitment to Tennesseans

In accordance with the ESOA Agreement, the FFA Agreement, and in line with TDEC’s mission statement, DoR-OR will conduct oversight of DOE ORR activities. Our purpose is to reassure all Tennesseans that activities on and around the ORR are being managed or performed in a manner protective of human health and the environment.

2.0 AIR MONITORING

2.1 FUGITIVE RADIOLOGICAL AIR EMISSIONS

2.1.1 BACKGROUND

Historically, leaks and spills of radionuclide-contaminated materials were not uncommon on the ORR. Radioactive materials were released from operations as gaseous, liquid, and solid effluents with little to no treatment (ORAU, 2003). Current D&D and related remediation activities across the ORR have the potential to generate fugitive airborne contamination that could pose a risk.

For many years DoR-OR used three projects to aid in the monitoring of the air on the ORR for radiological contaminants. This project has been the longest running, with RadNet Air project a close second, with both beginning operations in the 1990s. The RadNet precipitation project began in the 2000s and monitors radionuclides in air brought to the ground with precipitation. Both RadNet projects are a part of the larger RadNet Program of the EPA, creating a wider radiation monitoring network across the United States. In FY24, the *RadNet Air Project* was phased out (with the last samples collected in June 2024) and the *Fugitive Air Project* was increased to include samplers at the prior RadNet locations as well as at additional ORR locations.

Additionally, DOE and its contractors conduct high-volume air monitoring at two ETTP locations and one ORNL location and via the ORR Ambient Air Monitoring Program, which has samplers largely around the perimeter of the ORR. The results from this air sampling are used to calculate the human dose exposure for vulnerable populations offsite. DoR-OR's *Fugitive Radiological Air Emissions* monitoring data will also be used to compare to DOE results.

2.1.2 PROBLEM STATEMENTS

Fugitive (i.e., non-point source) dispersal of contaminants can accidentally occur within the ORR. Legacy contaminants could potentially become exposed during remediation activities, disposal at the onsite hazardous and low-level radioactive waste facility, and severe weather events. Y-12 contains decaying buildings with uranium contamination which must undergo remediation and can release contaminants. ORNL structures are contaminated with various fission and activation products in addition to uranium and plutonium isotopes. Some structures at ORNL were identified as the highest risk buildings on the ORR. These building are physically deteriorating and contain loose contamination. The risk is exacerbated by the proximity of these structures to pedestrian and vehicular traffic, to privately funded businesses, and to other active ORNL buildings. In addition to legacy contamination concerns, releases could also be possible from current research and manufacturing projects.

2.1.3 Goals

To verify the protectiveness of human health and the environment, TDEC DoR-OR aimed to conduct independent air sampling, compare the results with the air sampling data published by DOE, and determine if DOE is adequately monitoring airborne emissions of radiological contaminants. DOR-OR's independent monitoring can then be used to determine if DOE is compliant with Federal Regulatory Standards by showing that members of the public are not receiving an effective dose greater than ten (10) mrem per year. With remedial activities in progress at each of these ORR sites, monitoring radiological particulate on the ORR is the focus of this project.

2.1.4 Scope

DoR-OR conducted the *Fugitive Radiological Air Emissions Monitoring Project* with continuous air monitoring at each of the ORR sites plus a comparable background location (Figure 2.1.4.1). A total of fourteen air samplers were monitoring for radiological contaminants in the air. By the end of FY24, there were five samplers at ORNL, five samplers at Y-12, two samplers at ETTP, as well as a sampler at EMWMF and another at the background location in Lenoir City. During FY24, four air monitors were put in place as replacements for RadNet Air samplers and to support better site coverage. Sampler locations were selected to maximize the likelihood of collecting representative samples from potential sources of airborne contamination.

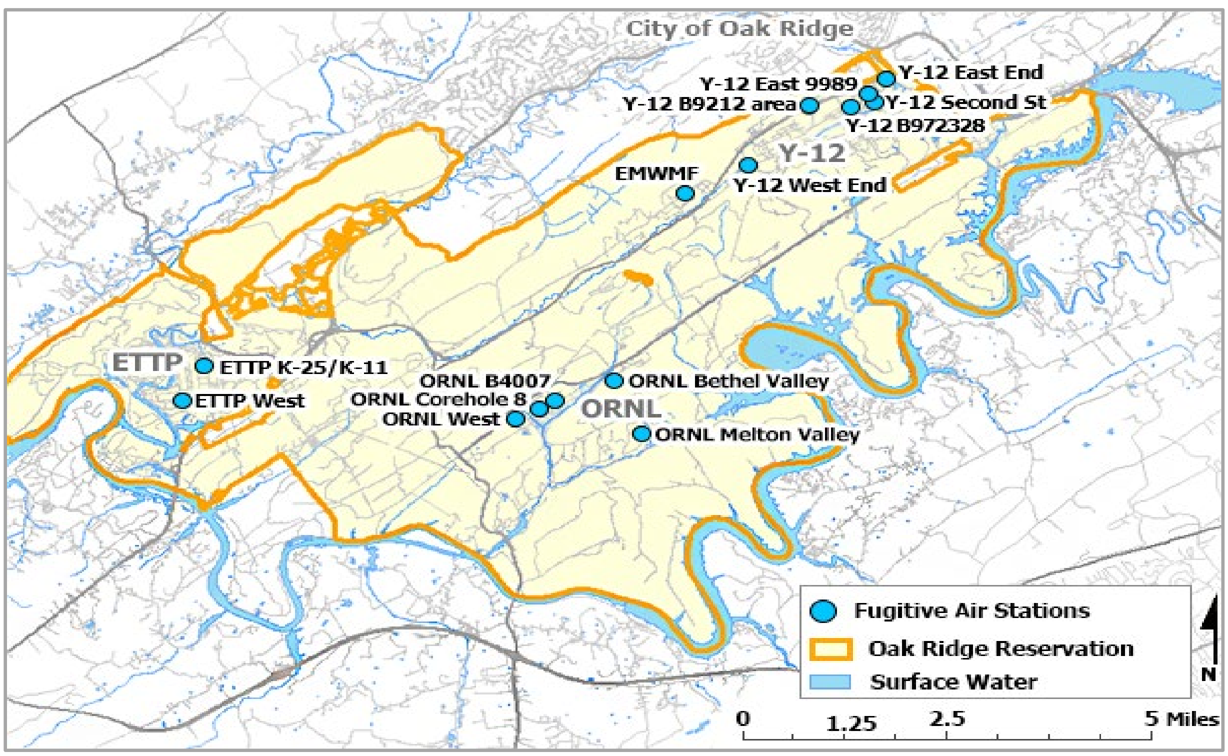

Figure 2.1.4.1: Fugitive Air Monitoring Locations

2.1.5 Methods, Materials, Metrics

The *Fugitive Air Monitoring Project* operated 14 high-volume air samplers by the end of FY24 to conduct continuous radiological particulate air monitoring on and near the ORR (Figure 2.1.4.1). One sampler was stationed in Lenoir City to collect background data for comparison. The remaining samplers were placed at ORR locations where the potential for release of fugitive airborne emissions was higher. For example, samplers were placed near locations where contaminated soils were being excavated, contaminated structures were being demolished, and near waste disposal operations.

Each of the 14 high-volume air samplers used 8 x 10-inch glass-fiber filters to collect particulates from the air. Air was drawn through the unit at a rate of approximately 35 ft^3 per minute. To ensure accuracy, airflow through each air sampler was calibrated quarterly, in accordance with the air sampler guidelines (TDEC, 2023).

Samples were collected from each air sampler weekly, with samples being composited every four weeks and analyzed by the Tennessee Department of Health Nashville Environmental Laboratory and/or by Eberline Analytical. The selection of analyses performed were based on the contaminants of concern and previous findings for the locations being monitored.

To assess contaminant concentrations measured at each location, results were compared with the background data and the standards provided in the *National Emission Standards for Hazardous Air Pollutants* (NESHAPs) *National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities* (40 CFR 61 Subpart H, 2023), required by the EPA under the Clean Air Act (CAA). These standards associate radiological emissions to quantities that would not cause a member of the public to receive an effective dose equivalent greater than 10 millirem (mrem) in a year (40 CFR 61 Appx E, 2023). Associated findings are reported to DOE, its contractors, and the public in this annual monitoring report.

2.1.6 Deviations from the Plan

The original project plan was to collect and report on the full year's data, even at the new stations. This would have included 13 four-week composite samples per station, every month through June 2024. However, there were delays due to funding for the placement of any new samplers on the ORR, including the placement of the air samplers at the RadNet Air monitoring locations. There was also a delay due to site contact approval considerations for the move from one Y-12 location to another nearby, though that only affected the timing of the move.

The new samplers are located at Y-12 East, ORNL Melton Valley, ORNL Bethel Valley, and ORNL West. One sampling location was changed from the Y-12 B9723-28 location to the Y-12 Second Street location with a new air sampler on 4/17/24. Since the new air sampling locations did not have a full year of data collected, the results from these stations are not directly comparable to the NESHAPS standards but will be compared regardless to ensure they were not exceeded for the time period during which monitoring occurred. The same was done for the Y-12 East 9989 and Y-12 Building 9212 sampler data as a full year's worth of data was not available due to power outages. At Y-12 East 9989 this was due to a long power outage that ended in early October 2023, with nine of the potential thirteen sample sets for the year analyzed. At the Y-12 Building 9212 sampler, only one of the thirteen sample sets was not sent due to power issues.

2.1.7 Results and Analysis

During FY24, *Fugitive Radiological Air* samplers monitored radiological particulate emissions at up to 14 stations. All particulate air monitor samples were analyzed for three isotopes of uranium (U-234, U-235, U-238). Samples from ETTP, Y-12, EMWMF, and the reference location were analyzed for technetium-99 (Tc-99). Samples from ORNL, EMWMF, and the reference location were analyzed for gamma, but only naturally occurring isotopes were detected (mostly naturally occurring daughter products of radon) and are not included in sum of fractions calculations. Results are shown in the tables below. When the sum of fractions is less than one, no regulatory limits were exceeded.

ETTP

The ETTP West fugitive radiological air monitor was located at ETTP southwest of the original site of the K-25 Gaseous Diffusion Plant and at the current west end of the ETTP site. The results show that no radiological limits were exceeded (Table 2.1.7.1).

Table 2.1.7.1: ETTP West Air Monitoring Average Results for (pCi/m^3)

ETTP West Sampling location	U-234	U-235	U-238	Tc-99	*Sum of Fractions*
Average FY24 *(July 2023 - June 2024)*	3.31E-05	4.65E-06	2.12E-05	2.56E-03	
Average background	2.73E-05	3.22E-06	2.46E-05	3.05E-03	
Net Activity *(Avg. minus background)*	5.83E-06	1.43E-06	-3.35E-06	-4.88E-04	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	1.40E-01	
Fraction of Limit *(Net/Limit)*	7.57E-04	2.02E-04	0	0	0.000958
Levels < background *can be considered ≈ zero (not negative values) and don't subtract from the sum of fractions*					

The K-25 K-11 area sampler at ETTP was located east of the northern portion of the K-25 building. The results show that no radiological limits were exceeded (Table 2.1.7.2).

Table 2.1.7.2: ETTP K-25 K-11 Air Monitoring Average Results for (pCi/m^3)

ETTP K-25 K-11 Sampling location	U-234	U-235	U-238	Tc-99	*Sum of Fractions*
Average FY24 *(July 2023 - June 2024)*	3.63E-05	3.06E-06	2.82E-05	3.68E-03	
Average background	2.73E-05	3.22E-06	2.46E-05	3.05E-03	
Net Activity *(Avg. minus background)*	9.04E-06	-1.68E-07	3.59E-06	6.27E-04	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	1.40E-01	
Fraction of Limit *(Net/Limit)*	1.17E-03	0	4.33E-04	4.48E-03	0.00608
Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions					

Y-12

Table 2.1.7.3 shows the results from the samples taken at the Y-12 West area, which is at the far west end of Y-12 and is near the Y-12 mercury air sampling station. It was also co-located with the Y-12 West RadNet Air sampler in FY24. The sum of fractions of less than one indicates that regulatory limits were not exceeded.

Table 2.1.7.3: Y-12 West Air Monitoring Average Results (pCi/m^3)

Y-12 West Sampling Location	U-234	U-235	U-238	Tc-99	*Sum of Fractions*
Average FY24 *(July 2023 - June 2024)*	1.44E-04	2.22E-05	3.41E-05	2.76E-03	
Average background	2.73E-05	3.22E-06	2.46E-05	3.05E-03	
Net Activity *(Avg. minus background)*	1.16E-04	1.90E-05	9.54E-06	-2.87E-04	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	1.40E-01	
Fraction of Limit *(Net/Limit)*	1.51E-02	2.67E-03	1.15E-03	0	0.0190
Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions					

Results are listed in Table 2.1.7.4 for the Y-12 Building 9212 area, which was associated with nuclear weapons work. A full year's worth of data was not available for the Y-12 Building 9212 area sampling location due to power/sampler issues for one sample set ending in early October 2023. However, twelve of the potential thirteen sample sets for the year were analyzed. The averaged available data did not indicate any exceedances for the time run. The sum of fractions of less than one indicates that regulatory limits were not exceeded for the time monitored.

Table 2.1.7.4: Y-12 Building 9212 Area Air Monitoring Average Results (pCi/m^3)

Y-12 9212 Sampling Location	U-234	U-235	U-238	Tc-99	*Sum of Fractions*
Average in FY24 *(*July 2023 - June 2024)*	2.03E-04	1.41E-05	4.46E-05	2.53E-03	
Average background	2.73E-05	3.22E-06	2.46E-05	3.05E-03	
Net Activity *(Avg. minus background)*	1.76E-04	1.09E-05	2.00E-05	-5.25E-04	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	1.40E-01	
Fraction of Limit (*Net/Limit)*	2.28E-02	1.54E-03	2.42E-03	0	0.0268

Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions
** Power outage –12 out of 13 possible sample sets were collected.*

In Table 2.1.7.5, the results are shown from the Y-12 Building 9723-28 area and the nearby Y-12 Second Street location. These areas are of interest because these samplers are often downwind of the majority of the original Y-12 buildings associated with the nuclear weapons work, many of which are now in disrepair and awaiting or undergoing demolition. On 4/17/24 the Building 9723-28 station was shifted to a new location (Y-12 Second Street), a couple of blocks to the east. Data from these nearby locations are combined in the table below, with eleven of the thirteen sample periods at the 9723-28 location and two at the Second Street location that were in range of the last values from the 9723-28 location. The averaged available data did not indicate any exceedances for the time run. The sum of fractions of less than one indicates that regulatory limits were not exceeded for the time monitored.

Table 2.1.7.5: Y-12 Building 9723-28 & Second St. Air Monitoring Average Results (pCi/m^3)

Y-12 B9723-28 & Second St. Locations	U-234	U-235	U-238	Tc-99	*Sum of Fractions*
Average in FY24 *(July 2023 - June 2024)*	6.49E-05	8.99E-06	3.08E-05	3.49E-03	
Average background	2.73E-05	3.22E-06	2.46E-05	3.05E-03	
Net Activity *(Avg. minus background)*	3.76E-05	5.77E-06	6.20E-06	4.40E-04	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	1.40E-01	
Fraction of Limit *(Net/Limit)*	4.89E-03	8.13E-04	7.46E-04	3.14E-03	0.00959

Station moved April 17, 2024; 11 sample sets collected at 9723-28 and 2 sample sets from Second St.

Table 2.1.7.6 shows the results from the samples taken at the Y-12 East Building 9989 area. This area is near the northeast end of the plant and is also next to the building where Y-12 air sampling is done for mercury. A full year's worth of data was not available for the Y-12 East

9989 area sampling location due to a long power outage that ended in early October 2023. However, nine of the potential thirteen sample sets for the year were analyzed. The averaged available data did not indicate any exceedances for the time run. The sum of fractions of less than one indicates that regulatory limits were not exceeded for the time monitored.

Table 2.1.7.6: Y-12 East Building 9989 area Air Monitoring Average Results (pCi/m^3)

Y-12 East 9989 Sampling Location	U-234	U-235	U-238	Tc-99	*Sum of Fractions*
Average in FY24 *(Oct 2023 - June 2024)*	4.46E-05	6.87E-06	2.01E-05	2.91E-03	
Average background	2.73E-05	3.22E-06	2.46E-05	3.05E-03	
Net Activity *(Avg. minus background)*	1.73E-05	3.64E-06	-4.48E-06	-1.40E-04	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	1.40E-01	
Fraction of Limit *(Net/Limit)*	2.25E-03	5.13E-04	0	0	*0.00276*

Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions
** Power outage –9 out of 13 possible sample sets were collected.*

Table 2.1.7.7 shows the results from the samples taken at the Y-12 East sampling location. This location is at the far east end of the plant, closest to the city of Oak Ridge, and was also co-located with the Y-12 East RadNet Air sampler for much of FY24. A full year's worth of data was not available for the Y-12 East sampling location due to sampling beginning at this location in early November 2023. However, eight of the potential thirteen sample sets for the year were analyzed. The averaged available data did not indicate any exceedances for the time run. The sum of fractions of less than one indicates that regulatory limits were not exceeded for the time monitored.

Table 2.1.7.7: Y-12 East Air Monitoring Average Results (pCi/m^3)

Y-12 East Sampling Location	U-234	U-235	U-238	Tc-99	*Sum of Fractions*
Average in FY24 *(Nov 2023 - June 2024)*	2.83E-05	4.55E-06	1.66E-05	3.74E-03	
Average background	2.73E-05	3.22E-06	2.46E-05	3.05E-03	
Net Activity *(Avg. minus background)*	1.05E-06	1.33E-06	-7.96E-06	6.84E-04	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	1.40E-01	
Fraction of Limit *(Net/Limit)*	1.37E-04	1.87E-04	0	4.89E-03	0.00521

Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions
New station, placed in November 2024; 8 sample sets collected in FY24.

EMWMF

One station is located at the EMWMF mixed waste disposal facility in Bear Creek Valley west of Y-12. Analyses for these samples included isotopic uranium, Tc-99, and gamma analysis. No elevated impacts were noted (Table 2.1.7.8) and the sum of fractions of less than one indicates that regulatory limits were not exceeded.

Table 2.1.7.8: EMWMF Air Monitoring Average Results (pCi/m^3)

EMWMF Sampling Location	U-234	U-235	U-238	Tc-99	***Sum of Fractions***
Average FY24 *(July 2023 - June 2024)*	9.67E-05	9.95E-06	2.91E-05	3.23E-03	
Average background	2.73E-05	3.22E-06	2.46E-05	3.05E-03	
Net Activity *(Avg. minus background)*	6.94E-05	6.73E-06	4.52E-06	1.83E-04	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	1.40E-01	
Fraction of Limit (*Net/Limit)*	9.02E-03	9.48E-04	5.44E-04	1.31E-03	0.0118

ORNL

Five air samplers were located at ORNL for at least part of FY24. Analyses for samples from these stations included isotopic uranium and gamma spectrometry. The gamma spectrometry results are not shown below because only naturally occurring daughter products of radon were detected. No instances of elevated isotopic uranium levels were noted, and the sum of fractions of less than one indicates that regulatory limits were not exceeded.

The B4007 air monitor is located in the heart of ORNL and is east of the 3000 area where more of the radiological work was done historically, with some of these areas undergoing D&D or remediation in the past, present, and future. Analyses for the B4007 air samples included isotopic uranium and gamma spectroscopy. No elevated impacts were noted (Table 2.1.7.9) and the sum of fractions of less than one indicates that regulatory limits were not exceeded.

Table 2.1.7.9: ORNL B4007 Air Monitoring Average Results (pCi/m^3)

ORNL B4007 Sampling Location	U-234	U-235	U-238	***Sum of Fractions***
Average FY24 *(July 2023 - June 2024)*	2.82E-05	3.43E-06	1.97E-05	
Average background	2.73E-05	3.22E-06	2.46E-05	
Net Activity *(Avg. minus background)*	9.55E-07	2.06E-07	-4.84E-06	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	
Fraction of Limit *(Net/Limit)*	1.24E-04	2.91E-05	0	0.000153
Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions				

The ORNL Corehole 8 location is right by the Corehole 8/Tank W-1A area and is located at the west end of the 3000 area. Analyses for the Corehole 8 air samples included isotopic uranium and gamma spectroscopy. No elevated impacts were noted (Table 2.1.7.10) and the sum of fractions of less than one indicates that regulatory limits were not exceeded.

Table 2.1.7.10: ORNL Corehole 8 Air Monitoring Average Results (pCi/m^3)

ORNL Corehole 8 Sampling Location	U-234	U-235	U-238	*Sum of Fractions*
Average FY24 *(July 2023 - June 2024)*	2.55E-05	3.09E-06	1.97E-05	
Average background	2.73E-05	3.22E-06	2.46E-05	
Net Activity *(Avg. minus background)*	-1.74E-06	-1.28E-07	-4.90E-06	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	
Fraction of Limit *(Net/Limit)*	0	0	0	0
Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions				

The ORNL Melton Valley sampler is located in the next valley south of the main ORNL campus. It is also east of the active High Flux Isotope Reactor (HFIR) and many burial grounds and waste storage areas. Also, this site was co-located with the Melton Valley RadNet Air sampler for much of FY24. Analyses for the Melton Valley air samples included isotopic uranium and gamma spectroscopy. No elevated impacts were noted (Table 2.1.7.11) and the sum of fractions of less than one indicates that regulatory limits were not exceeded.

Table 2.1.7.11: ORNL Melton Valley Air Monitoring Average Results (pCi/m^3)

ORNL Melton Sampling Location	U-234	U-235	U-238	*Sum of Fractions*
Average FY24 *(Nov 2023 - June 2024)*	1.63E-05	1.46E-06	9.33E-06	
Average background	2.73E-05	3.22E-06	2.46E-05	
Net Activity *(Avg. minus background)*	-1.09E-05	-1.76E-06	-1.52E-05	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	
Fraction of Limit *(Net/Limit)*	0	0	0	0
Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions				

The ORNL Bethel Valley sampler is located to the northeast of the main ORNL campus, in Bethel Valley. This site was co-located with the Bethel Valley RadNet Air sampler for much of FY24. Analyses for the Bethel Valley air samples included isotopic uranium and gamma spectroscopy. No elevated impacts were noted (Table 2.1.7.12) and the sum of fractions of less than one indicates that regulatory limits were not exceeded.

Table 2.1.7.12: ORNL Bethel Valley Air Monitoring Average Results (pCi/m^3)

ORNL Bethel Sampling Location	U-234	U-235	U-238	*Sum of Fractions*
Average FY24 *(Nov 2023 - June 2024)*	2.53E-05	3.39E-06	1.19E-05	
Average background	2.73E-05	3.22E-06	2.46E-05	
Net Activity *(Avg. minus background)*	-1.99E-06	1.66E-07	-1.27E-05	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	
Fraction of Limit *(Net/Limit)*	0	2.33E-05	0	0.0000233
Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions				

The ORNL West sampler is a new station with the fist composite sample in December 2023. It is located west of the main ORNL campus, in Bethel Valley, and is near the ORR Ambient Air monitoring Station 3. Analyses for the ORNL West air samples included isotopic uranium and gamma spectroscopy. No elevated impacts were noted (Table 2.1.7.13) and the sum of fractions of less than one indicates that regulatory limits were not exceeded.

Table 2.1.7.13: ORNL West Air Monitoring Average Results (pCi/m^3)

ORNL West Sampling Location	U-234	U-235	U-238	*Sum of Fractions*
Average FY24 *(Dec 2023 - June 2024)*	1.68E-05	4.11E-06	7.25E-06	
Average background	2.73E-05	3.22E-06	2.46E-05	
Net Activity *(Avg. minus background)*	-1.05E-05	8.91E-07	-1.73E-05	
40 CFR *Part 61 Limit, Appendix E, Table 2*	7.70E-03	7.10E-03	8.30E-03	
Fraction of Limit *(Net/Limit)*	0	1.25E-04	0	0.000125
Levels < background can be considered ≈zero (not negative values) and don't subtract from the sum of fractions				

2.1.8 Conclusions

The average annual concentrations, minus background, for all sites, were below the federal standards for each isotope measured. DOE ORR Ambient Air Monitoring program indicated that all radionuclide concentrations measured in 2023 were well below the derived concentration standards for air established by DOE as guidelines for controlling exposure to members of the public (DOE, 2024).

The DoR-OR radiological air monitoring project's shorter composite interval of every four weeks can result in a timelier observation of potential problems than the related DOE air programs. For example, the DOE ORR Ambient Air Monitoring analyzes quarterly composite samples of thirteen weekly samples. Their program analyzes four composite samples per station annually, versus the 13 annual composites analyzed per station annually with the DoR-OR radiological air monitoring project.

2.1.9 Recommendations

DoR-OR should continue routine fugitive radiological air monitoring on the ORR because it is valuable as an independent verification of DOE's results, its sampling locations are more directly associated with active operations on the ORR and analyzes samples at a greater frequency that would allow quicker response if elevated results were to be observed.

The air monitoring plan for the DOE's EMP was reviewed. This project team suggests more frequent composites for analysis at all locations and high-volume site-specific monitoring by DOE contactors at Y-12 and ORNL in addition to the ORR ambient air perimeter monitoring. Currently, the DoR-OR radiological air monitoring program helps fill this monitoring gap.

2.1.10 References

40 CFR 61, Appx E. 2023. *Title 40 of the Code of Federal Regulations, Chapter 1, Subchapter C, Part 61; National Emission Standards for Hazardous Air Pollutants (NESHAPS)*, Appendix E, Table 2: Concentration Levels for Environmental Compliance. https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-61/appendix-Appendix%20E%20to%20Part%2061.

40 CFR 61, Subpart H. 2023. *Title 40 of the Code of Federal Regulations, Chapter 1, Subchapter C, Part 61 National Emission Standards for Hazardous Air Pollutants (NESHAPS)*, Subpart H *National Emission Standards for Emissions of Radionuclides Other than Radon From Department of Energy Facilities*. National Archives. Washington, DC. https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-61/subpart-H.

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2.2 RadNet Air

2.2.1 Background

Radiological air emissions from DOE activities on the ORR have substantially decreased over the years; however, concerns remain that radiological air pollutants from current activities (e.g. production of radioisotopes and demolition of radioactively contaminated facilities) could pose a threat to public health and the surrounding environment.

The average adult inhales about 16,000 liters of air per day (compared to ingesting less than two liters of water per day) (EPA, 2011). Consequently, good air quality is essential to human health. To evaluate this health concern, TDEC DoR-OR implemented three ongoing air monitoring projects to assess the potential impacts of ORR air emissions. The *RadNet Air Monitoring Project* provides additional monitoring on the ORR along with independent third-party air quality analysis.

This EPA project began sampling on the ORR in 1996 and provided radiochemical analysis of air particulate samples. In FY24, these samples were collected twice weekly from four air monitoring stations. These stations were located at ORNL and Y-12, which have potential sources of radiological air emissions. RadNet samples were collected by project staff and analysis was performed at the EPA National Air and Radiation Environmental Laboratory (NAREL). FY24 was the final year of this project. This air sampling scope was transferred to the Fugitive Radiological Air Monitoring Project, with Fugitive Air samplers now at each of the FY24 RadNet Air sampling locations.

DoR-OR RadNet Air sampling does not directly correlate to DOE's ORR air sampling program as this project conducts gross beta analysis (as a screening tool) on twice weekly particulate air filters and submits samples to by analyzed at the EPA lab. Additional rad analyses may be run if appropriate. TDEC collects and analyzes particulate air filter samples at a greater frequency than DOE's Ambient Air Monitoring Program.

DOE's ORR Ambient Air Monitoring program is described in the 2022 ASER: "Particulates are captured by high-volume air samplers equipped with glass-fiber filters. The filters are collected weekly, composited quarterly, and then submitted to an analytical laboratory to quantify gross alpha and gross beta activity and to determine the concentrations of specific isotopes of interest on ORR." However, results are shown for gamma isotopes as well as isotopic uranium, and for Tc-99 at two locations (ETTP and background), while any gross alpha and gross beta activity is not shown (ASER, 2023).

2.2.2 Problem Statements

Y-12 and ORNL could potentially release radioactive contaminants into the air from a disturbance of legacy contaminants (D&D or general deterioration of contaminated structures) or from current operations.

2.2.3 Goals

- Protect human health and the environment by continuous sampling for airborne gross beta activity on the ORR, confirming levels do not go above EPA regulatory levels.

- Complement the DoR-OR *Fugitive Radiological Air Emissions Project* by providing gross beta analysis and additional analysis if above EPA screening levels.

- Provide additional air monitoring data to support greater general coverage of the ORR, as well as more frequent air monitoring and analysis.

    - This project collected twice weekly sampling and sample analysis, rather than the weekly sampling with four-week composite analysis done for the DoR-OR *Fugitive Radiological Air Emissions Project*, and the quarterly (thirteen-week) composites of the weekly samples that the DOE ORR Ambient Air Monitoring program collects. This project's sampling schedule will allow for the assessment of contaminant levels with data provided at shorter time intervals.

    - This project monitors locations within the ORR near active clean-up sites where contaminant releases are more likely to occur, not just on the perimeter of the ORR. While DOE's Ambient Air program monitors potential impacts to the public off the ORR, the DoR-OR air monitoring programs can help determine sources of ambient air contamination if they are present.

2.2.4 Scope

The scope of this project included the continuous monitoring for airborne gross beta contamination on the ORR at four sampling stations, with two stations located at Y-12 and two at ORNL. The locations of the four RadNet Air samplers are provided in Figure 2.2.4.1. Stations were sampled twice per week.

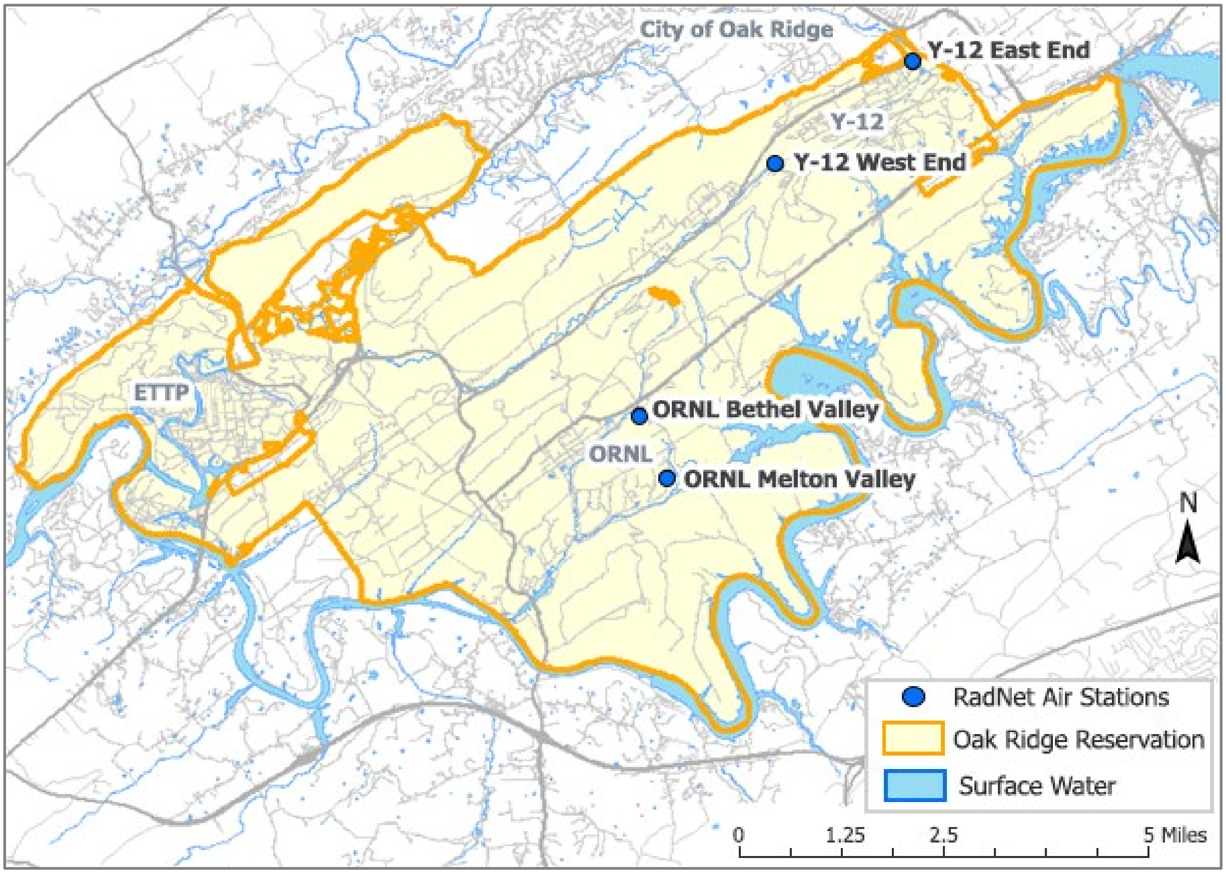


Figure 2.2.4.1: ORR RadNet Air Monitoring Stations

2.2.5 Methods, Materials, Metrics

The four RadNet Air samplers ran continuously, and suspended particulates were collected on synthetic fiber filters (10 centimeters in diameter). Air was drawn through the high-volume units by a pump at approximately 35 ft^3 per minute (60 m^3/hour). DoR-OR personnel collect the filters twice weekly from each ORR sampler, following the specified procedures (EPA, 1988; EPA, 2006; TDEC, 2023). The filters are then shipped to NAREL for analysis.

EPA NAREL performs gross beta analysis on each sample collected. If the gross beta result for a sample exceeds one picocurie per cubic meter (1 pCi/m^3), then gamma spectrometry is performed on the sample. Additionally, gamma spectrometry is performed on the annually composited sample for each station. Once every four years, EPA performs uranium and plutonium isotopic analysis on these yearly composites (Table 2.2.5.1). The results of EPA NAREL's analyses of the nationwide RadNet Air data are available at EPA's Envirofacts website (EPA, 2024). The RadNet searchable database allows for simple or advanced searches.

The gross beta data from the ORR RadNet Air monitors was compared to data from the Nashville RadNet Air monitor, which is used as a background location. The ORR RadNet Air gross beta data was also compared to the EPA Clean Air Act environmental limit for strontium-90 (a pure beta emitter with a conservative limit) (40 CFR 61 Appx E, 2023).

Table 2.2.5.1: RadNet Air Analyses and Frequencies

AIRBORNE RADIOLOGICAL PARTICLES	FREQUENCY
Gross Beta	Each twice weekly sample is analyzed by EPA
Gamma Scan	As needed on samples showing greater than 1 pCi/m^3 of gross beta and annually on composite samples
Plutonium-238, 239, 240 Uranium-234, 235, 238	Every four years on an annual composite from each station (started in 2014, previously analyzed annually)

Each year nearly 400 ORR samples are analyzed for this project. While gross beta analysis is used as a screening tool, much lower levels were seen overall, with an average minimum detectable concentration of about 0.000281 pCi/ m^3 from 2014 through 2023 and gross beta results averaging .01018 pCi/ m^3.

2.2.6 Deviations from the Plan

There were no major deviations from the planned work for the ORR *RadNet Air Monitoring Project*. One minor deviation at all the ORR sites was a gap in sampling due to a large snowstorm in January 2024 that limited access to area roads and hence air samplers.
The Knoxville RadNet Air monitor was not used for comparison to the ORR RadNet Air project for FY24 as only one sample was analyzed (July 2023) for the FY24 time period. Instead, the ORR RadNet Air data is shown in comparison to RadNet Air station in Nashville, TN, which is used for this report as a reference or background location.

2.2.7 Results and Discussion

The ORR gross beta results for the *RadNet Air Monitoring Project* from July 2023 through June 2024 were all well below 1.0 pCi/m^3, which is the screening level that triggers further analysis.

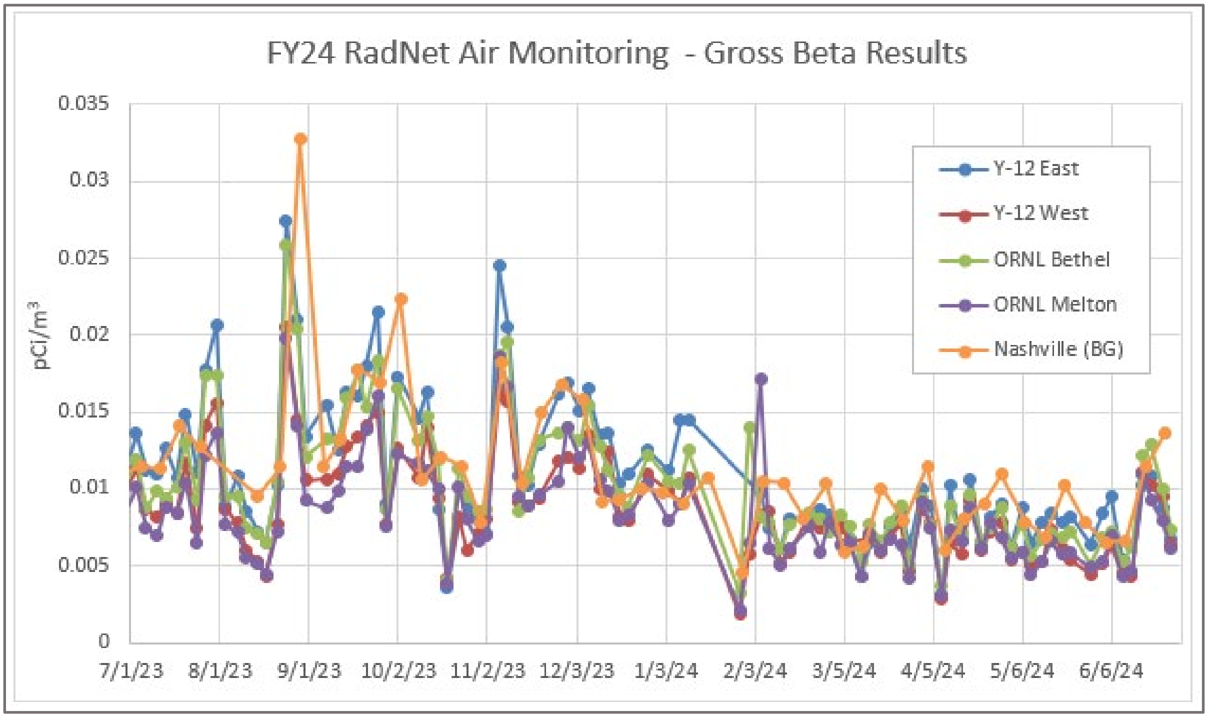
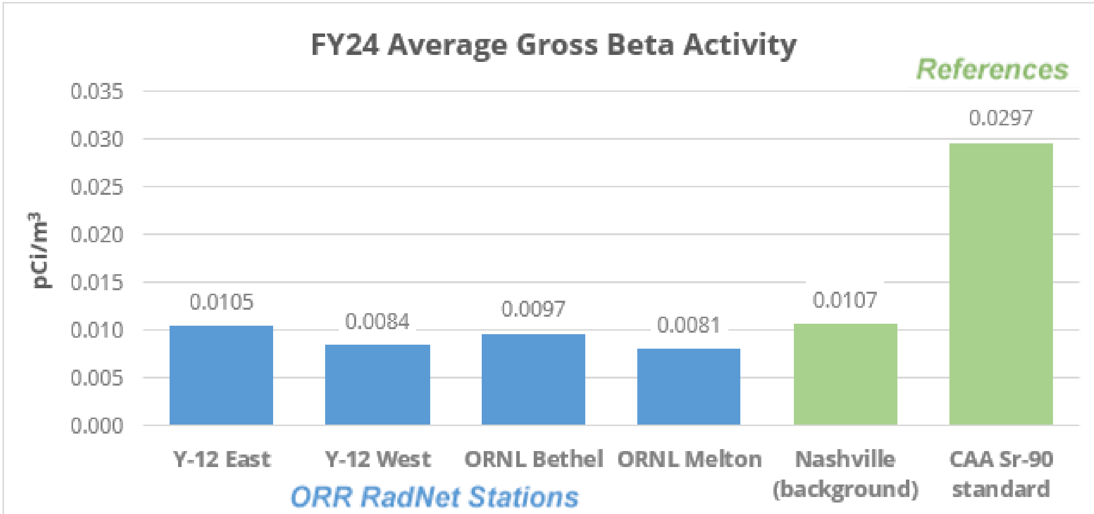


Figure 2.2.7.1: FY24 *RadNet Air Monitoring Project* Gross Beta Results

As seen in Figure 2.2.7.1, the FY24 results for the gross beta analysis were similar for all four ORR RadNet stations and the Nashville RadNet Air station. The variations during the different sample periods are largely attributable to natural phenomena (wind and rain) that influence the amount of particulate suspended in the air and ultimately deposited on the filters. Note that Figure 2.2.7.1 is intended to show the results at the sampled stations for visual comparison only. For individual station results, visit the EPA Envirofacts RadNet website (EPA, 2024).

While fluctuations were similar between results from the ORR and Nashville stations, one can see that the gross beta activity was sometimes higher at ORR stations than at the background station in Nashville. Some of the differences may be attributed to differences in weather as well as the collection schedules and the distance between the locations.

Figure 2.2.7.2 depicts the FY24 average gross beta results for each of the four RadNet Air stations. This figure also shows the average background concentration measured at the Nashville RadNet location and the CAA environmental limit for strontium-90. The average gross beta activity at all four ORR stations was lower than, but similar to, the average activity at the background Nashville location.



Note: Typical background values for gross beta in air range from .005 to 0.1 pCi/m3 (ORISE, 1993). The standards provided by the Clean Air Act (CAA) apply to the dose above background; therefore, the standard provided for reference in this figure (CAA Sr-90 standard, 0.0297 pCi/m3) has been adjusted to include the average of the FY24 gross beta results from the RadNet Air station in Nashville (0.0107 pCi/m3) added to the the level above background allowed by the CAA standard for Sr-90 (0.019 pCi/m3).

Figure 2.2.7.2: FY24 *RadNet Air Monitoring Project* Average Gross Beta Results

The CAA specifies that exposures to the public from airborne radioactive materials released from DOE facilities shall not cause members of the public to receive an effective dose equivalent to greater than 10 mrem above background measurements per year. For point-source emissions, compliance is usually determined with air dispersion models that predict the dose at offsite locations, where the public could be exposed. The CAA via NESHAPS also provides environmental concentrations for non-point source radionuclides that would result in an equivalent dose of 10 mrem per year (40 CFR 61 H, 2023) to determine compliance.

The average gross beta results from ORR RadNet Air Monitoring are also compared to the CAA limit for strontium-90. This Sr-90 limit is one of the most stringent standards out of all the beta-emitting radionuclides. The CAA standards apply to the dose above background, so the limit represented in Figure 2.2.7.2 was adjusted to include the average gross beta measurement taken at the Nashville RadNet Air station. However, note that strontium-90 is unlikely to be a large contributor to the total beta measurements reported here and is used only as a conservative reference level to determine if further analysis is warranted.

While the FY24 results at all the RadNet Air stations showed that sites responded in a similar pattern during sampling, the average gross beta results were lower at the Y-12 West and the ORNL Melton Valley stations. Slightly higher average gross beta levels were found at the other two ORR locations. The average results from each of the ORR RadNet monitoring stations were well below the strontium-90 limit (Figure 2.2.7.2).

In FY24, none of the ORR gross beta results exceeded the screening level (1.0 pCi/m^3). And results from 2014 through 2023, showed an average minimum detectable concentration (MDC) of 0.000281 pCi/m^3. In this case, while a concentration at or above 1 pCi/m^3 triggers gamma spectrometry, concentration levels as low as 0.000281 pCi/m^3 can be detected and comparisons can be made. The actual MDC In FY24, none of the ORR gross beta results exceeded the screening level (1.0 pCi/m^3). The actual MDC for each sample is sample-specific but it is usually close to the average MDC across samples.

The most recent 4-year composite analysis for isotopic uranium and plutonium was performed in 2022. Each of the four yearly composite samples from the ORR were analyzed. All values for each isotope were below the limits established by the CAA. The results are listed in Table 2.2.7.1 with units in aCi/m^3. An attocurie (aCi) represents 10E-18 curies, while a picocurie (pCi) represents 10E-12 curies. This table lists individual values for each of the ORR sites as well as some reference values: the average and maximum values for the ORR, background locations (Knoxville, Memphis, and an average of the corresponding national stations), as well as the CAA standard limits. The CAA standards refer to the concentration level allowable above background and were much higher than any of the Tennessee results, or even the national results. In Tennessee, all stations' isotopic plutonium results (Pu-238, Pu-239) were less than the associated MDCs. For isotopic uranium (U-234, U-235, U-238), the ORR average results were comparable to or less than the background results.

The highest results (highlighted in light yellow in Table 2.2.7.1) were almost always from background locations far from ORR. The one exception was the composite U-234 from the Y-12 West location (32.3 aCi/m^3). Overall, the ORR composite results for isotopic plutonium and uranium were well below limits established by the CAA.

Table 2.2.7.1: 2022 RadNet Air Composite Results for Plutonium and Uranium (aCi/m^3)

2022 RadNet Air Composite Analisis for Plutonium and Uranium

	Y-12 East	Y-12 West	ORNL Bethel	ORNL Melton	ORR Average	ORR Maximum	Background Knoxville	Background Memphis	Background National Average*	CAA standard (amount above background)
Pu-238	-0.066	-0.097	0.034	-0.019	-0.037	0.034	0.154	-0.061	0.036	2100
Pu-239	-0.011	0	0.011	0.026	0.0065	0.026	0.033	-0.061	0.103	2000
U-234	14.9	32.3	10.3	3.7	15.3	32.3	6	18	17.2	7700
U-235				0.35			0.45	1.61	1.01	7100
U-238	12.6	15.1	7.9	4.0	9.9	15.1	5.44	15.8	15.6	8300

*Includes all RadNet stations with 2022 Plutonium (Pu) and Uranium (U) data

Highest Results

The 2023 composite gamma analysis for ORR RadNet sites were not yet available for comparison.

2.2.8 Conclusions

The gross beta results for each of the four RadNet Air monitoring stations exhibited similar trends and concentration levels for the period of July 2023 through June 2024 (FY24). All the data during this period were well below the levels which would warrant further analysis. None of the results indicated that activities on the ORR posed a significant impact on the environment or public health.

2.2.9 Recommendations

DoR-OR will discontinue using the RadNet Air project to monitor the ORR for airborne radiological contaminants. Instead, these samplers have been replaced by samplers that are now part of the *Fugitive Radiological Air Emissions Monitoring* project. The recommendation is that the monitoring of air for radiological contaminants on the ORR be continued by the Fugitive Radiological Air Emissions Monitoring project, including at the locations previously monitored by the RadNet Air Monitoring project. Two DoR-OR projects (Fugitive Radiological Air Emissions Monitoring and RadNet Precipitation) will now focus on the detection of radiological contaminants in air. The combined efforts will help to ensure that the radiological air quality is protective of human health and the environment.

Monitoring is especially important due to the upcoming demolition of contaminated buildings, movement of contaminated soils, ongoing operations, and other remedial and construction activities on the ORR. All these activities have the potential to impact air quality.

Also, in the event of an environmental radiological release on or around the ORR, the DoR-OR air monitoring projects could provide valuable information on the extent of airborne radiological contamination before, during, and after the release.

2.2.10 References

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2.3 RadNet Precipitation

2.3.1 Background

The nationwide EPA RadNet Precipitation Monitoring Program measures radioactive contaminants that are removed from the atmosphere and transported to the Earth's surface by precipitation. On the ORR, the *RadNet Precipitation Monitoring Project* provides radiochemical analysis on precipitation samples taken from monitoring stations at two ORNL sites and one Y-12 site. Samples are collected by TDEC DoR-OR personnel, and gamma analysis is performed on monthly composite samples by the EPA Laboratory, NAREL. Gamma analysis functions as a screening tool because few isotopes of interest are pure beta or pure gamma emitters; therefore, if a radiological release occurred on the ORR, some gamma radiation would likely be emitted either directly or from daughter products. Additional analysis may be conducted if a radiological release is known or is indicated by monthly gamma analysis results.

This project measures radioactive contaminants that are captured by precipitation and then fall into a sampler. The analytical results serve as an additional indicator to show when radioactive materials are present. While there are no regulatory standards that apply directly to contaminants in precipitation, this project provides data that could potentially indicate the presence of radioactive materials that may not be evident in the particulate air samples.

Precipitation sampling techniques for this project do not directly correlate to any of DOE's air sampling programs per DOE's *EMP* for 2023 (DOE, 2022). This project seeks to fill a gap in DOE monitoring data by sampling a different medium that might capture radioactive contaminants that are not collected by other methods.

2.3.2 Problem Statements

The two ORR sites with the greatest potential for releasing airborne radioactive contaminants are ORNL and Y-12. Contaminants released from previous and current operations are a concern. Airborne legacy contaminants could potentially be released from the deterioration of contaminated buildings and the decontamination and decommissioning (D&D) of these facilities.

2.3.3 Goals

The goal of the EPA RadNet Precipitation Monitoring Project is to measure radioactive contaminants that are washed out of the atmosphere and reach the Earth's surface through precipitation. DoR-OR participates in this EPA program, collecting samples that provide the precipitation sampling data used as one indicator of the presence or absence of radiological contaminants affecting the ORR and nearby environments.

Precipitation monitoring is used as an additional methodology to possibly capture and measure radioactive contaminants in the environment. This project compares sampling results to drinking water limits used by EPA (as conservative reference values) to assure the public that human health and the environment are being protected.

The results from the project can also be used to identify anomalies in radiological contaminant levels and to assess the significance of precipitation in contaminant pathways. The results can also be used to evaluate associated control measures, and to appraise conditions on the ORR compared to other locations in the nationwide EPA RadNet Program.

2.3.4 Scope

Three precipitation samplers were used to monitor precipitation for radiological contamination. Each sampler was co-located with an ORR RadNet Air station as well as a TDEC Fugitive Radiological Air station for all or much of FY24. The first sampler is located at the east end of Y-12. At this location, the sampler could potentially indicate if any gamma radioisotopes have been moving offsite and towards the City of Oak Ridge. The other two samplers are at ORNL, with one in Bethel Valley and the other in Melton Valley. Samples from all three locations were collected twice weekly. Station locations are shown in Figure 2.3.4.1. The precipitation samples are composited monthly at the EPA laboratory (NAREL) and analyzed for gamma radionuclides. Additional analysis on individual samples may be conducted at the discretion of the EPA, such as in the event of elevated findings or for a nuclear release.

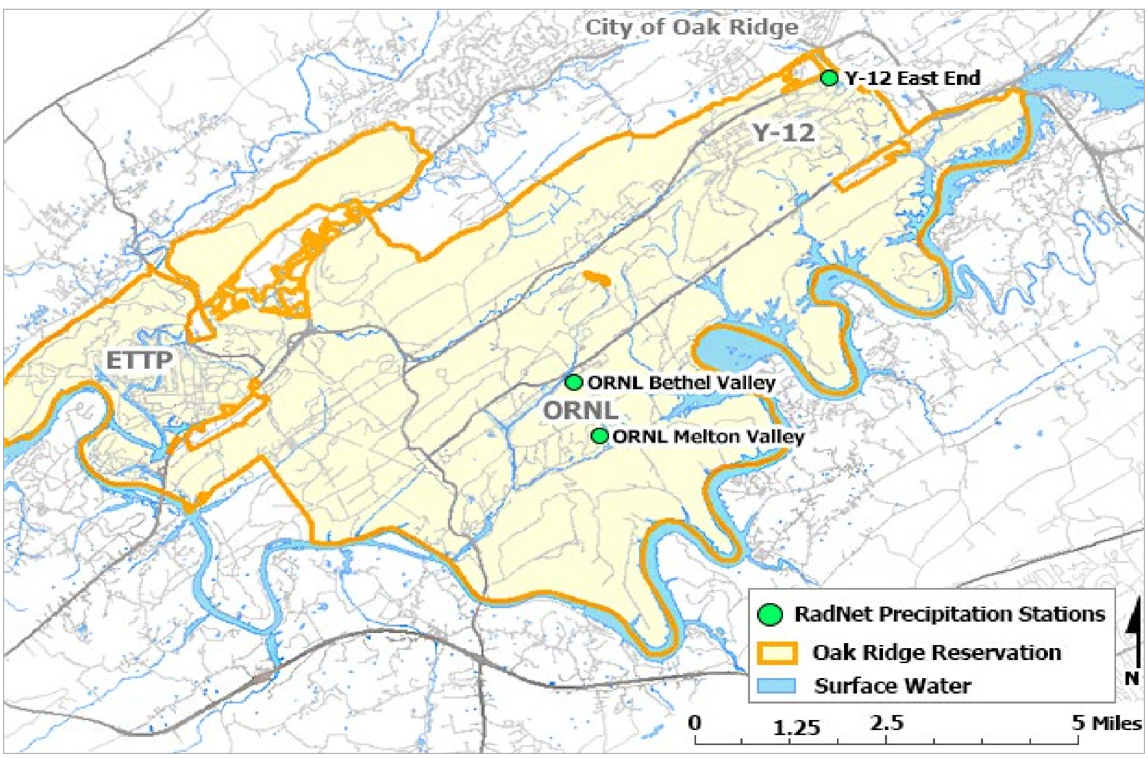

Figure 2.3.4.1: ORR RadNet Precipitation Samplers

2.3.5 Methods, Materials, Metrics

The three precipitation samplers provided by the EPA RadNet Program were used to collect samples on the ORR. Samples were measured and collected on Mondays and Thursdays, except when skipped due to a holiday.

Each RadNet Precipitation sampler collected precipitation that falls on a 0.5 square meter fiberglass collector and drained into a five-gallon plastic collection bucket. Each sample was measured in centimeters with a measuring stick, then collected from the bucket into a four-liter container. These containers were shipped to NAREL for analysis when at least two liters of precipitation were collected and at the end of the month if any sample was collected, as specified by EPA (EPA, 1988; EPA, 2017; TDEC, 2023).

Once at NAREL, each station has any samples combined into one composite monthly sample. Analysis for gamma emitting radionuclides will then be performed on the composite samples from each of the three stations. Additional analysis may be conducted if there is a known radiological release or in the event of elevated findings in the monthly gamma analysis results. The gamma analysis functions as a screening tool because few isotopes of interest are pure beta or pure gamma emitters, so if there were a release on the ORR, it is likely there would be some gamma radiation emitted either directly or from daughter products. Alpha and beta radiation could also be emitted but would not be directly measured by gamma analysis.

Since no regulatory limits for radiological contaminants in precipitation exist, the results of the DoR-OR ORR sampling gamma analyses were compared to drinking water limits established by the EPA and were used here as conservative reference values. In general, EPA's Radionuclides Rule (EPA, 2000) for drinking water allows gross alpha levels of up to 15 picocuries per liter (pCi/L), while beta and gamma emitters are limited to four millirem (mrem) per year and are radionuclide specific (EPA, 2015). Table 2.3.5.1 shows the maximum contaminant levels (MCLs) of beta and gamma emitters that EPA uses as drinking water limits, for select isotopes. Not all gamma producing isotopes have EPA drinking water limits, for example Potassium-40 and Thorium-228 have none. Results from RadNet Precipitation Monitoring stations on the ORR can also be compared to other locations in the EPA RadNet Precipitation network, such as Nashville. However, while the stations located on the ORR are in areas near nuclear sources, most of the other stations in the EPA RadNet Precipitation network are located near major population centers, with no major sources of radiological contaminants nearby.

The results of NAREL's analyses are available in the EPA Envirofacts RadNet searchable database, by either a simple or an advanced search (EPA, 2024). The data can be used to identify anomalies in radiological contaminant levels, to appraise conditions on the ORR as compared to other locations in the RadNet database, and to determine levels of local contamination.

Table 2.3.5.1: EPA Drinking Water Limits for Select Isotopes

Isotope		**EPA Limit *(pCi/L)***
Beryllium-7	Be-7	6,000
Cobalt-60	Co-60	100
Cesium-137	Cs-137	200
Iodine-131	I-131	3

Source: Beta and Photon Emitters in Drinking Water table (EPA, 2015)

2.3.6 Deviations from the Plan

The results in this report would normally cover FY24 (July 2023 through June 2024); however, the results were only available through April 2024, due to a lab equipment issue. Since the May and June 2023 results were not available last year, but are now, the monthly composite results from May 2023 through April 2024 are discussed below.

2.3.7 Results and Analysis

Nationwide RadNet Precipitation sampling results are available via the [RadNet Search]webpage (EPA, 2024).The gamma isotopes identified from the ORR precipitation stations for May 2023 through the first four months of 2024, include beryllium-7, cesium-137, cobalt-60, potassium-40, radium-226, and radium-228. The ORR data for this timeframe were within the range of available data seen at the RadNet Precipitation station in Nashville.

For all isotopes except beryllium-7 (Be-7), results were less than EPA MDCs (minimum detectable concentrations). As stated in the RadNet user guide, the MDCs reflect, "…*the ability of the analytical process to detect the analyte for a given sample. The MDC is the activity concentration for which the analytical process detects the radioactive material in a given sample that provides a 95% chance that the radioactive material will be detected."*

While the majority of Be-7 results were higher than MDCs at the ORR sampling locations, Be-7 was not detected all months at any ORR location. This was similar at the Nashville station. In addition, Be-7 is a naturally occurring cosmogenic radionuclide produced in the upper atmosphere and has a drinking water limit of 6,000 pCi/L. The highest ORR RadNet Be-7 result during this time period was 72 pCi/L, with an average value of 39 pCi/L, well below the conservative drinking water limit, and so is not of concern.

2.3.8 Conclusions

In the absence of regulatory limits for radionuclides in precipitation, EPA's drinking water limits provide conservative reference values for data comparison. The highest values seen in the composited monthly precipitation samples for all three ORR stations were well below the EPA Drinking Water MCLs. Only Be-7, had any results above the associated MDCs, and it is naturally occurring. For May 2023 through April 2024, RadNet Precipitation results for the ORR stations were below detection limits or below the regulatory limits used for drinking water for all analyses and, as such, does not indicate an impact on the environment or public health from ORR emissions.

2.3.9 Recommendations

Continued monitoring of the ORR precipitation for airborne radiological contamination via the ORR *RadNet Precipitation Project* is recommended by DoR-OR. Precipitation monitoring will help ensure that contamination on the ORR does not present risk to human health or the environment.

2.3.10 References

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3.0 BIOLOGICAL MONITORING

3.1 BENTHIC COMMUNITY HEALTH

3.1.1 BACKGROUND

The *Benthic Community Health Project* monitors the current and changing conditions of benthic (i.e., stream-bottom) communities in streams on the ORR. These streams have been negatively impacted by historical Manhattan Project activities as well as current DOE operational activities. The purpose of this project is to document the macroinvertebrate taxa present in streams, assign Tennessee Macroinvertebrate Index (TMI) scores for stream sites, and note any changes from previous sampling years. Additionally, changes that coincide with ongoing CERCLA remedial activities are documented.

Aquatic macroinvertebrate species serve as quantitative (the number of species present) and qualitative (the type of species present) indicators to assess biotic responses to environmental stressors (Holt, 2010). Macroinvertebrates are tied to the stream bottom and generally do not move or migrate very far. These animals are continuously exposed to any adverse conditions caused by direct or indirect discharges to these waters. In addition, the longest life stage for macroinvertebrate species is usually aquatic or semi-aquatic. Remaining in the same stream section for a significant portion of their lives, allows these animals to be a good index of environmental changes over time.

The biodiversity of macroinvertebrates was evaluated for the four (4) main streams on the ORR. Unimpacted reference streams were used to determine the typical composition of a healthy macroinvertebrate community. The macroinvertebrate taxa from each impacted stream were compared with those found in the associated reference stream.
Four (4) main streams were studied at the three (3) ORR campuses:

1) ORNL: (1) White Oak Creek
2) ETTP: (2) Mitchell Branch
3) Y-12: (3) East Fork Poplar Creek and (4) Bear Creek

Alternatively, ORNL conducts benthic macroinvertebrate sampling for DOE across the ORR. After completion of the taxonomy and relevant calculations, ORNL reports their findings in both the *Remediation Effectiveness Report (RER)* and the *Annual Site Environmental Report (ASER)* each year.

ORNL's Aquatic Ecology Group conducts benthic macroinvertebrate monitoring on some of the same streams as DoR-OR. The number of specific stream sites differs between the two agencies, but some sampling sites are shared. ORNL operates two protocols: 1) a quantitative method that is run in the spring, and 2) TDEC's semiquantitative method that is run in the fall.

At shared sites, TDEC sampling serves as an independent check on ORNL's monitoring results. At sites that only TDEC samples, macroinvertebrates are collected to fill a gap in data.

3.1.2 Problem Statements

Past studies indicate that most of the ORR macroinvertebrate communities have been negatively impacted. ORR communities are typically less diverse, have fewer sensitive species, and lower TMI scores, when compared to healthy communities in unimpacted reference streams (TDEC 2022, DOE 2022). Many of the impacts affecting ORR streams result from both historical and current DOE activities. When macroinvertebrate communities change, the project team attempts to determine whether the migration of legacy waste, current operations, and/or another variable is responsible for this change. Below are specific considerations that arise when determining what variables are responsible for the changes.

1) Identifying what contaminants are impacting each sampled community. Contaminants could be from migration of legacy waste (Manhattan project), from current operational effluents and/or spills, or a combination of both.

2) Channelization inhibits the establishment of diverse, healthy stream bottom communities by altering *riffle, run, pool* sequence, reducing number of preferred habitats, and eliminating stream sinuosity (i.e. curvature). Straightening a stream eliminates its natural sinuosity (i.e. curvature), which slows stormwater and reduces flooding which creates in-stream areas of refuge.

3) Controlling for inherent, environmental variability (i.e., seasonal changes, year-to year fluctuations in weather) as much as possible and moderating data through long-term sampling.

4) Controlling for the knowledge and experience of the sampler, alleviated with ongoing long-term sampling.

5) Necessary sample site location changes due to habitat alterations (i.e., construction of beaver dam), severe weather events (i.e., flash flooding), or human activities that cause a loss or alteration in habitat.

6) DoR-OR sampling produces semi-quantitative data and ORNL's sampling produces quantitative data. Due to this difference DoR-OR must evaluate for qualitative similarities as opposed to direct, quantitative comparisons.

3.1.3 Goals

1) Assess the benthic macroinvertebrate community health of the four (4) main ORR streams.

2) Maintain continuous sampling at impacted and reference sites to compare current stream health with previous years.

3) Find any changes in biodiversity that may be due to contaminant migration and/or potential releases.

4) Provide a yearly quality check (QC) on ORNL's ORR macroinvertebrate data.

5) Draft monitoring recommendations and contaminant impact concerns based on the analysis of macroinvertebrate communities.

3.1.4 Scope

The four (4) main streams on the ORR were sampled in FY24. During the spring of 2023, eleven (11) benthic macroinvertebrate samples were collected from DOE impacted streams and four (4) samples were collected from unimpacted reference streams (Table 3.1.4.1). Additional duplicate samples were collected at two (2) sites (WCK 6.8 and MBK 1.6) to collect quality control data on field and laboratory methods. The total number of macroinvertebrate samples collected was seventeen (17).

Table 3.1.4.1: Benthic Macroinvertebrate Sampling Sites

Facility	Stream	Site	Reference Station
Y-12	Bear Creek	BCK 12.3	MBK 1.6* & CCK 1.6
		BCK 7.6	
		BCK 3.3	
	East Fork Poplar Creek	EFK 23.4	
		EFK 13.8	
		EFK 6.3	
		EFK 2.2	
ORNL	White Oak Creek	WCK 3.9	WCK 6.8*
		WCK 2.3	
	First Creek	FCK 0.1	
ETTP	Mitchell Branch	MIK 0.45	MIK 1.16

**Duplicate samples were collected at these two sites*

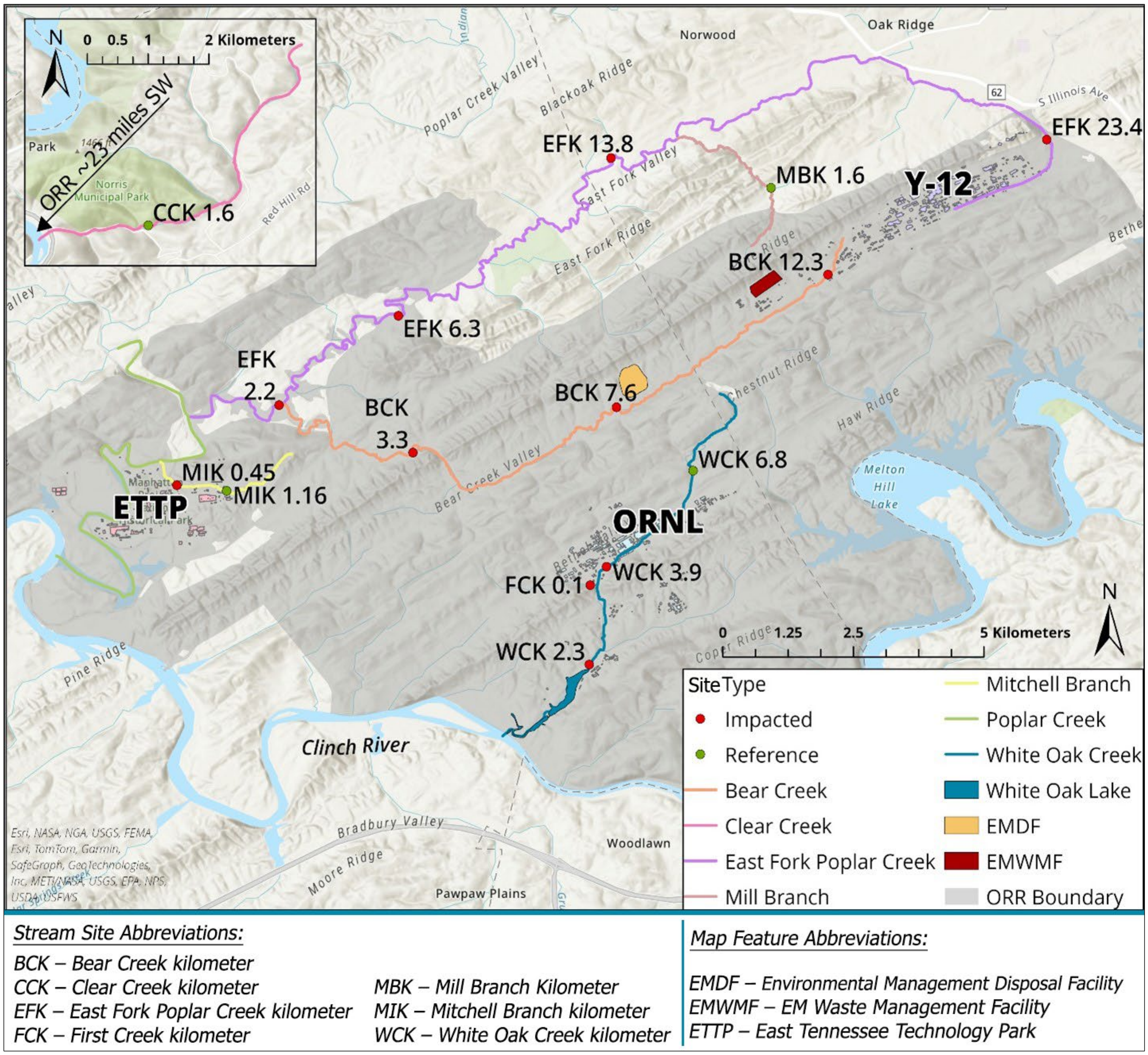


Figure 3.1.4.1: Benthic Macroinvertebrate Sampling Locations

3.1.5 Methods, Materials, Metrics

All sampling methods follow the TDEC DWR *Standard Operating Procedure for Benthic Macroinvertebrate Sampling* (SOP # DoR OR-T-260).

Macroinvertebrate Collection:

Sampling for this project required two people at a minimum. One person, standing downstream, set a one-square-meter kick net with a 500-micron mesh across a predetermined riffle. The other person, using their feet, disturbed approximately 1 m^2 area of the stream substrate directly upstream of that net. The organisms, sediment, and detritus flowed into the net. The net was then carefully lifted out of the water and carried horizontally to the streambank. The bottom of the net was positioned in a 500-micron sieve bucket. The net was thoroughly rinsed into the sieve bucket. Organisms still clinging to the net after rinsing were collected and placed into the bucket using forceps. This process was repeated using a second riffle upstream of the previous sample collection. The two square kick collections were then composited, placed in a plastic container, and preserved with 95% ethanol.

PROCESSING SAMPLES:

The processing of benthic samples occurred at the DoR-OR Laboratory and consisted of two major steps. The first step was sample sorting, where benthic organisms were removed from almost all the detrital material collected. The benthic organisms and any remaining detrital material were transferred into a numbered tray and evenly distributed. Four random numbers were selected using a random number generator. The corresponding numbers in the tray were then selected as subsamples.

The four subsamples were processed using a binocular dissecting microscope to remove benthic macroinvertebrates from the remaining detrital material. During sorting of the subsamples, macroinvertebrates were placed into a separate vial with 95% ethanol and a running count of collected organisms was maintained. If more than 240 macroinvertebrates were counted after processing all four original subsamples, then another subsampling was performed on the macroinvertebrates counted from the original subsamples. During a second subsample, organisms and ethanol were transferred to a petri dish with a grid. Four grids were selected using a random number generator and macroinvertebrates were sorted and again counted. If the second sorting produced less than ~160 individuals, additional grid numbers were randomly selected and counted. Grid numbers were selected until the required number, between 160 and 240, of macroinvertebrates were collected. Typically, more than four grids were needed to achieve the desired number of organisms in the second subsample.

Once sorting and subsampling of all samples was completed, macroinvertebrates without the potential for radiological contamination were sent to Third Rock Consultants to be identified. Macroinvertebrates with potential for radiological contamination were sent to a laboratory with the appropriate radiological license, CG Services. Macroinvertebrates were identified to genus when possible.

DATA ANALYSIS:

After receiving the identification results, these data were transcribed into the Division of Water Resources (DWR) macroinvertebrate template and the DoR-OR's database template. Data were sent to DWR and uploaded to TOReis, an internal data repository. DWR calculated various biometrics scored them to produce final TMI scores for each site. A description of the biometrics calculated and the expected response to environmental stressors are listed in Table 3.1.5.1.

A numerical score was calculated for each individual biometric. Those scores were used to determine the TMI score. A TMI score of 32 to 42 meets all bio-criteria for a healthy benthic macroinvertebrate community with no impairment to the system. A TMI score below 32 falls below bio-criteria guidelines and indicates macroinvertebrate community impairment. TMI scores for impacted sites are compared to the unimpacted reference sites. Further information about sampling procedures and biometric calculations can be found in the *Quality System SOP for Macroinvertebrate Stream Surveys* published by DWR (TDEC DWR, 2021).

Table 3.1.5.1 Biometrics used to calculate TMI Score

Description of Biometrics and Expected Responses to Stressors			
Category	**Metric**	**Description**	**Response to Stress**
Richness	Taxa Richness	Measures overall diversity of the macroinvertebrate assemblage	Number Decreases
	EPT Richness	Number of taxa in the orders Ephemeroptera, Plecoptera, and Trichoptera	Number Decreases
Composition	%EPT-Cheum	% of EPT abundance excluding Cheumatopsyche taxa	% Decreases
	%OC	% of Oligochaetes and Chironomids present	% Increases
Tolerance	North Carolina Biota Index (NCBI)	Incorporates richness and abundance with a numerical rating of tolerance	Number Increases
	% TNUTOL	% of Nutrient Tolerant organisms, those with NCBI scores > 3.0	% Increases
Habitat	%Clingers	% of organisms with fixed retreats or attach themselves to substrate	% Decreases

3.1.6 Deviations from the Plan

Instead of sampling Mitchell Branch kilometer (MIK) 1.43 as originally planned, MIK 1.16 was sampled (TDEC EMP 2024). Once TDEC staff became aware of the site discrepancy, the spring sampling season was over, and another sample could not be collected from MIK 1.43. Samples collected in Bear Creek and White Oak Creek were collected in June 2023 instead of May 2023. These samples were collected later due to a site access issue. Results are not expected to be impacted by the change in sampling date.

3.1.7 Results and Analysis

Small year-to-year variations in TMI scores can be attributed to a multitude of factors including, but not limited to, the following:

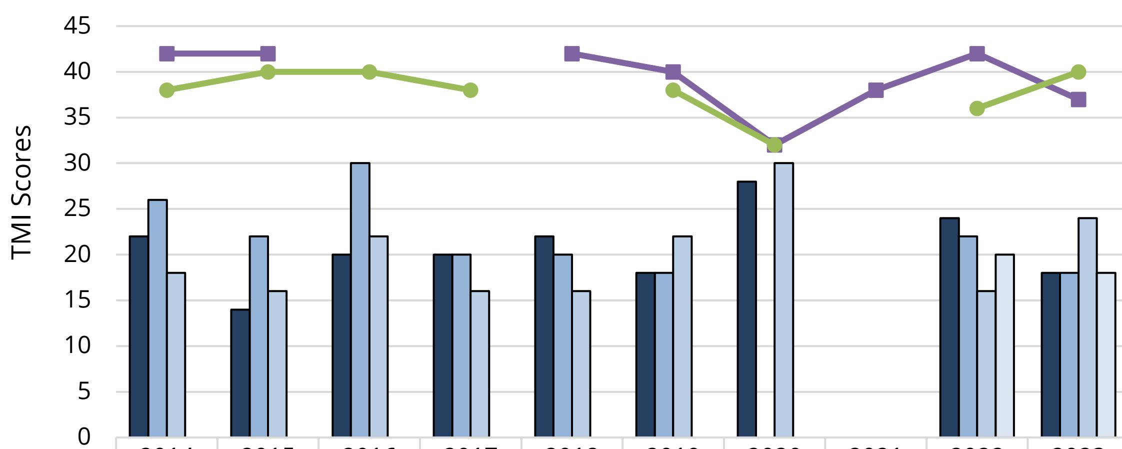
1) Climate fluctuations with increased extremes in temperatures.

2) Dry seasons cause low water levels various times of the year.

3) Extreme weather events, especially heavy rains, and flooding on days prior to sampling events.

East Fork Poplar Creek (EFPC)

The headwaters of EFPC originate from tributaries that flow through the main industrialized portion of Y-12. At its headwaters, EFPC receives inputs of contaminants such as mercury, uranium, volatile organic compounds (VOCs), and other metals and organics. Once offsite, EFPC receives further contaminant loading from municipal Oak Ridge as it flows downstream through urbanized and suburbanized areas. Additionally, site EFK 13.8 is located just upstream of a sewage treatment facility. Downstream portions of EFPC after site EFK 6.3 are relatively undisturbed before reaching its confluence with Poplar Creek.



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
EFK 23.4	22	14	20	20	22	18	28		24	18
EFK 13.8	26	22	30	20	20	18			22	18
EFK 6.3	18	16	22	16	16	22	30		16	24
EFK 2.2									20	18
MBK 1.6	42	42			42	40	32	38	42	37
CCK 1.6	38	40	40	38		38	32		36	40

EFK 23.4 EFK 13.8 EFK 6.3 EFK 2.2 MBK 1.6 CCK 1.6

Figure 3.1.7.1 EFPC Historical and Current TMI Scores (2014-2023)

TMI scores for all EFPC sites have been below the biocriteria guideline of 32 for the past ten years (Figure 3.1.7.1). Additionally, all EFPC sites have lower TMI scores than their reference sites (MBK 1.6 and CCK 1.6). In 2023, EFK 6.3 had the highest TMI score of all the EFPC sites. EFK 6.3 also scored above the ten-year average TMI score of twenty (20) for the site. All the other EFPC sites had the same TMI score of eighteen (18). All EFPC sites, excluding EFK 6.3, scored lower than the ten-year average TMI score at each site.

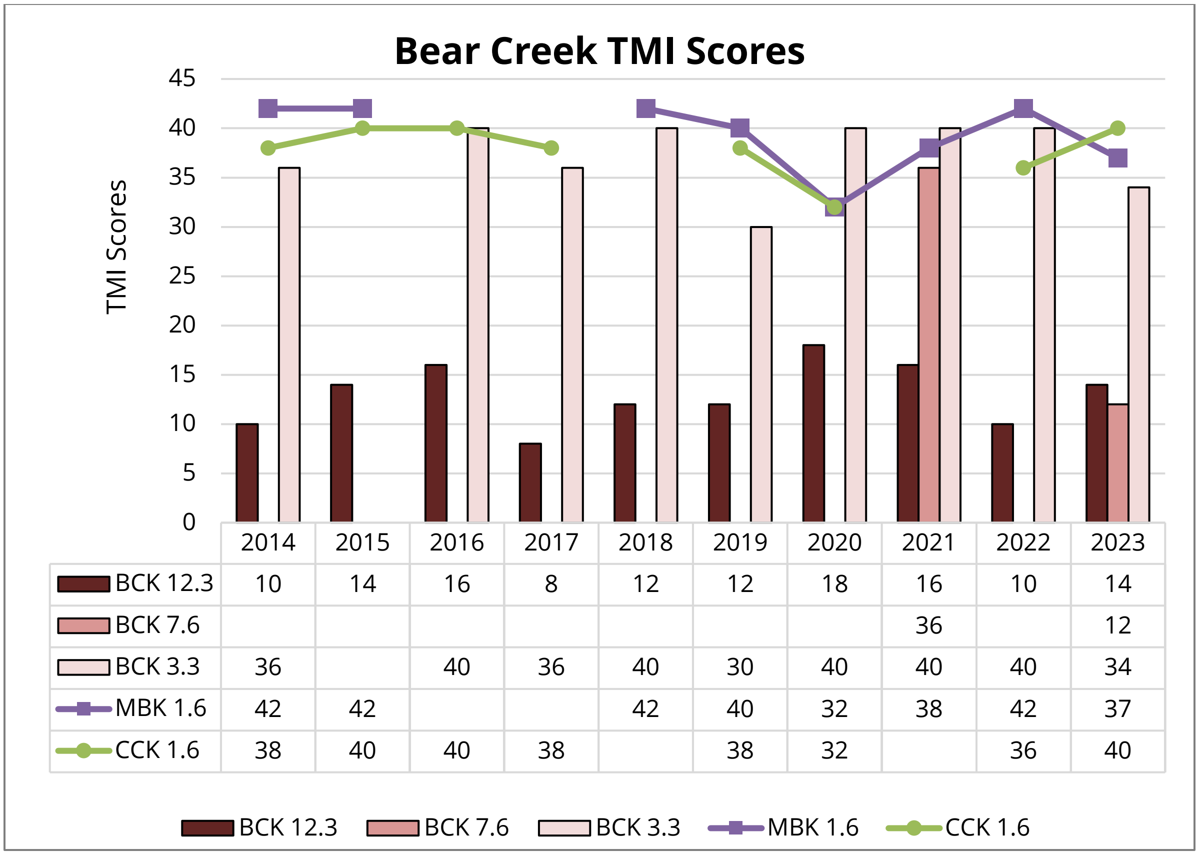
The individual calculated biometrics for each EFPC site in 2023 can be found in Table 3.1.7.1. Each of these metrics were given a score and were composited to yield the TMI score.

Table 3.1.7.1 East Fork Poplar Creek Macroinvertebrate Biometrics in 2023

	EFK 23.4	EFK 13.8	EFK 6.3	EFK 2.2	MBK 1.6	CCK 1.6
Taxa Richness	22	22	21	26	34	37
EPT Richness	4	4	5	8	12.5	18
%EPT-Cheum	2.8	9.5	25.6	19.8	49.8	55.9
%OC	61.2	44.8	21.3	67.1	10.95	8.5
NCBI	6.84	5.9	5.44	5.19	3.02	3.58
%Clingers-Cheum	59.6	30.3	46.4	14	49.3	47.3
%TNUTOL	51.7	59.9	57	32.9	7.05	19.1

Bear Creek (BC)

BC is a small to moderate-sized stream whose headwaters originate at the west end of Y-12. Historically, pollutants from industrial activities, as well as waste disposal activities at Y-12, were released into BC. Former waste disposal sites, such as the S3 ponds (at its headwaters), continue to negatively impact the water quality of the stream. Downstream from Y-12, BC continues to be impacted by inputs from legacy and active waste disposal sites, like the EMWMF Landfill and Bear Creek Burial Grounds. BC is also a stream where shallow groundwater and surface waters mingle freely throughout its length to its confluence with EFPC.



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
BCK 12.3	10	14	16	8	12	12	18	16	10	14
BCK 7.6								36		12
BCK 3.3	36		40	36	40	30	40	40	40	34
MBK 1.6	42	42			42	40	32	38	42	37
CCK 1.6	38	40	40	38		38	32		36	40

Figure 3.1.7.2 Bear Creek Historical and Current TMI Scores (2014-2023)

In 2023, BCK 7.6 had the lowest TMI score of any Bear Creek site (Figure 3.1.7.2). There is a stark difference in TMI score from 2021 and 2023 at BCK 7.6 for reasons unknown. BCK 12.3 had a TMI score of fourteen (14), which is similar to the ten-year average of thirteen (13) for this site. BCK 12.3 is located near Y-12. BCK 3.3 remained above the passing bio-criteria guidelines (TMI ≥32) in 2023.

In addition to scoring well below bio-criteria guidelines, BCK 12.3 TMI scores are decidedly below those of both reference sites (MBK 1.6 and CCK 1.6). The ten-year average for BCK 12.3 is only a 13. Additionally, the ten-year average for both reference sites is 40 (MBK 1.6) and 38 (CCK 1.6) respectively. BCK 3.3 has a ten-year average of 37, which better aligns with the reference site TMI scores.

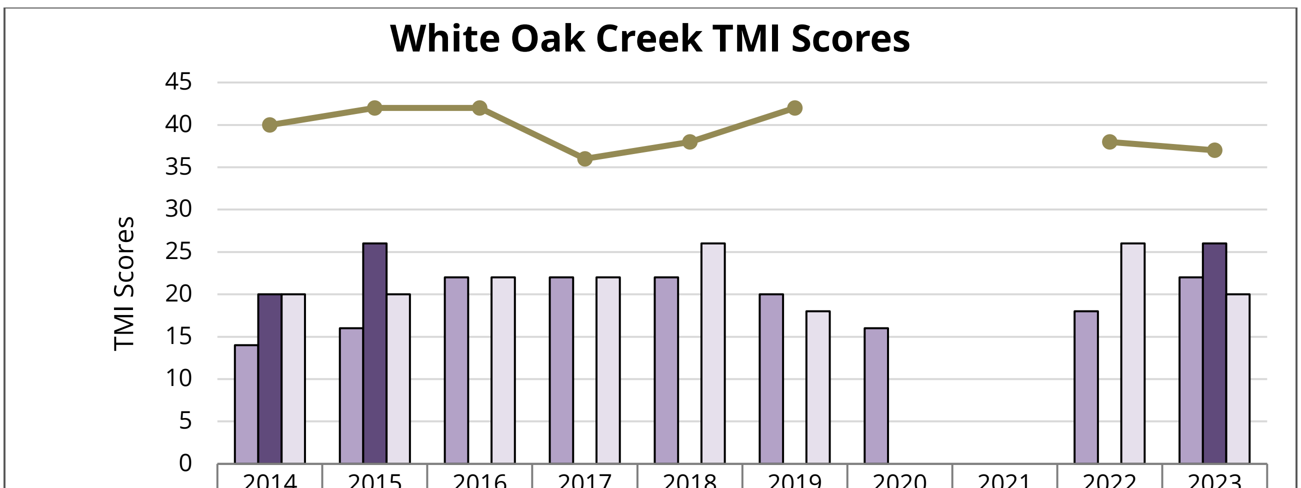
The individually calculated biometrics for each BC site in 2023 can be found in Table 3.1.7.2. Each of these metrics were given a score and were composited to yield the TMI score.

Table 3.1.7.2 Bear Creek Macroinvertebrate Biometrics 2023

	BCK 12.3	BCK 7.6	BCK 3.3	MBK 1.6	CCK 1.6
Taxa Richness	17	13	23	34	37
EPT Richness	3	3	9	12.5	18
%EPT-Cheum	1.7	7.5	36.4	49.8	55.9
%OC	15.7	2	7.2	10.95	8.5
NCBI	6.43	5.1	3.71	3.02	3.58
%Clingers-Cheum	22.1	12	57.4	49.3	47.3
%TNUTOL	78.5	81.5	35.4	7.05	19.1

WHITE OAK CREEK (WOC)

WOC is the main drainage for majority of ORNL's contaminated areas. The stream flows near the Spallation Neutron Source, then through the main plant area in Bethel Valley, and finally into the Melton Valley watershed. WOC flows through Solid Waste Storage Areas (SWSAs) and then empties into White Oak Lake (WOL). Water from WOL exits the reservation through White Oak Embayment into the Clinch River. WCK 3.9 is located on the south side of ORNL and downstream of Fifth Creek. This tributary receives inputs from a large portion of ORNL's main campus. WCK 3.9 is downstream of a radiological wastewater treatment facility. WCK 2.9 is located near the mouth of WOL and just after SWSAs. The main COCs of WOC and WOL are radionuclides such as, cesium-137 and strontium-90.



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WCK 3.9	14	16	22	22	22	20	16		18	22
FCK 0.1*	20	26								26
WCK 2.3	20	20	22	22	26	18			26	20
WCK 6.8	40	42	42	36	38	42			38	37

**2014-2015 samples were collected during the fall by ORNL following the TDEC DWR protocol*

Figure 3.1.7.3 White Oak Creek (WOC) Historical and Current TMI Scores (2014-2023)

In 2023, WCK 3.9 scored similarly to previous years, showing some improvement in score from the 2020 and 2022 results (Figure 3.1.7.3). WCK 2.3 decreased in TMI score from twenty-six (26) to twenty (20). All WOC sites have scored much lower than the reference site, WCK 6.8, over the past ten years. The ten-year average TMI score for WCK 3.9 and WCK 2.3 are nineteen (19) and twenty-two (22), respectively, whereas the ten-year average for WCK 6.8 is thirty-nine (39). Additionally, WCK 3.9 and WCK 2.3 remain well below the threshold for passing all bio-criteria guidelines (TMI≥32).

First Creek kilometer 0.1 (FCK 0.1) was sampled in 2023 to support the goals of the *White Oak Creek Assessment Project (WOCAP)*. ORNL results from 2014 and 2015 are similar to results DoR-OR collected in 2023. This site had lower TMI scores than the reference site and was below passing bio-criteria guidelines (TMI≥32).

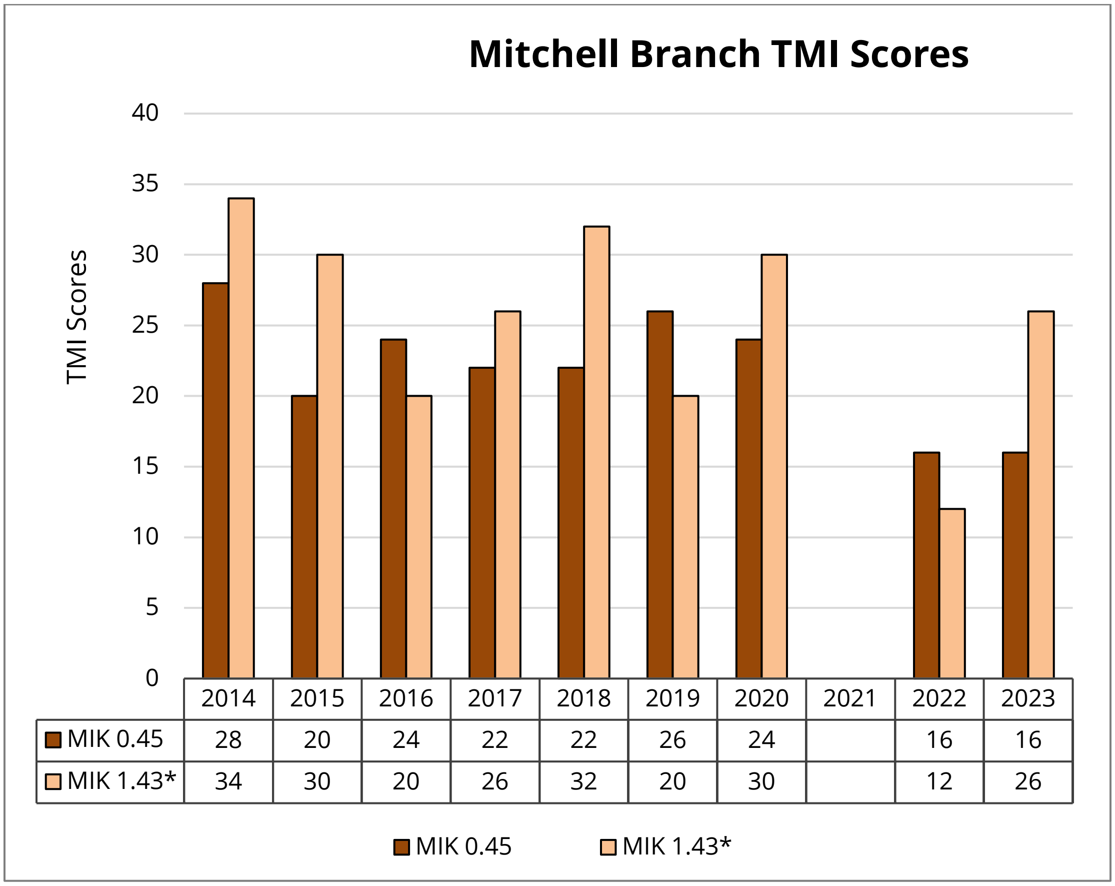
The individual calculated biometrics for each WOC site and the First Creek site in 2023 can be found in Table 3.1.7.3. Each of these metrics were given a score and were composited to yield the TMI score.

Table 3.1.7.3 White Oak Creek and First Creek Macroinvertebrate Biometrics in 2023

	WCK 3.9	FCK 0.1	WCK 2.3	WCK 6.8
Taxa Richness	20	31	20	33
EPT Richness	2	8	7	12.5
%EPT-Cheum	38.2	11.6	75.1	38.55
%OC	8.5	15.2	10.5	13.65
NCBI	4.96	4.89	6.34	3.79
%Clingers-Cheum	22.4	45.5	12.4	61.9
%TNUTOL	35.2	49.5	77.5	24.5

MITCHELL BRANCH

Mitchell Branch is a small headwater tributary to Poplar Creek at the ETTP. The highest upstream station, which serves as the reference station (MIK 1.43), does not meet the criteria for rating, according to the bioregion concept, due to the size of the watershed above it (<two square miles). Because of the small upstream watershed and variable flow conditions depending on annual rainfall, MIK 1.43 does not always provide a clear picture of the impacted condition of the downstream station (MIK 0.45). Historically, MIK 1.43 has been relatively unimpacted by the presence of ETTP. The lower station, MIK 0.45, has been impacted not only by former industrial activities at ETTP and waste areas, but also channelization, with much of the channel being replaced with unnatural substrate. Over time, the substrate (stream bottom) is becoming more natural, allowing a more diverse community to inhabit those stations. Further improvements in substrate, as well as water quality improvements due to remediation activities, will allow Mitchell Branch to continue to improve.



**MIK 1.16 was sampled in 2023 instead of MIK 1.43*

Figure 3.1.7.4 Mitchell Branch Historical and Current TMI Scores (2014-2023)

In 2023, there was a sharp increase in the TMI score for MIK 1.43. Mostly likely, the increase can be attributed to the change in sampling location (MIK 1.16), but it may also be a return to the values typically observed in the upstream portion. The ten-year average for MIK 1.43 is twenty-six (26), so the score of twenty-six (26) downstream at MIK 1.16 should allow for comparison between the impacted site (MIK 0.45) and the unimpacted site (MIK 1.16).

MIK 0.45 continued to show an impairment in the macroinvertebrate communities in 2023. The site's ten-year average is twenty-two (22) which is not much lower than the reference site's ten-year average of twenty-six (26). Neither Mitchell Branch site is considered to be passing bio-criteria guidelines (TMI≥32).

The individual calculated biometrics for each MIK site in 2023 can be found in Table 3.1.7.4. Each of these metrics were given a score and were composited to yield the TMI score.

Table 3.1.7.4: Mitchell Branch Macroinvertebrate Biometrics in 2023

	MIK 0.45	MIK 1.16
Taxa Richness	24	32
EPT Richness	4	8
%EPT-Cheum	5.1	16.4
%OC	83.7	54.5
NCBI	5.66	5.02
%Clingers-Cheum	18.6	35.5
%TNUTOL	31.2	30

3.1.8 Conclusions

The health of the benthic macroinvertebrate communities in ORR streams has improved since the 1980's. The improvement has remained somewhat consistent for the past decade. In 2023, some impacted sites saw a decrease in TMI scores from previous sampling years, but a few impacted sites were comparable to previous years or improved. The two Y-12 streams (EFPC and BC) continue to show impairment at their headwaters, which are located near DOE facilities and industrial activities.

EFPC sites have scored substantially lower than reference sites consistently over the years. Lower scores are potentially the result of human alterations.

1) Channelization at the headwaters of EFPC reduced ideal stream habitats.

2) Water temperatures are typically higher at EFPC sites than at reference sites.

3) EFPC receives substantial inputs of mercury from Y-12 facilities.

BC sites closer to Y-12 (BCK 12.3 and 7.6) have lower TMI scores than sites further away from Y-12 (BCK 3.3). Lower scores at upstream sites are potentially the result of the following:

1) Limited water in the stream during the dry season reduces the potential for contaminant dilution.

2) Higher contaminant concentrations at sites closer to Y-12 facilities.

3) Reduction in available habitat closer to Y-12.

In 2023, Bear Creek had the lowest and second lowest TMI scores (BCK 7.6 and 12.3, respectively) out of all the ORR sites sampled in 2023. On the other hand, BCK 3.3 is the only ORR site that continues to have TMI scores above bio-criteria guidelines and comparable to scores seen at reference sites.

The ORNL streams, White Oak Creek and First Creek have been relatively static over the past decade, with only slight variations from year-to-year. WCK 3.9 and WCK 2.3 scored comparable to previous years. In 2023, FCK 0.1 had similar TMI scores observed in 2014 and 2015 by DOE. However, both WOC and First Creek impacted sites score well below bio-criteria guidelines and the corresponding reference site (WCK 6.8). Since both streams only receive inputs from ORNL, it is most likely the ORNL activities have an impact on the macroinvertebrate communities in both streams, causing lower TMI scores. WCK 2.3 typically scores higher than WCK 3.9, possibly because it is located further downstream from ORNL's main campus.

The ETTP stream, Mitchell Branch, expressed an increase in TMI score for the reference site (MIK 1.16) and the impacted site (MIK 0.45) remained the same as the previous year's sample. One reason for the decrease in TMI score at MIK 0.45 could be due to soil excavation activities taking place near the site. An increase in sedimentation and turbidity in streams can have negative effects on macroinvertebrate communities.

3.1.9 Recommendations

Benthic macroinvertebrate communities should continue to be monitored yearly, generally at an upstream and downstream location for each watershed, to verify DOE's interpretation of stream health following their benthic macroinvertebrate monitoring program across the ORR. DoR-OR will compare DOE's data (collected using the TDEC semi-quantitative protocol) to DoR-OR's monitoring efforts and calculated TDEC metrics. This ongoing long-term sampling will help to adjust for differences in sampler experience and additional environmental variables (i.e., temperature increases, dry seasons, flooding events, etc.). TMI scores that are higher than previous years serve to verify that DOE remedial efforts are having a positive effect on those communities. Other areas, with lower TMI scores, are possibly more impacted and may take more time to be effectively remediated.

3.1.10 References

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3.2 ROVING CREEL SURVEY

3.2.1 BACKGROUND

The three main ORR streams, White Oak Creek (WOC), Bear Creek (BC), and East Fork Poplar Creek (EFPC), are impacted by both historical and ongoing DOE activities. Grassy Creek (GC) has been impacted by historical DOE activities. Previous sediment samples collected from the mouth of GC have had detections of cesium-137 prompting the inclusion of the confluence of Grassy Creek with the Clinch River as a new zone this FY. The three main streams and GC contain contaminants of concern (COCs) that have been shown to bioaccumulate in fish tissue (EPA, 2020). Since these streams discharge into publicly accessible waters (Clinch River and Poplar Creek), fish consumption is a likely pathway for human exposure to COCs. The Roving Creel Survey (RCS) is an ongoing project that measures angling effort on waterways just outside the ORR boundaries. Measuring angling effort will provide more quantitative information on potential human exposure.

BC and EFPC originate within the confines of the Y-12. Both streams are fed by springs and numerous outfalls from the Y-12 National Security Complex. Uranium in BC and mercury (Hg) in EFPC are the main COCs in these streams. Considering the risk posed by these COCs on human and environmental health, fishing and recreational activities were also surveyed in the lower reaches of BC and EFPC. Monitoring recreational activities, such as swimming or wading, in these two streams can also provide information about potential exposure to COCs. Survey drop boxes were placed along the North Boundary Greenway (NBG) in 2022 and walking surveys performed once per quarter. Numerous paper and online surveys are submitted at the survey boxes every year and many people have been observed and interviewed by DoR-OR staff. Based on previously submitted surveys and interviews, fishing occurs in both BC and EFPC. Surveying along the NBG remains important because COCs have continued to be found in higher concentrations in BC and EFPC than in the Clinch River (CR).

White Oak Creek (WOC) originates just north of ORNL and eventually empties into the Clinch River via White Oak Lake (WOL). Radionuclides released from ORNL to WOC are a result of leaks from ponds and waste disposal areas and include contaminants such as strontium-90 (Sr-90) and cesium-137 (Cs-137), as well as other byproducts from nuclear and industrial activities (DOE, 1988). These are significant because of their radiotoxicity, their mobility in the environment, and the quantities released. Other radionuclides of significance include tritium and transuranics (DOE, 1988). The availability of Cs-137 for biological uptake is a public health concern, as it can be transferred to humans through food webs. Even in the most mobile aquatic habitats (i.e., flowing rivers), Cs-137 may persist in a biologically available form for several years after release (Rowan DJ, 1994; Sakai MT et al, 2016). The RCS project monitors angler activity where WOL discharges into the Clinch River.

3.2.2 Problem Statements

1) Bioaccumulation: Fish have been shown to bioaccumulate mercury and other contaminants (Murphy, 2004). If contaminated, ingestion of these fish could harm people and other piscivores.

2) Warning Signage: Fish consumption warning signs and postings are either not visible, not legible, or they are missing. In addition, residents who have fished these waters for many years may disregard warnings.

3) Human Exposure: Previous surveys suggest that recreational use of the resources surrounding the ORR is common, but the extent of human engagement with these resources is not fully understood.

4) DOE does not monitor angling effort in areas of concern, leaving a gap in knowledge about exposure pathways after leaving the ORR.

3.2.3 Goals

1) Quantify the angling effort in the five (5) key locations just outside ORR boundaries (EFPC and BC along the NBG, confluence points of EFPC-PC, PC-CR, WOL-CR, and GC-CR).

2) Determine if recreational fishing is a viable pathway for human exposure to contaminants.

3) Provide data that is pertinent to future ORR decisions regarding human health and environmental protection.

4) Document the amount of human recreational activity in the lower reaches of BC and EFPC within the North Boundary Greenway.

3.2.4 Scope

Roving Creel Surveys (RCSs) were conducted along the Clinch River (CR) and Poplar Creek (PC). Attempts to interview every angler observed along the entire route were made; however, angling effort was only calculated for the survey zones of interest. These survey zones are the following confluence areas; (1) WOL-CR, (2) PC-CR, (3) EFPC-PC, (4) GC-CR. Additionally, a survey box at the Gallaher boat ramp passively collected digital and paper surveys (Figure 3.2.4.1). Attempts to complete RCSs were conducted five times per quarter.

NBG recreator interviews were conducted once per quarter, at the same time as the RCSs. During NBG surveys, DoR-OR personnel travelled along the interview path and interviewed recreators. The same path was walked each survey and survey boxes along the greenway were checked for submitted paper surveys (Figure 3.2.4.1).

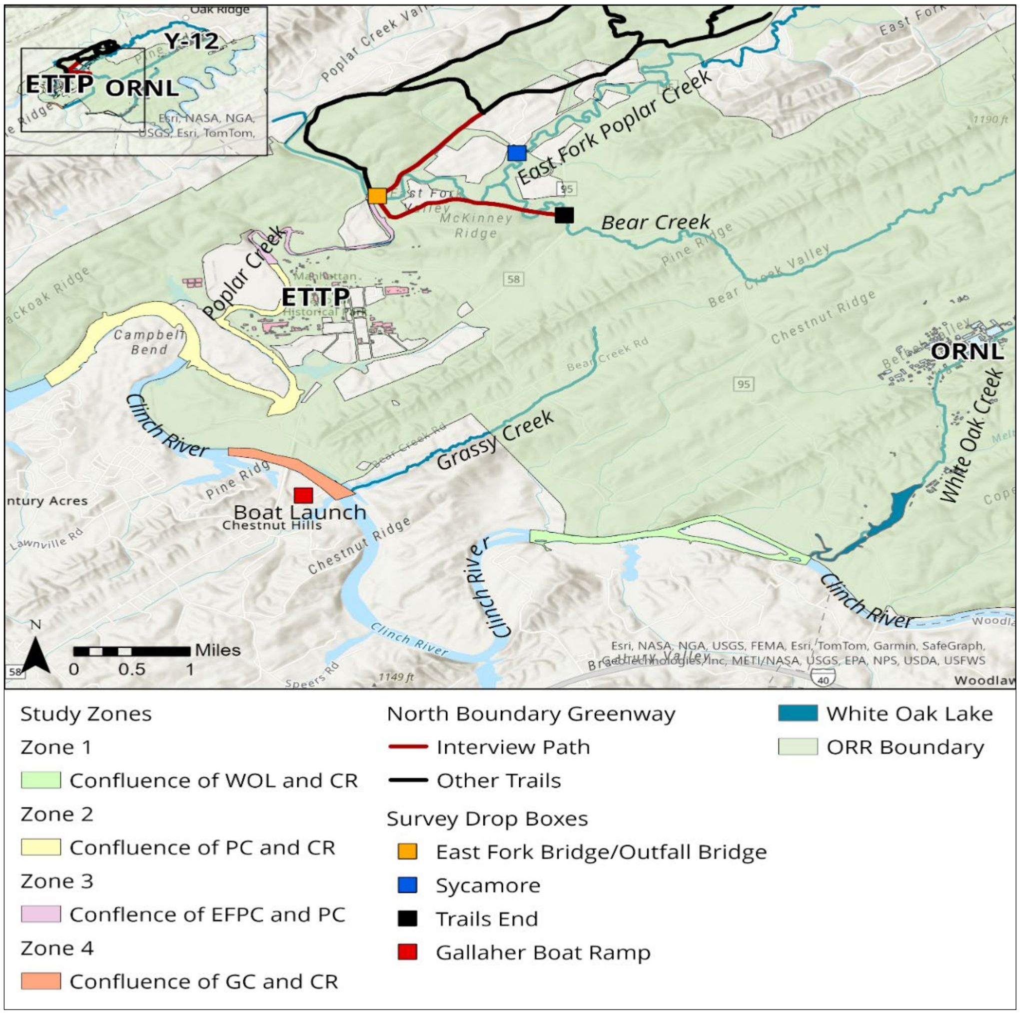


Figure 3.2.4.1: RCS Study Zones and NBG Trail for Interviews

3.2.5 Methods, Materials, Metrics

A randomized sampling schedule was created prior to the beginning of the survey year. Each date for each quarter of the fiscal year was numbered, with weekdays and weekends kept separately. Two weekend dates and three weekdays were randomly selected using a random number generator. A total of twenty dates were selected to conduct RCSs. NBG surveys were randomly selected to occur on one RCS date each quarter, for a total of five NBG surveys during the fiscal year. RCSs were typically conducted from 8am to noon and NBG surveys from 8am to 11am, with few deviations.

Roving Creel Survey – Angler Interviews

DoR-OR personnel conducted angler interviews between 7/9/2023 and 5/19/2024 along the CR and PC. Anglers were interviewed either before, during, or immediately following fishing trips. All waterbodies were sampled using roving creel survey methods, outlined in the *TDEC SOP Roving Creel Survey - Angler Interviews* (TDEC, 2024).

RCSs were conducted by boat for a ½-day sampling period. DoR-OR interviewed anglers observed either on the water or on the shore. There were no efforts to stop vessels underway to conduct interviews. Anglers that declined to be interviewed were thanked for their time and DoR-OR personnel immediately left the area. Angling parties that could not be safely approached or did not wish to be interviewed were noted and counted.
Both observable and angler reported survey information collected are listed below.

Observable data collected includes:

1. Date/Time
2. Type – boat/bank fishing, private/commercial
3. Location – Latitude/Longitude
4. Number of people in party

Angler reported data includes:

1. Local (living within 50 miles of the area) or visiting (living further than 50 miles)
2. County and state residence
3. Total hours spent fishing for that trip
4. An estimate of days spent fishing per month
5. Target species of fish
6. Consumption of fish harvested from the study zones
7. Provision of fish to sensitive populations (i.e., pregnant women, nursing mothers, or children) for consumption
8. Knowledge of posted signage for the study area

Digital surveys were downloaded, and voluntary paper surveys were collected from the survey box posted at the Gallaher boat ramp (Figure 3.2.4.1).

North Boundary Greenway – Recreator Interviews

DoR-OR personnel conducted interviews of recreators along the NBG on 8/17/2023, 12/7/2023, 3/17/2024 and 4/4/2024. One survey was cancelled due to inclement weather. Recreators were interviewed as they were encountered along the greenway. Some bike riders and runners were not stopped by DoR-OR personnel unless they stopped on their own. Interviews were conducted in the morning while the RCSs were taking place. Interview questions were similar to RCS questions. If recreators were not fishing that day, then the questions about fishing were skipped.

Both observable and recreator reported survey information collected are listed below.
<u>**Observable data collected includes:**</u>

1. Date/Time
2. Location – Latitude/Longitude
3. Number of people in party

<u>**Recreator reported data includes:**</u>

1. Total hours spent recreating
2. An estimate of days spent recreating on the NBG per month
3. Local (living within 50 miles of the area) or visiting (living further than 50 miles)
4. County and state residence

   <u>*If fishing, recreators were also asked the following*</u>*:*

5. Type of fishing (wading, kayaking, bank)
6. An estimate of days spent fishing from the NBG per month
7. Target species of fish
8. Consumption of fish harvested from the area
9. Provision of fish to sensitive populations (i.e., pregnant women, nursing mothers, or children) for consumption
10. Knowledge of posted signage in the area

Digital surveys were downloaded, and voluntary paper surveys were collected from three survey boxes posted at different locations along the NBG (Figure 3.2.4.1).

FISHING EFFORT FOR ROVING CREEL SURVEYS

Estimates of fishing efforts for a given fiscal year quarter were calculated using TWRA's method (TWRA, 1992):

$$\boldsymbol{e} = \boldsymbol{c}(\boldsymbol{h}) \qquad \textit{fishing effort = total party size (number of hours reported)}$$

where fishing effort or total hours per interview (e) was calculated as the product of the total party size (c) and the number of hours reported (h). Each interview's total hours (e) were then added together for each quarter in each zone.

All RCSs were performed during the morning half of the day. Each survey event encompassed the same four zones. Following TWRA's methodologies to calculate full-day angler hours, it was assumed that morning and evening angler counts are roughly equal and provide an adequate approximation of fishing activity over the course of a whole day. Thus, total hours (e) were multiplied by two to give full-day angler hours per day (f):

$$\boldsymbol{f} = \boldsymbol{e}(\boldsymbol{2}) \qquad \textit{full day = total hours (2)}$$

To estimate the fishing effort per quarter (T), full-day angler hours (f) were divided by the number of RCSs performed during each quarter (RCS per quarter) then multiplied by the number of days in each quarter (d):

$$\boldsymbol{T = \left(\frac{f}{RCS\ per\ quarter}\right) x\ d}$$

total fishing effort of the quarter = (full day in hours / # RCS for the quarter) x # days in the quarter

TDEC's fiscal year runs July 1st – June 30th with the number of days per quarter (d) listed below.

- Quarter 1 = **92** days (July – September)
- Quarter 2 = **92** days (October – December)
- Quarter 3 = **90** days (January – March)
- Quarter 4 = **91** days (April – June)

Using the methods listed above, fishing effort was also calculated from survey responses collected digitally or via paper submission from the Gallaher Boat Ramp. Digital or paper surveys collected at the other three survey boxes on the NBG were used to calculate recreator activity.

3.2.6 DEVIATIONS FROM THE PLAN

Efforts to complete five (5) RCSs and one NBG survey per quarter were made. A total of four (4) NBG surveys were completed and only two RCSs were cancelled due to inclement weather. An additional study zone (confluence of GC and the CR) was included during this fiscal year's data analysis. In the past, there have been elevations of Cs-137 in the river sediment around this confluence, so this zone was added to monitor angler activity in this area.

3.2.7 RESULTS AND ANALYSIS

Notable Angler Observations from RCS Results:

- 47 fishing parties were observed in FY24.
- 76 individuals were observed fishing.
- 59 individuals, or 84%, of the participants described themselves as "locals".
- 11 individuals, or 16%, of the participants described themselves as "visiting".
- 50 individuals, or 86%, of the participants were on private fishing vessels.
- 7 individuals, or 10%, of the participants were on commercial fishing charters.
- 23 individuals, or 33%, of the participants reported "Yes" to consuming fish from the area.
- 21 individuals, or 91%, of the participants reported "Yes" to awareness of signage in the area warning against consumption of fish.

Notable Angler Comments from RCS Results:

- A pair of anglers were camping on Grubb Island and reported they would be eating catfish they caught from the area (Interview Q3-22). They camp at the location every year.

- An angler fishing at the confluence of WOL and the CR reported eating fish from the area two to three times per week (Interview Q4-26).

- An angler was observed fishing from the Sediment Retention Structure (SRS) into the White Oak Lake embayment area. Angler reported catching multiple fish from the embayment area (Interview Q4-28).

<u>MAPS OF INTERVIEW POINTS AND RESULTS BY ZONE:</u>

The following maps contain angler party locations that are listed by the fiscal year quarter and the order they were observed. The format is *Q# - X*, where *Q#* is the quarter number and *X* is the observation number during that fiscal year.

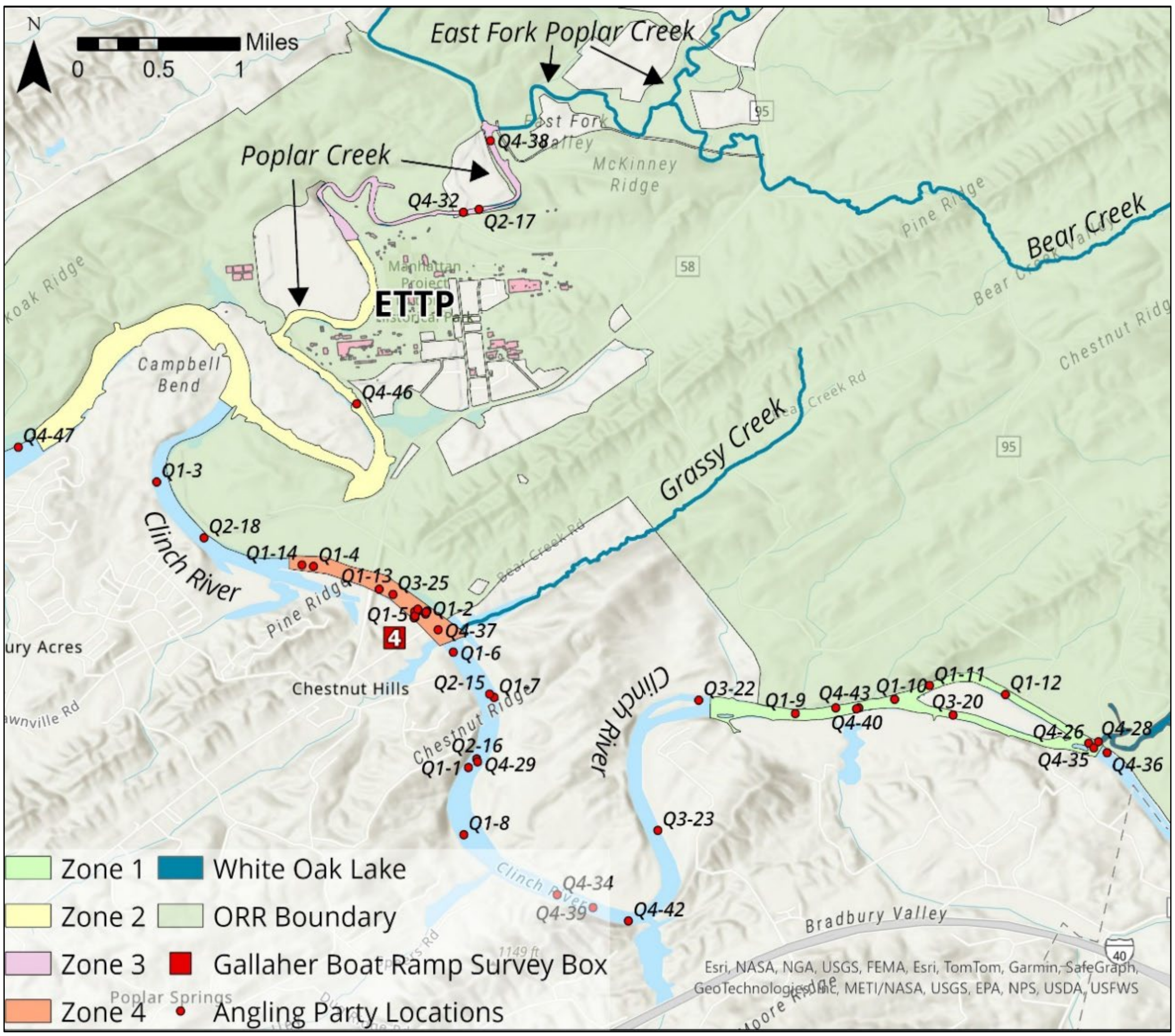


Figure 3.2.7.1: RCS Angling Party Locations

RCS Zone 1: White Oak Lake – Clinch River (WOL-CR) Confluence

The *Zone 1* region receives inputs from White Oak Lake and White Oak Creek both containing discharges originating within the footprint of ORNL. The primary contaminants of concern (COC) in this area are byproducts from historical or legacy radionuclides as well as COCs from ongoing industrial activities. These radionuclides include Cs-137, Sr-90, and other fission daughter products. Due to potential release of legacy contaminants, signage is required to dissuade anglers from fishing directly in front of the White Oak Embayment (WOE). The signage should read:

"WARNING, RADIATION HAZARD AREA, CONTAMINATED, KEEP OUT".

The signage is faded and no longer legible. On April 18th, 2024, an angler was observed fishing from the WOE – Sediment Retention Structure into the contaminated area (Figure 3.2.8.2). The angler reported fishing from the structure many times prior.

Figure 3.2.7.2: Angler Fishing Into Contaminated Area on the WOE-SRS

During FY24, eleven angling parties were observed in *Zone 1* (Figure 3.2.7.3). Anglers interviewed reported the hours they spent fishing during their trips, listed as "Reported (h)" column (Table 3.2.7.1). Anglers in *Zone 1* reported fishing between 2.0 and 13.0 hours on the day they were interviewed. The average time reported fishing was 5.7 hours. The median reported fishing time was 5.0 hours. The estimated fishing effort, time spent fishing, in *Zone 1* was 4048.4 hours, during FY24 (Table 3.2.7.1). In FY23, the estimated fishing effort was approximately 3659 hours (TDEC EMR 2023). The total estimated fishing effort increased by 389.4 in FY24.

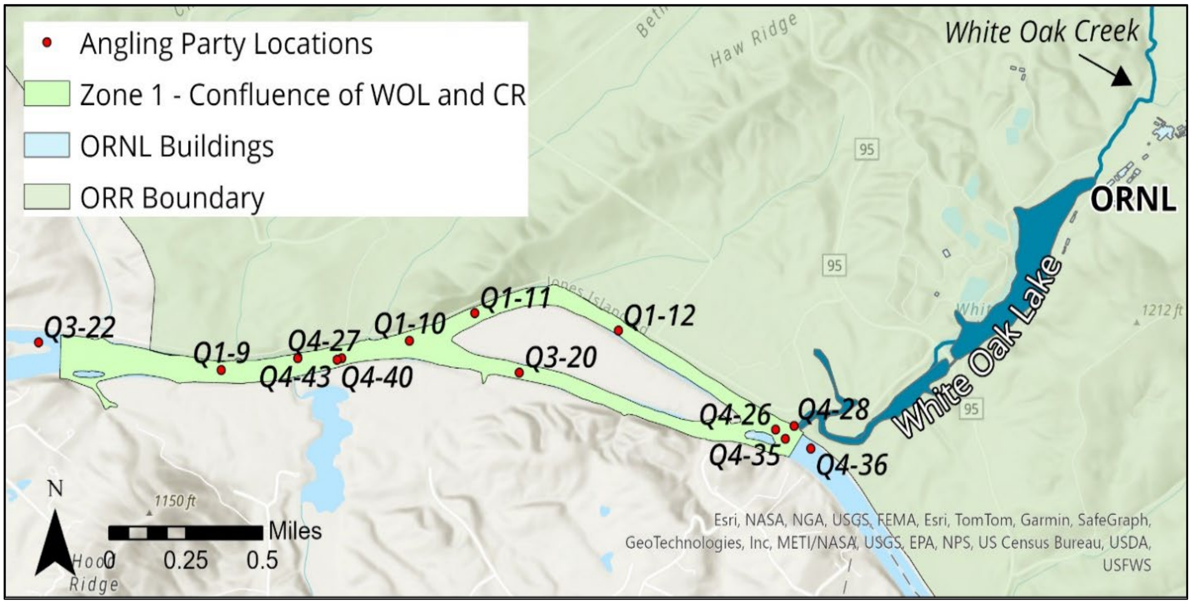


Figure 3.2.7.3: *Zone 1* RCS Angling Party Locations

Table 3.2.7.1: *Zone 1* Summary of Angler Counts and Reported Hours

***Zone 1* Interviews**						
Quarter-Party	Date	Party Size (c)	Reported (h)	Total Hrs. (e)	Latitude	Longitude
Q1-9	9/16/2023	2	2.0	4.0	35.898989	-84.360191
Q1-10	9/16/2023	1	13.0	13.0	35.900236	-84.351306
Q1-11	9/16/2023	1	4.0	4.0	35.901421	-84.348223
Q1-12	9/16/2023	2	4.0	8.0	35.900668	-84.341445
Q3-20	2/6/2024	2	8.0	16.0	35.898885	-84.346113
Q4-26	4/4/2024	3	5.0	15.0	35.896445	-84.334013
Q4-27	4/4/2024	1	4.0	4.0	35.899494	-84.354511
Q4-28	4/18/2024	1	9.0	9.0	35.896605	-84.333139
Q4-35	4/28/2024	4	5.0	20.0	35.896066	-84.333552
Q4-40	5/13/2024	2	6.0	12.0	35.899432	-84.354727
Q4-43	5/19/2024	1	3.0	3.0	35.899487	-84.356578
Total		**20**	**63.0**	**108.0**		
Notes: equation used to calculate total hours (e) is e = c (h)						

Table 3.2.7.2: *Zone 1* Summary of Angling Effort

Zone 1: Calculated Angling Effort		
	Hours/Day (f)	Hours/Quarter (T)
Quarter 1	58	1067.2
Quarter 2	0	0.0
Quarter 3	32	720.0
Quarter 4	126	2293.2
Yearly	**216**	**4080.4**
Notes: equation used is (T) total fishing effort/quarter, where (f) is the full day in hours (see equation above).		

RCS ZONE 2: POPLAR CREEK – CLINCH RIVER (PC-CR) CONFLUENCE

Zone 2 includes portions of lower Poplar Creek located near the former K-25 Gaseous Diffusion Processing Building that has since been demolished. This zone also includes the confluence point of Poplar Creek with the Clinch River and downstream from the confluence around Campbell Bend. The overall site is now known as the East Tennessee Technology Park (ETTP) and has been repurposed as an industrial park. The contaminated buildings at ETTP have been removed and remediation of contaminated areas is ongoing. Roving Creel Surveys (RCSs) took place along this portion of the creek and river to monitor the ongoing impacts of historical DOE activities and the resulting legacy contaminants. The main COCs in this zone are mercury and PCBs.

During FY24, only one angling party was observed in *Zone 2*. The two anglers were fishing from the bank and were not approached for an interview (Figure 3.2.7.4). There were two other angling parties interviewed, but they were located outside *Zone 2*. Angling effort was not calculated based on the two interviews outside of the zone. Angling effort in FY23 for *Zone 2* was estimated at 2000.6 hours.

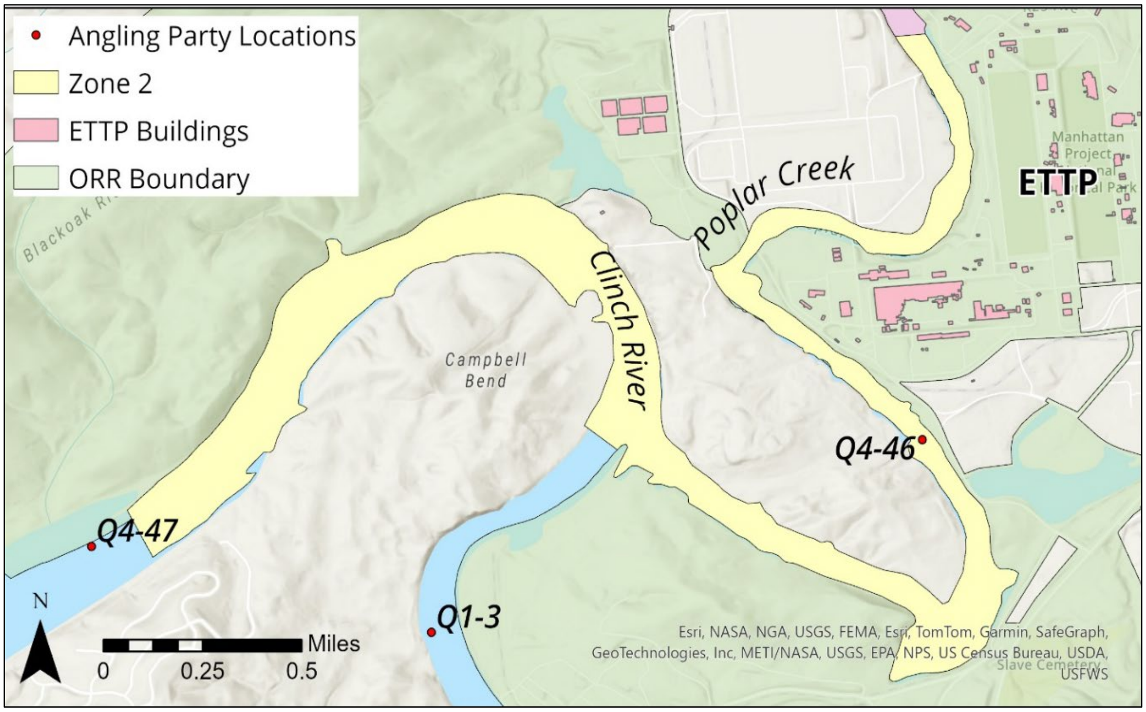


Figure 3.2.7.4: *Zone 2* RCS Angling Party Locations

RCS ZONE 3: EAST FORK POPLAR CREEK – POPLAR CREEK (EFPC-PC) CONFLUENCE

Zone 3 includes the confluence of EFPC with PC and the downstream portion of the confluence before reaching the former K-25 footprint. The main contaminants of concern in this area are mercury (Hg) and methylmercury. Both contaminants bioaccumulate in fish tissue and are hazardous to human health.

Surveys conducted in previous fiscal years suggest that the *Zone 3* region is typically utilized by locals. These locals regard Poplar Creek as a "prime fishing spot" during the spring and fall fishing seasons, when the Clinch River shows an increase in anglers. NBG survey efforts show that *Zone 3* is typically accessed by foot from East Fork Bridge located at the EFPC-PC Confluence, or adjacent to Blair Road. There is litter scattering the banks of the area across from the East Fork bridge and a small trail leading to Poplar Creek from Blair Road. This indicates significant fishing activity in this area.

During FY24, three angling parties were observed in *Zone 3* (Figure 3.2.7.5). Anglers interviewed reported the hours they spent fishing during their trips, listed as "Reported (h)" column (Table 3.2.7.3). Anglers in *Zone 3* reported fishing either 2.0 or 3.0 hours on the day they were interviewed. The estimated fishing effort, time spent fishing, in *Zone 3* was 565.2 hours, during FY24 (Table 3.2.7.4). In FY23, the estimated fishing effort was zero hours (TDEC EMR 2023). The total estimated fishing effort increased by 565.2 in FY24.

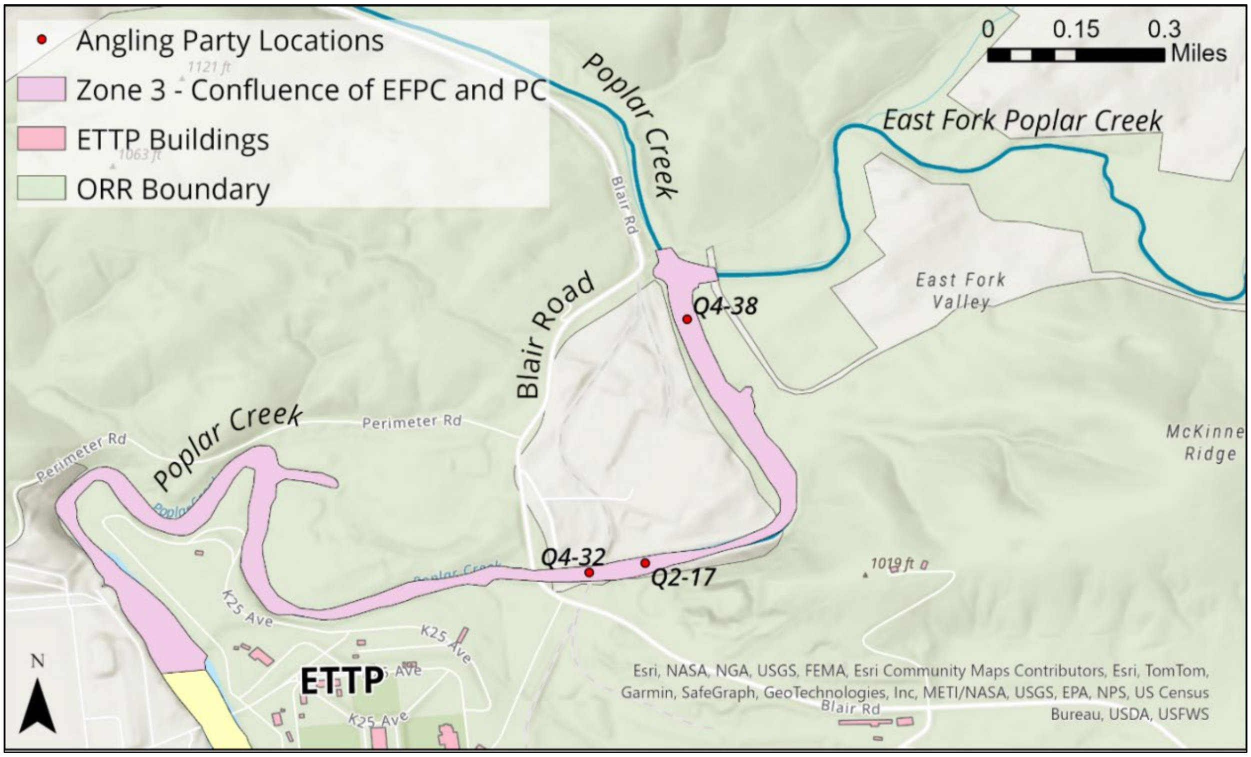


Figure 3.2.7.5: *Zone 3* RCS Angling Party Locations

Table 3.2.7.3: *Zone 3* Summary of Angler Counts and Reported Hours

***Zone 3* Interviews**						
Quarter-Party	Date	Party Size (c)	Reported (h)	Total Hrs (e)	Latitude	Longitude
Q2-16	11/20/2023	1	2	2	35.942453	-84.388454
Q4-23	4/18/2024	2	2	4	35.942227	-84.389832
Q4-28	4/28/2024	3	3	9	35.948365	-84.387423
Total		**6**	**7**	**15**		
Notes: equation used to calculate total hours (e) is e = c (h)						

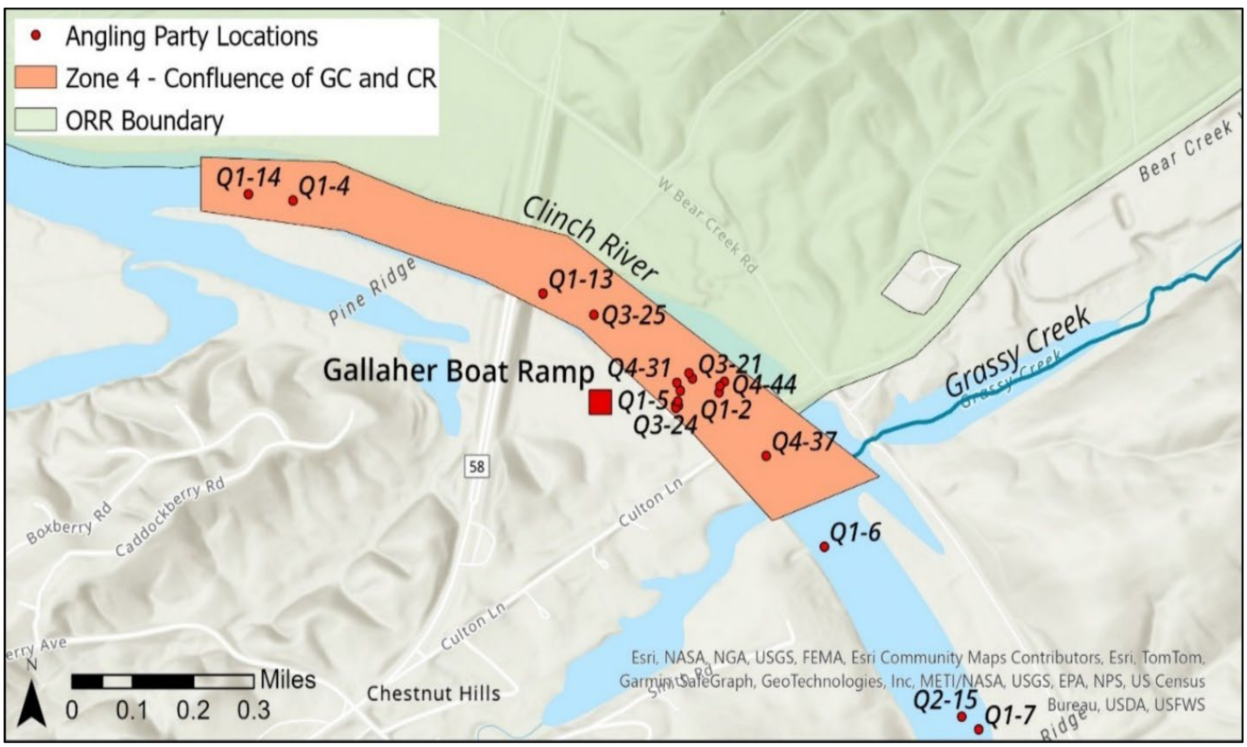
Table 3.2.7.4: *Zone 3* Summary of Angling Effort

***Zone 3*: Calculated Angling Effort**		
	Hours/Day (f)	Hours/Quarter (T)
Quarter 1	0	0.0
Quarter 2	4	92.0
Quarter 3	0	0.0
Quarter 4	26	473.2
Yearly	**30**	**565.2**
Notes: equation used is (T) total fishing effort/quarter, where (f) is the full day in hours (see equation above).		

RCS Zone 4: Grassy Creek – Clinch River (GC-CR) Confluence

During FY24, the project team decided to add an additional zone (*Zone 4*), at the confluence of Grassy Creek (GR) and the CR. During 2020, Cs-137 was detected at 15 pCi/g in a sediment sample from the CR near the mouth of GC, that was collected by DoR-OR and shared with DOE (OREIS, 2024). Due to this sample and a few other historical samples with detections of Cs-137 in river sediment, DoR-OR staff decided to calculate fishing effort in this zone.

During FY24, seventeen (17) angling parties were obeserved in *Zone 4* (Figure 3.2.7.6). Anglers interviewed reported the hours they spent fishing during their trips, listed as "Reported (h)" column (Table 3.2.7.5). Anglers in *Zone 4* reported fishing between 3.0 and 14.0 hours on the day they were interviewed. The average time reported fishing was 5.9 hours. The median reported fishing time was 5.0 hours. The estimated fishing effort, time spent fishing, in *Zone 4* was 2459.2 hours (Table 3.2.7.6).



Note: some sites are not labelled – Q2-19, Q4-30, Q4-33, Q4-41, Q4-45

Figure 3.2.7.6: *Zone 4* RCS Angling Party Locations

Table 3.2.7.5: *Zone 4* Summary of Angler Counts and Reported Hours

Zone 4 Interviews						
Quarter-Party	Date	Party Size (c)	Reported (h)	Total Hours (e)	Lat (DM)	Long (DM)
Q1-3	8/17/2023	2	14.0	28.0	35.9117026	-84.4032313
Q1-4	9/16/2023	2	4.0	8.0	35.9073383	-84.3942360
Q1-5	9/16/2023	2	3.0	6.0	35.9043099	-84.3907403
Q1-12	9/16/2023	1	4.0	4.0	35.9097092	-84.3973518
Q1-13	9/16/2023	1	5.0	5.0	35.9118410	-84.4042835
Q4-24	4/18/2024	2	5.0	10.0	35.9074122	-84.3941825
Q4-31	5/13/2024	1	6.0	6.0	35.9080121	-84.3939284
Total		**11**	**41.0**	**67.0**		
Notes: equation used to calculate total hours (e) is e = c (h)						

Table 3.2.7.6: *Zone 4* Summary of Angling Effort

Zone 4: Calculated Angling Effort		
	Hours/Day (f)	Hours/Quarter (T)
Quarter 1	102	1876.8
Quarter 2	0	0.0
Quarter 3	0	0.0
Quarter 4	32	582.4
Yearly	**134**	**2459.2**
Notes: equation used is (T) total fishing effort/quarter, where (f) is the full day in hours (see equation above).		

SURVEY BOX AT GALLAHER BOAT RAMP

During FY23 a survey box was placed at the Gallaher Boat Ramp to passively collect surveys from anglers (Red Box, Figure 3.2.7.7). Gallaher Boat Ramp is utilized by DoR-OR to launch the boat for RCSs. Many anglers planning to fish in the defined study zones use this boat ramp to launch their own boats. Additionally, many anglers utilize the banks and boat dock at the ramp to fish.

A total of four surveys were collected from the survey box and online submissions. Only one of the four surveys submitted reported fishing within the study zones; therefore, fishing effort was calculated based on the results of the one survey (Table 3.2.7.8). Since angler effort is only based on one survey, conclusions are not able to be drawn from these results. The other three submitted surveys reported the following activity types: hunting, water watching, and "just looking."

Table 3.2.7.7: ***Gallaher Survey Box*** **Summary of Angler Counts and Reported Hours**

Gallaher Boat Ramp				
Quarter-Survey #	Date	Party Size (c)	Reported (h)	Total Hours (e)
Q1-1	8/13/2023	2	7	14.0
Total		**2**	**7.0**	**14.0**
Notes: equation used to calculate total hours (e) is e = c (h)				

Table 3.2.7.8: ***Gallaher Survey Box*** **Summary of Angling Effort**

Calculated Gallaher Boat Ramp Angling Effort		
	Hours/Day (f)	Hours/Quarter (T)
Quarter 1	28	515.2
Quarter 2	0	0.0
Quarter 3	0	0.0
Quarter 4	0	0.0
Yearly	**28**	**515.2**
Notes: equation used is (T) total fishing effort/quarter, where (f) is the full day in hours (see equation above).		

Notable Observations from NBG Interviews and Surveys:

- **283** individuals were reported recreating along the greenway.
- **261.2** total hours of reported recreator use.
- **14** individuals, or 5%, of the participants described themselves as "visiting".
- **269** individuals, or 95%, of the participants described themselves as "locals".
- **15** individuals were reported fishing, all reported "No" to fish consumption from the area.
- Types of reported recreation – running, hiking, swimming, kayaking, biking, walking, bird watching, and fishing

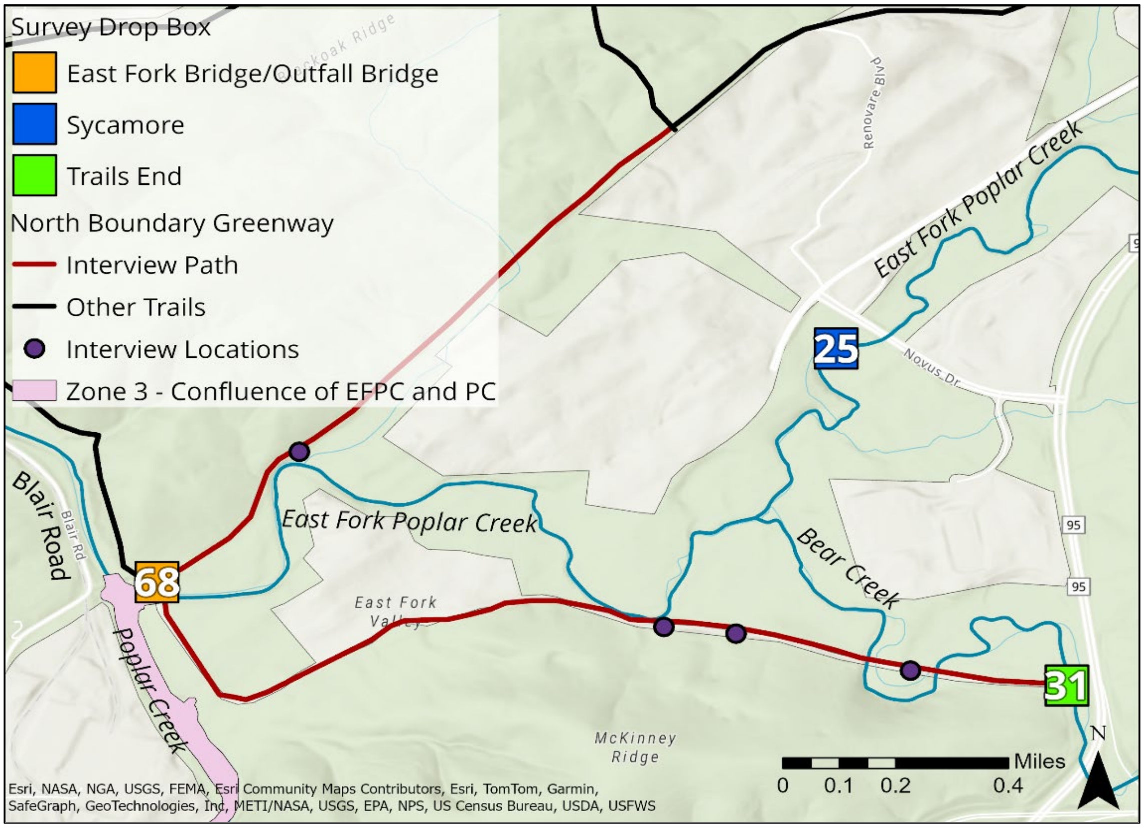


Figure 3.2.7.7. NBG Interviews and Survey Drop Box Locations

Table 3.2.7.9: NBG Interview and Paper/Digital Survey Statistics

Location	*# of Surveys*	*Recreators*	*Total Hours*	*Average Hours*	*Days per Month*	*Anglers*	*Angling Hours*
East Fork Bridge	68	139	154.75	2.3	333	4	3
Trails End	31	74	64.5	2.1	180	2	2.5
Sycamore	25	62	35.45	1.4	103	9	2
NBG Interviews	4	8	6.5	1.6	58	0	0
TOTAL	**128**	**283**	**261.2**	**7.4**	**674**	**15**	**7.5**

Between 6/24/2023 and 6/29/2024 surveys were collected at three survey drop boxes along the NBG (Figure 3.2.7.7). Additionally, DoR-OR personnel conducted walking surveys along the NBG and to interview recreators on four separate occasions. Recreators reported spending a total of 261.2 hours of activity on the greenway. The total average hours spent each day along the greenway were 7.4 hours (Table 3.2.7.9). Recreators reported spending between one and thirty (1-30) days per month along the greenway. A total of 15 anglers were observed or reported fishing along or just off the greenway (not all recreators were fishing during the visit they completed the survey). Anglers reported a total of 7.5 hours of fishing use along the greenway.

3.2.8 Conclusions

Roving Creel Surveys (RCS) in FY24 indicate that the White Oak Lake – Clinch River (WOL-CR) confluence was the most popular among anglers, with an estimated 4080.4 hours of angler effort. The Grassy Creek – Clinch River (GC-CR) confluence had an estimated 2459.2 hours of angler effort. The East Fork Poplar Creek – Poplar Creek (EFPC-PC) confluence had an estimated 565.2 hours of angler effort (based on three interviews). However, there were no RCS angler interviews conducted from the boat in the Poplar Creek – Clinch River (PC-CR) confluence. A total of 7,104.8 hours were spent fishing in the areas of concern.

While very few anglers (15 anglers) reported fishing in BC and EFPC from the NBG, there were a significant number recreators that use the NBG for various activities (283 recreators). Activities reported include wading, swimming, and kayaking and all have the potential to lead to hazard exposures (contact or ingestion) through water contact. It is important to monitor these activities as well as fishing activities in these areas due to the levels of mercury and other potential COCs in EFPC and BC.

Not surprisingly, the majority of the anglers and recreators that were interviewed or completed a survey were locals. Eighty-four percent (84%) of the individuals who participated in the RCS portion of this study described themselves as locals. Ninety-five percent (95%) of the recreators along the NBG described themselves as locals. Many locals reported that they fish frequently and often angle in the areas of concern, and some also reported that they consume fish caught from areas of concern. These results suggest that there is potential for human exposure to contaminants through the consumption of fish, especially amongst locals.

3.2.9 Recommendations

DoR-OR is aware that concentrations of contaminants in the water are higher than background levels at ORR watershed exit points. DoR-OR suggests that a more precise study be conducted to evaluate the potential human exposure risk of fishing in these publicly accessible waters. DOE does not have any project in place to monitor angler effort in these areas. At minimum, this *Roving Creel Survey Project* should continue.

During FY25, DoR-OR plans to collect fish to analyze for contaminants. DoR-OR performed fish tissue sampling in 2020 and 2021, but in FY25 species targeted by anglers for consumption will be targeted for contaminant analysis. The project team recommends that this type of sampling be performed regularly to determine risk to human health through fish consumption from the study areas.

In addition, signage along the outskirts of the ORR needs more regular maintenance, with more clear warnings of potential radiological and contaminant hazards. Better signage will allow anglers to weigh the risks and pursue fishing in these areas with proper caution.

3.2.10 References

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3.3 Mercury Uptake in Biota – Lower East Fork Poplar Creek (LEFPC)

3.3.1 Background

Mercury is found in elevated levels throughout the ORR resulting from processes and spills dating back to Manhattan Project and Cold War era activities. Mercury in streams and wetlands often undergoes methylation and is transformed into toxic methylmercury (MeHg) in conjunction with the activity of microorganisms (Kalisinska et al, 2013). Methylmercury is particularly bioavailable to wildlife (and humans) and, if ingested, may cause serious neurological, reproductive, and other physiological damage (Standish, 2016). For example, decreases in reproductive success of 35–50% have been observed in birds with high dietary methylmercury uptake including reduced hatching and fledging success (USDI, 1998; Hallinger and Cristol, 2011).

Methylmercury biomagnifies through food webs. Organisms at higher trophic levels, such as songbirds, accumulate increasingly larger body burdens of MeHg through consumption of lower trophic-level prey items. Small invertebrates, salamanders, benthic larval-stage biota, terrestrial spiders, and emergent flying insects are examples of some possible prey items (Scheuhammer et al, 2007). Adults of some aquatic macroinvertebrates that emerge from these contaminated streams are often eaten by terrestrial insectivores, creating a key link of accumulation from aquatic environments to terrestrial ones (Henderson et al, 2012).

Based on these bioaccumulation studies, key species from multiple trophic strata should be monitored to document any movement of these contaminants through the food web when possible. There are ongoing concerns that contaminants may migrate away from the known point sources via movement of organisms that make up the associated food web. Evidence of bioaccumulation will provide a key link between aquatic and terrestrial systems. One could also hypothesize that some migratory birds and snakes may spread these contaminants over a larger area.

In FY24, to better understand the pathways of bioaccumulative transfer of mercury and other contaminants, this DoR-OR project consisted of sampling songbird eggs, adult flying insects, spiders, and snakes.

3.3.2 Problem Statements

1) Contaminated terrestrial macroinvertebrate adults that emerge from larval stages in contaminated aquatic environments are often eaten by terrestrial insectivores such as songbirds, waterfowl, bats, and spiders. This link in the food web creates a key transfer point of Hg and MeHg. In effect, contaminants are transferred from aquatic biota and accumulate in terrestrial biota.

2) Little to no data has been collected in the last 10–15 years on the ORR on the role of mercury bioaccumulation in snake ecology. As an intermediate and top-level consumer, snakes have the potential to bioaccumulate higher levels of mercury and methylmercury through the consumption of birds, bird eggs, small mammals, and other small herpetofauna. Additionally, with their larger home ranges, snakes have the capability to disperse contaminants over larger distances.

    - Studies have demonstrated a correlation between contaminants levels in herpetological species and humans (Pelallo-Martinez et al, 2011). This research lends support to the use of snakes to assess potential exposure risks to humans within those same geographical areas.

3) TDEC-DoR-OR staff observed people in homeless camps established along the banks of the upper reaches of lower EFPC (LEFPC) (i.e., NOAA site), and at a new public greenway along the Bruner site, downstream of the NOAA site. These sightings suggest that the human exposure risk to Hg and MeHg along LEFPC may be higher than previously thought. An investigation into the quantity of Hg and MeHg travelling through trophic levels is warranted to support protectiveness evaluations in these areas for both human and ecological health.

3.3.3 Goals

1) Determine the concentrations of mercury and methylmercury in biota samples collected from impacted ecological zones along EFPC and compare them to unimpacted reference zones.

2) Document the bioaccumulation of mercury and methylmercury through the trophic levels in biota species living along EFPC and thereby note possible human health risks.

3) Support the EFPC Holistic Assessment Project (EFPCAP) by providing data to supplement the findings of the watershed assessment.

3.3.4 Scope

This project consisted of laboratory analysis of mercury and methylmercury in songbird eggs, adult flying insects, wolf spiders, and adult snakes. Specimen(s) were captured on the ORR by DoR-OR personnel from three main study areas and one reference area (Figure 3.3.4.1) over a one-year period or until enough biomass had been collected for laboratory analysis. Results from the three monitoring zones were then compared with results from the reference zone.

Figure 3.3.4.1 EFPC Biota Sample Sites & Freels Bend Reference Sites

Species that are State or federally listed as greatest conservation need (GCN), threatened, endangered, or deemed in need of management were not sampled.

1) **Zone 1**: *Horizon Center reach* is the most downstream reach of LEFPC. DoR-OR personnel collected specimens at seven (7) sites on EFPC from EFPC kilometer EFK 0.0 to EFK 13.8.

2) **Zone 2**: *Bruner Site reach* flows through the City of Oak Ridge, following closely to the Oak Ridge Turnpike. DoR-OR personnel collected specimens at five sites on EFPC from EFK 13.8 to EFK 19.2.

3) **Zone 3**: *NOAA site reach* is the most upstream reach of EFPC, in closest proximity to Y-12, and flows through the City of Oak Ridge. DoR-OR personnel collected specimens at six (6) sites on EFPC from EFK 19.2 to EFK 23.4.

4) **References Locations**: were comprised of seven (7) sites within Freels Bend, a peninsular area along the Clinch River upstream of Melton Hill Lake. These sites are not within the floodplain of EFPC and have not been affected by mercury or methylmercury contamination.

3.3.5 Methods, Materials, Metrics

Terrestrial biota collected to obtain biomass for mercury and methylmercury testing are listed below. All sampling was completed in accordance with the TDEC *Health and Safety Plan* (TDEC 2020).

Songbird Eggs:

Songbird nest boxes were installed along EFPC and at reference locations, following TDEC *SOP T-290B Songbird Nestbox Construction and Deployment* (TDEC 2023a). Songbird nest boxes were checked routinely in the spring to determine occupancy. Once a nest box is confirmed to have an occupant, the box was checked twice per week to collect the first clutch of eggs for analysis (TDEC 2023b). The breeding season for songbirds runs from March through June, and this protocol allows songbirds time to produce a second brood. All eggs collected from the same zone were composited into one sample. There were four total composite songbird egg samples sent for analysis.

Spiders:

Wolf spiders were sampled by staff at EFPC and reference sites. Sampling activities occurred between May and October 2023. After dark, samplers held flashlights at eye level to locate the reflective spider eyes near the stream shoreline or adjacent floodplain area (TDEC 2023d). The spiders were retrieved using either an aquarium net or forceps. During collection, spider specimens were placed into plastic cups with lids. Spiders collected from the same zone were composited into one sample. There were four total composite spider samples sent for analysis.

Adult Insects:

Adult insects were collected from EFPC and reference sites between May and October 2023. Nocturnal insects were trapped in an adult insect trap comprised of a white mesh globe (*no-see-um* material) containing a black light inside (TDEC 2023c). Insects were attracted to this special black light which provides maximum insect response from as far away as 500 meters. After numerous insects landed on the globe, they were hand collected using an aspirator-vacuum tool which sucks the insects off the mesh globe and secures them inside sample vials. Adult insects collected from the same zone were composited into one sample. There were four total composite insect samples sent for analysis.

Snakes:

Snakes were sampled along EFPC and at reference sites (TDEC 2023e). Snake boards were used to attract snakes. Snakes resting under boards were then captured by hand. Trained staff recorded morphological measurements to assess snake body condition and attempted to collect blood samples from captured snakes. Snakes were released unharmed at the site of capture. Due to safety concerns, venomous snakes were not sampled. A total of three samples were sent for analysis.

BIOTA SAMPLING AND HANDLING PROTOCOL FOR TDEC DOR-OR LAB:

- Biota samples were weighed to the nearest 0.01 gram and recorded on the laboratory sample log.

- Bird egg, flying insect, and wolf spider biota samples were placed into Level 2 pre-cleaned glass jars with labels and screw-top plastic lids. These sample jars were stored at -18ºC in the DoR-OR lab freezer until shipped to an external lab for analysis.

- Upon assessment of total biomass per zone, snake blood samples were either left in the original collection tubes or composited into Level 2 pre-cleaned glass vials with labels and screw-top plastic lids. These samples were stored at -18ºC in the DoR-OR lab freezer until shipment to an external laboratory for processing.

DATA ANALYSIS:

- Biota data results were compared to available DOE biota datasets in OREIS.

- The Hg, MeHg, and radiological analytical data results were normalized to account for differences in body mass, where applicable, among and between species.

- Total Hg vs. MeHg graphs and figures were generated to compare among sites on the ORR and reference sites.

- When possible, total Hg and MeHg concentrations and additional contaminants were compared among feeding guilds: insectivores, omnivores, herbivores, carnivores.

3.3.6 DEVIATIONS FROM THE PLAN

SONGBIRD EGGS

Mixed species songbird egg samples were originally planned; however, all but one nest box collected only Eastern Bluebird (*Sialia sialis*) eggs. Thus, songbird eggs samples were only submitted for the Eastern Bluebirds, and the reported data is species specific.

SNAKES

Snake captures were low during the sampling period. No blood samples were obtained. However, a whole-body redbelly snake sample was obtained from a road mortality, as well as two (2) snakeskin sheds. All were submitted as individual samples for analysis.

3.3.7 Results and Analysis

Songbird Eggs

A total of four (4) composited samples were submitted to Pace Analytical for heavy metal analysis. Each composite was 100% comprised of Eastern Bluebird eggs. The majority of Hg transferred to eggs is in the form of MeHg (Ackerman et al. 2020), with most being deposited into the albumen (i.e., egg whites) (Wiener et al. 2003). Only the MeHg concentrations in the bluebird eggs per zone are reported (Figure 3.3.7.1). MeHg concentrations at Feels Bend (REF) are lower than concentrations in the EFPC zones (0.0274 mg/kg). Zone 2 had the highest MeHg concentrations (0.347 mg/kg), while Zones 1 and 3 had lower concentrations that measured closer to the reference zone (0.0647 mg/kg and 0.0436 mg/kg, respectively).

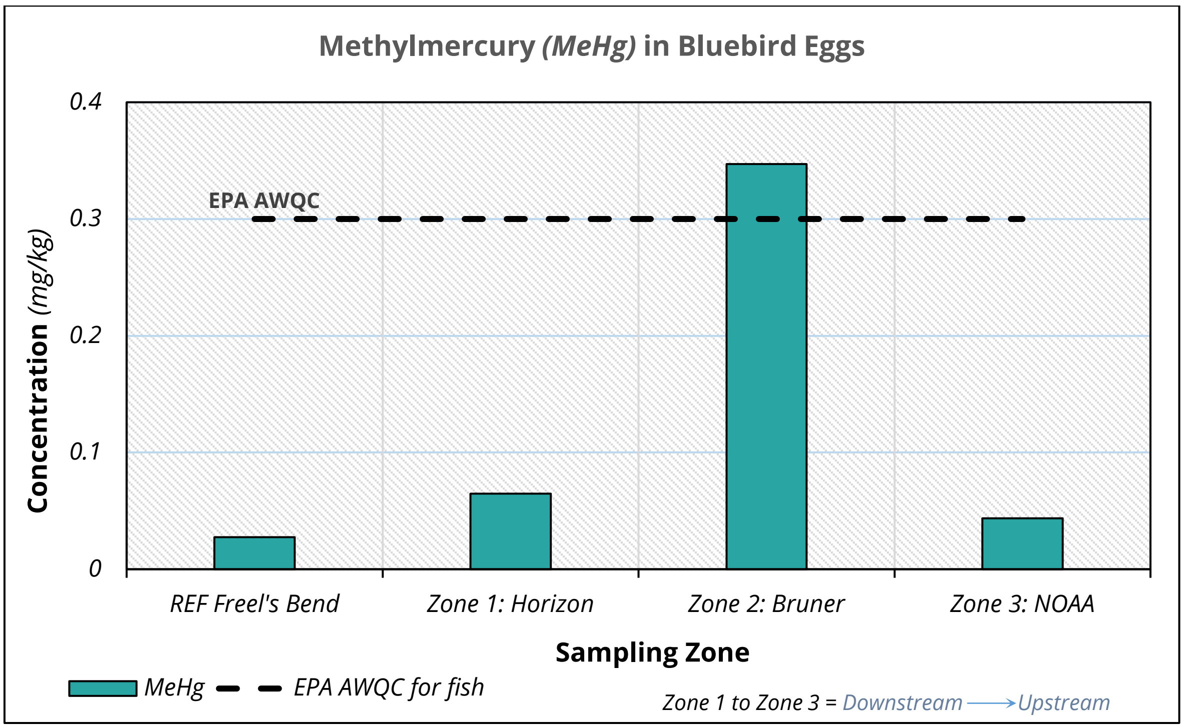

Figure 3.3.7.1: Methylmercury in Eastern Bluebird Eggs by Composited Zone.

PCB Aroclors 1254 and 1260 were the only detectable PCB Aroclors in the bluebird eggs and comprise the Total PCB concentration (Figure 3.3.7.2). Generally for all PCBs, Zone 1 concentrations (the most downstream) resembled concentrations measured at Freels Bend. Zones 2 and 3 were similar in measured concentrations and were considerably higher than Zone 1 and Freels Bend.

While the eggs were also analyzed for arsenic, cadmium, and uranium metals, all returned at non-detectable levels and are thus not reported here.

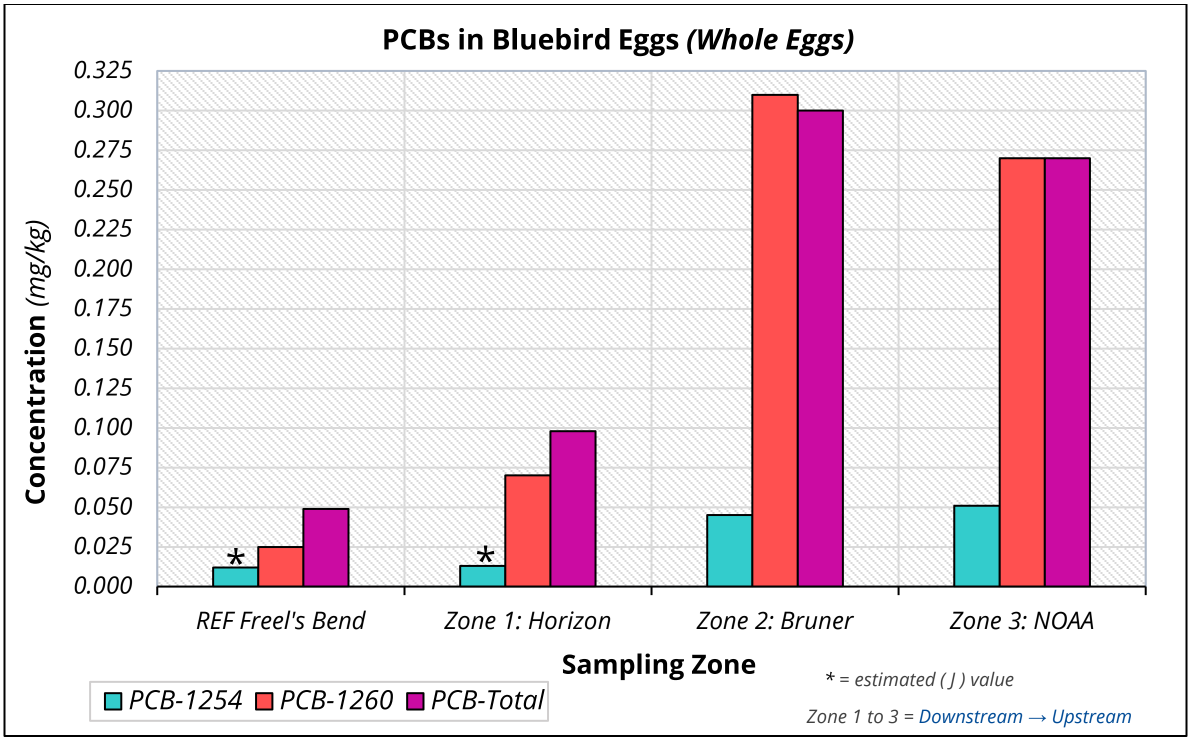

Figure 3.3.7.2: PCBs in Eastern Bluebird Eggs by Composited Zone

ADULT FLYING INSECTS AND SPIDERS

Four (4) composite samples each of adult flying insects and spiders were submitted to Pace Analytical for heavy metal analysis. Non-detected concentrations were removed from the figures below, thus all reported concentrations in the figures are detectable concentrations unless otherwise noted.

Hg concentrations in both spiders and flying insects were higher than the EPA recommended AWQC (0.3 mg/kg) in all impacted EFPC Zones (Figure 3.3.7.3). Freels Bend reference concentrations were below that EPA AWQC for both spiders and flying insects. In spiders, Zones 1 and 3 also had MeHg concentrations exceeding the EPA AWQC; the Zone 2 concentration is below the EPA AWQC but closely approaching the value. The majority of total Hg (HgT) in spiders is composed of MeHg. There is no obvious spatial trend in MeHg concentration in spiders; however, HgT concentrations are higher upstream and decrease moving downstream. Flying insects contrast spiders in the proportion of MeHg in HgT concentration. Insects contain mostly Hg and little MeHg. Generally Hg concentrations are higher upstream than in downstream EFPC. All impacted zones have HgT concentrations above the EPA AWQC recommendations, while all MeHg concentrations are below.

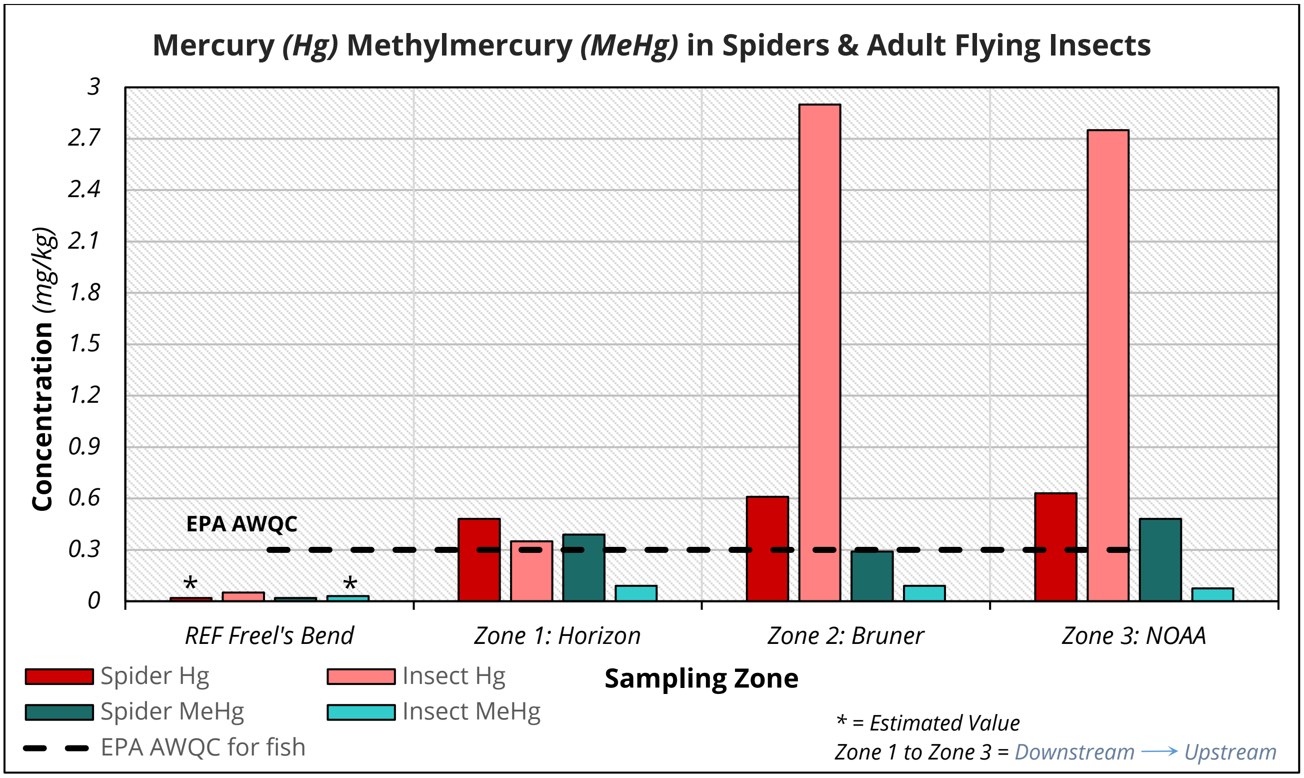

Figure 3.3.7.3: Mercury (Hg) & Methylmercury (MeHg) in Spiders & Adult Flying Insects

Concentrations of arsenic (As), cadmium (Cd), and uranium (U) metals were also evaluated in spiders and adult flying insects (Figure 3.3.7.4). Spiders had the highest concentrations of Cd (range: 0.38 – 2.00 mg/kg) with some much lower levels of As (range: 0.044 – 0.094 mg/kg) and U metal (range: 0.039 – 0.087 mg/kg) detected. While there are no specific EPA consumption limits for spiders, non-cancer endpoints for fish can be used for comparison (EPA 2000). Non-cancer limits for 0.5 fish meals/month of consumption are >2.8 ppm for both As and Cd. While none of the measured concentrations exceed this limit, the highest Cd concentration in spiders from Zone 3 (2.00 mg/kg) is approaching this limit and aligns with a fish consumption limit of 1 fish meal per month (1.4 – 2.8 ppm). There are no reported limits for U metals in biota.

Heavy metal concentrations in adult flying insects were comprised predominantly of As with lower concentrations of Cd and no detectable concentrations of U metal. Generally, concentrations of As are higher in upstream impacted zones than downstream impacted zones. The highest concentration of As in insects (1.5 mg/kg) is within the EPA fish consumption limit of one (1) fish meal per month (1.4 – 2.8 ppm) (EPA 2000).

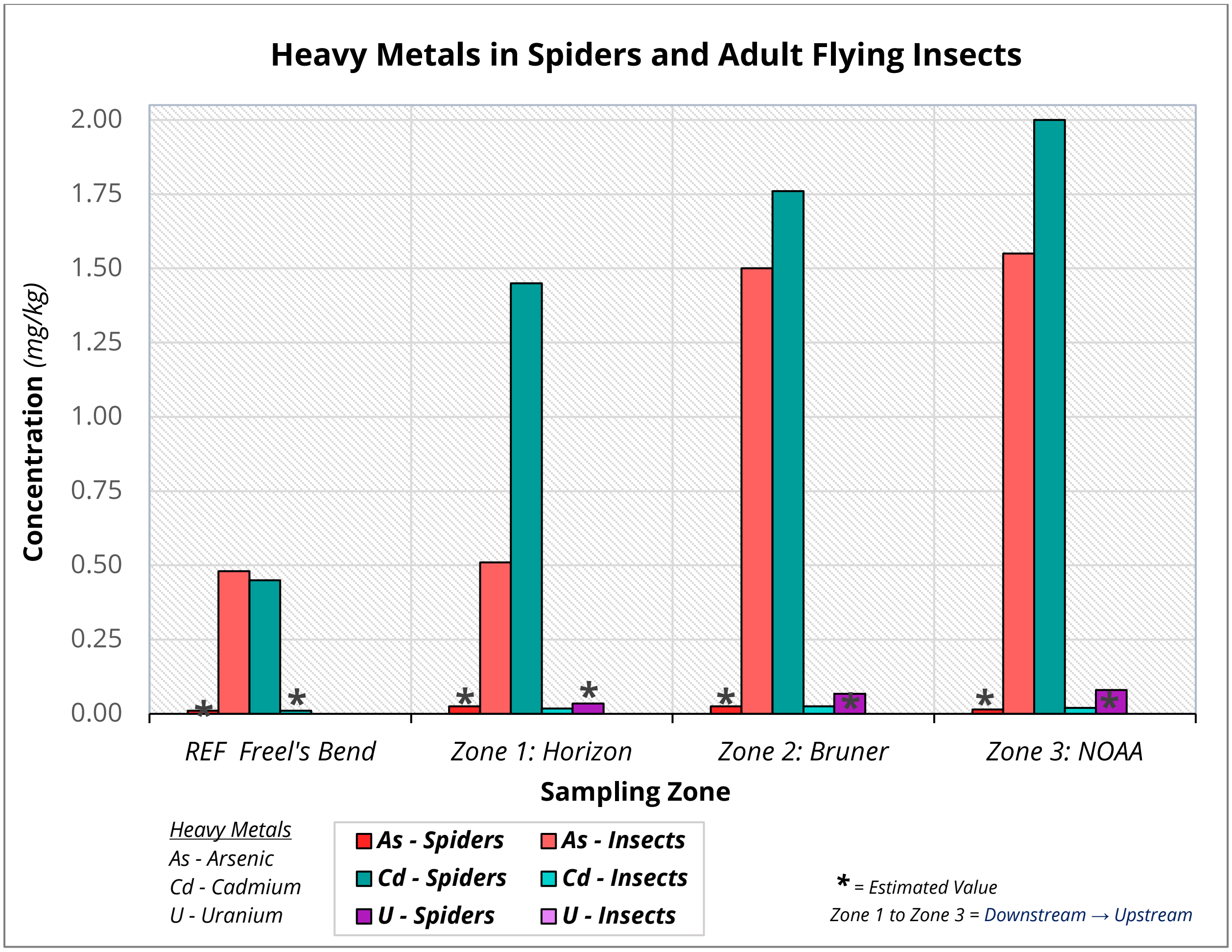

Figure 3.3.7.4: Heavy Metals (Arsenic, Cadmium, Uranium) in Spiders & Adult Insects

PCBs in insects and spiders were highest in the most upstream impacted Zone 3 (Figure 3.3.7.5). PCBs were not detected in the reference Freels Bend zone for spiders but were detected at concentrations slightly higher than Zone 1 for insects. Total PCBs were predominantly comprised of three (3) Aroclors (PCB-1248, 1254, and 1260). Non-cancer EPA fish consumption limits for zero (0) fish meals/month equates to PCB concentrations of >0.38 ppm. Insects' concentrations (range: 0.0085 – 0.38 mg/kg) reached the margins of that limit, while spiders (0.031 – 0.40 mg/kg) exceeded that limit for some samples.

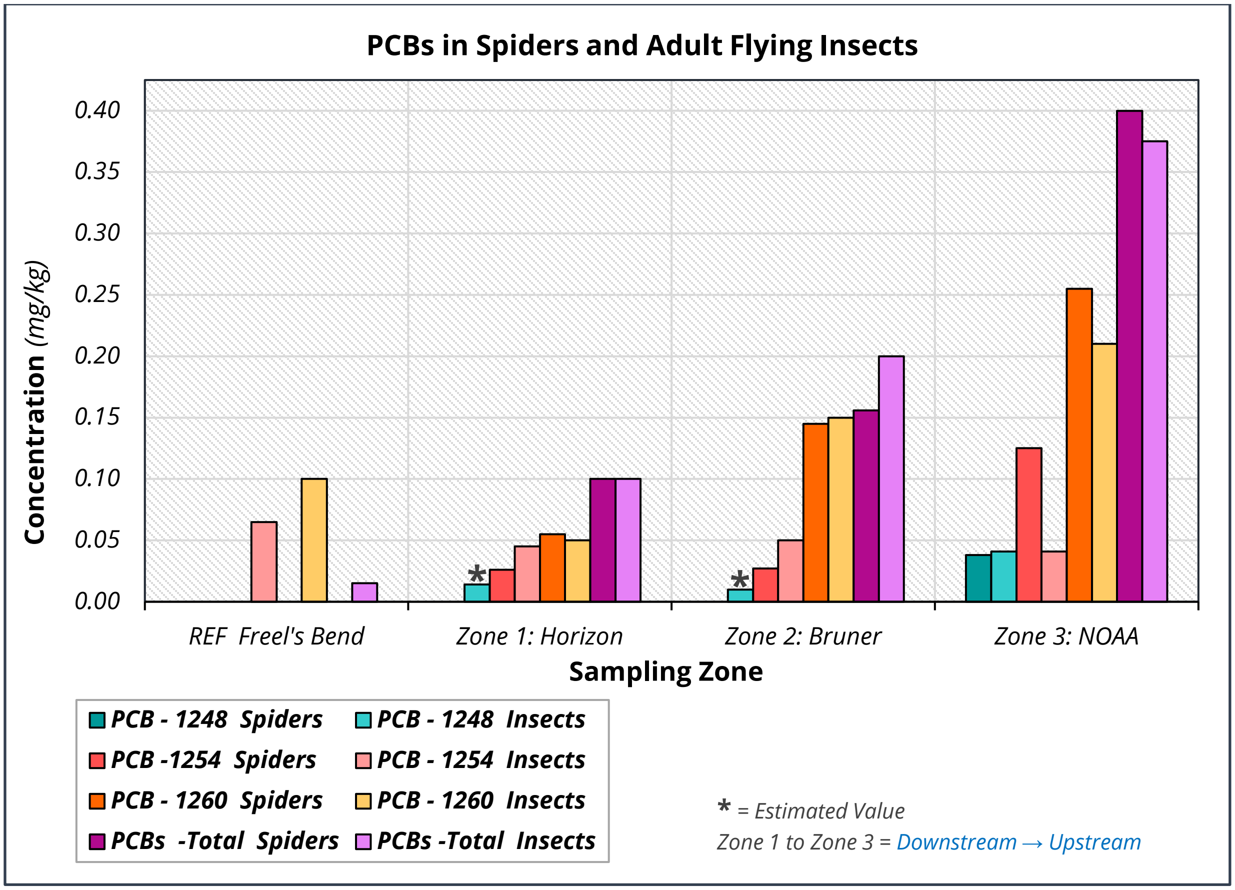

Figure 3.3.7.5: PCBs in Spiders and Adult Flying Insects

SNAKES

Few snake samples were collected and consisted of two (2) skin sheds (Eastern Racer and Eastern Rat snake species) and one (1) whole body sample (Redbelly snake). Samples were collected in the most upstream zone (Zone 3) and most downstream zone (Zone 1) of EFPC. No samples were collected from a reference site. Due to the limited total biomass of the skin sheds, only HgT and MeHg concentrations were measured in snakes.

Both the eastern racer and eastern rat snake had Hg levels exceeding the EPA AWQC for fish consumption (0.3 ppm); the redbelly snake had mercury concentrations much lower (Figure 3.3.7.6).

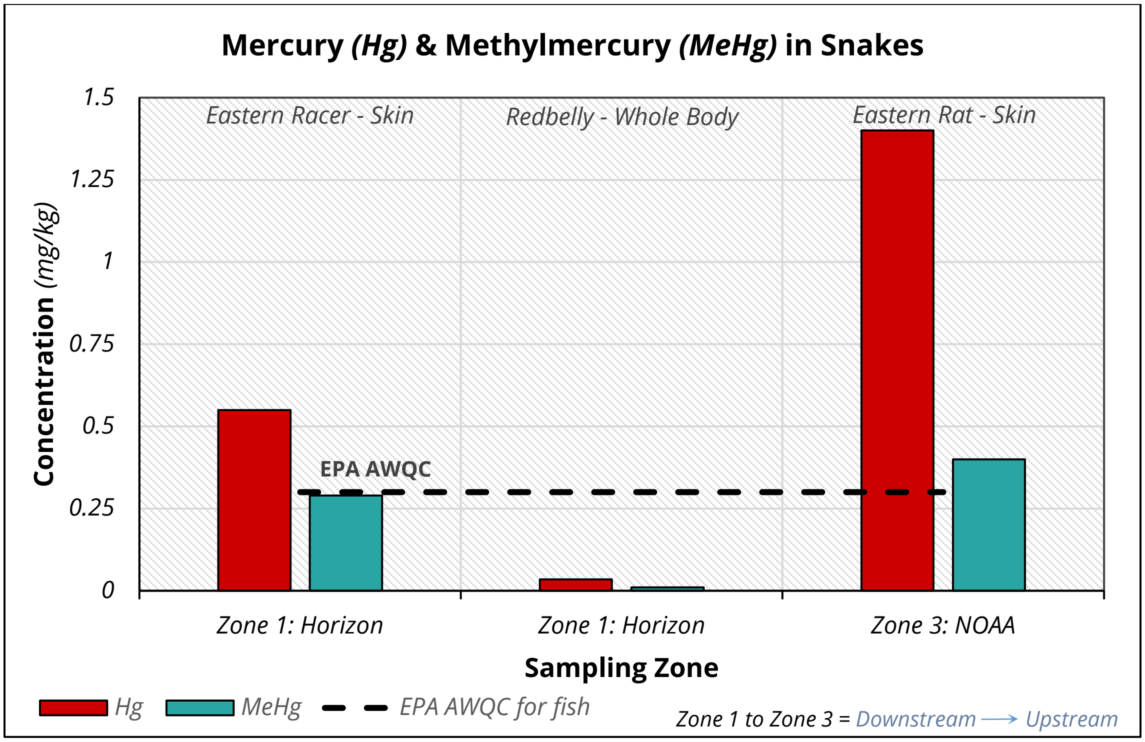

Figure 3.2.7.6: Hg and MeHg Concentrations in Snakes.

3.3.8 Conclusions

With the exception of some unique contaminants (e.g., MeHg), most COCs tend to exhibit reduced detectible concentrations the further away the sample was collected from the source site. In this case, the more downstream LEFPC stream locations would predictably have lower concentrations of most COCs than upstream locations of EFPC.

Hg and MeHg

Heavy metal contaminants are a concern for biota in some areas of EFPC. Hg and MeHg concentrations exceed the EPA AWQC in mutliple trophic levels, contributing to the biomagnification of MeHg. While most zone samples detected MeHg at concentrations below the EPA recommeneded AWQC in fish (0.3 mg/kg), these values are still relatively high for eastern bluebirds when considering their life history. Average habitat range for eastern bluebirds is about 30 ha (Weinkam 2013, Janos 2018), an area extending well beyond the immediate riparian corridor. Larger habitat ranges increases the possibility of bluebirds taking advantage of food sources that are less impacted by watershed contaminants. In spite of the available food resources beyond the known contaminated areas of the riparian zone, bioaccumulation and impacts were still identified in bluebirds in Zone 2, specifically.

There are a few possible factors affecting HgT concentrations in snake samples.

One factor is body size. Both the black racer and rat snake are larger snake species as compared to the redbelly snake. Like other biota species (e.g., many fish species), larger individuals are more likely to carry a higher Hg load.

A second factor could be related to differing diets. Redbelly snakes primarily feed on slugs, which could carry a lower Hg concentration being lower in the food chain. Rat snakes and racers both eat larger prey items (e.g., small mammals, lizards, frogs, birds, bird eggs, etc.), all of which are positioned at a higher level on the food chain and could carry a higher Hg burden and more potential for Hg to biomagnify in snakes.

Lastly, this variation could result from the difference in sample type. The racer and rat snake are both skin shed samples, which as a single organ could carry higher concentrations of Hg. The redbelly snake sample was a whole-body sample for which other organs that are less likely to accumulate Hg could be functionally diluting the overall Hg concentrations within the sample. Studies have demonstrated a correlation between contaminants levels in herpetological species and humans (Pelallo-Martinez et al. 2011), making snakes an optimal species to continue to monitor. As snakes have been demonstrated to carry Hg levels above the EPA AWQC, this may be an indicator of potential human exposure to Hg remaining in some areas of LEFPC. Though more sampling is warranted to better understand the broader distribution of Hg in snake populations.

OTHER CONTAMINANTS (AS, CD, U, PCBS)

Arsenic concentrations in flying insects and cadmium concentrations in spiders exceed or approach EPA fish consumption limits and may warrant closer consideration in both taxonomic groups. The ecological impact of the accumulation of these contaminants coud be different for taxa depending on their relative diet. For example, organisms that feed primarily on insects (e.g., bats) may have higher exposure to arsenic concentrations within insects than would organisms that primarily feed on spiders, where higher cadmium concentrations are a greater concern. PCBs also exist at concentrations approaching or exceeding EPA fish consumption limits in multiple biota groups. However, keep in mind, that the EPA human health fish consumption limits are being used as a point of reference only and are not directly applicable to these biota groups. Elevated contaminants, singly or in combination, could impact biological processes and health of ecological receptors, so continued monitoring is warranted.

3.3.9 RECOMMENDATIONS

As elevated concentrations of several contaminants were detected in biota along LEFPC, this project team recommends continuing monitoring of biota of various trophic levels. Biota continue to receive contaminant inputs from EFPC surface water that transition to terrestrial ecological systems and warrant additional consideration. While the focus is currently centered around heavy metals with more severe and acute physiological consequences (e.g., Hg and MeHg), expanding monitoring efforts to other contaminants known to be present in EFPC (e.g., radionuclides and their associated heavy metals, and PCBs) is valuable. Conversely, compounds that are not detected or are at concentrations below EPA recommended limits (e.g., As or Cd) may need less monitoring as they are less likely to be impactful to the ecological systems. These contaminants could be monitored on a three- or five-year basis to ensure these low concentrations remain consistent.

Lastly, focusing monitoring efforts on bioindicator species may be a useful tool to identify and focus sampling efforts to areas that are the most impacted by present contamination. For example, continued sampling of spiders can identify the contaminants most likely to bioaccumulate and impact other ecological receptors, since spiders act as both predators and prey for several organisms.

Overall, EFPC biota have bioaccumulated various contaminants that have remained in place or have potentially migrated from upstream sources. Elevated concentrations of these contaminants warrant continued monitoring until EFPC has been fully remediated for all media types.

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3.4 Terrestrial Invertebrate Community Health

3.4.1 Background

As a direct result of historical releases from the Y-12 NSC (Brooks et al, 2017), mercury (Hg) remains a focal contaminant of concern (COC) in East Fork Poplar Creek (EFPC). Today, this stream's headwaters are fed by surface water runoff and groundwater exposed to mercury-contaminated structures. Hg in streams and wetlands around Y-12 undergoes methylation and is transformed into toxic methylmercury (MeHg) through microbial activity (Kalisinska et al, 2013). MeHg is detrimental to local biota (e.g. wildlife and humans). If ingested, MeHg may cause serious neurological, reproductive, and other life-altering physiological damage (Standish, 2016). Hg and MeHg contamination and its migration through ORR streams and into terrestrial food webs continue to elevate the potential exposure risks to humans and other biota living in and around EFPC.

Key bioindicator species from multiple trophic strata should be assessed for a better understanding of the impacts of mercury subsidies in the environment. A critical first step for this process is evaluating impacts of contaminants on habitat quality and organismal community health. For example, benthic macroinvertebrate species (see CH. 3.1 *Benthic Macroinvertebrate Community Health*) are key bioindicators used to monitor stream health and assess impacts of human disturbance to aquatic environments. Similarly, terrestrial bioindicators should be monitored for a better understanding of industrial and ORR impacts to the surrounding terrestrial environment. While benthic macroinvertebrates are used as bioindicators of stream health, on the ORR there is no established, analogous terrestrial equivalent that can connect watershed health directly to terrestrial environmental health. This monitoring project begins to address the terrestrial biota sampling gap and focused on ground beetles (carabids).

Carabid ground beetles are ideal bioindicators given their close contact with contaminants present in soils and leaf litter (Hunter et al, 1987; Pizzolotto et al, 2013; Ghannem et al, 2018). Contaminated soils and leaf litter provide a link between aquatic and terrestrial environments. Carabids are ground-dwelling arthropods throughout their life cycle. Considering this increased exposure time during the larval stage, these beetles have a strong potential to uptake mercury and other heavy metals in their immediate environment (Ghannem et al, 2016). Also, carabids are generalist consumers that occupy multiple trophic levels and have the potential to be impacted through multiple contaminant pathways. They are additionally ideal bioindicators due to their sensitivity to environmental change. Carabids exhibit relatively rapid and measurable changes within species and community composition in response to anthropogenic impacts on local environments (Pearce and Venier, 2006; Avgin and Luff, 2010; Ghannem et al, 2018).

Heavy metals and other contaminant concentrations have been analyzed by ORNL in some terrestrial invertebrate species along EFPC at sites downstream of the ORR (Smith et al, 2016). However, no ORR studies have evaluated the impacts of contaminants on terrestrial invertebrate community composition. More specifically, no study has looked at carabid communities to evaluate heavy metal impacts on ground beetle community composition, as a proxy for impacts to terrestrial ecological communities.

To further aid in the success of this project, open-sourced data from the National Ecological Observatory Network (NEON) was leveraged. NEON has collected data on carabids from multiple unimpacted sites around the ORR for 8 years. This database served as a robust reference data source.

In addition to filling a data gap in terrestrial systems monitoring, this project contributed to a separate, larger *EFPC Holistic Watershed Assessment* (EFPCAP). The EFPCAP aims to complete a comprehensive evaluation of the ecological health of the entire watershed.

3.4.2 Problem Statements

1) Mercury inputs into EFPC from Y-12 continue to be a concern, especially as it becomes bioavailable through methylation.

2) Mercury and methylmercury concentrations have been quantified for some biotic groups but have not been evaluated for impacts on terrestrial biotic community assemblages.

3) DOE does not directly monitor the migration of mercury and methylmercury via bioaccumulation from aquatic to terrestrial habitats.

4) While benthic macroinvertebrates are used as bioindicators of stream health, there is no established, analogous terrestrial equivalent that can connect watershed health directly to terrestrial environmental health. The ground beetle is a good terrestrial equivalent.

3.4.3 Goals

1) Determine if ground beetles are a good terrestrial bioindicator to evaluate mercury migration through the food web.

2) Support the *EFPC Holistic Assessment Project* by providing data to supplement the ongoing biotic sampling under the watershed assessment.

3.4.4 SCOPE

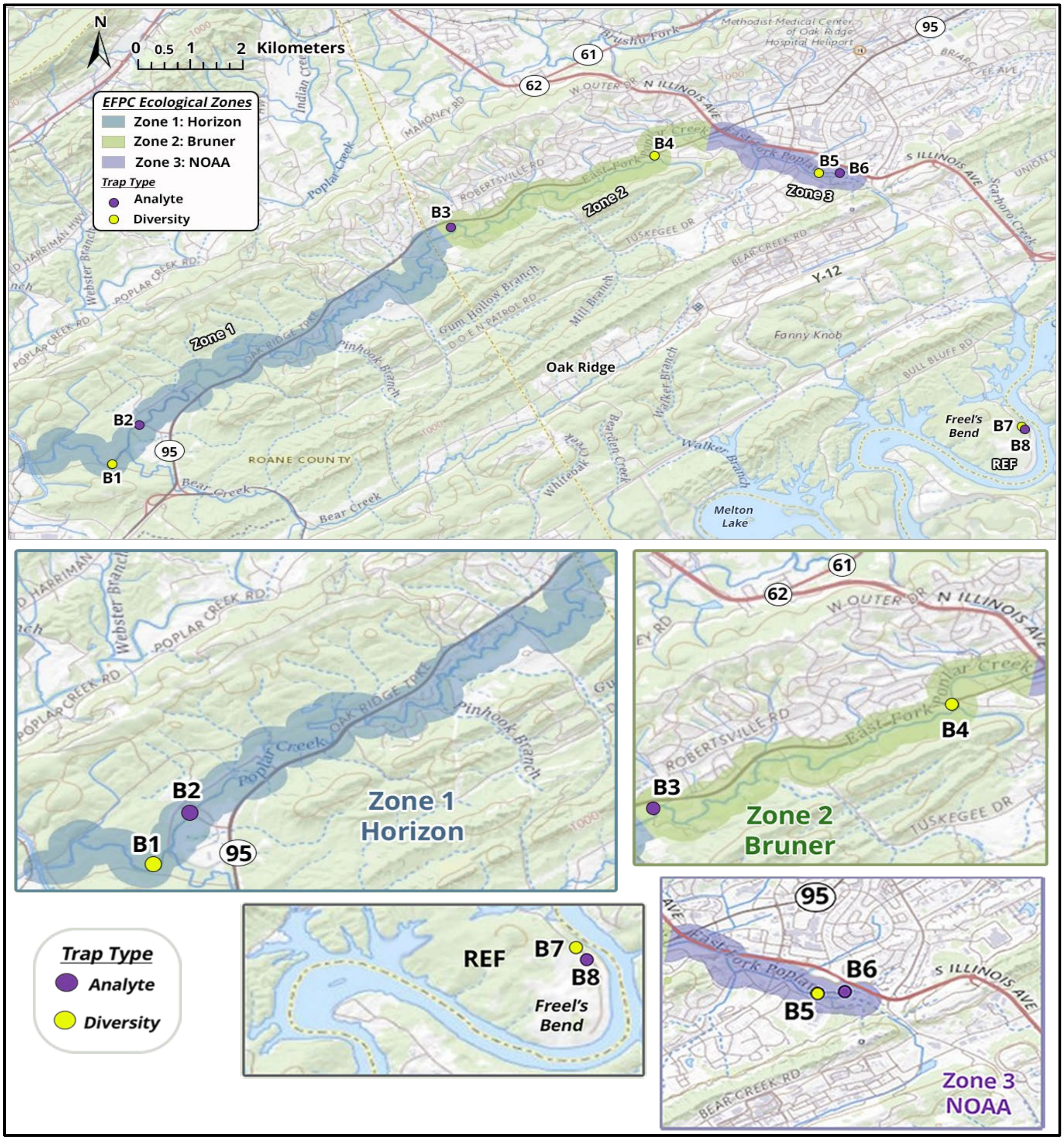

Figure 3.4.4.1: East Fork Poplar Creek Ground Beetle Sampling Sites

1) Specimen(s) were collected from the three main impacted study zones along EFPC and from one reference zone in Freel's Bend (Figure 3.4.4.1).

2) Sampling took place May through August.

3) Each zone consisted of two sample sites with at least two invertebrate traps per site.
   - The two sample sites per zone differed in the collection of sample type:
     1. <u>Diversity Samples [taxa]:</u> preservative used in traps.
     2. <u>Analyte Samples [contaminants]:</u> no preservative used in traps so as not to interference with chemical analyses.

4) Results from the three impacted zones were compared with results from the reference zone.

5) Carabid community data collected by NEON Domain 07 in Oak Ridge (NEON 2024) were used to strengthen carabid community data collected from the reference zone.

3.4.5 METHODS, MATERIALS, METRICS

All sampling was completed in accordance with the TDEC *Health and Safety Plan* (TDEC 2020).

<u>TERRESTRIAL INVERTEBRATE FIELD SAMPLING</u>:

Insect pitfall traps were installed along EFPC and at corresponding reference zones (TDEC 2023). Two different types of sites were established within each zone: diversity sites (**DS**) and analyte sites (**AS**) (Figure 3.4.4.1).

The first project objective was to collect samples from **DS** pitfall traps to document carabid community taxa diversity. These traps contained propylene glycol, a preservative that is non-toxic to wildlife and people, and samples were collected every two weeks.

To complete the second project objective, **AS** pitfall traps were used to passively collect samples that were used for contaminant analysis (Hg, MeHg). These traps contained no preservative and were collected twice a week. Sampling continued until sufficient biomass was collected. All organisms present in the traps were collected. The pitfall traps from all sites were left open from May 2023 through August 2023. State or Federal listed species (if encountered) were reported to TWRA within 5 working days after discovery.

<u>TDEC DOR-OR LABORATORY PROCESSING:</u>

DS samples were rinsed and stored in 70% ethanol at the DoR-OR Lab until sorting was complete. Sorting involved separating carabid beetles from bycatch for taxonomic identification to species, where possible. Additionally, invertebrate bycatch was separated into coarse taxonomic groups. Once identified, organisms were composited by taxonomic groups and by site.

AS samples were collected and stored at the DoR-OR Lab at -18^{0}C to euthanize any live invertebrates in the sample. Samples were sorted to identify any carabids in the sample while invertebrate bycatch was separated into coarse taxonomic groups. Carabids and invertebrate bycatch remained separated or were composited, depending on collected biomass. These samples were stored in the -18ºC freezer until shipment for mercury and methylmercury analysis.

DATA ANALYSIS:

Carabid communities were assessed by various diversity metrics along with comparisons between impacted sites and reference zones.

(1) **Diversity Metrics**

1. *Abundance*: measured as the total number of individuals collected within a zone.

2. *Species Richness*: the number of unique species within a zone.

3. *Shannon Diversity:* an index commonly used in ecology to account for both species richness and species evenness (the relative abundance of each species at a site).

4. *Simpson Diversity:* an index used in ecology that measures species diversity within a community, emphasizing species dominance (higher abundance with a strong influence on other species) and evenness (distribution of abundance across species in a community, where high evenness is associated with similar abundance among species in a community)

(2) **Statistical Comparisons**

1. *MIB* (*Mean Individual Biomass*) scores were used to compare sampling zones. MIB accounts for individual body size (Kedzior et al. 2018) and is calculated by using the length of an individual to determine its body mass.

2. *HgT/MeHg (Total Mercury / Methylmercury*) comparisons among groups:
   1) Feeding Guilds (i.e., omnivores, herbivores, carnivores, detritivores).
   2) Invertebrate taxa.
   3) Non-carabid taxa versus DOE OREIS data.
   4) Analytical data versus community data, which were normalized, where applicable, to account for differences in body mass among and between species.

3. *MIB and HgT/MeHg*: compared ORR sites versus references sites, using graphs of Carabid MIB plotted against HgT/MeHg.

4. *ANVOVA* with $\log_{10}$ transformations and *Tukey Post-hoc* tests were used to analyze relationships between zones and MIB scores.

3.4.6 Deviations from the Plan

Insufficient biomass was collected to compare carabid feeding guilds. However, general feeding guilds were comparable when included with other non-carabid taxa groups. These comparisons were evaluated and reviewed alongside similar data collected by ORNL (Smith et al. 2016).

Sample sizes were smaller than expected and may not be directly comparable with well-established NEON sampling data.

3.4.7 Results and Analysis

Ground beetle community composition can be used to qualitatively assess health of terrestrial ecological communities. These ground beetle community composition results can be correlated with analytical contaminant data to link exposure to contaminants more directly to shifts in community composition that may be observed.

The purpose of monitoring the ground beetle community is to establish a terrestrial biota measurement analagous to aquatic benthic macroinvertebrates to provide qualitative information on environmental health. Additionally, chemical analysis coupled with community dynamics can link qualitative information with quantitative contaminant bioaccumulation measurements.

Community Measurements

Ground beetle diversity metrics, including *abundance*, *species richness, Shannon Diversity,* and *Simpson Diversity*, were calculated across the represented sampling zones. Of note, the TDEC zones had relatively low sample sizes that may impact the results of these calculated metrics. Low sample sizes could be due to relevant differences in ground beetle availability in impacted zones. Alternatively, small sample sizes could be related to inherent sampling effects (trap placement, site selection, etc.). NEON sites have been used for several years and are well established. Comparing results between TDEC and NEON sampling zones helps discern the impacts of sample collection methods and variability due to the changes in contaminant presence in different zones. The NEON dataset contains taxonomic data, a subset of which is expertly verified. To remain conservative, only taxonomic data that has been expertly verified is used. Additionally, due to logistical necessities, there is a temporal lag from when samples are collected to when data is uploaded to the NEON data portal. Due to those lags in the data upload process, 2021 is the most recent year of NEON data. For these community metric comparisons, only NEON data from sampling year 2021 was used to allow for more direct comparisons of data by reducing the impact of variability in datasets due to natural environmental changes (e.g., rainfall, temperature, etc.).

Abundance of ground beetles, or total number of individuals, varied across zones (Figure 3.4.7.1). The most downstream zone of EFPC (Zone 1) and the reference zone at Freels Bend (REF) had the highest individual counts. Generally, the more upstream you move along EFPC, the fewer ground beetles were captured. The reference zone data from NEON had higher abundances.

This higher abundance in the NEON reference data is largely due to the number of sites that represent each NEON zone. The NEON REF 03 zone is also located within Freels Bend and has 1 site with 3 traps; this is a more direct comparison to the TDEC REF 01 zone sampling. NEON REF 02 zone is a forested zone that contained 8 different sites and 24 traps in total. With more traps to collect samples, NEON REF 02 naturally has higher ground beetle abundance counts than other zones. Separating the NEON reference zones in this manner is useful to determine if the reference zones are representative of the community metrics collected within the impacted zones along EFPC.

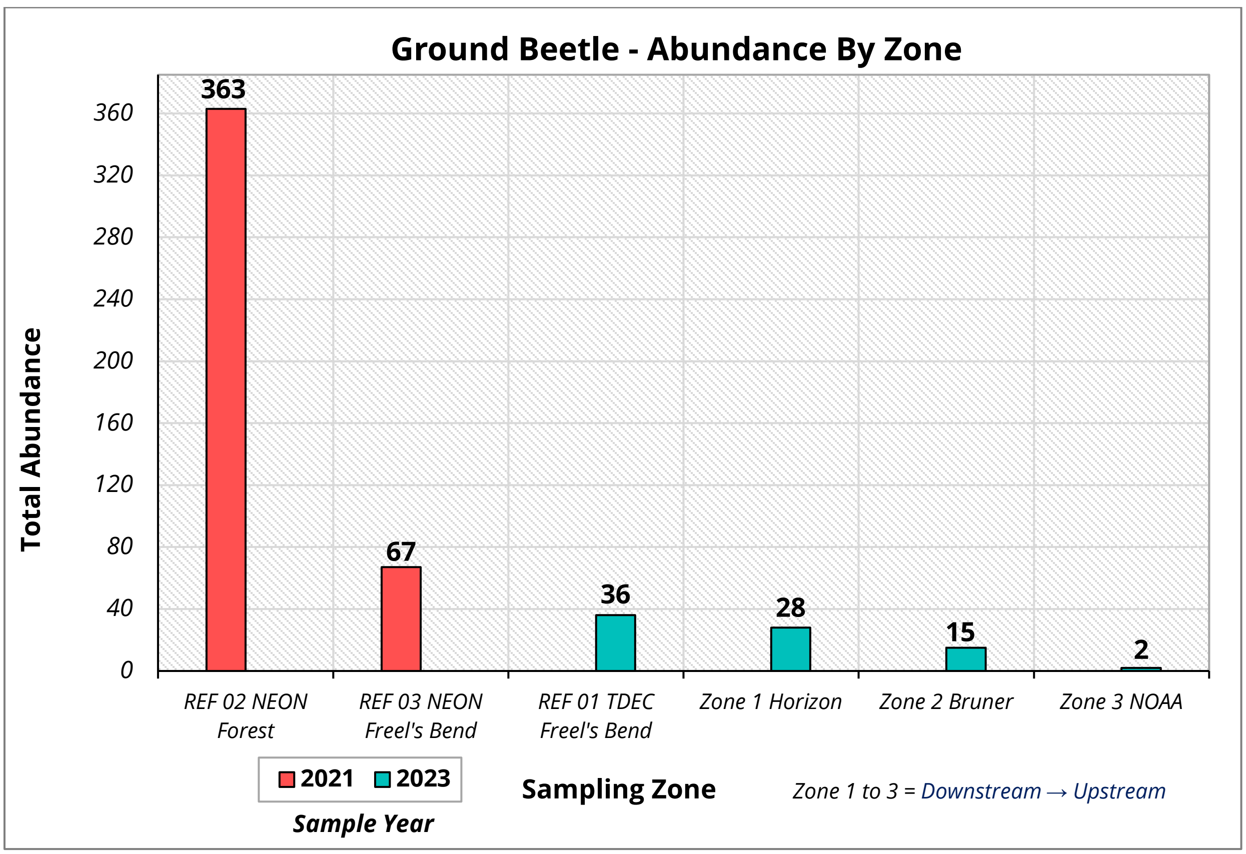

Figure 3.4.7.1: Ground Beetle Abundance by Zone in 2021 and 2023

Species richness, the number of unique species, is more comparable across zones. Again, the NEON reference zones (REF 02 and REF 03) have higher richness values than the TDEC reference zone (due to a difference in numbers of traps utilized). Generally, the most downstream EFPC zone (Zone 1) had similar species richness values to the reference zones. Moving upstream to Zone 3, there is lower species richness (Figure 3.4.7.2).

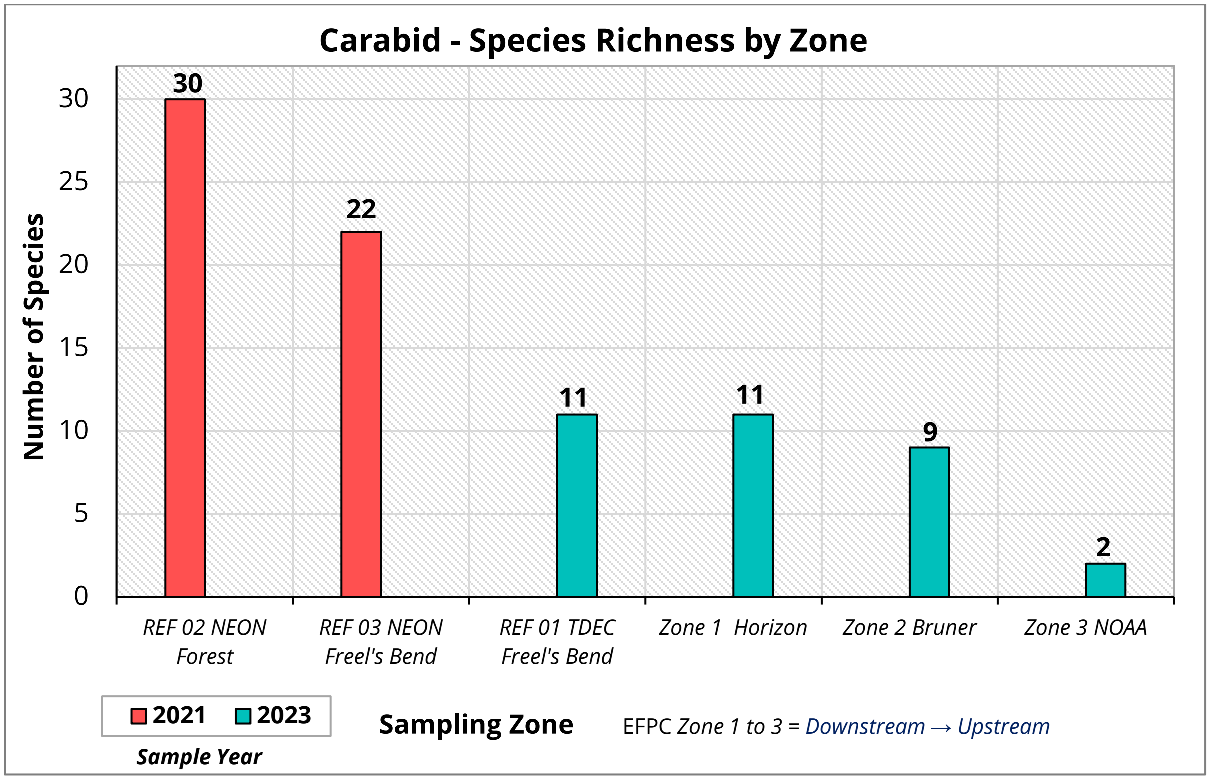

Figure 3.4.7.2: Ground Beetle Species Richness by Zone in 2021 and 2023

Ground beetle diversity metrics showed similar patterns to abundance and richness measurements (Figure 3.4.7.3 and Figure 3.4.7.4). The *Shannon Diversity* index, accounting for both species richness and species evenness, calculated for the most downstream EFPC zones (Zone 1 and Zone 2) was similar to that calculated for the TDEC and NEON reference zones. The most upstream zone (Zone 3) had the lowest *Shannon Diversity* score (Figure 3.4.7.3).

Using the *Simpson Diversity* index, another measure of species' diversity, to evaluate ground beetle diversity within the given zone communities showed similar trends as *Shannon Diversity*. Downstream EFPC zones (Zone 1 and Zone 2) had similar diversity scores to both the TDEC and NEON reference zones, the most upstream EFPC zone (Zone 3) is less diverse (Figure 3.4.7.4).

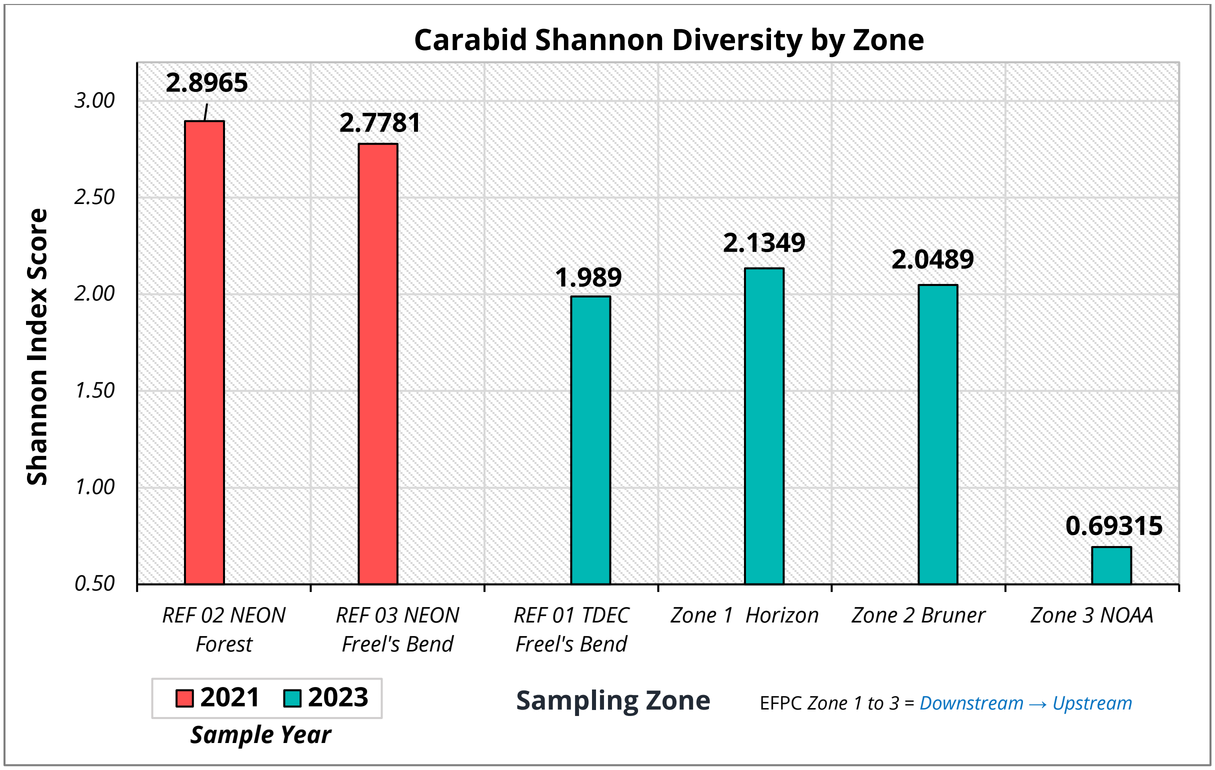

Figure 3.4.7.3: Shannon Diversity Index Scores for Ground Beetles per Zone

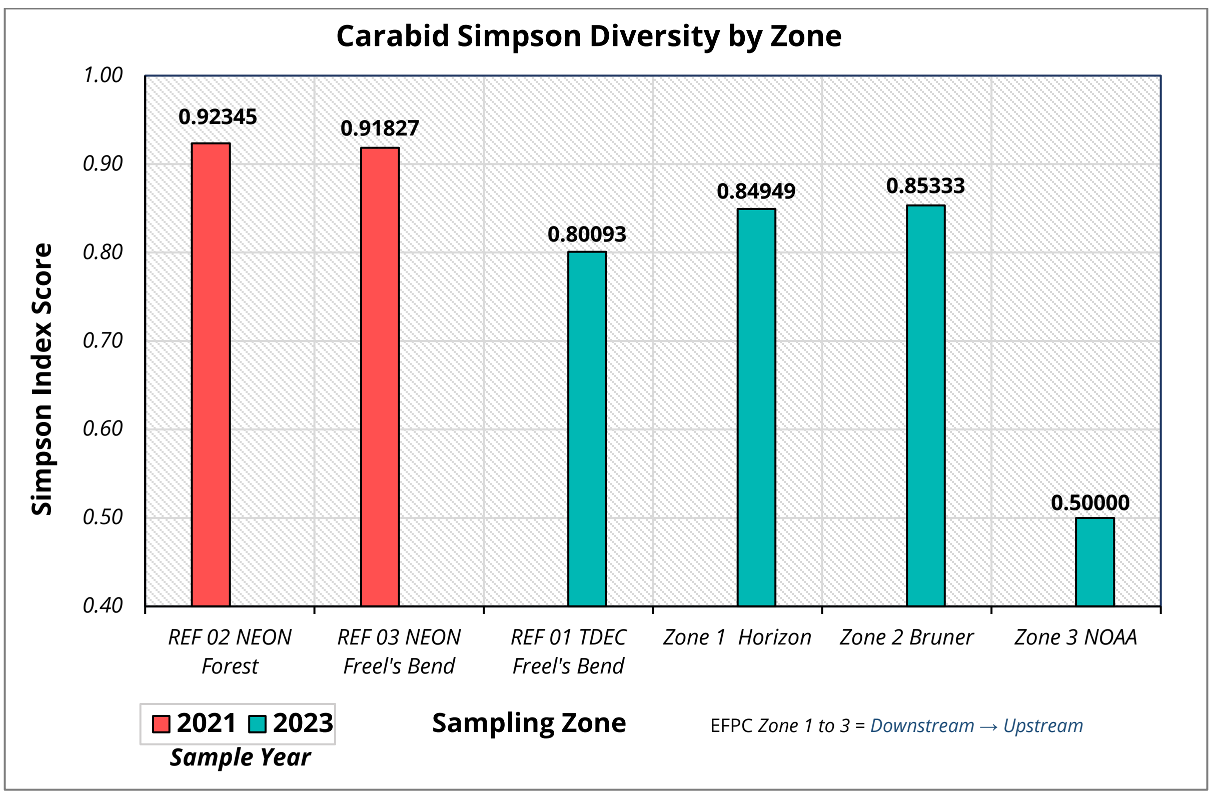

Figure 3.4.7.4 Simpson Diversity Index Scores for Ground Beetles per Zone

Pitfall sampling methods are limited by invertebrate activity so diversity metrics may be incomplete. An alternative metric to assess ground beetle community health is Mean Individual Biomass (MIB), which accounts for individual body size (Kedzior et al. 2018). Bioaccumulation of heavy metals may have more subtle effects on biota communities (e.g., individual growth rates). MIB metrics may be a more valuable indicator of contaminant impacts on local biota communities. The most downstream zones of EFPC (Zone 1 and Zone 2) had the highest total MIB scores (Figure 3.4.7.5) of impacted zones and similar MIB scores to the reference zones. Generally, the more upstream you move along EFPC the lower the MIB scores. This trend is similar to the abundance and diversity metrics. When assessed with species richness in each zone (Figure 3.4.7.2, Table A1), lower MIB scores could be impacted by smaller species being more abundant at different sites.

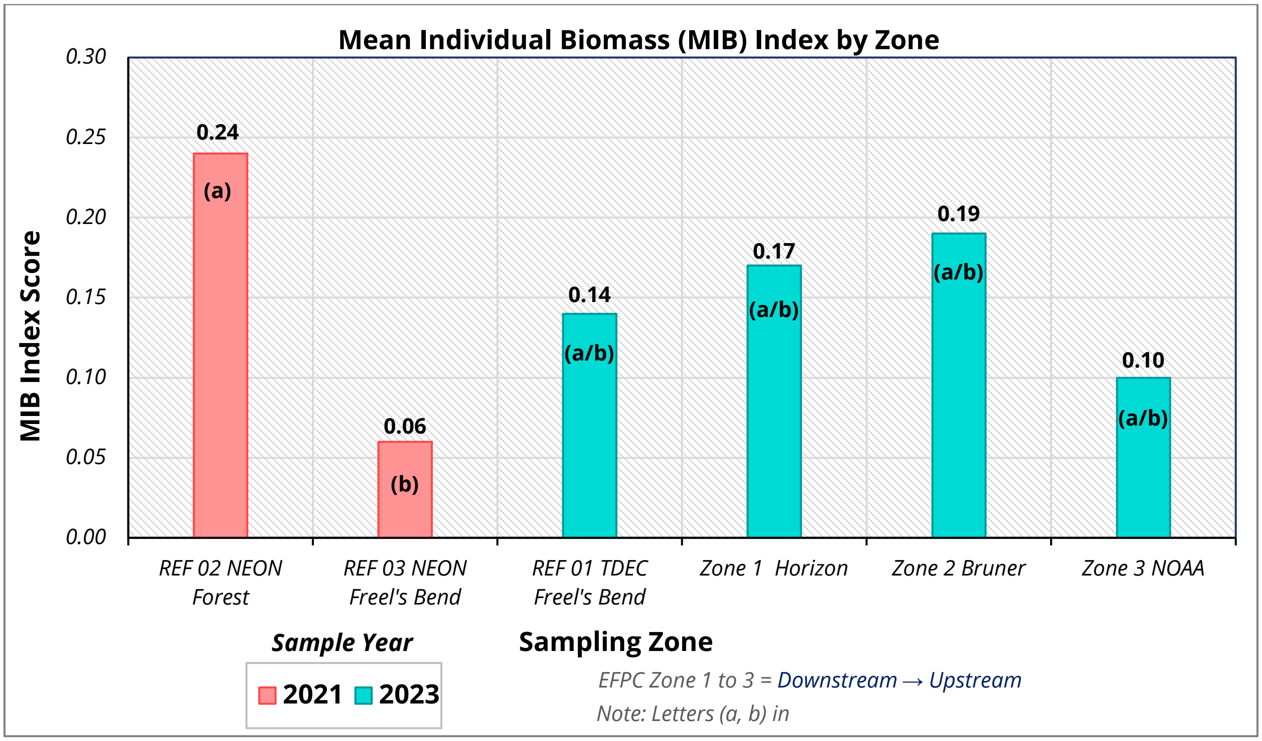

Figure 3.4.7.5 Mean Individual Biomass (MIB) Index Scores by Zone.

An *Analysis of Variance* (ANOVA) statistical test was performed on the MIB index scores by zone. MIB data were $\log_{10}$ transformed to meet the assumptions of the ANOVA statistical analysis. A *Tukey post-hoc test* was run to determine where, if any, significant differences in zones occurred. The ANOVA analysis showed a significant difference between zones ($F = 4.1027$, num df = 5, denom df = 293, $p = 0.0013$). Using the *Tukey Post-hoc* analysis, only REF 02 and REF 03 are significantly different ($p < 0.001$), while all other zone comparisons showed no significant difference in MIB index scores ($p > 0.05$).

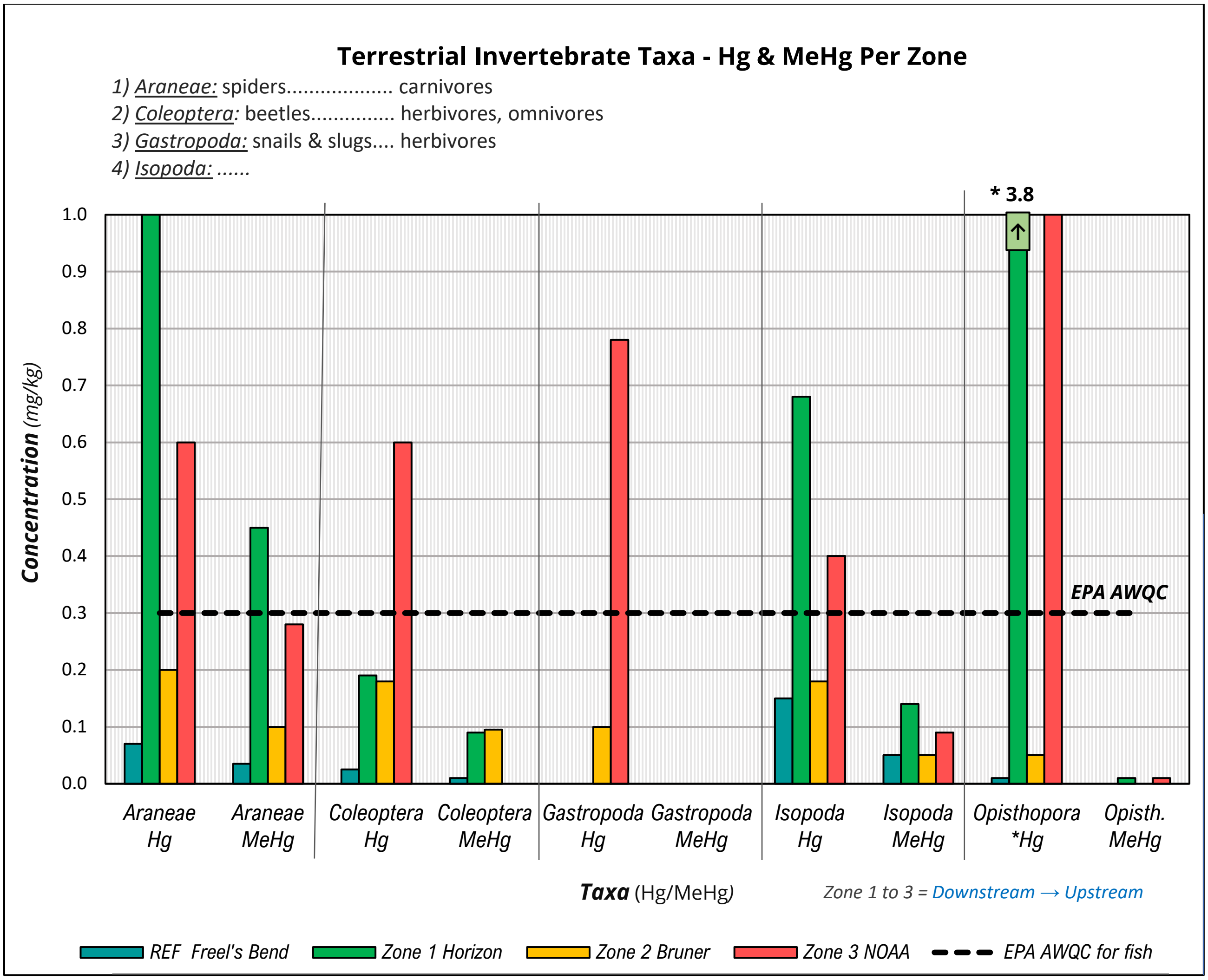

Figure 3.4.7.6: Mercury & Methylmercury Across Taxonomic Groups per Zone.

CHEMICAL ANALYSIS

Community metric measurements alone cannot directly attribute community changes to heavy metal contaminants in the environment. Ground beetles, as well as associated invertebrate bycatch, were analyzed for HgT and MeHg bioaccumulation (Figure 3.4.7.6). To simplify the invertebrate taxonomic groups, bycatch was sorted into taxonomic Orders, where ground beetles are listed as Coleoptera. Non-ground beetle taxonomic groups were chosen based on their bioaccumulative potential and relative interactions with soils. The represented taxonomic groups are: Araneae (spiders), Coleoptera (ground beetles), Gastropoda (snails), Isopoda (pill bugs), and Opisthopora (worms). Taxonomic groups were not collected at every site and available sample biomass was limited for some groups and sites, thus only the sites with successful collections and detectable Hg concentrations are represented in Figure 3.4.7.6.
HgT and MeHg concentrations in the different taxonomic groups showed similar trends to concentrations in invertebrate groups collected by ORNL (Figure 3.4.7.7). Higher concentrations

of MeHg were found in secondary consumers (spiders and pillbugs) which have higher potential to accumulate MeHg from food sources. Conversely, primary consumers (worms and snails) have food sources that have less potential for higher MeHg concentrations (soils and plants). Ground beetles, which occupy several trophic levels as either primary consumers or secondary consumers, align more closely with spiders and isopods and have more moderate concentrations of MeHg compared to HgT.

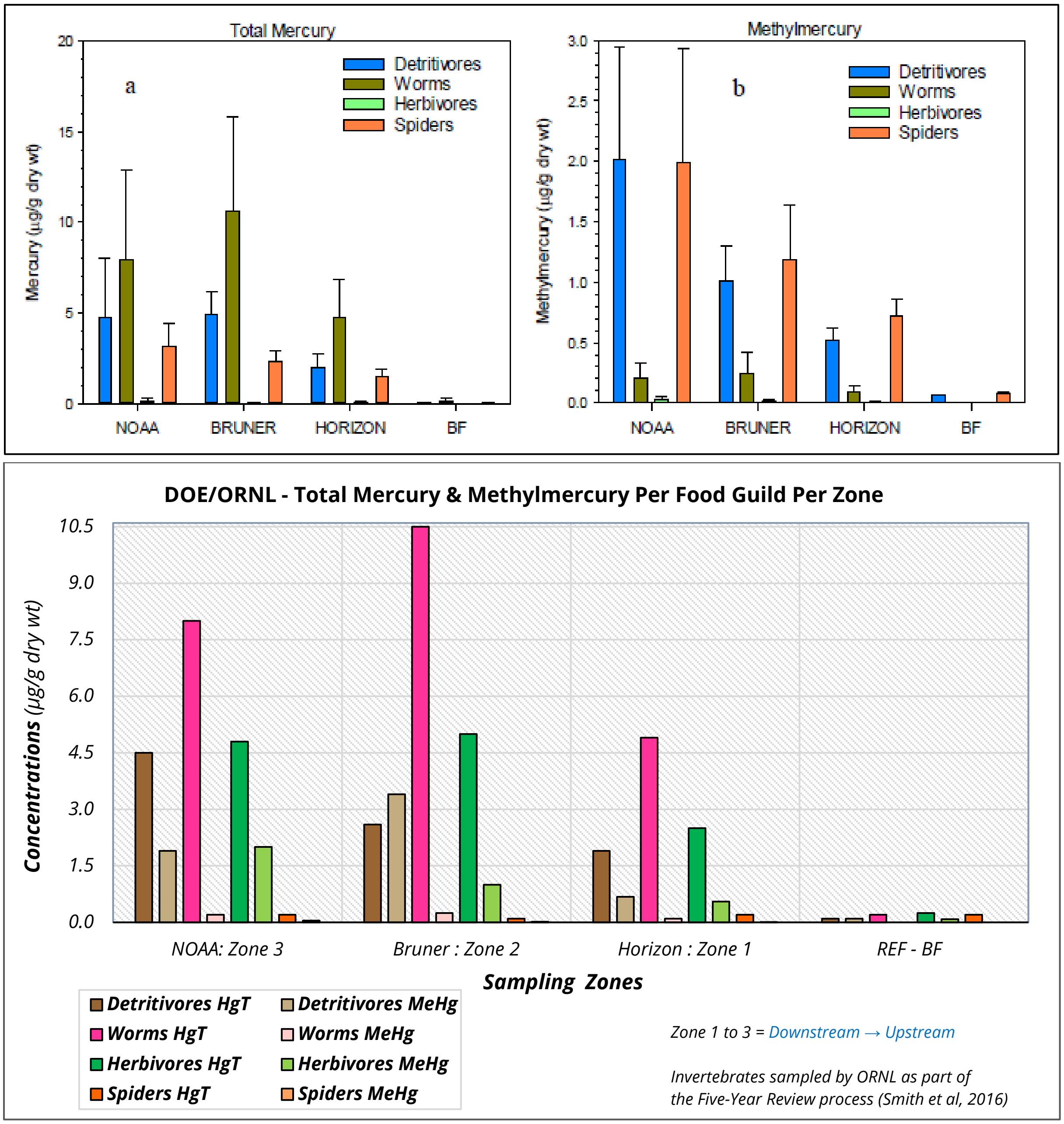

Figure 3.4.7.7: DOE/ORNL - Mercury & Methylmercury in Food Guilds Per Zone.

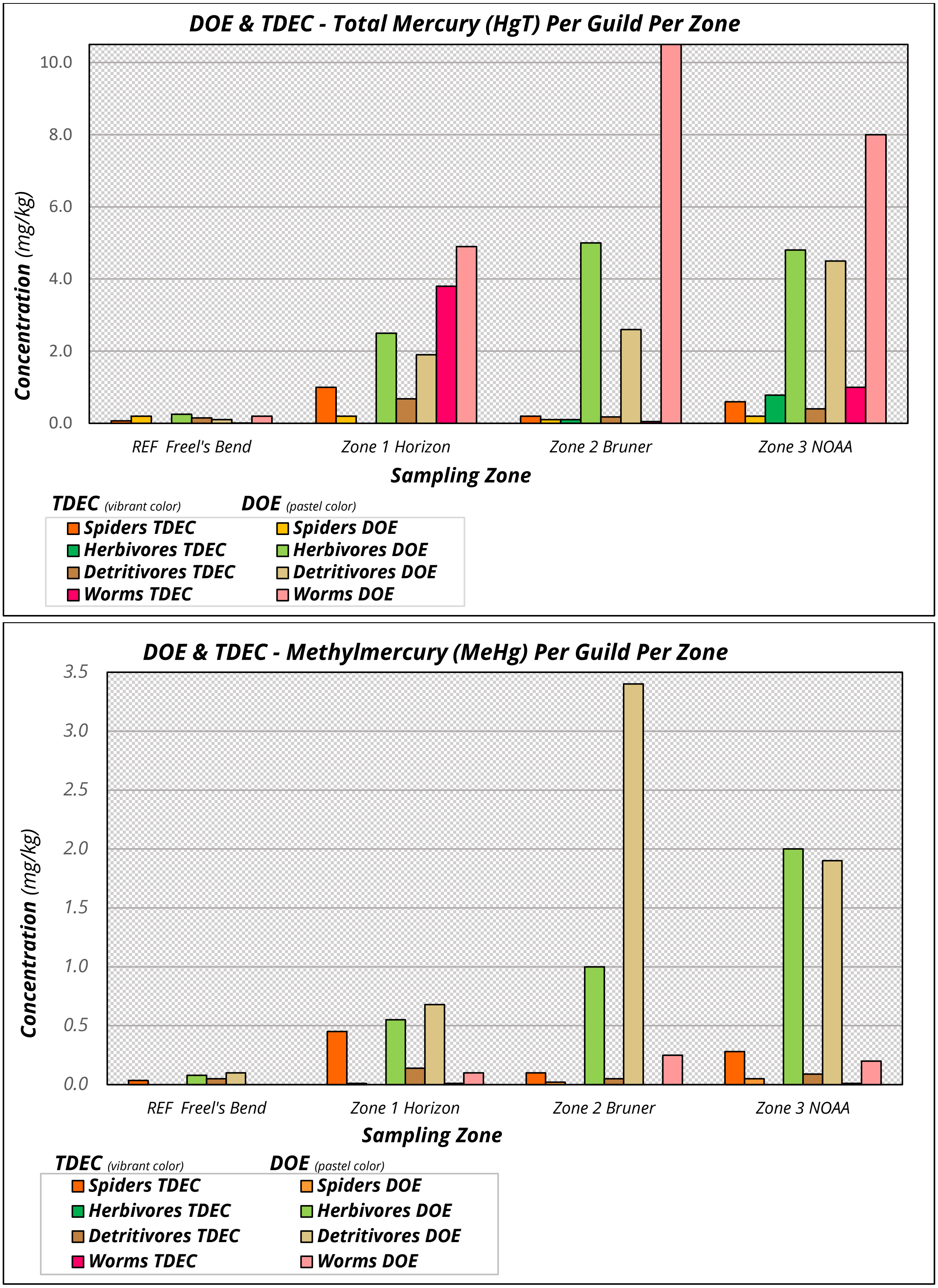

Figure 3.4.7.8: DOE & TDEC – Mercury in Food Guilds Per Zone.

When reviewing the relationship between MIB and Hg concentrations, there is an inverse relationship in which MIB per zone decreases as you move upstream in EFPC and closer to potential Hg sources (Figure 3.4.7.9). MeHg concentrations are higher in impacted zones in comparison to the reference zone but are not largely different from each other. There was not sufficient sample biomass available to sample MeHg within Zone 3, so there is only a Hg concentration available for that zone. Sample sizes for these measurements were small and cannot positively define a significant correlation between MIB and Hg concentrations. However, the general trends represented suggest further investigation is promising and additional sample collections warranted.

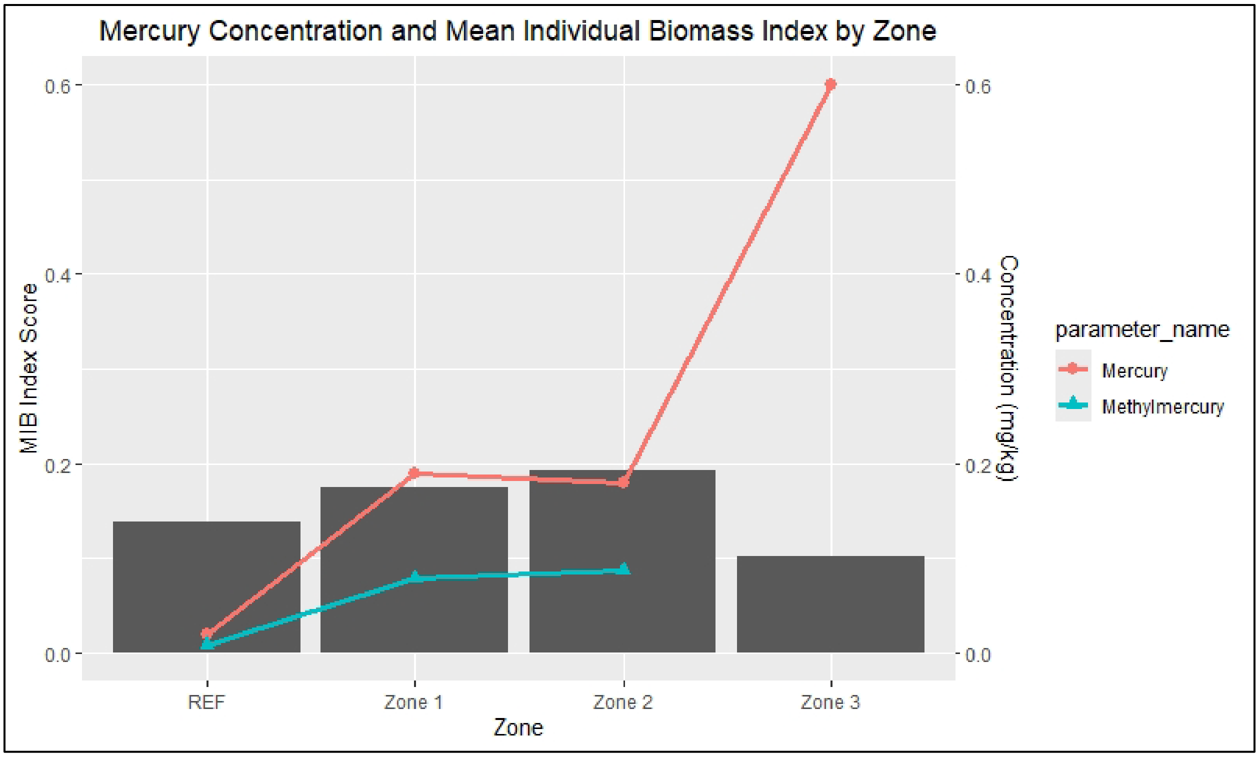

Figure 3.4.7.9: Ground Beetle Mean Individual Biomass (MIB) Index & Mercury per Zone

3.4.8 Conclusions

Hg and MeHg concentrations are high in multiple trophic levels in EFPC, allowing for the biomagnification of MeHg. The accumulation of bioavailable MeHg in ground beetles and other invertebrate groups could impact biological processes that affect ecological health (e.g., reproduction and growth).

When evaluating the use of various diversity metrics to predict Hg/MeHg impacts on community dynamics, this preliminary data would suggest that Hg may have an impact on ground beetle diversity and relative biomass. Upstream areas in LEFPC (Zone 3) possibly have environmental impacts that suppress diversity of ground beetles, while more downstream zones are less impacted and thus have higher diversity scores.

With a small dataset, such as this one, the full extent of potential relationships among community metrics and impacted zones cannot be fully assessed. Additional data is necessary to properly evaluate these relationships.

When using ground beetles as a qualitative bioindicator of heavy metal contaminants, these data suggest that only evaluating species diversity metrics alone likely misses part of the picture. Species diversity metrics should be evaluated in combination with MIB to fully understand and evaluate ecological health of an impacted area.

3.4.9 Recommendations

Biota continue to receive contaminant inputs from EFPC that transition to terrestrial ecological systems and warrant additional consideration. While the focus is currently centered around heavy metals with more severe and acute physiological consequences (e.g., Hg and MeHg), EFPC has other COCs that have been less monitored in terrestrial biota (e.g., Uranium). Thus, expanding monitoring efforts to include radionuclides and their associated heavy metals may be valuable. Moving forward, focusing monitoring efforts of bioindicator species may be a useful tool to identify heavily impacted areas and focus sampling efforts where they are likely to have the greatest impact. Elevated concentrations of contaminants in EFPC warrant continued monitoring until EFPC has been fully remediated for all media types.

3.4.10 References

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3.4.11 APPENDIX A: SPECIES AND HABITAT DESCRIPTION

Table A.1: List of Captured Species with Habitat Descriptions

Species	Species/Habitat Description [1]	Sites
Agonoleptus thoracicus [4,10]	Unknown feeding guild; Strongly favored by human activities and spring floods along large rivers. Grasslands, prairies, sagebrush areas, meadows, rangelands, pastures, cultivated fields (e.g., corn, wheat, clover), old fields, pastures, lawns, vacant lots, roadsides, sand pits, gravel pits, ski fields, orchards (e.g., peach), forest edges and clearings, and light woods. Open ground; dry, usually sandy soil covered with sparse vegetation.	FBR07
Agonum sp [3,4]	Insectivore; Deciduous woodland swamps, flood-plain forests, eutrophic marshes (Salix), marshy borders of slow rivers, brooks, and drainage channels. Ground shaded by trees and shrubs; soft, wet, clayish or muddy soil, rich in organic debris, covered with moderate or dense vegetation (e.g., Typha, Solanum, grass). Nocturnal; sheltering during the day under dead leaves, depressed grass, and stones (Habitat taken from Agonum palustre).	EFK 22.4
Amphasia interstitialis [3,4,8]	Omnivore; Deciduous flood-plain forests. Shaded ground; wet, clayish or muddy soil, rich in organic debris. Nocturnal; sheltering during the day under dead leaves, logs, and stones.	FBR03, EFK 3.1
Anisodactylus sp [4,8]	Omnivore; Cultivated fields (e.g., alfalfa, cotton, soybean), grasslands, pastures, pecan fields, orchards (e.g., peach), blowouts, upper zone of brook borders. Open ground; sandy soil covered with some vegetation. Nocturnal; sheltering during the day under dead leaves, stones, logs, and fallen tree bark (Habitat taken from Anisodactylus furvus).	FBR03, FBR07
Brachinus alternans [2,4,8]	Insectivore; River banks, swamps, low forests, salt meadows, and cultivated fields (e.g., corn). Shaded or open ground; moist, sometimes saline soil. Nocturnal; sheltering during the day under pieces of wood and logs.	FBR03, FBR07, EFK 13.8
Chlaenius amoenus [4,8]	Predatory; Deciduous forests. Moderately moist soil. Nocturnal; sheltering during the day in leaf litter.	EFK 18.5
Chlaenius emarginatus [3,4,8]	Insectivore; Deciduous forests: along paths, roadsides, small openings, clearings, and edges. Cultivated fields (rarely; e.g., corn). Shaded ground; moderately moist, gravelly or sandy soil. Nocturnal; sheltering during the day under well-embedded stones, logs, pieces of wood, and dead leaves.	FBR07, EFK 1.9, EFK 3.1, EFK 18.5
Cyclotrachelus fucatus [4,11]	Unknown feeding guild; Forests (e.g., deciduous). Shaded ground; moderately moist soil. Nocturnal; sheltering during the day in leaf litter	EFK 1.9
Cyclotrachelus sibilates [4,8]	Unknown feeding guild; Deciduous forests (mostly; e.g., Ulmus, Acer, Castanea, Fagus, Quercus, Magnolia, Carya), mixed forests (e.g., Quercus, Carya, Pinus), coniferous forests (e.g., Pinus), pastures, grasslands, low prairies, and cultivated fields (e.g., tobacco, corn). Shaded (mostly) or open ground; moderately moist soil covered with thick leaf litter or grass. Nocturnal; sheltering during the day in leaf litter (mostly), under stones, logs, pieces of wood, and other debris	FBR07, EFK 1.9

Species	Species/Habitat Description [1]	Sites
Cyclotrachelus sodalis [4,6,7]	Insectivore; Cultivated fields (e.g., corn, alfalfa, sweet clover), pastures, meadows, fencerows, roadsides, and farm yards. Open ground; dry soil covered with some vegetation (e.g., grass). Nocturnal; sheltering during the day under pieces of wood.	EFK 1.9
Cylindera unipunctata [4,8,9]	Unknown feeding guild	EFK 1.9
Dicaelus ambiguus [4,8]	Unknown feeding guild; Forests (mostly; deciduous, mixed); cultivated fields (e.g., cotton). Moderately moist soil. Nocturnal; sheltering during the day under stones.	FBR03
Dicaelus elongatus [4,6,7,8]	Insectivore; Deciduous forests (mostly), hillsides, swamps, and old fields. Shaded ground; moderately moist soil. Nocturnal; sheltering during the day under stones (mostly), logs, pieces of wood, and among dead leaves. Larval habitat: woods, under stones.	EFK 18.5
Galerita bicolor [4,5,8]	Insectivore; Deciduous forests (mostly), coniferous forests (e.g., Pinus), forest clearings, and cultivated fields (e.g., peanut, alfalfa). Shaded ground: moderately moist soil. Nocturnal; sheltering during the day under the loose bark of rotten logs, in rotten tree-stumps, under logs, pieces of wood, and stones.	FBR03, FBR07, EFK 1.9, EFK 3.1, EFK 13.8, EFK 18.5
Galerita janus [4,5,8]	Insectivore; Deciduous forests, their clearings and edges, hedges, orchards, and adjacent cultivated fields (e.g., corn, alfalfa, wheat, soybean, tobacco), meadows, pastures, vacant lots, relict prairies, wastelands, fencerows, and gravel pits. Shaded or open ground; moderately moist soil, often covered with thick leaf litter. Nocturnal; sheltering during the day under the loose bark of logs and fallen trees, under logs, stones, pieces of wood, in leaf litter, and under other debris.	EFK 18.5
Harpalus sp [4,8]	Omnivore; Meadows, pastures, relict prairies, wastelands, cultivated fields (e.g., corn, soybean, tobacco, alfalfa), semi-open fields, fencerows, gardens, gravel pits, roadsides, forest edges, and open forests (e.g., Quercus). Open ground; rather dry, sandy or clayish soil covered with some vegetation (e.g., grass). Nocturnal; sheltering during the day under stones, dead leaves and plants, and pieces of wood (Habitat taken from Harpalus erythropus)	FBR03, FBR07, EFK 1.9, EFK 18.5
Olisthopus parmatus [3,4]	Insectivore; Deciduous forests (mostly; e.g., Acer, Quercus), mixed forests (often along brooks), forest clearings, roads, and edges; hedges and swampforests. Shaded ground; moderately moist, often sandy or gravelly soil covered with thick leaf litter. Nocturnal; sheltering during the day in leaf litter.	EFK 3.1, EFK 18.5
Pterostichus coracinus [4,8]	Insectivore; Mostly forests (deciduous, mixed, coniferous); forest clearings, edges and roadsides; tree plantations (e.g., Pinus) and orchards. Also wastelands, cultivated fields (e.g., wheat, tobacco, corn), and meadows. Shaded or open ground; usually moderately moist soil (wet in coastal areas) covered with thick leaf litter (in forests) or some vegetation (in open country). Nocturnal; sheltering during the day under dead leaves, stones, and in rotten logs.	EFK 1.9

Species	Species/Habitat Description [1]	Sites
Pterostichus permundus [4,8]	Open forests (deciduous, e.g., Quercus, Carya; mixed, e.g., Quercus, Pinus; sometimes coniferous, e.g., Pinus), groves, and thickets: often long ravines and streams. Cultivated fields (e.g., corn, soybean, cotton, oat, alfalfa, sweet clover), old fields, prairies, lawns, vacant lots, fencerows, and upper zone of brook banks. Shaded or open ground; moist soil consisting of sand or clay loam, covered with leaf litter (in wooded areas) or moderate to dense vegetation (in open areas). Nocturnal; sheltering during the day under logs, pieces of wood, and stones.	EFK 18.5
Pterostichus stygicus [3,4,8]	Insectivore; Mostly forests (deciduous, e.g., Acer, Quercus; mixed; rarely coniferous): often along streams. Also their edges, clearings, and roadsides. Adjoining hedges, cultivated fields (e.g., corn, soybean), grasslands (short-grass), relict prairies, and fencerows. Shaded (mostly) or open ground; wet or moist soil covered with thick leaf litter (in forests) or moderate to dense vegetation (in open areas). Larval habitat: under the loose bark of logs.	EFK 3.1, EFK 18.5
Scarites subterraneus [2,4,8]	Insectivore; Borders of rivers, lakes, ponds, and irrigation canals; roadsides, gardens, lawns, urban and rural parks, vacant lots, old fields, wastelands, pastures, cultivated fields (e.g., corn, soybean, peanut, alfalfa, cabbage, cotton, tobacco), field edges, seed beds, orchards (e.g., citrus, apple), forest edges, and open forests. Open ground; moderately moist, sandy, clayish or muddy, rarely gravelly soil covered with some vegetation.	FBR07, EFK 22.4
Trichotichnus fulgens [4,8]	Unknown feeding guild; Open deciduous forests, pastures, cultivated fields (e.g., alfalfa), old fields, grasslands, vacant lots, and roadsides. Open or shaded ground; moderately dry, sandy or gravelly soil covered with dead leaves or grass. Mostly diurnal; active in the sunshine; sheltering on cloudy and cool days under dead leaves (mostly) and plants, stones, and other debris.	FBR03, FBR07

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3.5 Radiological Uptake in Food Crops

3.5.1 Background

DOE has conducted sampling on locally grown vegetables, including root crops (turnips), fruiting crops (tomatoes), and leaf crops (turnip greens, lettuce), as well as on hay and cow milk for many years. DOE then requested that DoR-OR conduct similar sampling, which became the *Radiological Uptake in Food Crops Project*, with the first samples collected in August of 2019. Each agency conducts separate sampling and radiological analysis on these locally grown products to look at any possible uptake of radiation. Sampling is done near or on the ORR and at reference locations farther from the ORR for comparison.

The purpose of this sampling is to determine if there is evidence that radionuclides have accumulated in food consumed by residents. This sampling addresses the question: Does radiological contamination extend beyond the bounds of the ORR and get taken up into local vegetables, grasses (potential animal fodder), and animal products, like milk and eggs? Both DOE and TDEC have had mixed success over the years in accessing target food crop samples at sufficient quantities to support this investigation; therefore, both agencies conduct similar sampling programs. This helps to ensure that the data are comparable, and the collective data are sufficient to understand potential offsite impacts to the surrounding community.

DOE initially conducted vegetable sampling at their perimeter monitoring stations on the ORR from 1992 to 1996. The focus then shifted to sampling at farms and gardens near the ORR. Their hay sampling later shifted from multiple locations on and near the ORR to only having one location at the far eastern edge of the ORR that is harvested for hay by an offsite operation.

Prior to 2017, cow milk was sampled from a dairy in Claxton, near the ORR, and at a few other local dairies as reference sites. There has not been any milk sampled since 2016 because the Claxton Dairy shut down and there have been no other dairy options found near the ORR by DOE staff, though they check each year (DOE, 2017; DOE, 2024). DOE's sampling plans and results for radiological uptake in vegetables, hay, milk (when available), and other media are documented in the annual DOE Environmental Monitoring Plan and ASER (DOE, 2022; DOE, 2024).

DOE conducts sampling of locally grown food crops, hay, and potentially milk to look for the uptake of contaminants in these products due to ORR activities. This is done to ensure that the health of residents is not being negatively impacted by consuming such products directly (vegetables, milk) or indirectly (hay as a precursor to milk for grazing animals).

As noted in the 2023 ASER (DOE, 2024), "If available, crops that represent broad-leaf systems (e.g., lettuce, turnip greens), root-plant-vegetable systems (e.g., tomatoes), and root-system vegetables (e.g., turnips, potatoes) are obtained from each location and analyzed for radionuclides." Hay was sampled in October from the eastern edge of the ORR. No milk samples were collected as there are no dairies currently located near the ORR. Vegetation samples were analyzed for gross alpha, gross beta, gamma emitting radionuclides, and isotopic uranium. These are the routine annual analyses. Vegetable samples were also scheduled for additional isotopic analyses in 2023, though the specific isotopes were not listed. "These additional analyses are conducted periodically to confirm that routinely monitored parameters are adequately characterizing doses from consuming food crops," according to the CY 2023 ORR Environmental Monitoring Plan (EMP) (DOE, 2022).

3.5.2 Problem Statements

- ORR radiological contaminants have been released into the atmosphere, groundwater, surface water, soils, and sediment, which then has the potential to uptake into plants and animals used as food sources.

- Contaminants could be disturbed by DOE ORR activities, become airborne, and spread outside of the ORR.

- Members of the public have the potential to be exposed to doses of ORR radiological contaminants through the consumption of locally grown food crops and animal products.

3.5.3 Goals

- Collect and analyze samples to determine if there is radiological contamination in food crops, hay, and animal products due to DOE activities and hence risk to human health through consumption.

- To check DOE's comparable sampling data to see if it shows any indications of radiological contamination off the ORR.

3.5.4 Scope

This project collects and analyzes samples of hay, animal products, and food crops from within a five-mile radius of the ORR for radiological contaminants (Figure 3.5.4.1). These samples were compared to samples taken from reference locations greater than five miles from the ORR boundary.

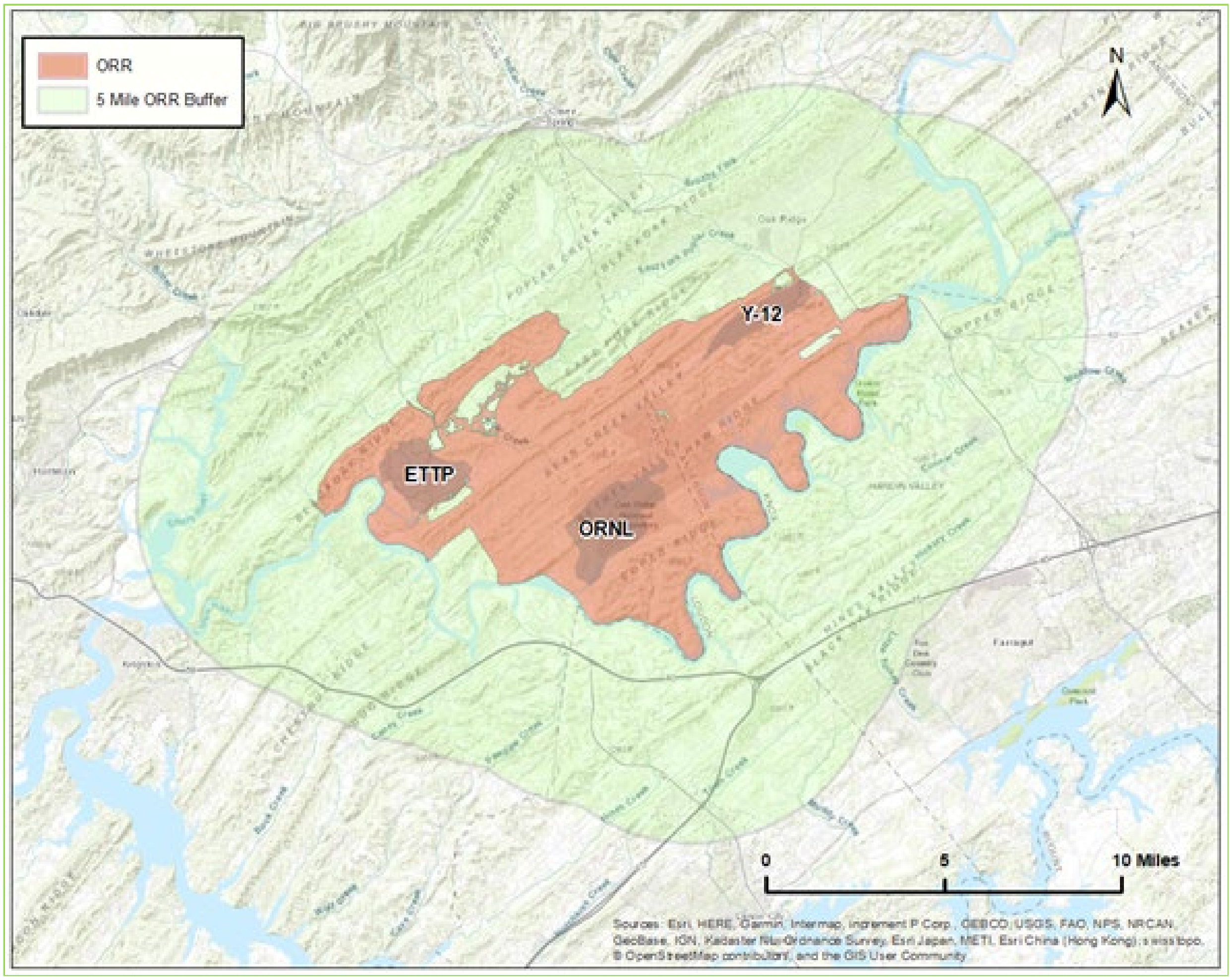

Figure 3.5.4.1: Five-Mile Radius Around ORR for Food Product Sampling

3.5.5 Methods, Materials, Metrics

In 2023, project staff collected samples of hay, food crops (root vegetables, fruiting vegetables, leafy vegetables), and animal products (eggs, milk) from within five miles of the ORR. Samples were also collected for each food crop type, hay, and eggs, from corresponding reference locations. Sampling began in July, at the start of the State of Tennessee fiscal year, and samples were mostly collected during July and August, with four additional root crop samples collected in October and November. The reference locations are over five miles from the ORR boundary and considered unimpacted. Vegetable and hay samples were analyzed for gross alpha, gross beta, and gamma emitting radionuclides. Additional isotopic analysis could be requested if indicated by elevated gross alpha or gross beta results. Milk samples were to be analyzed for tritium, gamma emitting radionuclides, strontium-90, and isotopic uranium. Instead, egg samples were collected and analyzed for the same isotopes, plus gross alpha and gross beta activity.

3.5.6 Deviations from the Plan

A different lab was used for some of the analyses as well as critical levels for determination of detection and the results are no longer as comparable to those from prior years. Previously, alpha, beta, and gamma analysis were completed by the State Environmental Analytical Lab in Nashville, with additional analyses completed by Eberline Analytical. This year all analyses were completed by Eberline Analytical. However, the results are still qualitatively comparable to prior years and can still be used to evaluate potential changes in risks to human health if they exist.

Milk samples were not readily available in 2023, even looking for goat milk. Instead, chicken eggs were collected and analyzed as a different type of animal product, which is being collected and eaten from the areas around the ORR. Egg samples were collected and analyzed for the same isotopes as planned for milk samples (tritium, gamma emitting radionuclides, strontium-90, and isotopic uranium), plus gross alpha and gross beta activity was added for comparison. Because analysis of backyard chicken eggs was a new addition in the absence of available milk samples, two sets of egg samples, each consisting of 6 eggs, collected from two locations were analyzed two ways: 1) whole eggs analyzed with shells and 2) eggs analyzed without shells. This comparison was done to determine if radiological contaminants accumulate differently in shells versus the edible portion of the egg.

3.5.7 Results and Analysis

Vegetable, hay, and milk samples were collected within five miles of the ORR (Figure 3.5.4.1). Reference samples from locations greater than five miles from the ORR were used to establish background levels. Results from this project are also compared to similar sampling by DOE, as published in the ASER.

The results of the FY24 food crops sampling are shown in Tables 3.5.7.1 to 3.5.7.4 (vegetables and hay) and Table 3.5.7.5 (eggs). There were 52 samples analyzed, with 46 vegetation samples (13 hay, 33 vegetable) and six egg samples analyzed. Radiological results were determined to be detections and are shown in the tables below if the measured result exceeded the sample specific Lc (critical level) values and with an error less than a third of the result. All blank cells with no data listed did not meet these criteria, indicating no radiological contaminants were detected. Locations with darker shaded cells were background or reference locations from more than five miles from the ORR.

DoR-OR Sampling

Vegetation: Vegetables and Hay

The vegetable and hay sampling results are shown in Tables 3.5.7.1 to 3.5.7.4.

Vegetables

Table 3.5.7.1 DoR-OR 2023 Leafy Green Vegetable Sampling Results (PCi/g)

Location			Alpha activity	Beta activity	gamma			
					K-40	Be-7	Cs-137	C0-60
		Max Greens Reference		3.12	19.4			
		Max Greens Reference x 2		**6.24**	**38.8**			
50R	Reference (Powell)	Reference lettuce		3.12	19.4			
50R	Reference (Powell)	Reference spinach			12.5			
33	N of Y-12	lettuce			6.67			
33	N of Y-12	broccoli			5.53			
23	SW of ORNL	onion greens						
28	SE of ORNL	onion greens			3.05			
28	SE of ORNL	mint			5.66			
34	NE of Y-12	mint			7.78			
28	SE of ORNL	brassica greens		2.07				
4	N of Y-12	collard greens			18.0			
53	NE of Y-12	turnips (whole)		3.88	**60.1**			

For all of the types of vegetables samples analyzed (leafy greens, fruiting vegetables, and root vegetables), none had alpha activity or gamma isotopes (other than K-40, a naturally occurring element) detected. The results for each vegetation type were compared to two times the highest reference location value for that vegetation type, for each analysis type, if available.

Analyses with results greater than twice max reference value are highlighted in bold text. Most of the results were well below these values, with two exceptions. The whole turnip sample (leaves and roots) had potassium-40 (K-40) levels higher than twice background (Table 3.5.7.1). The elevated K-40 could have been due to NPK fertilizer use, though interestingly, it did not result in significantly higher gross beta levels, and K-40 is also a beta emitter. The other sample with elevated K-40 was a cucumber sample from northeast of Y-12 (Table 3.5.7.2). Again, despite an elevated K-40 value (88.3 pCi/L), the gross beta level was similar to that of the reference cucumber and much less than the reference zucchini beta activity.

Table 3.5.7.2 DoR-OR 2023 Fruiting Vegetable Sampling Results (pCi/g)

Location			Alpha activity	Beta activity	gamma			
					K-40	Be-7	Cs-137	C0-60
		Max Veg Reference		5.48	5.13			
		Max Veg Reference x 2		**10.96**	**10.26**			
27R	Reference (Karns)	Reference cucumber		1.51	5.13			
23	SW of ORNL	cucumber			3.24			
53	NE of Y-12	cucumber		1.9	**88.3**			
55	N of Y-12	cucumber			1.66			
50R	Reference (Powell)	Reference zucchini		5.48	2.64			
56	N of Y-12	squash		2.01	2.51			
57	W of Y-12	squash			1.93			
58	SE of Y-12	cucumber		1.73				
33	N of Y-12	bean			3.20			
31	SE of ORNL	bean						

Table 3.5.7.3 DoR-OR 2023 Root Vegetable Sampling Results (pCi/g)

Location			Alpha activity	Beta activity	gamma			
					K-40	Be-7	Cs-137	C0-60
		Max Root Reference		4.24	7.53			
		Max Root Reference x 2		**8.48**	**15.06**			
50R	Reference (Powell)	Reference onion			3.87			
23	SW of ORNL	onion			2.68			
28	SE of ORNL	onion			2.79			
33	N of Y-12	onion			4.00			
60	N of Y-12	onion			2.91			
12R	Reference (Clinton)	Reference potato		3.7	7.53			
59	SE of Y-12	potato		3.78	4.95			
50R	Reference (Powell)	Reference sw potato		4.24	5.31			
33	N of Y-12	sw potato		2.88	5.15			
31	SE of ORNL	sw potato		2.58	3.29			
31	SE of ORNL	carrot			4.84			
58	SE of Y-12	beet		2.98	9.67			

HAY

The hay sample results in Table 3.5.7.4 were similar to those of the vegetable samples in the prior three tables, but beryllium-7 (also naturally occurring) was detected in two of the samples.

Table 3.5.7.4 DoR-OR 2023 Hay Sampling Results (pCi/g)

Location			Alpha activity	Beta activity	gamma K-40	Be-7	Cs-137	C0-60
	Max Hay Reference			NA	NA			
	Max Hay Reference x 2							
41R	Reference (Lenoir City)	hay						
30	S of ORNL	hay			2.69			
32	S of Y-12	hay			4.32			
61	SE of Y-12	hay		2.72	3.80			
16	South of ETTP	hay						
38	N of ETTP	hay			4.71	1.59		
37	NE of ETTP	hay			4.29			
39	NE of ETTP	hay		2.23	4.19			
40	NW of Y-12	hay		2.06				
11	N of Y-12	hay			4.59			
28	SE of ORNL	hay						
9	SE of Y-12	hay		2.44	5.67	2.96		
62	NE of Y-12	hay			3.34			

No additional analyses were needed for any of the vegetation samples, as indicated by no elevated gross alpha or gross beta results, at any of the home garden or hay locations in 2023. The low-level concentrations that were detected were comparable to background locations outside a 5-mile radius of potential impact from the ORR.

Animal Products:

Eggs

Due to difficulty finding cow and goat milk samples, egg samples from chickens were collected as the sampled animal product because residents are raising and consuming this food. The egg data is shown in Table 3.5.7.5. Six egg samples were collected from a total of four locations, with each sample consisting of 6 eggs. Two sets of eggs from both a background and non-background location were also analyzed, one sample with shells and one without for each location. There were no discernible differences in the radiological results in whole eggs versus eggs without shells.

The egg sampling results shown in Table 3.5.7.5. Only two radiological detections were observed in the composite egg samples. One detection was recorded in a whole egg reference sample, where beta activity (2.46 pCi/g) was measured. The other detection was recorded in a whole egg sample collected from northeast of Y-12, where Sr-90 (a beta emitter) was detected (0.262 pCi/g) at a low level. Interestingly, the beta activity result for the whole egg sample collected from northeast of Y-12 sample did not meet the criteria to be considered a detect. Also, any beta activity values are likely largely due to the potassium-40 (K-40) levels as K-40 is common natural beta emitter in addition to being a gamma emitter. Gross beta levels on their own weren't elevated enough to have triggered additional analysis had Sr-90 analysis not already been requested. However, there have been very few egg analyses completed for this project and the normal range of beta activity and Sr-90 levels will become more clear when more analyses have been completed.

Table 3.5.7.5 FY24 2023 Egg Results (pCi/g)

			Alpha	Beta	beta		alpha			gamma			
Location			activity	activity	H-3	Sr-90	U-234	U-235	U-238	K-40	Be-7	C0-60	Cs-137
50R	Reference (Powell)	egg no shell											
50R	Reference (Powell)	whole egg		2.46									
51	NW of Y-12	whole egg											
52	NE of Y-12	whole egg				0.262							
54	SW of ETTP	whole egg											
54	SW of ETTP	egg no shell											

Note: Locations with green shaded cells were background or reference locations, greater than five miles from the ORR.

DOE ASER Comparisons

The most recent DOE ORR ASER data was from 2023 in the 'ORR Environmental Monitoring Program' in section 6.6 (DOE, 2024). In 2023, DOE sampled tomatoes (5 samples), cabbage (2 samples), and hay (1 sample). In 2022, DOE sampling was limited to tomatoes (4 samples) and hay (1 sample) (DOE, 2023). DOE 2022 and 2023 detected concentrations in vegetables and hay are listed in Table 3.5.8.6.

Vegetables

The DOE vegetable results were converted to the same units (pCi/g) used for the DoR-OR data. Only data with results above detection limits were shown in the 2022 and 2023 ASER, with non-detects listed here as "m". Detection limits are likely not the same between DOE and DoR-OR sampling projects as different laboratories were used.

Table 3.5.7.6: 2022 & 2023 DOE Vegetables and Hay Radionuclide Results

2022 Detected Concentrations (pCi/g)

sample type	location	gross alpha	gross beta	gamma K-40	gamma Be-7	isotopic uranium U-234	isotopic uranium U-235	isotopic uranium U-238
Tomatoes	North of Y-12	m	2.03	1.97	m	m	m	m
Tomatoes	East of ORNL	m	1.81	1.68	m	m	m	m
Tomatoes	West of ETTP	m	1.46	1.20	m	m	m	m
Tomatoes	Reference	m	1.81	1.55	m	m	m	m
Hay	East ORNL	m	4.65	9.92	7.02	m	m	m

m = values less than or equal to minimum detectable activity

2023 Detected Concentrations (pCi/g)

sample type	location	gross alpha	gross beta	gamma K-40	gamma Be-7	isotopic uranium U-234	isotopic uranium U-235	isotopic uranium U-238
Tomatoes	North of Y-12	m	2.53	2.85	m	m	m	m
Tomatoes	East of ORNL	m	2.01	2.37	m	m	m	m
Tomatoes	West of ETTP	m	1.48	1.99	m	m	m	m
Tomatoes	South of ORNL	m	2.15	2.98	m	m	m	m
Tomatoes	Reference*	m	1.65	2.46	m	m	m	m
Cabbage	North of Y-12**	m	2.75	2.75	m	m	m	m
Cabbage	Reference	m	3.31	3.15	m	m	m	m
Hay	East ORNL***	m	1.93	7.44	2.34	m	m	0.009

m = values less than or equal to minimum detectable activity
*Bismuth-214 detected in tomato sample from reference location (0.0316pCi/g)
*Lead-214 detected in tomato sample from reference location (0.0368 pCi/g)
**Thorium-230 detected in cabbage sample from north of Y-12 (0.0329 pCi/g)
***Lead-210 detected in hay sample (0.710 pCi/g)

DOE vegetable samples were analyzed for gross alpha, gross beta, gamma emitters, and uranium isotopes. The 2023 DOE vegetable gross beta and K-40 results were similar to the amounts seen by the 2023 DoR-OR sampling, with the results of most other analyses less than the minimum detectable activity.

Hay

Hay is a potential radiation exposure pathway to humans if meat, milk, or other animal products are consumed. DOE's single hay location results were similar to those listed for 2023 DoR-OR analyses (12 samples within five miles of the ORR).

Milk

DOE did not collect any milk samples for analysis in 2023; however, DOE checks each year for dairies that could potentially be affected by the ORR. The last milk analysis was done for 2016 samples, when a nearby dairy was still operating (DOE, 2024).

3.5.8 CONCLUSIONS

In general, for the vegetation samples (hay, vegetables) and egg samples collected in 2023, the low-level concentrations that were detected were comparable to background locations outside a five-mile radius of potential impact from the Oak Ridge Reservation boundary or were below radiological critical levels or detection limits. Overall, the TDEC DoR-OR FY2024 vegetable, hay, and egg sampling results did not indicate that DOE ORR activities are significantly impacting radionuclide concentrations in food crops in the areas surrounding the ORR, nor did the DOE data from the current ASER.

3.5.9 RECOMMENDATIONS

As DOE remedial activities are increasing at ORNL and Y-12, and there is greater potential for spread of contaminants near the ORR, DoR-OR recommends that additional vegetable, hay, and animal product sampling be conducted in order to generate a larger dataset to identify any trends in radionuclide uptake that may be present in the vicinity of the ORR and for comparison to DOE data and contaminant limits. In the continued absence of available milk samples, DoR-OR will continue to analyze poultry eggs as an alternative animal product. In light of the continued popularity of maintaining backyard livestock, including chickens, monitoring efforts should continue. Future egg analysis will be completed on whole eggs as there were no notable differences between analyses for eggs with and without the eggshells. Also, whole eggs are easier to analyze consistently as there is no potential loss of the inner egg material when removing the shells.

3.5.10 REFERENCES

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4.0 GROUNDWATER MONITORING

4.1 GROUNDWATER MONITORING OFFSITE

4.1.1 BACKGROUND

Offsite groundwater downgradient of the ORR has been monitored by both the TDEC DoR-OR and the DOE for decades. Monitoring by the DoR-OR *Offsite Groundwater Monitoring Project* continues to be conducted due to the potential migration of ORR legacy contamination into the adjacent surrounding areas. Each fiscal year, this project focuses on an area where groundwater might flow from the ORR to offsite locations.

One ORR site with known point-source contaminants is Bear Creek Valley (ORR BCV) waste disposal area. ORR BCV is located southwest and along strike, of the Y-12 NSC. A topographic and hydrologic divide has been identified in the general vicinity of the former S-3 ponds. As such, the headwaters of Bear Creek and Upper East Fork Poplar Creek are on the west and east side of this divide, respectively (Elvado, 2020). Due to this divide, groundwater can flow downgradient to two divergent areas.

During FY24, the offsite locations for sampling efforts were private resident water wells and springs in two offsite subareas that could be impacted by ORR BCV. The Eastern Offsite Subarea (Eastern OS) is to the northeast of Y-12 and the Bear Creek Valley Offsite Subarea (BCV-OS) is southeast of ETTP (DOE, 2017). The area is illustrated on Figure 4.1.1.1.

Historically, DOE and its contractor(s) have collected groundwater samples from numerous offsite private water well locations, many of which have been collected alongside TDEC DoR-OR scientists. Within the last five (5) years, DOE has completed or is in the process of completing the following offsite groundwater activities:

- **2017:** DOE submitted the *Offsite Groundwater Assessment Remedial Site Evaluation* (DOE, 2017) which documents the collection of water samples between FY14 and FY16 at 34 private water wells and 15 springs located outside the ORR boundary.

- **2018-2022**: a 3-year study by DOE (Remedial Site Evaluation Phase 2 Offsite Detection Monitoring, DOE, 2018)

    - 14 offsite private wells/springs in all 4 subareas

    - 5 shared sample sites in BCV-OS: RWA-035, 118, 132, 143 and SYN-120

- Water Quality Parameters [WQP] (DOE, 2018)
    - temperature, pH, specific conductivity [SpC], dissolved oxygen [DO], oxidation-reduction potential [ORP], and turbidity

- Water Sample Analyses (DOE, 2022d)
    - VOCs, gross alpha/beta, uranium-233/234, uranium-235/236, uranium-238, and select fission products/transuranic elements

- DOE collects groundwater samples from *exit pathway* monitoring wells and springs, specifically within Bear Creek Valley and Melton Valley, to monitor groundwater quality within the western boundary of the ORR. These exit pathways wells and/or springs contain concentrations of VOCs and manmade radionuclides which suggests westward contaminant migration (DOE, 2022b). Exit pathway wells are designated as such by the DOE.

- Offsite migration of VOCs is occurring on the east end of Y-12. DOE operates a groundwater extraction system to control offsite migration of the East End Volatile Organic Compound (EEVOC) Plume (DOE, 2022b).

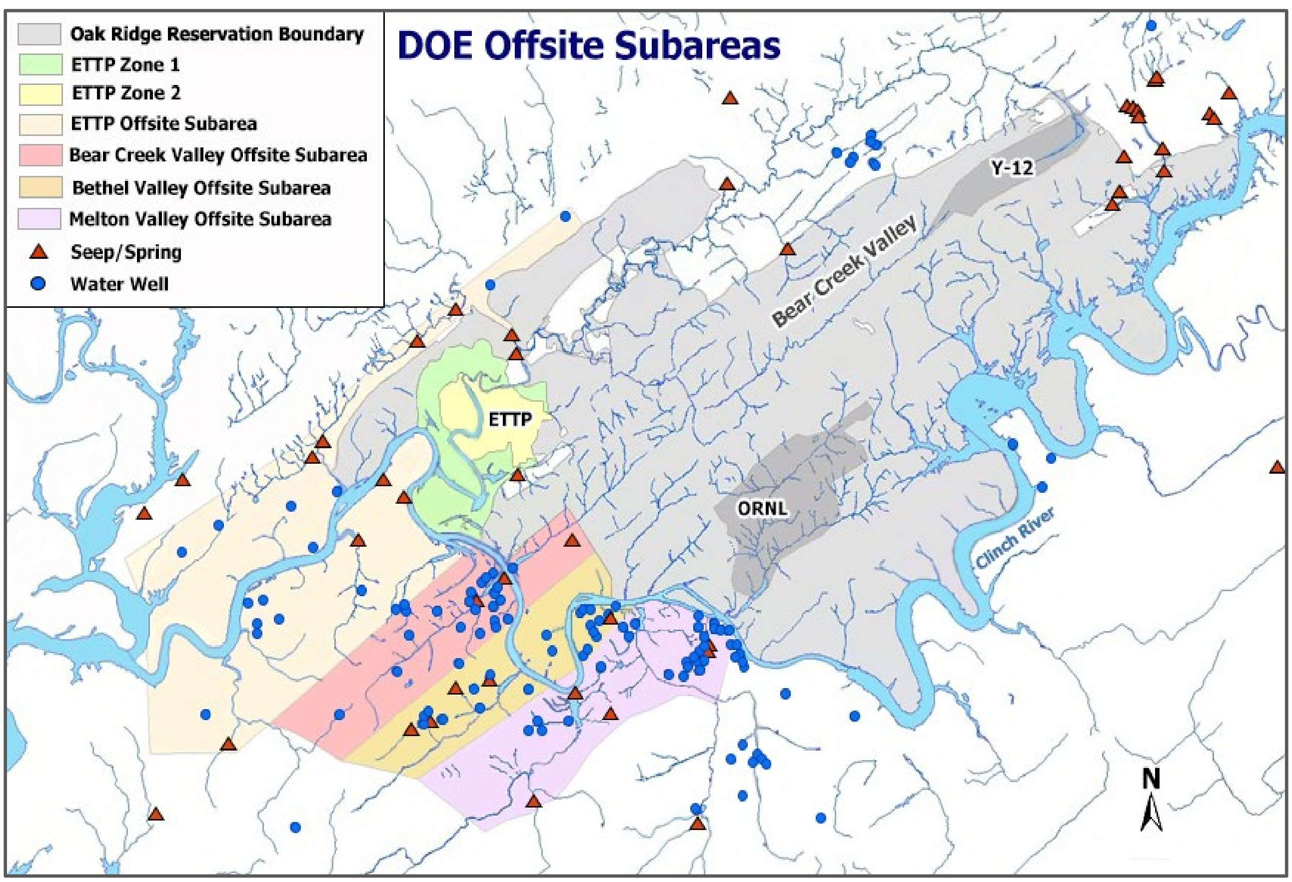

Figure 4.1.1.1: DOE Offsite Subarea Map (DOE, 2017*)*

4.1.2 Problem Statements

Delineation of the nature and extent of groundwater contamination is incomplete in most areas of the ORR (DOE, 2022). Figures 4.1.4.1 and 4.1.1.1 depict the reservation boundary and the three primary DOE facilities: ETTP, Y-12, and ORNL. Each of these facilities have numerous groundwater contaminant plumes associated with them due to past DOE mission activities. Many contaminant plumes are not well defined and require better investigation techniques to delineate their vertical and horizontal extent.

The ORR is an area with complex bedrock containing many faults and carbonates that exhibit a karst terrain with large sinkholes. Little is understood about the contaminant flow paths within the bedrock and further investigation is necessary to evaluate these flow paths. It is known that groundwater can move long distances rapidly in all fractured-rock settings (Worthington, 2001) and in channels and conduits. Accordingly, the monitoring of groundwater/spring water quality offsite the ORR is important. By monitoring water quality, TDEC DoR-OR can evaluate if there is no current threat to human health and the environment from potential offsite migration of DOE ORR legacy contamination.

4.1.3 Goals

The primary goal of this project is to evaluate protectiveness of human health and the environment though monitoring groundwater offsite the ORR that citizens may utilize for drinking water sources. This project involves collecting groundwater samples at private water wells and springs within the BCV Offsite Subarea (OS) at the locations illustrated on Figures 4.1.4.2 and 4.1.4.3.

The objectives of this project include the following:

- Monitor water quality of private water wells and springs in a preselected offsite subarea to spot check water quality intermittently and to use that data to assess protectiveness to human health at that time.

- Provide additional offsite groundwater data to allow for comparison with DOE collected onsite and offsite groundwater data, including data collected in co-sampling events.

The collection of these data may support TDEC evaluation of future groundwater cleanup decisions and project prioritization discussions that support TDEC DoR-OR's mission of protecting human health and the environment.

4.1.4 Scope

The scope of this project was to obtain access and collect groundwater samples from 24 private water wells and 11 springs within the BCV Offsite Subarea (Figures 4.1.4.1 and 4.1.4.2). At each location, field water quality parameter measurements were documented, and groundwater samples were collected and submitted for laboratory analysis.

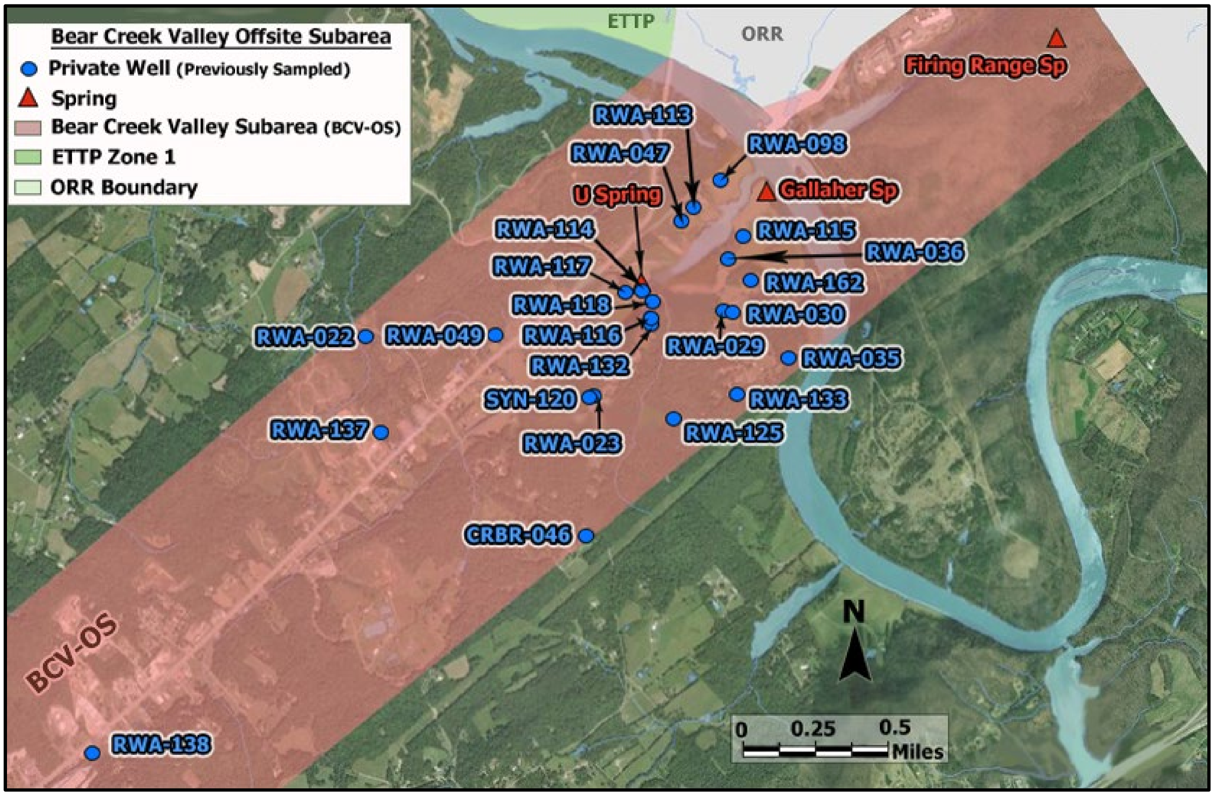

Figure 4.1.4.1: Bear Creek Valley Offsite Subarea Sample Locations

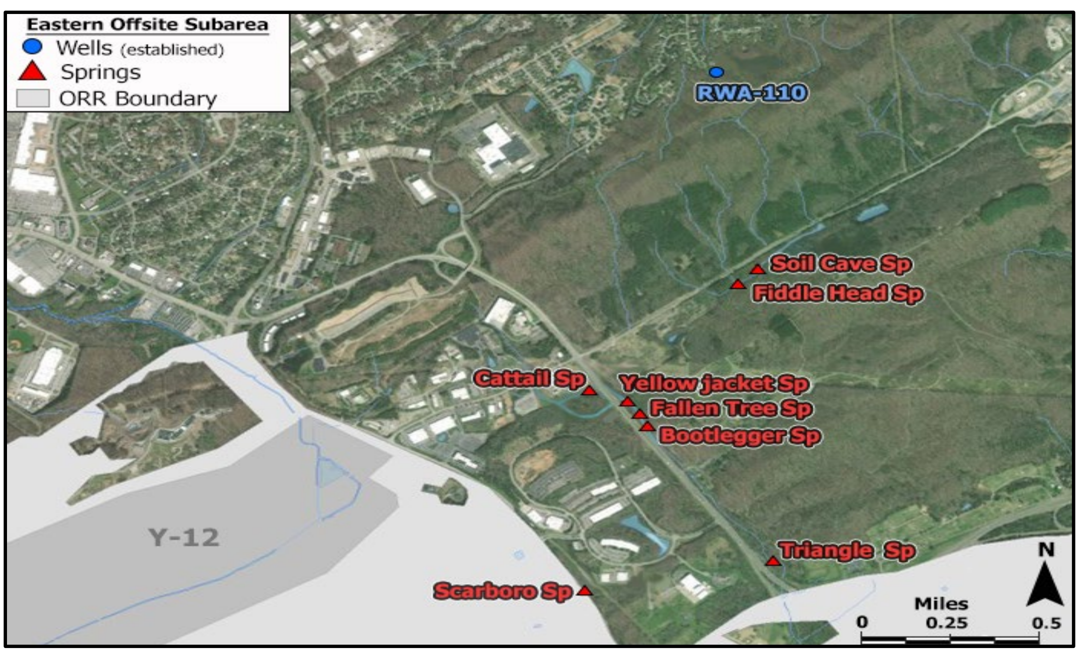

Figure 4.1.4.2: Eastern Offsite Subarea Sample Locations

4.1.5 Methods, Materials, Metrics

Sample Collection

The private water well samples were collected using each well's dedicated submersible pump from an accessible tap located as close to the well as possible, ideally prior to any filtration and/or water softener systems. Once the appropriate volume of water had been purged and water quality parameters had stabilized, a groundwater sample was collected. The springs were sampled using a peristaltic pump using low flow methods. Once three stabilized parameter readings were obtained, a groundwater sample was collected.

A total of 18 water samples, including 15 stations' samples and three (3) duplicate samples, were collected from private water wells and springs, and analyzed for volatile organic compounds (VOCs), gross alpha/beta, inorganics, and metals. Additionally, isotopic uranium was also analyzed for 12 stations: eight (8) of the nine (9) well stations, and four (4) of the six (6) springs' stations.

Table 4.1.5.1: BCV Offsite Subarea Groundwater Sampling

Station Name	No. of Samples
Wells	***9 stations, 11 samples***
RWA-047, RWA-049, RWA-114, RWA-116, RWA-132, RWA-137, SYN-120 *****	1
RWA-035, RWA-118	2 **
CRBR-046, RWA-022, RWA-023, RWA-029, RWA-030, RWA-036, RWA-098, RWA-110, RWA-113, RWA-115, RWA-117, RWA-133, RWA-138, RWA-125, RWA-162	*Not sampled, no access, access denied, or no response*
Springs	***6 stations, 7 samples***
Bootlegger Sp, Fallen Tree Sp, Soil Cave Sp, Triangle Sp, U Sp	1
Cattail Sp.	2
Fiddle Head Sp, Firing Range Sp, Gallaher Sp, Scarboro Sp, Yellowjacket Sp	*Not located, dry, or no access*
* *= one sample, co-sampled with DOE using DOE SOP;* ** *= 2nd sample was a co-sample with DOE using DOE SOP*	

Quality assurance/quality control (QA/QC) samples were collected, and samples were collected in accordance with internal standard operating procedures (SOPs).

4.1.6 Deviations from the Plan

Groundwater samples were planned to be collected from twenty-four (24) private water wells; however, due to access issues, only nine (9) private water wells were sampled (Table 4.1.5.1). The main reason for not sampling wells was no response from homeowner(s). Other reasons included denial of access from homeowner, duplicate well names, well no longer present, and pump not working.

Additionally, of the eleven (11) springs locations planned to be sampled, only six (6) spring locations were sampled. Two springs, Fiddlehead Spring and Yellowjacket Spring, were unable to be located or were dry. Two other springs, Scarboro Spring and Firing Range Spring were not sampled due to property access reasons. Gallaher Spring was not sampled as a beaver dam had blocked access from the Clinch River and flooded/submerged the area around the spring.

Other deviations from the plan included co-sampling with the DOE contractor. As part of this co-sampling, a second set of samples were collected from two (2) private wells; RWA-035 and RWA-118. Sampling of well SYN-120 was performed with the DOE contractor. During co-sampling events, the DOE contractor was the lead in the sampling and all sample activities were performed using their SOP procedures.

Additionally, isotopic uranium was originally proposed for samples with results of alpha activity exceeding 5 pCi/L. Due to the limited number of wells that were sampled, isotopic uranium was also analyzed on nine (9) of the eleven (11) well samples, and four (4) of the seven (7) spring samples.

4.1.7 Results and Analysis

For comparison purposes only, the resulting analytical data were evaluated and compared against numerical standards set forth by TDEC and the EPA in the following documents:

(1) *General Water Quality Criteria Chapter 0400-40-03-.03* (TDEC, 2019)

(2) *National Priority Drinking Water Regulations* (EPA, 2009)

(3) *National Secondary Drinking Water Regulations* (EPA, 2009).

A summary of the results for the private water wells and springs is presented below.

Private Water Wells

Except for SYN-120, no VOCs were detected in any of the nine (9) private water wells sampled (eleven samples total as RWA-035 and RWA-118 were sampled twice).

Bromodichloromethane, chloroform, dibromochloromethane, and dibromomethane were detected in well SYN-120 at concentrations above the detection limit but below applicable Drinking Water Regulations (Table 4.1.6.1). Notable levels of gross alpha/beta, inorganics, and metals were not identified in any of the well samples.

North and South or Eastern-OS and BCV Offsite Subarea Springs

Except for the Eastern-OS spring, Cattail spring, no significant VOC results were noted in any of the analytical results for the six (6) BCV Subarea springs sampled. Cattail spring contained detectable concentrations of TCE in both the sample and field duplicate collected from this location. Concentrations of TCE were just above the detection limit (estimated concentration) and were well below its respective Drinking Water Regulation. Notable levels of gross alpha/beta, inorganics, and metals were not reported in any of the spring samples.

Table 4.1.7.1: Summary of VOC Detections

Sample Site	Sample Date	Bromodichloromethane	Chloroform	Dibromochloromethane	Dibrommethane	TCE
MCL		*80*	*80*	*80*		*5*
SYN-120	*3/12/24*	***11.1***	***29.0***	***3.09***	***0.548 J***	*< 0.190*
Cattail Sp. East	*3/07/24*	*< 0.136*	*< 0.111*	*< 0.140*	*< 0.122*	***0.285 J***
Cattail Sp. East (dup)	*3/07/24*	*< 0.136*	*< 0.111*	*< 0.140*	*< 0.122*	***0.265 J***

*All concentrations are in **µg/L** (micrograms per liter).* ***Bolded*** *values = detection.*
< *= not detected above concentration shown.* ***J*** *= reported result is an estimate.*

4.1.8 Conclusions

BCV-OS

Detectable concentrations of bromodichloromethane, chloroform, dibromochloromethane, and dibromomethane were reported in well SYN-120. All concentrations were below their regulatory action levels. It should be noted that detections of chloroform and bromoform chemicals are typically associated with potable water treatment. Based on this, there is a possibility that groundwater in the vicinity of this well is being impacted by municipal water due to a subsurface leak from a source containing treated water.

Eastern-OS

Detectable concentrations of TCE were detected in Cattail Spring. The concentrations were very close to the detection limit. The presence of TCE at this spring may be an indicator of migration of the leading edge of a known plume east of Y-12.

4.1.9 Recommendations

TDEC DoR-OR recommends continuing monitoring offsite groundwater focusing on one subarea at a time. During FY25, the offsite groundwater project should include another offsite subarea in the rotation or selected wells across multiple subareas. At a minimum, it is recommended to collect additional samples from Cattail Spring to monitor TCE detection in this area.

4.1.10 References

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5.0 Landfill Monitoring

5.1 EMDF

5.1.1 Background

The EMDF is a new landfill that DOE began constructing in 2024. Once completed, this landfill will be used for the disposal of low-level radioactive waste, hazardous waste, and toxic waste generated by remediation activities on the ORR. The landfill will be operated under the authority of CERCLA and DOE directives. While the EMDF will not be required to hold a State of Tennessee permit, the landfill will be required to comply with DOE orders and substantive portions of Applicable or Relevant and Appropriate Requirements (ARARs). These regulations are listed in the CERCLA EMDF Record of Decision (ROD) signed in September 2022.

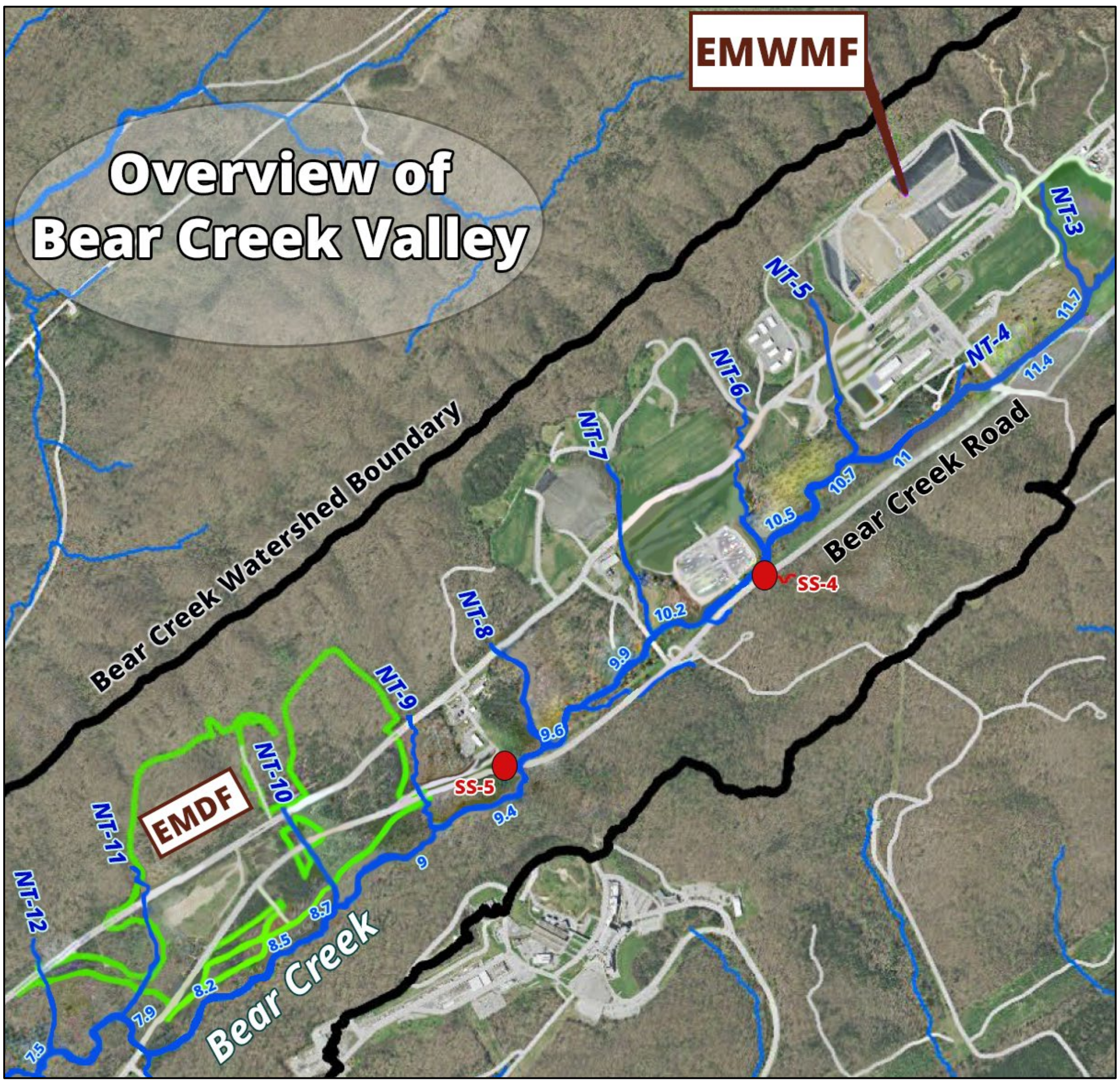

Figure 5.1.1.1: EMDF Site and EMWMF in Bear Creek Watershed

The EMDF is located within the Central Bear Creek Valley (CBCV) area; more specifically, the site lies west of the current active landfill, the Environmental Management Waste Management Facility (EMWMF). In FY24, DoR-OR staff monitored surface water along the CBCV reach of Bear Creek. Furthermore, surface water plus one spring was sampled to support efforts to get baseline data prior to construction.

DOE will continue to monitor the existing landfill, the EMWMF. Currently, DOE monitors Bear Creek and some of its northern tributaries (NT-3, NT-4, NT-5) for potential releases. The wastewater released from the EMWMF sediment basin is collected by an automatic sampler using a weekly flow-weighted composite sample. Annually, the results from these sampling efforts are published in the EMWMF *Phased Construction Completion Report* (PCCR).

DOE plans to conduct surface water sampling within the CBCV Watershed. EMDF baseline sampling is slated to begin either in 2028, or one year prior to the planned start of EMDF operations.

5.1.2 Problem Statements

1) Early site preparation and construction activities could potentially impact surface water quality.

2) Contaminants in the waste materials from CERCLA remediation activities will be buried in the EMDF once construction is completed. Once placed in the landfill, contaminants may leach out into the environment.

3) If EMDF landfill runoff is contaminated and spreads into the surrounding area, TDEC and DOE will need baseline water quality parameters to plan and assess remediation efforts.

5.1.3 Goals

1) Obtain baseline surface water monitoring data before EMDF Landfill construction begins in the CBCV.

2) Verify / compare baseline surface water parameter data with DOE collected surface water data.

5.1.4 Scope

The EMDF is located within the Central Bear Creek Valley (CBCV) area; more specifically, the site lies west of the current active landfill, the Environmental Management Waste Management Facility (EMWMF). In FY24, DoR-OR staff monitored surface water along the CBCV reach of Bear Creek.

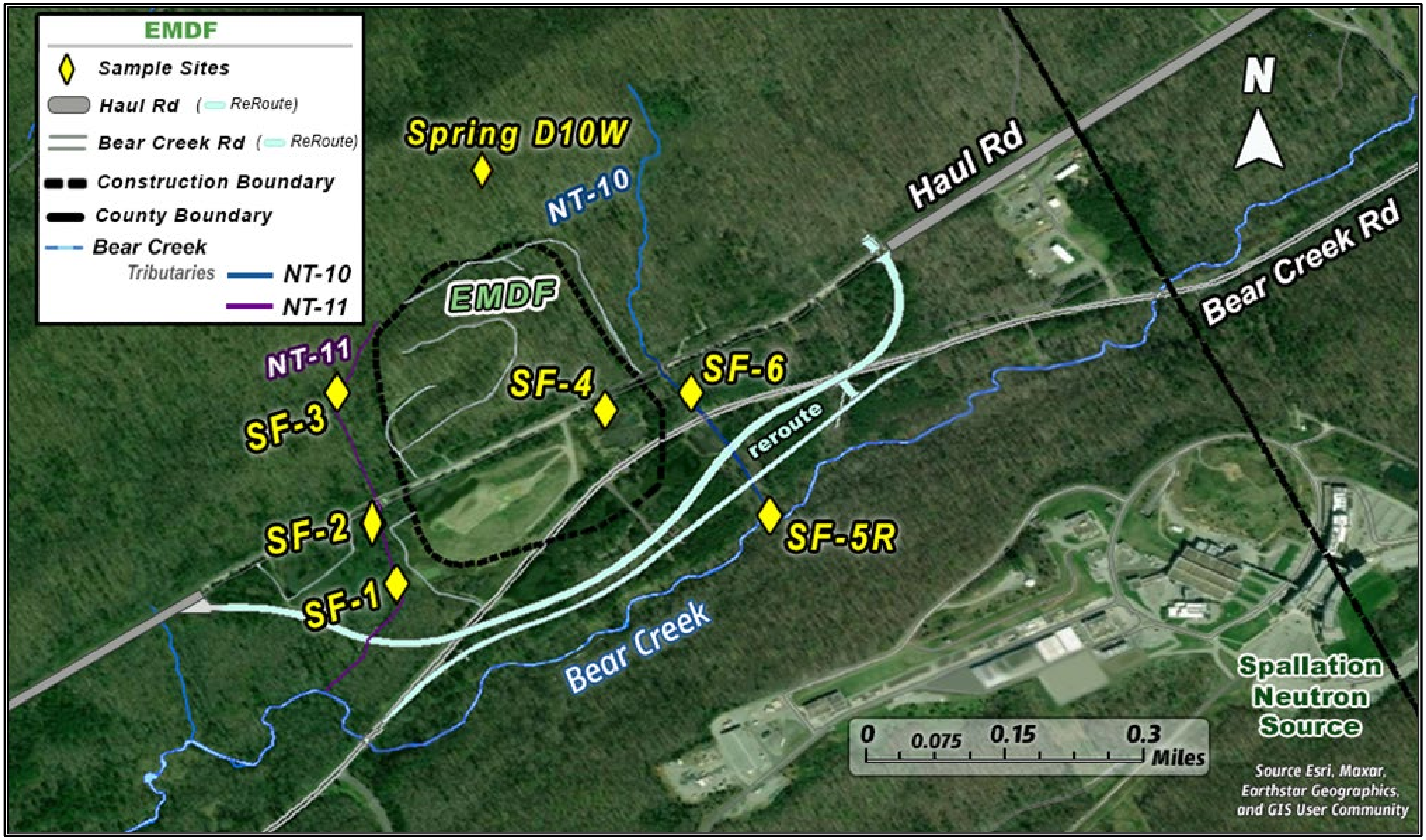

Figure 5.1.4.1: EMDF Site & Sampling Locations

Within the proposed EMDF footprint, staff will measure water quality parameters in streams at six flume discharge locations and at one spring: SF-1, SF-2, SF-3, SF-4, SF-5, and SF-6 and spring D10W (Figure 5.1.1.1).

5.1.5 Methods, Materials, Metrics

Surface water monitoring tasks for this program included measuring water quality parameters and analytical sampling. DoR-OR monitored the parameters at seven locations, which includedone stream site, five stream discharge flumes, and one spring (i.e., D10W) (Figure 5.1.4.1). Staff used a YSI Professional Plus water quality meter to collect measurements monthly. Parameters included temperature, pH, conductivity, dissolved oxygen, and oxidation-reduction potential (*see Chapter 7.4 for EMDF turbidity analysis*). Calibration and/or confidence checks of this instrument were performed prior to field use. Multi-parameter logging probes were in-stream and used at two locations to collect continuous samples (recorded hourly, unless other schedule was deemed appropriate) at locations SF-1 and SF-5R. At least twice a month, a visual inspection was conducted on in situ equipment. These two locations were selected for continuous monitoring because both SF-1 and SF-5 receive water from upstream via NT-11 and NT-10 respectively.

Analytical sampling was conducted on a semi-annual basis at four locations, including a background location. The schedule for this sampling corresponded to one wet and one dry season sample. Table 5.1.5.1 presents the four locations where surface water samples were collected. In addition, the sampling frequency and rationale for each station are listed. The analytical test suite is presented in Table 5.1.7.1. All pertinent water quality regulatory criteria from the EPA and TDEC were included in the results graphs.

DoR-OR staff monitored the streams and documented discharges, water conditions, stream bank conditions, and noted any concerns. All concerns were brought to the attention of DOE. Field notes were recorded in a dedicated field book and events were also reported internally in a monthly project report. Data collected from these key locations by both DoR-OR and DOE were entered into an Excel database for evaluation. This data evaluation included the construction of tables and graphs illustrating ranges, limits of constituents and parameters, and identifying trends throughout the project period.

Two samples were collected from the sites listed in Table 5.1.5.1 (SF-1, SF-5R, SF-6 and Spring D10W). The samples were collected following the 2015 and 2016 TDEC sampling and analysis plans (SAPs). The grab samples were analyzed for metals, volatile organics, PCBs, and radioactivity. The analytes are listed in Table 5.1.5.2.

Table 5.1.5.1: FY24 EMDF Sample Sites

<table>
<tr><th rowspan="2">Station</th><th colspan="2">Sampling Frequency</th><th rowspan="2" colspan="2">Sampling Site Description and Rationale</th></tr>
<tr><th>Analytical</th><th>Parameters</th></tr>
<tr><td>SF-1*</td><td rowspan="2">Semi-annually</td><td rowspan="2">Continuous In-situ probe</td><td>NT-11 @BCK, farthest downstream location</td><td rowspan="6">In Stream</td></tr>
<tr><td>SF-5R*</td><td>NT-10 @BCK, farthest downstream location</td></tr>
<tr><td>SF-2</td><td rowspan="3"></td><td rowspan="5">Monthly</td><td>NT-11, along the western landfill footprint</td></tr>
<tr><td>SF-3</td><td>NT-11, upstream location</td></tr>
<tr><td>SF-4**</td><td>NT-10W, south of the new Haul Rd</td></tr>
<tr><td>SF-6**</td><td rowspan="2">Semi-annually</td><td>NT-10, upstream location</td></tr>
<tr><td>Spring D10W</td><td colspan="2">Background spring</td></tr>
<tr><td colspan="5">Red Stations = surface water sampling sites for analytical analysis; SF: Surface Water Flume; NT: Northern Tributary
* In-situ probes removed and relocated to Bear Creek on 09/30/2024.
** Site removed for EMDF construction activities.</td></tr>
</table>

Table 5.1.5.2: FY24 DoR-OR EMDF Monitoring Analyte List

Radionuclides		Metals	Inorganics	Organics
Gross α/β Activity Americium-241 Carbon-14 Chlorine-36 Cobalt-60 Cesium-137 Europium-154 Tritium Iodine-129 Lead-210 Neptunium-237	Plutonium-238 Plutonium-239/240 Radium-226 Radium-228 Strontium-90 Technetium-99 Thorium-228 Thorium-232 Uranium-233/234 Uranium-235/236 Uranium-238	Arsenic Barium Cadmium Chromium Cobalt-60 Copper	Nitrate/Nitrite	Volatile Organics Polychlorinated Biphenyls

5.1.6 Deviations from the Plan

1) At times, weekly monitoring events were not completed due to unavoidable schedule changes, changes in priorities, accessibility, or weather.

2) From January 2024 to May 2024, DOE requested that TDEC not access the EMDF site due to safety concerns during due to relocation of the Haul Road and the Groundwater Field Demonstration (GWFD) tree felling, grubbing, and grading activities.

3) Several flume stations were modified or moved due to EMDF construction activities

1. Flume SF-5R was relocated to NT-10, just above its confluence with Bear Creek.
2. Flumes SF-4 and SF-6 were removed and not relocated.

4) Continuous water quality parameter probes were relocated from tributary locations to Bear Creek in September 2024.

5.1.7 Results and Analysis

Surface Water Sampling

Surface water samples were analyzed for COCs known to be present in nearby waste disposal areas.

1) Radionuclide Activity Results

Table 5.1.7.1 shows the analytical results for radionuclides in semi-annual sampling at the EMDF. None of the radiological analytical results were above the Regional Screening Level (RSL) provided by the EPA. There are no regulatory criteria for radionuclides in the Tennessee Surface Water Quality Criteria as seen in Table 5.1.7.2.

Table 5.1.7.1: FY24 EMDF Radionuclide Analytical Results

Radionuclide	SF-1				SF-5R				SF-6				Spring D10W			
	Dec-23	*CSU*	*Jun-23*	*CSU*	*Dec-23*	*CSU*	*Jun-23*	*CSU*	*Dec-23*	*CSU*	*Jun-23*	*CSU*	*Dec-23*	*CSU*	*Jun-23*	*CSU*
Americium-241	0.04	0.16	0.01	0.08	0.10	0.18	0.08	0.11	1.01	0.50	0.17	0.15	0.13	0.22	0.09	0.09
Beryllium-7	-11.52	28.48	8.48	20.44	-15.14	29.50	13.07	27.16	-16.63	27.00	-12.52	39.62	6.55	26.14	4.36	34.56
Carbon-14	-7.34	6.29	-2.51	6.23	4.07	6.64	-2.86	6.39	2.41	6.67	-1.18	6.62	-5.24	12.31	0.56	6.36
Cesium-137	0.62	3.26	1.12	2.96	-1.51	3.81	3.37	3.10	2.98	3.26	3.22	4.12	3.77	3.41	3.14	4.23
Chlorine-36	1.19	0.88	-0.50	1.26	0.19	0.82	-0.69	1.43	0.73	0.83	1.11	1.46	0.00	0.95	0.23	1.38
Cobalt-60	0.90	2.83	1.50	3.46	0.66	3.15	0.60	2.50	-1.09	4.47	0.91	5.24	-0.48	4.26	-0.78	6.69
Europium-154	-3.18	8.87	1.05	11.71	-0.30	9.54	-6.53	11.10	-2.21	10.17	-1.13	12.17	2.80	10.93	7.78	14.94
Gross Alpha	0.52	0.63	2.41	1.52	0.44	0.62	8.09	2.35	0.49	0.59	11.21	2.42	10.17	3.03	12.45	3.69
Gross Beta	5.28	1.54	5.99	2.65	2.68	1.30	10.47	4.46	2.81	1.36	19.48	3.75	5.47	3.08	10.61	5.03
Iodine-129	0.56	0.69	2.13	1.58	1.60	0.58	2.09	1.69	1.33	0.61	1.29	1.85	3.14	1.05	3.19	1.56
Lead-210	2.38	0.95	0.50	0.33	0.14	0.39	0.21	0.37	0.52	0.38	0.25	0.33	1.39	0.80	10.87	1.59
Neptunium-237	-0.07	0.08	0.08	0.11	0.14	0.13	0.02	0.10	-0.04	0.08	0.04	0.09	0.32	0.33	0.06	0.10
Plutonium-238	0.08	0.11	0.34	0.44	0.03	0.08	-0.02	0.09	0.10	0.13	0.17	0.31	0.02	0.16	0.33	0.57
Plutonium-239/240	0.03	0.06	0.06	0.19	0.04	0.11	0.12	0.15	-0.02	0.08	0.07	0.17	0.22	0.31	0.36	0.56
Potassium-40	3.87	35.82	35.04	39.76	1.83	29.20	20.53	40.85	24.31	35.24	45.83	39.45	56.34	42.82	8.58	59.36
Radium-226	0.18	0.21	0.06	0.12	-0.01	0.05	0.03	0.09	0.24	0.16	0.09	0.10	-0.21	0.15	0.62	0.42
Radium-228	0.45	0.81	0.90	0.59	0.69	0.43	1.16	0.61	0.04	0.43	4.98	1.49	0.62	1.15	1.28	1.00
Strontium-90	0.82	0.59	1.55	1.21	0.25	0.28	0.99	1.37	0.04	0.31	0.13	1.10	0.62	0.65	0.72	1.49
Technetium-99	-0.86	1.29	0.38	1.61	-0.70	1.38	-0.19	1.62	0.22	1.30	-0.20	1.64	2.11	2.50	-0.30	1.67
Thorium-228	0.11	0.16	0.29	0.23	0.13	0.14	0.38	0.22	0.03	0.08	0.50	0.27	0.05	0.14	11.95	2.82
Thorium-230	1.11	0.48	0.79	0.38	0.26	0.19	0.50	0.25	0.15	0.13	0.70	0.33	0.58	0.43	4.28	1.23
Thorium-232	0.07	0.11	0.25	0.19	0.15	0.15	0.04	0.11	0.00	0.07	0.51	0.26	0.17	0.24	6.89	1.73
Tritium	41.34	202.56	313.69	286.27	187.00	206.00	234.44	276.01	229.98	208.34	216.04	281.89	207.32	196.63	216.79	282.88
Uranium-234	0.08	0.12	0.37	0.22	0.36	0.19	1.04	0.35	0.10	0.11	0.47	0.25	1.40	0.71	1.33	0.41
Uranium-235	0.04	0.10	0.23	0.19	0.06	0.10	0.10	0.12	0.03	0.09	0.04	0.11	0.18	0.28	0.03	0.07
Uranium-238	0.20	0.15	0.35	0.22	0.37	0.19	0.76	0.30	0.05	0.09	0.47	0.25	0.58	0.46	1.30	0.40

CSU = Combined Standard Uncertainty

2) *Metals Results*

Table 5.1.7.2 lists the State of Tennessee and EPA limits for metals in surface water based on the type of water usage (e.g., recreation, fishing, consumption, etc.).

Table 5.1.7.2: Tennessee & EPA Surface Water Criteria for Metals

Surface Water Criteria Comparison						
EMDF Analyte List *(µg/L)*	***Human Life Criteria***		***TN Aquatic Life Criteria***		***EPA Aquatic Life Criteria***	
	Human Health *for the consumption of water + organism*	Human Health *for the consumption of organism only*	Freshwater *CMC[1] (acute)*	Freshwater *CCC[2] (chronic)*	Freshwater *CMC[1](acute)*	Freshwater *CCC[2] (chronic)*
1. Arsenic	0.018	0.14	340	150	340	150
2. Barium	--	--	--	--	--	--
3. Cadmium	--	--	1.8	0.72	1.8	--
4. Chromium III	100 (total Cr MCL)	--	570	74	570	74
5. Cobalt	--	--	--	--	--	--
6. Copper	1,300	--	13	9	--	--
7. Lead	--	--	65	2.5	82	3.2
8. Mercury	--	--	1.4	0.8	1.4	0.8
9. Nickel	610	4,600	470	52	470	52
10. Uranium	--	--	--	--	--	--
11. Vanadium	--	--	--	--	--	--
12. Zinc	7400	26,000	120	120	120	120
CMC[1] CMC: Criterion Maximum Concentration CCC[2] CCC: Criterion Continuous Concentration MCL: maximum contaminant level						

Metals' concentrations for stations SF-1, SF-5R, SF-6, and Spring D10W, were analyzed during sampling events in December 2023 and June 2024. The 12 analytes measured include arsenic, barium, cadmium, chromium, cobalt, copper, lead, nickel, uranium, vanadium, zinc, and mercury. All analyte concentrations, except for mercury, are reported in micrograms per liter (µg/L), while mercury concentrations are reported in nanograms per liter (ng/L). The metals results are presented in Table 5.1.7.3. All results fall below the EPA Maximum Contaminant Levels (MCLs) and Tennessee Surface Water Criteria (see Table 5.1.7.2).

- Arsenic concentrations ranged from 0.21 µg/L to 5.61 µg/L. While all concentrations were below the acute and chronic aquatic life criteria of 340 µg/L and 150 µg/L, respectively, arsenic levels at SF-1 and SF-6 exceeded the EPA human health criterion for water consumption + organism, which is set at 0.018 µg/L. Further investigation of background arsenic levels is necessary to draw any definitive conclusions.

- Barium concentrations ranged from 43.6-107.0 µg/L, and although there are no established aquatic life criteria for barium, these levels are consistent with the local geology.

- Cadmium was not detected in any of the samples.

- Chromium was detected only at SF-6 in December 2023 at a concentration of 17.2 μg/L, well below the acute and chronic aquatic life criteria.

- Cobalt was detected at concentrations ranging from 0.17 μg/L to 2.96 μg/L, though there are no established criteria for this metal.

- Copper concentrations ranged from 0.79 μg/L to 1.83 μg/L, which are well below the acute (13 μg/L) and chronic (9 μg/L) aquatic life criteria.

- Lead was detected at SF-5R and SF-1 in June 2024, with concentrations ranging from 0.52 μg/L to 2.48 μg/L. These levels were below the acute criterion of 65 μg/L and the chronic criterion of 2.5 μg/L, though the lead concentration at SF-1 is approaching the chronic threshold.

- Mercury concentrations ranged from 2.39 ng/L to 25.60 ng/L. These values are well below the acute and chronic aquatic life criteria of 1.4 μg/L (1,400 ng/L) and 0.8 μg/L (800 ng/L), respectively. Nickel concentrations ranged from 0.56 μg/L to 2.48 μg/L, which are well below the acute (470 μg/L) and chronic (52 μg/L) aquatic life criteria.

- Uranium concentrations ranged from 0.19 μg/L to 4.41 μg/L, but there are no established aquatic life criteria for uranium. Vanadium concentrations ranged from 0.54 μg/L to 8.25 μg/L, though no criteria are available for comparison. Zinc concentrations ranged from 10.3 μg/L to 48.90 μg/L, all of which were below the aquatic life criteria of 120 μg/L.

Table 5.1.7.3: FY24 EMDF Metals Analysis Results

Station	***Date***	*Arsenic*	*Barium*	*Cadmium*	*Chromium*	*Cobalt*	*Copper*	*Lead*	*Nickel*	*Uranium*	*Vanadium*	*Zinc*	*Mercury*
SF-1	12/12/23	**0.21 J**	**65.5**	<0.16 U	<5.6 U	**0.17 J**	<0.67 U	<0.51 U	<0.51 U	**0.19 J**	<0.46 U	<7.9 U	**20.4**
SF-5R	12/12/23	<0.19 U	**45.8**	<0.16 U	<5.6 U	**0.23 J**	**0.94 J**	**0.52 J**	<0.51 U	**0.45 J**	**0.54 J**	<7.9 U	**25.6**
SF-6	12/12/23	**3.01**	**98.3**	<0.16 U	**17.2 J**	<0.42U	<0.67 U	<0.51 U	<0.51 U	**4.41**	**8.25**	<7.9 U	**11.8**
Sp. D10W	12/19/23	**0.34 J**	**43.6**	<0.16 U	<5.6 U	**0.34 J**	<0.67 U	<0.51 U	**0.56 J**	<0.08 U	<0.47 U	<7.9 U	**3.94**
SF-1	6/13/24	**5.61 J**	**107**	<0.16 U	<5.6 U	**2.96**	**1.83**	**2.48**	**2.48**	**0.5 J**	**1.65 J**	**10.3 J**	**2.39**
SF-5R	6/13/24	**3.65 J**	**92.5**	<0.16 U	<5.6 U	**0.41 J**	**0.79 J**	<0.51 U	**0.83 J**	**1.28**	**0.7 J**	<7.9 U	**10.1**
SF-6	6/13/24	**0.63 J**	**80.1**	<0.16 U	<5.6 U	**0.24**	**0.94 J**	**0.51 J**	**2 J**	**0.49 J**	**0.72 J**	**48.9**	**7.22**
Sp. D10W	6/13/24	**0.2 J**	**89.4**	<0.16 U	<5.6 U	**1.42 J**	**2.17**	**1.5 J**	**1.87 J**	**0.2 J**	**1.44 J**	<7.96 U	**6.96**

Notes: *All analyte results in (µg/L) except mercury (ng/L)*
J *= The identification of the analyte is acceptable; the reported value is an estimate*
U *= Not detected at the Reporting Limit (or MDL where applicable)*
MDL *= Method Detection Limit*

Water Quality Parameters

Table 5.1.7.4 shows the monthly results for seven stations (SF-1, SF-2, SF-3, SF-4, SF-5R, SF-6, and Spring D10W) monitored during FY24. Water quality parameters measured included temperature (°C), pH (standard units), conductivity (μS/cm), dissolved oxygen (mg/L), and oxidation-reduction potential (mV). Some stations were not visited due to accessibility issues. Flumes often had no discharge after periods of dry weather, with little-to-no flow observed at SF-2, SF-4, and SF-6 until rainfall occurred. Water quality parameters could not be measured at stations without flow.

Table 5.1.7.4: FY24 EMDF Monthly Water Quality Parameter Measurements

Station	WQ	2023						2024					
		July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
SF-1	Temp.	DNV	DNV	DNV	13.2	11.9	7.9	9.3	CE	CE	CE	CE	18.9
	pH	DNV	DNV	DNV	6.5	7.8	7.1	7.0	CE	CE	CE	CE	7.6
	SPC	DNV	DNV	DNV	366.6	277.1	233.1	53.2	CE	CE	CE	CE	197.9
	DO	DNV	DNV	DNV	7.2	7.8	11.5	11.6	CE	CE	CE	CE	8.2
SF-2	Temp.	DNV	DNV	DNV	13.8	12.5	4.3	CE	CE	CE	CE	CE	19.0
	pH	DNV	DNV	DNV	7.0	7.9	6.9	CE	CE	CE	CE	CE	7.5
	SPC	DNV	DNV	DNV	321.7	246.1	208.9	CE	CE	CE	CE	CE	195.7
	DO	DNV	DNV	DNV	7.0	9.0	12.0	CE	CE	CE	CE	CE	8.1
SF-3	Temp.	DNV	DNV	DNV	13.6	12.9	72.7	CE	CE	CE	CE	CE	21.8
	pH	DNV	DNV	DNV	7.4	7.3	7.4	CE	CE	CE	CE	CE	7.5
	SPC	DNV	DNV	DNV	107.3	104.3	88.0	CE	CE	CE	CE	CE	89.6
	DO	DNV	DNV	DNV	5.7	7.8	7.0	CE	CE	CE	CE	CE	6.8
SF-4	Temp.	DNV	DNV	DNV	Dry	12.5	Dry	CE	CE	CE	CE	CE	DNV
	pH	DNV	DNV	DNV	Dry	6.9	Dry	CE	CE	CE	CE	CE	DNV
	SPC	DNV	DNV	DNV	Dry	196.6	Dry	CE	CE	CE	CE	CE	DNV
	DO	DNV	DNV	DNV	Dry	12.0	Dry	CE	CE	CE	CE	CE	DNV
SF-5R	Temp.	DNV	DNV	DNV	8.0	9.4	8.8	6.2	10.6	14.5	20.9	21.7	21.7
	pH	DNV	DNV	DNV	7.0	7.3	6.8	8.2	8.0	7.3	7.7	7.9	7.9
	SPC	DNV	DNV	DNV	465.8	249.5	80.8	165.2	164.3	234.7	281.9	335.2	335.2
	DO	DNV	DNV	DNV	4.2	9.3	10.9	11.1	11.1	5.7	7.6	3.1	3.1
SF-6	Temp.	DNV	DNV	DNV	Dry	7.2	Dry	CE	CE	CE	CE	CE	19.8
	pH	DNV	DNV	DNV	Dry	7.2	Dry	CE	CE	CE	CE	CE	7.2
	SPC	DNV	DNV	DNV	104.1	Dry	104.1	CE	CE	CE	CE	CE	228.8
	DO	DNV	DNV	DNV	9.7	Dry	9.7	CE	CE	CE	CE	CE	6.7
Spring D10W	Temp.	DNV	DNV	DNV	Dry	5.2	Dry	CE	CE	CE	CE	CE	19.9
	pH	DNV	DNV	DNV	Dry	7.3	Dry	CE	CE	CE	CE	CE	7.7
	SPC	DNV	DNV	DNV	120.7	Dry	120.7	CE	CE	CE	CE	CE	93.9
	DO	DNV	DNV	DNV	11.4	Dry	11.4	CE	CE	CE	CE	CE	8.24

Temperature - °C | pH - Std. Units | Conductivity - µSiemen/cm | Dissolved Oxygen (DO) - mg/L
DNV = Did not visit; CE = Construction Exclusion; SPC = Specific Conductivity; SF = stream discharge flume

5.1.8 Conclusions

Data from FY24 can be used to help establish a baseline of conditions prior to EMDF operations. DoR-OR's monthly monitoring of water quality parameters and analytical water sampling show that most water quality parameters and analytes fall within ranges consistent with background.

Metals analyses and radiological laboratory results indicate low concentrations and activities. No exceedances of any criteria were observed during FY24.

5.1.9 Recommendations

Water quality exhibits seasonal variation, and each year sampling is frequently interrupted from August to November due to dry conditions, except at SF-1. Inability to monitor during the dry months (August to November) represents a data gap that can be addressed by adjusting sampling and monitoring efforts to correlate with rain events during this period.

Additionally, DoR-OR recommends semi-annual sampling and spot sampling based on field observations to perform continuity checks and monitor water quality parameters in the interim until DOE initiates their own pre-operational baseline sampling. Regular sampling should be conducted at streams and the spring feeding the Bear Creek tributaries, focusing on radionuclides, metals, and volatile organic compounds.

5.1.10 References

TDEC. 2019. *Rules of the Tennessee Department of Environment and Conservation, General Water Quality Criteria*. Chap. 0400-40-03. Tennessee Department of Environment and Conservation (TDEC). Nashville, TN. 0400-40-03.20190911.pdf (tnsosfiles.com).

TDEC. 2015. *Environmental Sampling of the ORR and Environs Quality Assurance Project Plan*. Tennessee Department of Environment and Conservation, Division of Remediation, Oak Ridge Office (TDEC DoR-OR). Oak Ridge, TN.

TDEC. 2016. *Sampling and Analysis Plan for General Environmental Monitoring of the Oak Ridge Reservation and its Environs.* Division of Remediation, Oak Ridge Office, Oak Ridge, TN.

TDEC. 2022. *Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water.* DWR-WQP-P-01-QSSOP-Chem-Bact-082918. Tennessee Department of Environment and Conservation, Division of Water Resources (TDEC-DWR). Knoxville, TN. https://www.tn.gov/content/dam/tn/environment/water/policy-and-guidance/dwr-wqp-p-01-qssop-chem-bac-082918-update-2022-jan.pdf.

EPA: Risk Assessment, Regional Screens Levels (RSLs), "Regional Screening levels for Chemical Contaminants at Superfund Sites". 2020. Washington (DC): US Environmental Protection Agency; [assessed 2023 Feb]. https://www.epa.gov/risk/regional-screening-levels-rsls.

5.2 EMWMF LANDFILL MONITORING

5.2.1 BACKGROUND

EMWMF is operated under the authority of CERCLA (EPA) and DOE. This landfill was constructed for the disposal of low-level radioactive waste and hazardous waste generated by remedial activities on the ORR. The EMWMF Landfill is required to comply with DOE orders and ARARs listed in the *CERCLA EMWMF Record of Decision* (ROD) (DOE, 1999). Due to oversight by these regulatory entities, the EMWMF is not required to hold a permit from the State of Tennessee.

Currently, potentially contaminated contact water (i.e., stormwater[1]), is the only authorized discharge from EMWMF. Contact water collects in the disposal cells above the leachate collection system. This water is routinely pumped from the disposal cells to holding ponds and tanks (Figure 5.2.5.1) and is then sampled and analyzed for known COCs, listed in Table 5.2.7.11.

Previously, the most prevalent contaminant, the one that had exceeded its release criteria and even required some targeted remediation, is chromium VI (Cr_6). Contact water is handled depending on Cr_6 concentrations. Water with elevated Cr_6 is either (1) treated onsite, or if that is not possible, the water is (2) treated offsite at the Liquid Gaseous Waste Operation (LGWO). The limits on radioactive waste discharge releases from the holding ponds to the sedimentation basin are published in *DOE Order 435.1* (formerly DOE Order 5400.5) which restricts the release of liquid wastes containing radionuclides to an average concentration equivalent of 100 mrem/year.

If Cr_6 levels are below criteria limits, (*2017 EMWMF SAP/QAPP*) the water is released to the storm water sedimentation basin which discharges into NT-5. The limit for radioactive discharges from the sedimentation basin to NT-5 are based on State of Tennessee regulations (*TDEC 0400-20-11-.16{2}*) which restrict "concentrations of radioactive material released to the general environment in groundwater, surface water, air, soil, plants, or animals to an annual dose equivalent of (1) 25 mrem to the whole body, (2) 75 millirems to the thyroid and (3) 25 millirems to any other organ of any member of the public. Reasonable effort shall be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable (ALARA)." (TDEC, 2012). In addition, *DOE Order 458.1* limits gross alpha and gross beta activity of settleable solids in liquid effluents to 5.0 pCi/g and 50 pCi/g, respectively.

DoR-OR water monitoring at the EMWMF began in 2006 and is ongoing. Each year since 2006, samples of surface water, contact water, and sediment have been collected and analyzed. The results are published in the annual *EMR*. All monitoring of contact water and surface water will assist DOE in their efforts to comply with the EMWMF *ROD* (DOE, 1999) and the Tennessee *General Water Quality Criteria* (TDEC, 2019).

DOE currently monitors surface water quarterly at *NT-5* and *NT-3* (Bear Creek Tributaries) for potential releases from the landfill. Monthly samples from the Underdrain and the V-weir are also collected. DOE collects the water released from the Sediment Basin at the V-weir (*EMWMF-3*) using an automatic sampler. Sampling consists of a weekly flow-rated composite sample as it is discharged (named *VCOMP*). This is used to calculate the volume weighted sum of fractions for discharge. Additional DOE sampling of surface water takes place at *EMWNT-03B*, *EMWNT-05*, *NT-4* (Bear Creek Tributary) and the V-weir semi-annually after a qualifying precipitation event (> 0.1 inches). In addition, DOE collects a suspended solids sample at the V-weir after a qualifying precipitation event (> 0.5 inches). Annually, DOE's results from this sampling are published in the *Phased Construction Completion Report* (PCCR) (DOE, 2020). These data are entered into the DOE Oak Ridge Environmental Information System (OREIS).

5.2.2 Problem Statements

Only low-level radioactive solid waste, as defined in TDEC 0400-02-11.03(21) with radiological concentrations below limits imposed by Waste Acceptance Criteria (WAC) and agreed to by the FFA tri-parties (DOE, EPA and TDEC), is then approved for disposal in the EMWMF. DOE is accountable for compliance with the WAC and has delegated responsibility of WAC attainment decisions to its prime contractor.

Contaminants in the waste materials from CERCLA remediation activities are buried in the EMWMF and may leach out and enter the surrounding environment and potentially go offsite via surface water and/or groundwater.

5.2.3 Goals

Provide assurance through independent monitoring and evaluation that DOE operations at the EMWMF are protective of public health and the environment.

1) Verify DOE's remedial effectiveness objectives for the EMWMF are being met.

2) Provide independent data on discharges from the Underdrain.

3) Track releases of contact water from ponds and tanks.

4) Collect independent surface water monitoring data for comparison to DOE data to validate and verify DOE datasets.
   - Surface water monitoring verifies DOE's adherence to limits in DOE 2017 (DOE/OR/01-2734&D1/R1) and ARARs listed in the EMWMF SAP/QAPP.

5.2.4 Scope

This project monitored environmental media, including discharged water, contact water, and sediments from the sedimentation basin, at the EMWMF. Contact water at EMWMF is defined as stormwater that has been in a cell but has not gone through the waste. All samples will be analyzed for radionuclides, metals, mercury, organics, and potentially PFAS where appropriate or requested. Additionally, staff will monitor the landfill and review DOE's contact water discharge log. These data will be used to assess DOE's calculated volume weighted sum of fractions from discharge.

For FY24, monitoring and sampling was conducted at the following stations listed in Table 5.2.4.1 and Figure 5.2.4.1 below, and samples were analyzed for contaminants associated with EMWMF waste.

Table 5.2.4.1: EMWMF Sites Sampling Frequency and Rationale for Inclusion

Station	Medium	Freq.	Rationale
EMWMF-2 *Underdrain*	GW and SW	SA (**WQP**)	NT-4 discharge below EMWMF Landfill
EMWMF-3 *VWEIR*	Water	SA (**WQP**)	Monitor discharges from sediment basin
EMWMF-5	Water	SA	Discharging pond effluent point
EMWMF-7 or -8	Pond or Tank	SA	Tank effluent locations and a ditch
EMWMFSB-1	Sediment	A	Sediment basin 1 composite sample if dry
EMWNT-3B/ EMWMF3B	Surface Water	A	Baseline – upstream site, **WQ** as requested
NT-5@BCK	Surface Water	A (**WQP**)	Baseline - downstream bioaccumulation
BCK 11.54 /SW-003	Water	A **(WQP)**	Below discharge
SA: Semi-annually; A: Annually; WQP: Monthly water quality parameters; GW and SW: groundwater & surface water			

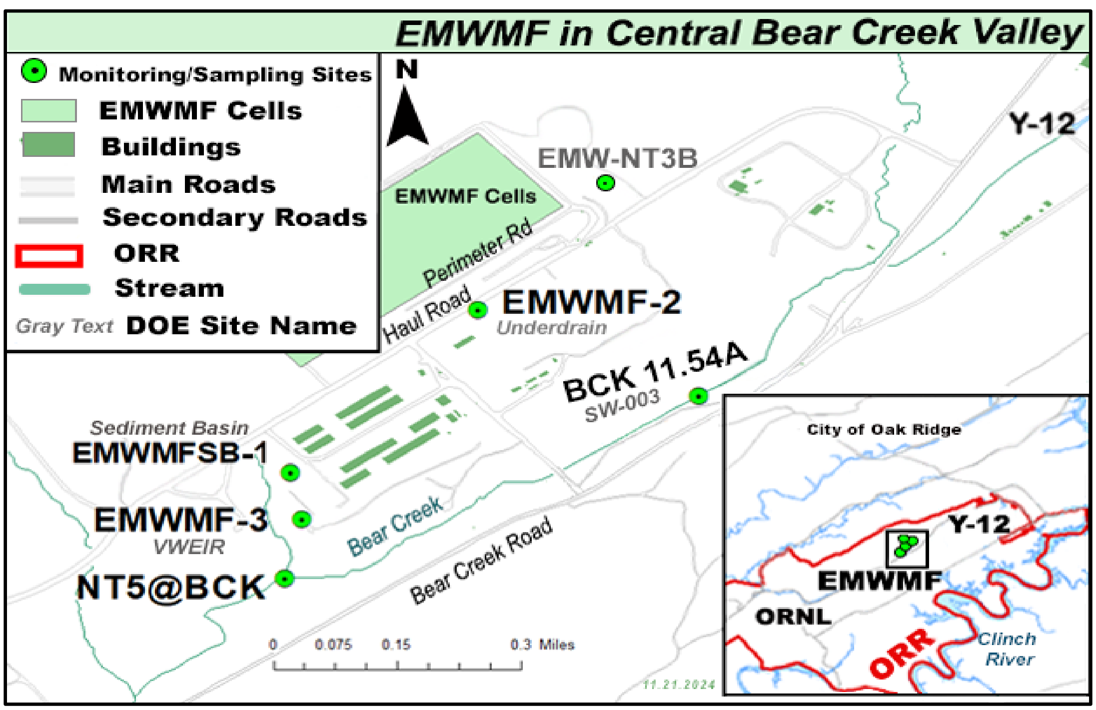

Figure 5.2.4.1: EMWMF Sample Sites

Surface water monitoring and sampling is intended to provide independent State led verification of DOE's datasets that will support protectiveness determinations and assurances that DOE is adhering to published (DOE 2017, interim SAP/QAPP DOE/OR/01-2734&D1/R1) agreed-to-limits with EMWMF discharges. Protectiveness assessments include evaluation of compliance with ARARS listed in the EMWMF interim SAP/QAPP, DOE 2017 and in the EMWMF ROD (1999). EMWMFs Site Specific ARARs that are relevant to this project are identified in Table 5.2.4.2 below.

Table 5.2.4.2: EMWMF ARARs for Contact Water/Surface Water

EMWMF SAP/QAPP - Regulations for Contact Water (CW) & Surface Water (SW)			
Action		**Objective**	**ARARs**
CW	Monitor discharges	TDEC 0400-40-03-.03(3) TDEC 0400-20-11-.16*****	EMW-VWEIR, CW ponds and tanks: compare analytical results to AWQC
SW	Check RAD	10 *CFR* 20.1301 (a) TDEC 0400-20-11-.16*****	SW samples from EMW-VWEIR: analyzed RAD COCs Use for sum of fractions required for dose calculations
***** *(10CFR20, 1991). Formerly TDEC 1200- 04-03-.3(3) and TDEC 1200-2-11-.16(2); RAD: radioactive activity*			

5.2.5 Methods, Materials, Metrics

Water Quality Parameters (WQPs)

Water quality parameters were monitored, utilizing YSI multiparameter probes and In-Situ continuous monitoring multiparameter instruments. The water quality parameters measured included temperature, pH, dissolved oxygen (DO), specific conductivity, and oxidation-reduction potential (ORP). Stations where WQPs were monitored are listed in Table 5.2.4.1. Parameters are measured because these metrics indicate changes in the components of EMWMF discharges.

Analytical Water Sampling

DoR-OR collected surface water grab samples on a regular basis for laboratory analysis. Sampling and monitoring locations (shown on Figure 5.2.4.1) included 2 semiannual samples each from EMWMF-2, EMWMF-3, BCK 11.54, and NT-5@BCK. An additional analytical sample was collected from both Contact Water Pond 2 and Contact Water Tank A (a co-sample with DOE). Collected samples were analyzed for radionuclides, metals, mercury, and organics (Table 5.2.5.1). Samples collected at Contact Water Pond 2and Contact Water Tank A were comprised of either contact water contained inside or contact water discharged from a pond or tank. Surface water analytical results were compared to EPA and TDEC criteria listed in Table 5.2.5.8. Any water samples collected directly from a pond or tank can be directly compared with DOE surface water sampling.

Table 5.2.5.1: EMWMF Analytes and Contaminants of Concern (COCs)

EMWMF WATER ANALYTE LIST		EMWMF SEDIMENT ANALYTE LIST	
Radionuclides		**Radionuclides**	
Gamma Activity	*Plutonium-238*	*Gamma Activity*	*Plutonium-238*
Gross Alpha Beta Activity	*Plutonium-239/240*	*Gross Alpha Beta Activity*	*Plutonium-239/240*
Americium-241	*Radium-226*	*Americium-241*	*Radium-226*
Carbon-14	*Radium-228*	*Carbon-14*	*Radium-228*
Chlorine-36	*Strontium-90*	*Chlorine-36*	*Strontium-90*
Cobalt-60	*Technetium-99*	*Cobalt-60*	*Technetium-99*
Cesium-137	*Thorium-228*	*Cesium-137*	*Thorium-228*
Europium-154	*Thorium-230*	*Europium-154*	*Thorium-230*
Tritium	*Thorium-232*	*Tritium*	*Thorium-232*
Iodine-129	*Uranium-233/234*	*Iodine-129*	*Uranium-233/234*
Lead-210	*Uranium-235/236*	*Lead-210*	*Uranium-235/236*
Neptunium-237	*Uranium-238*	*Neptunium-237*	*Uranium-238*
Metals		**Metals**	
Arsenic	*Lead*	*Aluminum*	*Manganese*
Barium	*Mercury (low level)*	*Arsenic*	*Mercury (low level)*
Cadmium	*Nickel*	*Barium*	*Nickel*
Chromium	*Uranium*	*Beryllium*	*Potassium*
Cobalt	*Vanadium*	*Cadmium*	*Selenium*
Copper	*Zinc*	*Calcium*	*Silver*
Inorganics		*Chromium*	*Sodium*
Nitrite and Nitrate		*Cobalt*	*Thallium*
Organics		*Copper*	*Uranium*
PCBs		*Iron*	*Vanadium*
		Lead	*Zinc*
		Magnesium	
		Organics	
		PCBs	

The EPA's human and aquatic life criteria and the State of Tennessee aquatic life criteria will be used as comparison values for the water samples collected during this project.

<u>SEDIMENTS: SEDIMENTATION BASIN</u>

Sediment sampling was conducted annually when the EMWMF sediment pond was dry and safe to walk on. One composite sample was sent to a contracted lab for analysis. Analytes (listed in Table 5.2.5.1) and contaminant screening levels used in this project for screening sediment samples are listed below in Table 5.2.5.2 and include:

1. EPA's Regional Screening Levels for the Soil to Groundwater pathway using the Soil Screening Level (SSL) tool.

2. The Consensus-Based Sediment Quality Criteria from the Wisconsin Department of Natural Resources which provides a threshold effects concentration (TEC) and a probable effect concentration (PEC) (MacDonald et al 2000).

Table 5.2.5.2 Sediment Level for Risk Comparisons

Sediment Level for Risk Comparisons			
Contaminant	***EPA RSL Soil to Groundwater SSL***	**TEC**	**PEC**
	mg/kg	*mg/kg*	*mg/kg*
Aluminum	30000	n.a.	n.a.
Arsenic	0.0015	9.8	33
Antimony	0.35	2	33
Barium	160	n.a.	n.a.
Beryllium	19	n.a.	n.a.
Cadmium	0.14	0.99	5
Calcium	n.a.	n.a.	n.a.
Chromium	4.00E+07	43	110
Cobalt	0.27	n.a.	n.a.
Copper	28	32	150
Iron	350	20000	40000
Lead	14 (MCL based)	36	130
Magnesium	n.a.	n.a.	n.a.
Manganese	28	460	1100
Mercury	0.033	0.18	1.1
Nickel	26	23	49
Potassium	n.a.	n.a.	n.a.
Selenium	0.52	n.a.	n.a.
Silver	0.8	1.6	2.2
Sodium	n.a.	n.a.	n.a.
Thallium	0.014	n.a.	n.a.
Uranium	1.8	n.a.	n.a.
Vanadium	86	n.a.	n.a.
Zinc	370	120	460
Gamma, Sediments	*Use EPA PRGs for comparison*	n.a.	n.a.
SR-89, 90 in solids	*Use EPA PRGs for comparison*	n.a.	n.a.
Technetium-99	*Use EPA PRGs for comparison*	n.a.	n.a.
Tritium in solids	*Use EPA PRGs for comparison*	n.a.	n.a.
Isotopic Uranium in solids	*Use EPA PRGs for comparison*	n.a.	n.a.

TEC: *Consensus Based Sediment Quality Criteria,* ***Threshold*** *Effects Concentration (McDonald et al. 2000)*
PEC: *Consensus Based Sediment Quality Criteria,* ***Probable*** *Effects Concentration (McDonald et al. 2000)*
n.a.: *criteria not established for that characteristic*

The results of laboratory analyses were entered into an Excel database for interpretation. Interpretation included construction of tables and graphs illustrating ranges and limits of constituents over the course of the project. Graphs include pertinent water quality criteria from the EPA and TDEC.

All samples were obtained via standard protocols and shipped for lab analysis. Sampling will follow criteria specified in the TDEC chemical and bacteriological sampling procedure (TDEC, 2022) and the EPA guide to *Surface Water Sampling* (EPA, 2021).

5.2.6 Deviations from the Plan

1) No PFAS analysis conducted per DOE request.

2) Some site trips were cancelled due to weather, scheduling, or staffing issues.

3) *In Situ* probe data gaps due to instrument removal for calibration and maintenance.

5.2.7 Results and Analysis

Water quality parameters are monitored regularly because they can indicate situations where the content of EMWMF discharges changes as the content of waste lots throughout the year. Potential problems could potentially occur with the liner system under the landfill, or in the case of EMWMF-3, release of contaminated stormwater that was previously untested.

Water Quality Parameters (WQPs)

In FY24, water quality data was collected from two primary discharge points, EMWMF-2 and EMWMF-3, as well as two stream locations, BCK 11.54A and NT-5@BCK, and the results are listed in Table 5.2.7.1 and Figures 5.2.7.1 – 5.2.7.4.

These data for EMWMF-2 and EMWMF-3 revealed similar patterns that mirrored previous years. EMWMF-2 showed stable trends with minor fluctuations across all parameters, consistent with groundwater conditions under the landfill. This discharge was not exposed to ambient conditions. In contrast, EMWMF-3 exhibited more pronounced fluctuations, likely due to its exposure to seasonal environmental conditions. For example, temperature and DO follow expected seasonal trends with lower DO at higher temperatures, thus reflecting standard surface water behavior.

In FY21, two additional creek monitoring sites, BCK 11.54A and NT-5@BCK, were added to monitor Bear Creek upstream and downstream of EMWMF discharges. As expected, water quality parameters at these sites fluctuate seasonally due to environmental factors. These fluctuations have not indicated any contaminant concerns from EMWMF discharges to Bear Creek. At BCK 11.54A, which monitors Bear Creek upstream of the EMWMF, parameters like temperature and DO follow seasonal patterns. Conductivity, however, was measured above 800 µS/cm from November to December 2023, suggesting potential changing upstream conditions. Elevated conductivity during these months may also be linked to lower water volumes and less dilution in Bear Creek, as is typical in dry seasons.

Downstream at NT-5@BCK, which captures surface water discharges from EMWMF into Bear Creek, conductivity was lower than upstream. This may be due to dilution from additional water flows at the EMWMF. Conductivity at this point did not consistently follow temperature trends, possibly influenced by discharges from EMWMF's sediment basin.

Table 5.2.7.1: FY24 EMWMF - Water Quality Parameters (WQP) Monthly Averages

FY24 EMWMF - Water Quality Parameters (WQP) Monthly Averages													
Site	**WQP**	*July*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
EMWMF-3	*T*	28.4	25.4	24.6	16.5	8.7	7.0	6.7	10.5	13.0	19.6	23.9	27.3
VWEIR	*pH*	8.1	8.2	8.2	7.6	7.9	7.8	7.7	7.4	7.5	7.5	9.7	9.5
	COND	233.1	143.2	197.9	317.6	282.3	325.3	257.0	256.0	233.1	211.3	160.9	150.8
	DO	6.2	5.5	5.6	3.9	9.9	12.2	12.2	12.7	10.3	8.9	8.6	7.9
	ORP	197.9	137.1	137.4	158.0	185.7	209.9	223.1	179.2	166.8	181.8	91.8	68.5
EMWMF-2	*T*	18.3	18.7	19.2	18.5	17.4	16.5	12.6	16.5	16.1	16.9	17.6	14.7
Underdrain	*pH*	8.1	8.2	8.2	8.2	7.9	7.8	7.7	7.4	7.5	7.5	9.7	9.5
	COND	558.9	583.0	556.3	521.8	508.5	514.8	642.5	574.2	566.1	690.5	589.7	542.7
	DO	2.7	4.9	5.6	3.4	5.2	6.0	6.8	5.1	4.7	4.3	3.5	3.0
	ORP	192.2	169.4	141.5	192.4	195.5	221.3	207.5	175.6	179.0	269.3	120.6	134.8
BCK 11.54A	*T*	20.2	20.8	21.2	15.5	7.8	6.7	7.2	11.0	10.4	14.8	17.6	20.4
SW-003	*pH*	7.8	7.8	7.4	7.2	7.6	7.4	6.8	7.1	7.1	7.7	8.1	8.1
	COND	650.5	405.4	598.3	436.0	712.5	462.6	343.8	491.4	518.1	393.0	507.7	569.3
	DO	3.5	5.7	5.2	5.6	8.9	11.7	11.3	11.0	10.2	8.5	8.7	8.5
	ORP	214.5	192.4	119.3	208.0	219.3	214.2	218.2	188.8	189.7	179.5	117.6	106.9
NT5@BCK	*T*	22.5	20.8	21.7	14.0	9.1	6.4	7.4	10.5	9.9	16.7	18.0	22.3
	pH	7.8	7.8	7.6	7.4	7.7	7.4	6.8	7.2	7.2	7.7	7.8	7.8
	COND	372.0	510.9	290.8	395.4	496.7	484.5	243.5	418.0	375.3	430.7	436.1	334.9
	DO	5.6	5.4	5.3	5.8	8.5	10.8	11.1	11.9	11.0	8.8	8.4	7.6
	ORP	214.2	196.6	151.7	213.2	233.3	192.4	222.0	134.4	174.4	173.2	93.0	89.0
Temperature (T): ^{o}C; Conductivity (COND): *μS/cm*; Oxygen Reduction Potential (ORP): *mV*; pH: *std. units* Dissolved Oxygen (DO): *mg/L*													

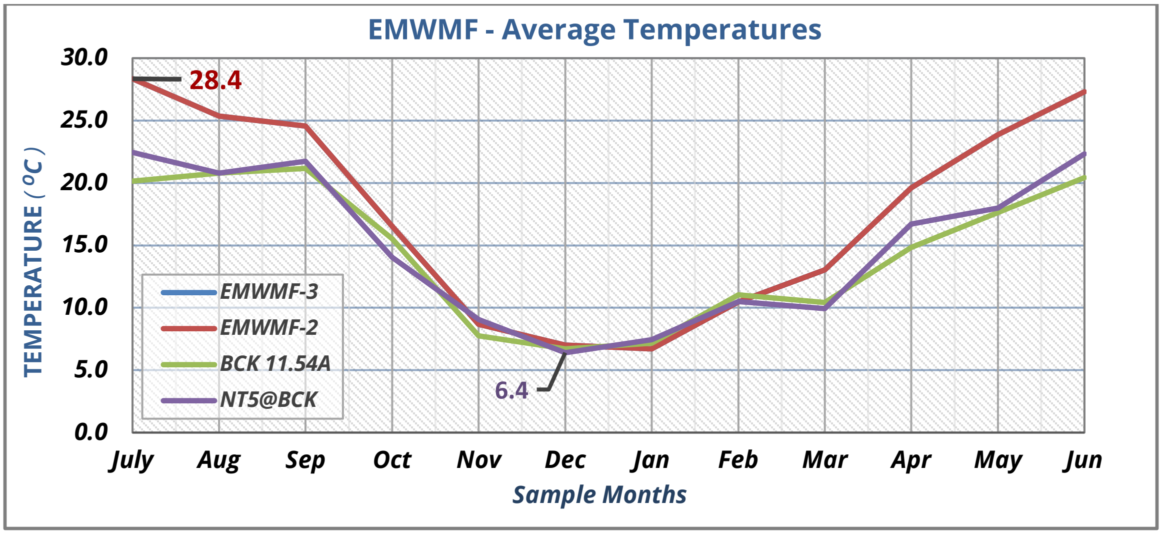

Figure 5.2.7.1: FY24 EMWMF – Average Monthly Temperature

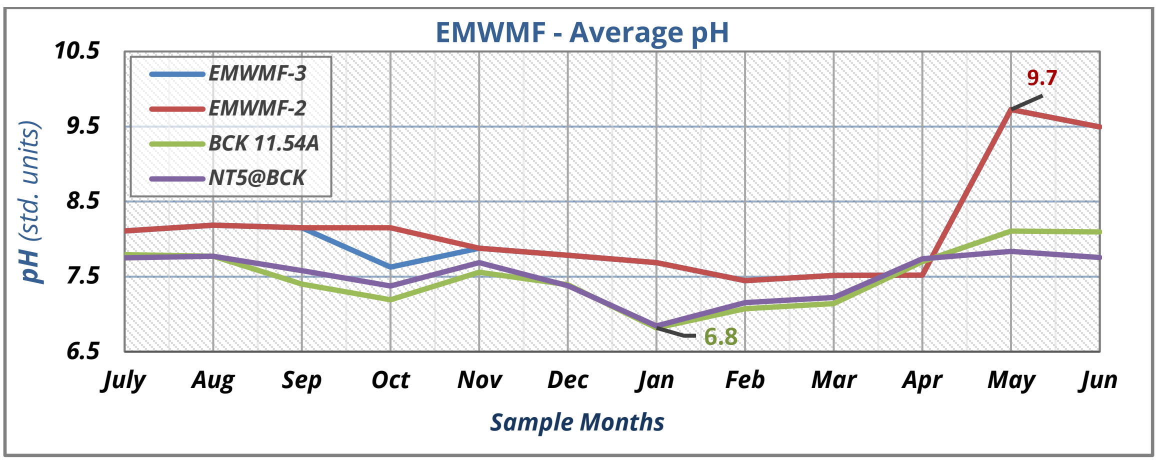

Figure 5.2.7.2: FY24 EMWMF – Average Monthly pH

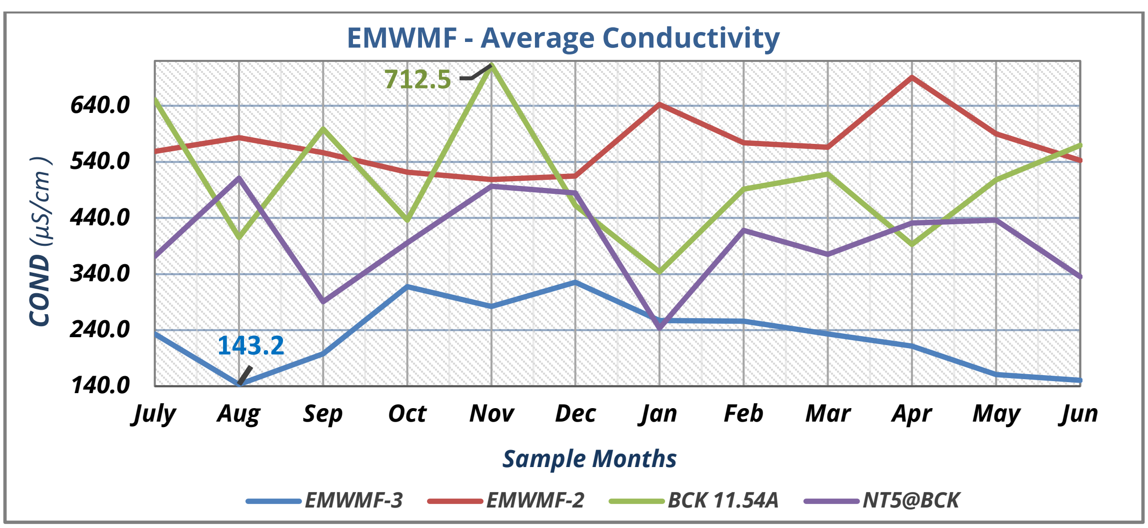

Figure 5.2.7.3: FY24 EMWMF – Average Monthly Conductivity

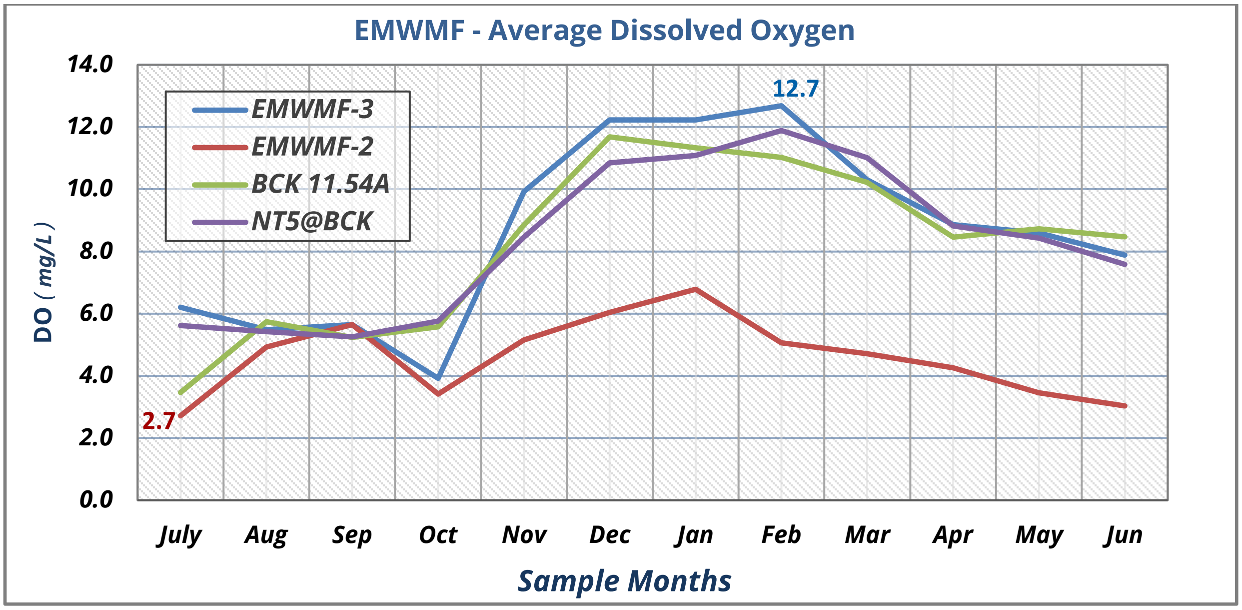

Figure 5.2.7.4: FY24 EMWMF – Average Monthly Dissolved Oxygen

In Situ Probe Data at EMWMF-2 & EMWMF-3

DoR-OR collected continuous data from multiparameter probes at EMWMF-2 and EMWMF-3, installed on October 19, 2023. These probes recorded parameters including pH, temperature, specific conductivity, DO, and turbidity on an hourly basis.

Table 5.2.7.3 Maximum and Minimums of In-Situ Probe

Parameter	EMWMF-2		EMWMF-3	
	Max	Min	Max	Min
Temperature	18.76	15.17	34.14	2.35
pH	8.17	5.95	13.99	0.71
SPC	728.26	0.06	1274.63	0
DO	9.55	2.34	14.94	2.025
Turbidity	628.51	0	612.11	0
TDS	0.47	0	0.82	0
ORP	352.79	58.66	932.80	-1362.88
Temperature: ° Celsius SPC: Specific Conductivity (µS/cm)	*DO: Dissolved Oxygen (mg/L) Turbidity: Nephelometric Turbidity Units*		*TDS: Total Dissolved Solids: mg/L ORP: Oxygen Reduction Potential (mV)*	

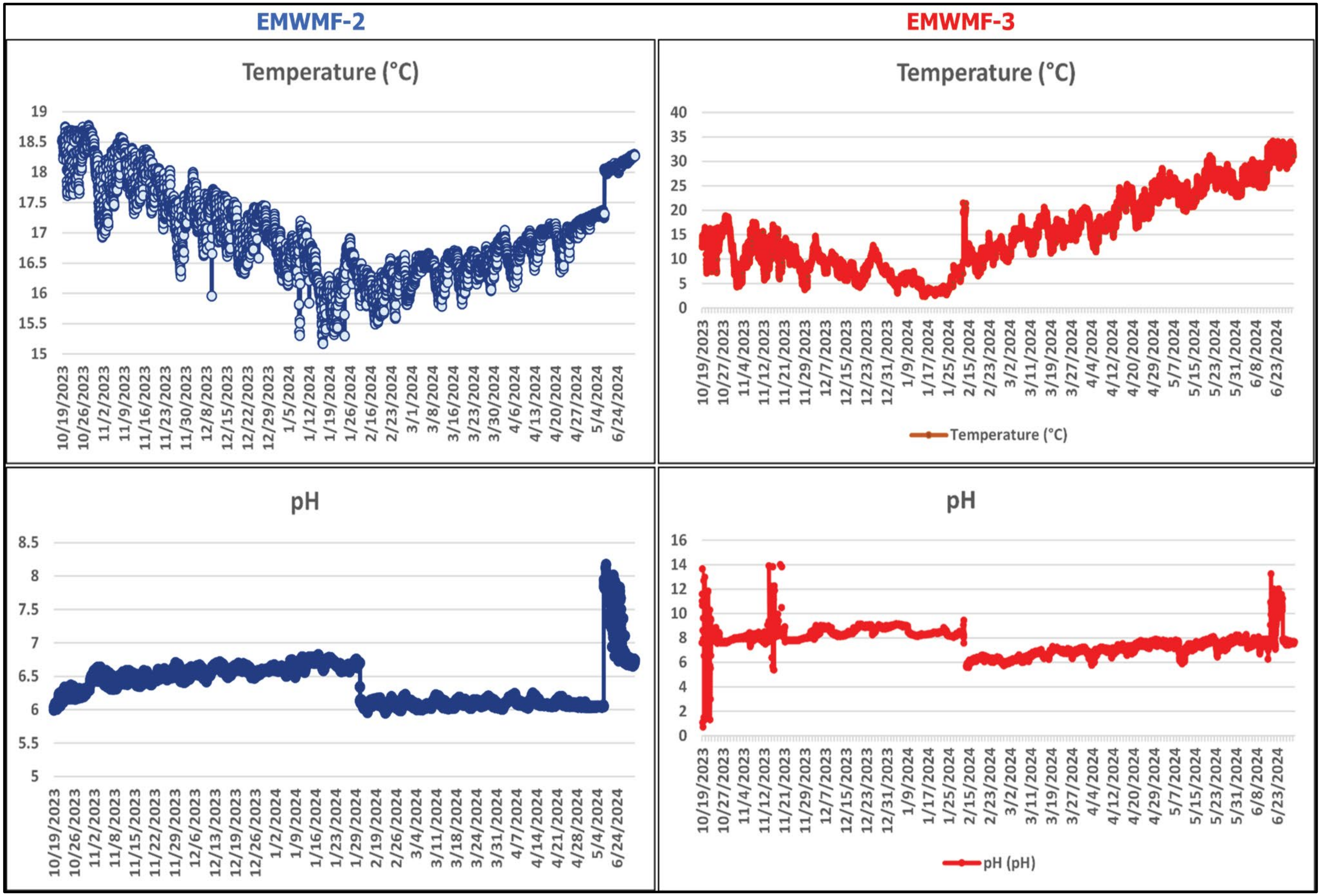

Figure 5.2.7.5: EMWMF-2 *vs.* EMWMF-3 In-Situ Probes - Water Quality Parameters (10/19/23-6/24/2024)

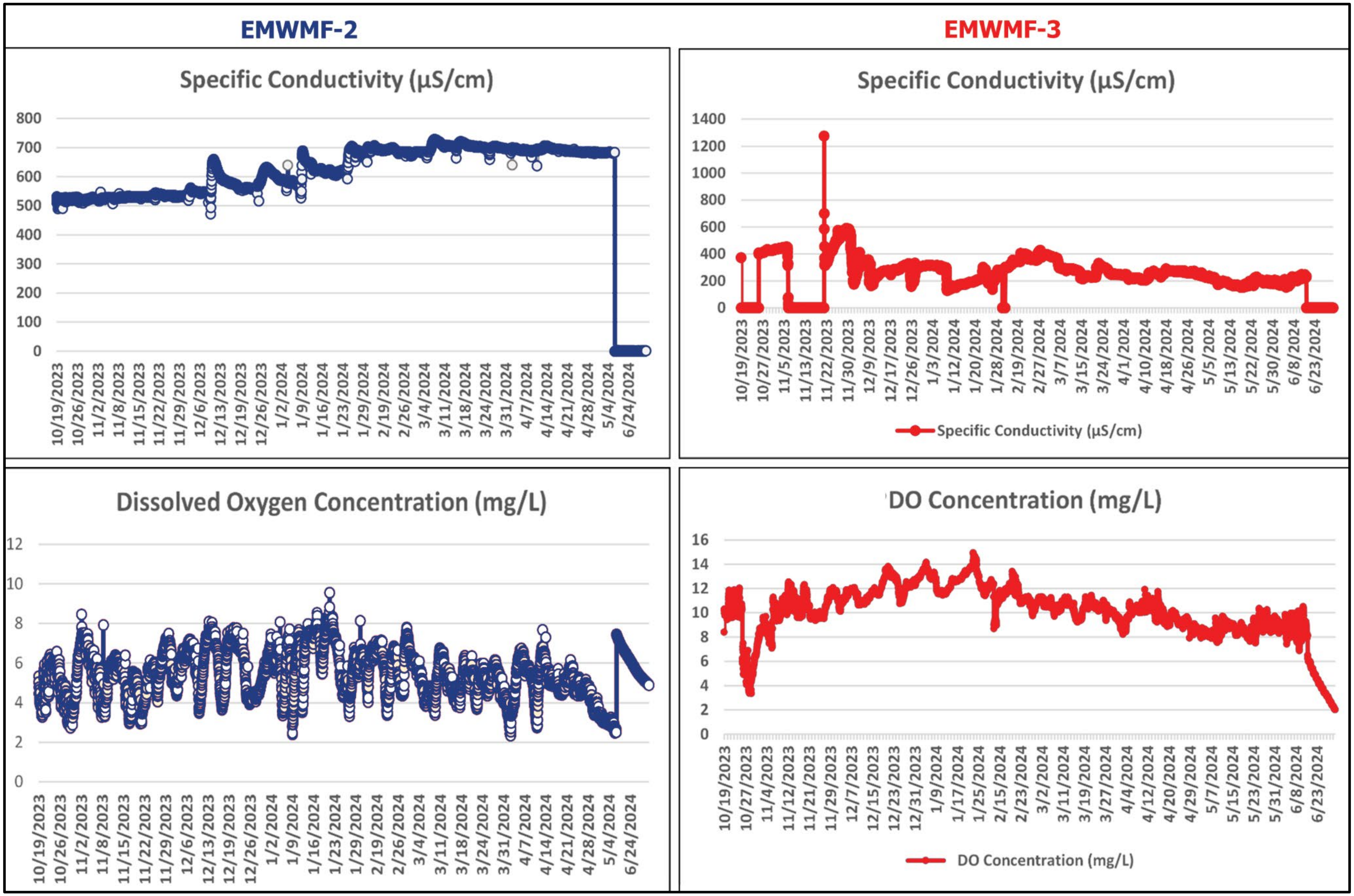

Figure 5.2.7.5: EMWMF-2 *vs.* EMWMF-3 In-Situ Probes - Water Quality Parameters (Cont.)

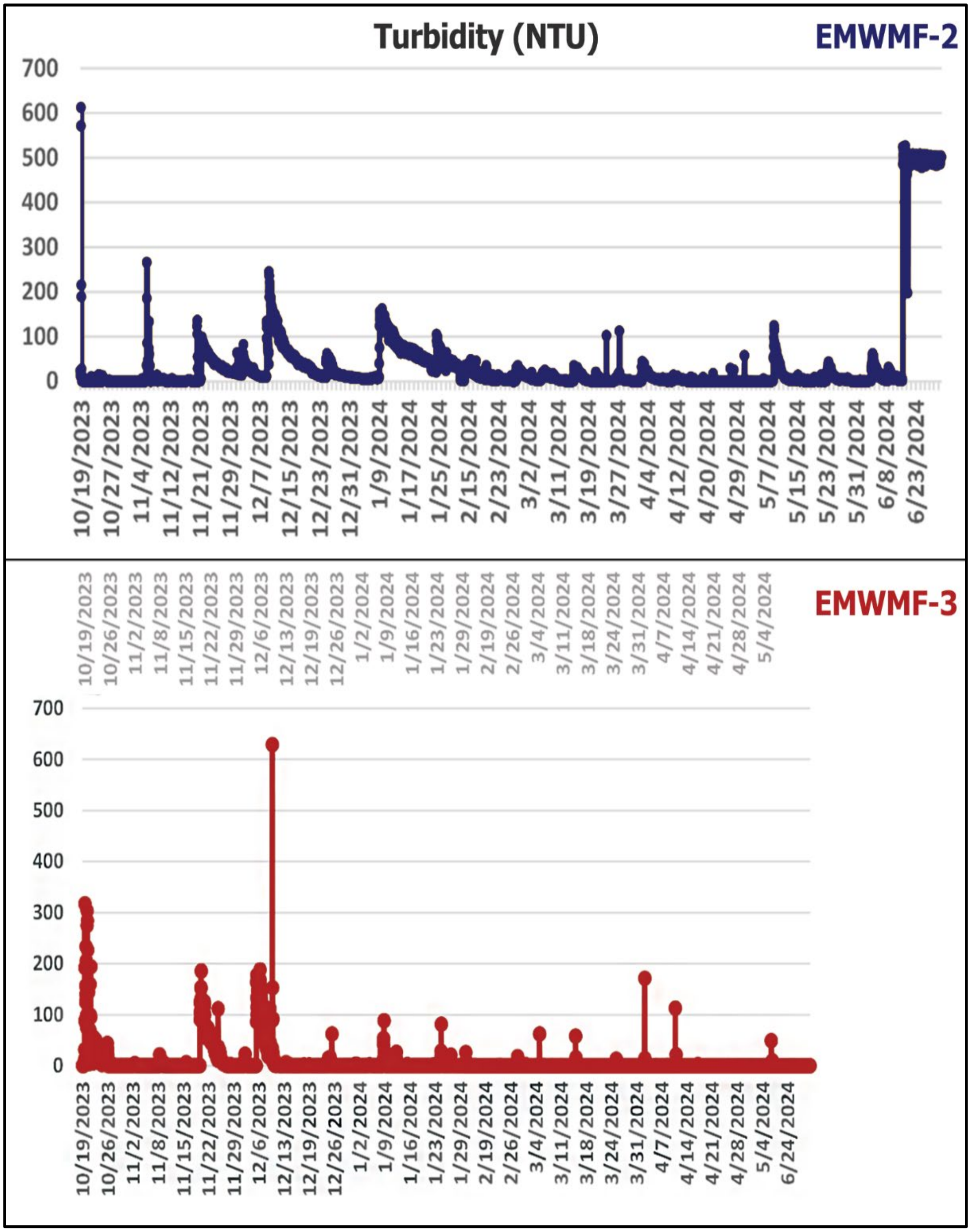

Figure 5.2.7.6: EMWMF-2 vs. EMWMF-3 In-Situ Probe – Turbidity

<u>Analytical Surface Water Grab Samples</u>

DoR-OR collected water grab samples from EMWMF-2 and EMWMF-3 in November 2023 and June 2024. Samples were analyzed for radiological and metal constituents, with low concentrations of radionuclides detected (see Tables 5.2.7.4 and 5.2.7.5). Additional samples collected from Bear Creek at BCK 11.54A and NT5@BCK in June 2024 yielded results for radionuclides and metals (see Tables 5.2.7.6 and 5.2.7.7). Aluminum, mercury, uranium, and zinc were present in both EMWMF-2 and EMWMF-3 samples, with higher concentrations at EMWMF-3. The EMWMF-3 sample also detected arsenic, cobalt, copper, lead, and nickel at estimated concentrations.

Table 5.2.7.4: FY24 Semi-Annual EMWMF-2 Radionuclides Results

EMWMF-2						
Sampled	***Radionuclide***	***Result (pCi/L)***	***CSU***	***MDA***	***Lc***	***Qualifier***
11/20/2023	*Americium-241*	*0.0742*	*0.0876*	*0.104*	*0.0648*	*J*
	Cesium-137	*-1.24*	*4.06*	*8.15*	*3.86*	*U*
	Cobalt-60	*-0.69*	*2.79*	*8.1*	*3.71*	*U*
	Europium-154	*0.788*	*10.3*	*26.5*	*12.3*	*U*
	Neptunium-237	*0.347* *	*0.0932*	*0.185*	*0.15*	
	Plutonium-238	*-0.009*	*0.0999*	*0.189*	*0.106*	*U*
	Plutonium-239/240	*-0.0517*	*0.0298*	*0.084*	*0.084*	*U*
	Strontium-89	*0.664*	*1.12*	*1.88*	*0.952*	*U*
	Strontium-90	*0.39*	*0.383*	*1.1*	*0.559*	*U*
	Technetium-99	*-0.608*	*6.76*	*8.01*	*2.84*	*U*
	Tritium	*98.3*	*212*	*358*		*U*
	Uranium-233/234	*0.725*	*0.369*	*0.245*	*0.192*	
	Uranium-235/236	*0.12*	*0.163*	*0.214*	*0.177*	*J*
	Uranium-238	*0.502*	*0.305*	*0.214*	*0.177*	
6/5/2024	*Cesium-137*	*-5.145*	*5.01*	*6.98*	*3.18*	*U*
	Neptunium-237	*-0.005*	*0.144*	*0.430*	*0.071*	*U*
	Plutonium-238	*-0.007*	*0.187*	*0.560*	*0.489*	*U*
	Plutonium-239/240	*-0.016*	*0.174*	*0.368*	*0.021*	*U*
	Strontium-89	*0.501*	*3.054*	*4.608*	*4.608*	*U*
	Strontium-90	*-0.135*	*1.043*	*2.239*	*1.760*	*U*
	Technetium-99	*0.382*	*1.132*	*1.913*	*0.472*	*U*
	Tritium	*-21.134*	*184.089*	*314.752*	*34.765*	*U*
	Uranium-234	*0.620*	*0.277*	*0.126*	*0.014*	
	Uranium-235	*0.207*	*0.179*	*0.178*	*0.013*	
	Uranium-238	*0.103*	*0.118*	*0.158*	*0.020*	

* Lo Rec

MDA: *Minimum detectable activity*
Lc: *Critical level*
Lo Rec: *Low recovery from QC standard*
CSU: *Combined Sample Uncertainty*

Table 5.2.7.5: FY24 Semi-Annual EMWMF-3 Radionuclides Results

EMWMF-3						
Sampled	***Radionuclide***	***Result (pCi/L)***	***CSU***	***MDA***	***Lc***	***Qualifier***
11/28/2023	*Americium-241*	*0.067*	*0.0766*	*0.0653*	*0.0455*	
	Cesium-137	*-0.794*	*4.44*	*8.91*	*4.2*	*U*
	Cobalt-60	*0.296*	*2.91*	*8.42*	*3.86*	*U*
	Europium-154	*-7.600*	*10.7*	*32.3*	*15.0*	*U*
	Neptunium-237	*-0.031*	*0.0529 **	*0.218*	*0.169*	*U*
	Plutonium-238	*-0.052*	*0.0817*	*0.168*	*0.0947*	*U*
	Plutonium-239/240	*0.013*	*0.0414*	*0.0539*	*0.0376*	*J*
	Strontium-89	*1.830*	*0.636*	*1.76*	*0.893*	
	Strontium-90	*1.200*	*0.417*	*1.16*	*0.586*	
	Technetium-99	*69.600*	*7.94*	*8.21*	*2.92*	
	Tritium	*137.000*	*213*	*358*		*U*
	Uranium-233/234	*11.100*	*1.74*	*0.316*	*0.261*	
	Uranium-235/236	*0.822*	*0.524*	*0.316*	*0.261*	
	Uranium-238	*4.600*	*1.15*	*3.362*	*0.284*	
6/5/2024	*Cesium-137*	*-0.109*	*3.45*	*5.56*	*2.56*	*U*
	Neptunium-237	*0.239*	*0.25*	*0.26*	*0.02*	
	Plutonium-238	*0.167*	*0.28*	*0.49*	*0.43*	*U*
	Plutonium-239/240	*0.942*	*0.56*	*0.34*	*0.02*	
	Strontium-89	*-1.469*	*3.03*	*4.43*	*4.43*	*U*
	Strontium-90	*1.276*	*1.00*	*1.96*	*1.90*	*U*
	Technetium-99	*7.340*	*1.54*	*2.13*	*0.53*	
	Tritium	*255.758*	*191.21*	*317.42*	*35.06*	
	Uranium-234	*1.924*	*0.49*	*0.16*	*0.01*	
	Uranium-235	*0.219*	*0.17*	*0.14*	*0.01*	
	Uranium-238	*0.800*	*0.30*	*0.11*	*0.01*	

* Lo Rec

MDA: *Minimum detectable activity*
Lc: *Critical level*
Lo Rec: *Low recovery from QC standard*
CSU: *Combined Sample Uncertainty*

Table 5.2.7.6: FY24 Annual EMWNT-3B and NT5@BCK Radionuclides Results

6/4/2024	EMWNT-3B					NT5 @ BCK				
Radionuclide	***Result** (pCi/L)*	***CSU***	***MDA***	***Lc***	***Qf***	***Result** (pCi/L)*	***CSU***	***MDA***	***Lc***	***Qf***
Actinium-228 (Ra-228)	*8.69*	*10.4*	*22.9*	*10.6*	*U*	*6.5*	*11.4*	*26*	*12.1*	*U*
Americium-241	*1.88*	*12.6*	*22.8*	*11.1*	*U*	*-2.38*	*13.9*	*25.2*	*12.3*	*U*
Antimony-124	*-4.35*	*3.3*	*7.44*	*3.53*	*U*	*-2.72*	*3.58*	*7.9*	*3.74*	*U*
Beryllium-7	*-8.7*	*30*	*49.3*	*23.2*	*U*	*1.65*	*31.9*	*50.6*	*23.7*	*U*
Bismuth-212	*-28.5*	*45.9*	*95.5*	*44.7*	*U*	*8.31*	*49.8*	*99.4*	*46.4*	*U*
Bismuth-214 (Ra-226)	*14.1*	*8.02*	*15*	*7.13*	*J*	*9.48*	*8.24*	*15.8*	*7.51*	*J*
Cesium-134	*-1.26*	*2.39*	*6.56*	*3.86*	*U*	*-1.48*	*2.59*	*6.9*	*3.26*	*U*
Cesium-137	*0.626*	*4.19*	*8.16*	*3.69*	*U*	*0.568*	*4.43*	*8.66*	*4.1*	*U*
Cobalt-60	*-0.608*	*2.78*	*8.05*	*2.5*	*U*	*-2.81*	*3.02*	*9.44*	*4.36*	*U*
Iridium-192	*-3.17*	*2.86*	*5.24*	*202*	*U*	*1.01*	*3.15*	*5.43*	*2.58*	*U*
Lead-210	*-89.9*	*229*	*416*	*5.72*	*U*	*-20.1*	*246*	*445*	*216*	*U*
Lead-212	*6.63*	*6.51*	*11.8*	*6.51*	*J*	*-1.98*	*6.96*	*12.9*	*6.27*	*U*
Lead-214	*12.4*	*6.76*	*13.6*	*40.7*	*J*	*3.74*	*7.1*	*15.1*	*7.21*	*U*
Potassium-40	*21.9*	*44*	*88*	*2.43*	*U*	*-4.97*	*49.4*	*102*	*47.3*	*U*
Scandium-46	*1.77*	*3.38*	*5.4*	*3.28*	*U*	*2.04*	*3.78*	*6.08*	*2.75*	*U*
Technetium-99	*1.56*	*4.85*	*4.12*	*2.07*		*1.47*	*4.02*	*7.67*	*3.63*	*U*
Thallium-208	*2.21*	*3.68*	*6.94*	*48.1*	*U*	*-44.9*	*53.9*	*125*	*51.3*	*U*
Thorium-234 (U-238)	*-2.49*	*47.6*	*117*	*4.31*	*U*	*-7.35*	*4.91*	*9.7*	*4.72*	*U*
Uranium-235	*-5.19*	*4.5*	*8.85*	*3.1*	*U*	*0.91*	*0.36*	*1.65*	*0.818*	*U*
Strontium-90	*1.33*	*0.444*	*2.02*	*1*	*U*	*0.561*	*0.36*	*1.02*	*0.504*	*U*
Strontium-90	*0.819*	*0.444*	*1.25*	*0.62*	*J*	*20.1*	*4.35*	*4.85*	*2.07*	
Tritium	*-118*	*316*	*545*	*268*	*U*	*26.8*	*319*	*544*	*268*	*U*
Plutonium-238	*0.0975*	*0.088*	*0.116*	*0.07*	*U*	*0.015*	*0.0462*	*0.072*	*0.047*	*U*
Plutonium-239/240	*-0.0381*	*0.022*	*0.0526*	*0.04*	*U*	*-0.0427*	*0.0212*	*0.054*	*0.038*	*U*
Neptunium-237	*0.0142*	*0.039*	*0.171*	*0.15*	*U*	*0.0515*	*0.0614*	*0.191*	*0.163*	*U*
Uranium-233/234	*0.204*	*0.201*	*0.244*	*0.18*	*U*	*3.06*	*0.743*	*0.393*	*0.262*	
Uranium-235/236	*0.0607*	*0.114*	*0.181*	*0.15*	*U*	*0.199*	*0.195*	*0.201*	*0.166*	*J*
Uranium-238	*0.188*	*0.175*	*0.181*	*0.15*	*U*	*5.08*	*0.923*	*0.201*	*0.166*	
Uranium-238	*1.56*	*4.12*	*4.85*	*2.07*	*U*					
***MDA:** Minimum detectable activity**; Lc:** Critical level; **CSU:** Combined Sample Uncertainty;* **Qf:** qualifier										

Table 5.2.7.7: FY24 EMWMF - Metals Results

		mg/L									*ng/L*
Station	**Sampled**	**Arsenic**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Nickel**	**Uranium**	**Vanadium**	**Zinc**	**Mercury**
EMWMF-2	**11/20/2023**	**0.00036**	**0.00124**	**0.00045**	***0.00658***	**0.00157**	**0.00082**	**0.00026**	**0.00080**	**0.00431**	***0.982***
	6/5/2024	**0.00114**	**0.00124**	**0.00034**	**0.00153**	**0.00085**	**0.00144**	**0.01290**	**0.00095**	***0.00663***	***0.544***
EMWMF-3	**11/28/2023**	**0.00036**	**0.00124**	**0.00045**	**0.00658**	**0.00157**	**0.00082**	***0.00026***	**0.00080**	**0.00431**	***0.982***
	6/5/2024	***0.00182***	**0.00560**	**0.00026**	**0.00082**	**0.00059**	**0.00051**	***0.00194***	**0.00098**	**0.00796**	***2.22***
EMWNT-3B	**6/4/2024**	**0.00023**	**0.00560**	**0.00068**	**0.00067**	**0.00051**	**0.00118**	**0.00012**	**0.00047**	**0.00796**	***3.95***
NT5 @ BCK	**6/4/2024**	**0.00077**	**0.00560**	**0.00017**	**0.00067**	**0.00051**	**0.00057**	***0.01390***	**0.00051**	**0.00796**	***2.15***
Tank A	**1/10/2024**	**0.00047**	**0.00560**	**0.00026**	***0.00147***	**0.00051**	**0.00109**	***0.06900***	**0.00066**	**0.00796**	***9.880***
EMWMF-5	**6/20/2024**	**0.00041**	**0.00560**	**0.00014**	-	**0.00051**	**0.00055**	***0.01130***	**0.00047**	**0.00796**	***7.860***
	Notes:	***Results***	**Estimated (J)**	**Non-Detect (U)**		**-**	= Not Measured				

Table 5.2.7.8: Tennessee and EPA Surface Water Criteria

Surface Water Criteria Comparison						
EMWMF Analyte List *(µg/L)*	***Human Life Criteria***		***TN Aquatic Life Criteria***		***EPA Aquatic Life Criteria***	
	Human Health *for the consumption of water + organism*	Human Health *for the consumption of organism only*	Freshwater *CMC¹ (acute)*	Freshwater *CCC² (chronic)*	Freshwater *CMC¹(acute)*	Freshwater *CCC² (chronic)*
* RADS	--	--	--	--	--	--
Arsenic	0.018	0.14	340	150	340	150
Chromium III	-	--	570	74	570	74
Chromium VI			16	11	16	11
Chromium, Total	100 *(**MCL)*					
Cobalt	--	--	--	--	--	--
Copper	1,300	--	13	9	--	--
Lead	--	--	65	2.5	82	3.2
Mercury	--	--	1.4	0.8	1.4	0.8
Nickel	610	4,600	470	52	470	52
Uranium	--	--	--	--	--	--
Vanadium	--	--	--	--	--	--
Zinc	7400	26,000	120	120	120	120

CMC[1] CMC: Criterion Maximum Concentration CCC[2] CCC: Criterion Continuous Concentration ** *MCL: maximum contaminant level*

* *RADS: Gamma Activity, Sr-89/90 in water, Tc-99, H-3 in water, Transuranics, Isotopic Uranium*

<u>SEDIMENT SAMPLING AT THE SEDIMENTATION BASIN</u>

A sediment sample was collected from EMWMF's sediment basin in September 2023 and analyzed for radionuclides and metals. The analytical results for radionuclides and metals are shown in table, Table 5.2.7.9. Six of the 24 analytes exceeded EPA's RSLs (MacDonald et al. 2000) with cobalt, manganese, and uranium exceeding by over an order of magnitude. Cadmium, thallium, and mercury were slightly above the RSL.

Table 5.2.7.9: FY24 Annual EMWMF Sediment Basin – Sediment Analysis

EMWMFSB-1 Sediment Samples (9/23/2023)

Radionuclide	Result (pCi/g)	CSU	Qualifier
Actinium-228 (Ra-228)	1.350	0.263	
Americium-241	0.089		J
Americium-241	0.108	0.198	U
Beryllium-7	0.656	0.607	J
Bismuth-212	1.380	0.892	J
Bismuth-214 (Ra-226)	0.967		
Cesium-134	0.023		U
Cesium-137	0.003		U
Cobalt-60	-0.010		U
Iridium-192	-0.070		U
Lead-210	1.340		U
Lead-212	1.690		
Lead-214	1.150		
Neptunium-237	-0.00331	0.007	U
Plutonium-238	-0.000512	0.009	U
Plutonium-239/240	0.00177	0.012	U
Potassium-40	21.100		
Radium-226 (186 KeV)	4.010		
Scandium-46	-0.037		U
Strontium-89	0.146	0.31	U
Strontium-90	0.068	0.101	U
Technetium-99	146	10.5	
Thallium-208	0.514		
Thorium-234 (U-238)	1.570		J
Tritium	-6.790		
Uranium-234	5.90		
Uranium-235	0.219	0.111	
Uranium-235	0.405	0.083	
Uranium-238	2.940	0.399	

Analyte	Result (mg/kg)	Qualifier	Detection Limit	Quant. Limit
Aluminum	3530		12.7	92.1
Antimony	0.306		0.306	5.53
Arsenic	3.06		0.184	1.84
Barium	67.2		0.28	4.61
Beryllium	0.315	J	0.254	4.61
Cadmium	0.158		0.158	1.84
Calcium	55900		139	921
Cobalt	4.01		0.0851	1.84
Copper	7.8	J	0.243	9.21
Iron	8770		16.5	92.1
Lead	8.82		0.182	3.68
Magnesium	17900		84.6	921
Manganese	246		0.494	4.61
Nickel	6.72		0.363	4.61
Potassium	751	J	125	921
Selenium	0.332		0.332	4.61
Silver	0.159		0.159	0.921
Sodium	141		141	921
Thallium	0.144	J	0.12	3.68
Uranium	3.59	J	0.0881	27.6
Vanadium	10.1		0.344	4.61
Zinc	29.6	J	1.36	46.1
Chromium	16.2		0.545	9.21
Mercury	0.0491	J	0.0332	0.0737
Cyanide	0.135		0.135	0.461
Total Organic Carbon	23100		470	1840
CSU = Combined Sample Uncertainty				

Table 5.2.7.10: EPA Sediment Quality Criteria Limits

Radionuclide	*PRG*	*PRG*	*Results (pCi/g)*	*Analyte*	*mg/kg*			
					EPA SSL* *GW*	*TEC*	*PEC*	***Results***
Actinium-228 (Ra-228)	*7.34E+03*	*1.70E+02*	*1.350*	*Aluminum*	*30000*			*3530*
Americium-241	*4.80E+00*	*1.63E-01*	*0.089*	*Antimony*	*0.35*	*2*	*33*	*0.306*
Americium-241	*4.80E+00*	*1.63E-01*	*0.108*	*Arsenic*	*0.0015*	*9.8*	*33*	*3.06*
Beryllium-7	*6.63E+02*	*-*	*0.656*	*Barium*	*160*			*67.2*
Bismuth-212	*2.83E+05*	*6.60E+02*	*1.380*	*Beryllium*	*20*			*0.315*
Bismuth-214 (Ra-226)	*7.46E+04*	*2.63E+03*	*0.967*	*Cadmium*	*0.14*	*0.99*	*5*	*0.158*
Cesium-134	*1.63E+04*	*4.13E+00*	*0.023*	*Calcium*				*55900*
Cesium-137	*3.58E+05*	*2.02E+03*	*0.003*	*Cobalt*	*0.27*			*4.01*
Cobalt-60	*2.85E-01*	*8.53E-01*	*-0.010*	*Copper*	*28*	*32*	*150*	*7.8*
Iridium-192	*2.68E+01*	*2.37E+00*	*-0.070*	*Iron*	*350*	*20000*	*40000*	*8770*
Lead-210	*5.81E-02*	*1.68E-02*	*1.340*	*Lead*	*14*	*36*	*130*	*8.82*
Lead-212	*1.24E+04*	*1.01E+01*	*1.690*	*Magnesium*				*17900*
Lead-214	*4.07E+05*	*1.45E+03*	*1.150*	*Manganese*	*28*	*460*	*1100*	*246*
Neptunium-237		*2.41E-01*	*-0.00331*	*Nickel*	*26*	*23*	*49*	*6.72*
Plutonium-238	*5.05E+00*	*1.28E-01*	*-0.000512*	*Potassium*				*751*
Plutonium-239/240	*4.45E+00*	*1.25E-01*	*0.00177*	*Selenium*	*0.52*			*0.332*
Potassium-40	*5.81E-02*	*1.34E-01*	*21.100*	*Silver*	*0.8*	*1.6*	*2.2*	*0.159*
Radium-226 (186 KeV)	*6.85E-02*	*3.50E-02*	*4.010*	*Sodium*				*141*
Scandium-46	*9.39E+00*	*2.83E+00*	*-0.037*	*Thallium*	*0.014*			*0.144*
Strontium-89	*1.74E+01*	*1.43E+00*	*0.146*	*Uranium*	*1.8*			*3.59*
Strontium-90	*4.81E-02*	*9.64E-02*	*0.068*	*Vanadium*	*86*			*10.1*
Technetium-99	*8.66E-03*	*2.41E-02*	*146*	*Zinc*	*370*			*29.6*
Thallium-208	*2.05E+05*	*4.15E+05*	*0.514*	*Total Chromium*	*180000 (MCL-based)*	*43*	*110*	*16.2*
Thorium-234 (U-238)	*3.35E+03*	*9.68E-01*	*1.570*	*Mercury*	*0.033*	*0.18*	*1.1*	*0.0491*
Tritium	*1.16E+00*	*6.11E+00*	*-6.790*	*Cyanide*				*0.135*
Uranium-234	*1.09E+00*	*2.14E-01*	*5.90*	*T.O. Carbon*				*23100*
Uranium-235	*7.23E-01*	*2.17E-01*	*0.219*					
Uranium-235	*7.23E-01*	*2.17E-01*	*0.405*					
Uranium-238	*1.20E+00*	*2.36E-01*	*2.940*					

GW = groundwater; TEC: threshold effects concentration; PEC: probable effects concentration (McDonald et al, 2000)
**Risk-based EPA SSL for protection of Groundwater; T.O. = Total Organic*

REVIEW OF DOE – EMWMF MONITORING

The DOE conducts regular monitoring of water samples from various sources at EMWMF, including wells, pipes, streams, ponds, tanks, and air. DOE's sampling schedule includes monthly, quarterly, annual, and biennial intervals. This report focuses on data from two primary discharge points: EMWMF-2 (designated as EMW-VWUNDRDRAIN for groundwater) and EMWMF-3 (designated as EMW-VWEIR for surface water). Radionuclide levels measured in TDEC DoR-OR grab samples from EMWMF-2 (EMW-VWUNDRDRAIN) and EMWMF-3 (EMW-VWEIR) align closely with those recorded by DOE at these same locations. The DOE project team has shared radionuclide data, which is also available on the Oak Ridge Environmental Information System (OREIS) database. DOE's monitoring at EMWMF-2 (EMW-VWUNDRDRAIN) shows no increases in isotopic uranium discharging through the Underdrain, with steady, low levels of gross alpha and gross beta activities, predominantly characterized by non-detects.

DOE observed elevated isotopic uranium concentrations, specifically U-234 and U-238, in discharges from EMWMF-3 (EMW-VWEIR) between October 2023 and February 2024. This increase did not correspond with any shifts in other measured water quality parameters at EMWMF-3 (EMW-VWEIR), suggesting that new waste lots entering the landfill may have influenced these uranium levels.

Gross alpha activity at EMWMF-3 (EMW-VWEIR) remained like FY23 data, while gross beta activity was noticeably higher, particularly from September 2023 to February 2024.

Metals detected in DoR-OR grab samples from EMWMF-2 (EMW-VWUNDRDRAIN) and EMWMF-3 (EMW-VWEIR) were generally consistent with DOE's findings, with concentrations falling within typical ranges and below TDEC's AWQC for Fish and Aquatic Life and Recreation (TDEC 0400-40-03-.03) and EPA's MCLs.

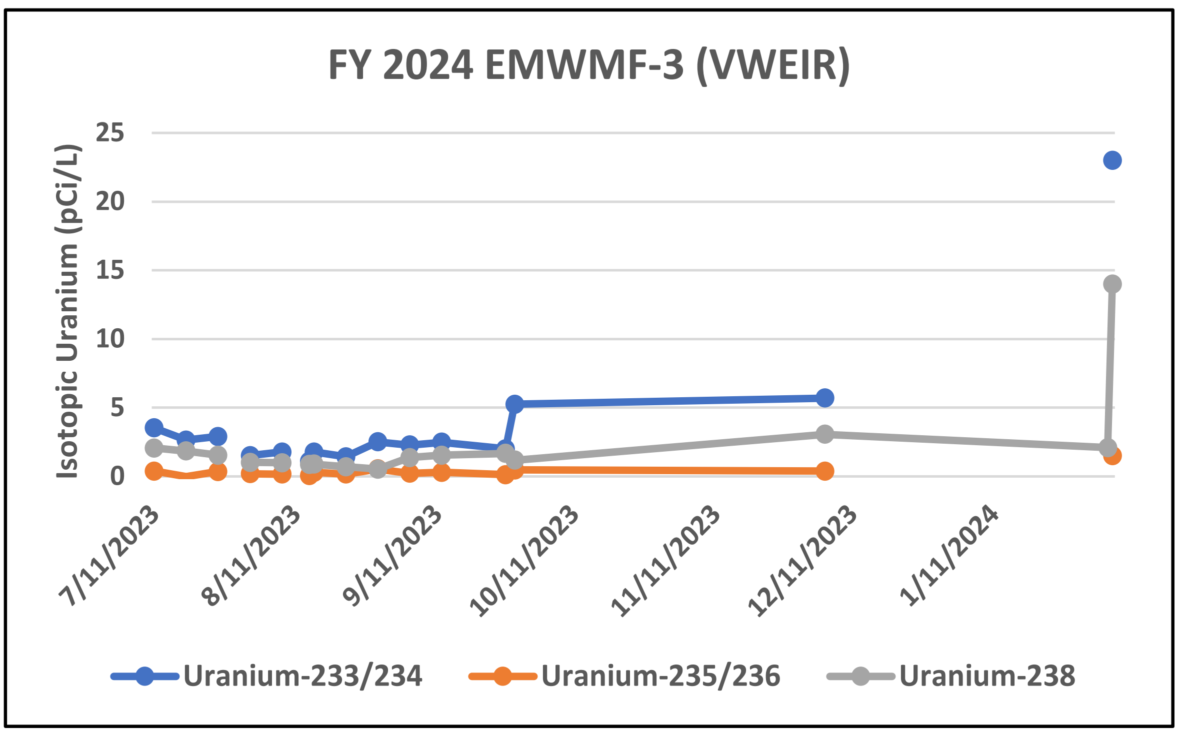

Figure 5.2.7.7: DOE Data EMWMF-3 Isotopic Uranium

Review of DOE Contact Water Ponds and Tanks Discharge Summary

Throughout FY24, DoR-OR received weekly updates from the DOE EMWMF Project Team regarding water management at the EMWMF. These "Water Management Snapshots" provided essential data on the volumes within the Contact Water Ponds (CWP), Contact Water Tanks (CWT), and Leachate Tanks, including:

- Approximate volume in each pond/tank
- Normal maximum capacity
- Total available volume
- Remaining available capacity in gallons and percent full
- Hexavalent chromium (Cr^{+6}) concentrations
- Additional operational comments

DoR-OR reviews this information each year to monitor DOE's water management practices at EMWMF. Table 5.2.7.11 summarizes the total volumes of non-stormwater (NSW) discharged from the ponds and tanks to the sediment basin for environmental release each quarter. Across all quarters, EMWMF discharged 7,796,000 gallons from ponds and 2,599,000 gallons from tanks, totaling 10,395,000 gallons of NSW for FY24.

Table 5.2.7.11: EMWMF FY24 Discharged Non-Stormwater (NSW) Volumes (*gallons*)

FY24 Quarter	Pond Subtotal	Tank Subtotal	Total
First	2,905,000	893,000	3,798,000
Second	559,000	824,800	1,383,800
Third	2,765,000	432,400	3,197,400
Fourth	1,567,000	448,800	2,015,800
FY24 Total	***7,796,000***	***2,599,000***	***10,395,000***

In FY24, EMWMF discharged approximately 1.5 million gallons less NSW than in recent years.

5.2.8 Conclusions

Monitoring results from FY24 indicate that wet and dry seasonal fluctuations and variations following waste lot disposals are typical at EMWMF. EMWMF-3 showed periodic increases in conductivity. Fluctuations at EMWMF-2 were muted and showed delayed shifts compared to EMWMF-3, which aligns with groundwater's steadier chemical conditions.

The DOE monitoring data, as reviewed by DoR-OR, indicated steady or decreasing trends in isotopic uranium concentrations from EMWMF-2. The lower NSW discharge volumes from EMWMF likely stem from operational adjustments and less precipitation during FY24. COCs continue to discharge at levels below ROD limits (AWQC).

5.2.9 Recommendations

1) Continue current water quality monitoring at EMWMF to track changes associated with

waste disposal and wet and dry seasonal variations.

2) Perform periodic grab sampling at key sites (EMWMF-2 and EMWMF-3) to validate DOE's monitoring trends.

3) Sustain oversight of NSW management at EMWMF.

5.2.10 References

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6.0 Radiological Monitoring

6.1 Haul Road Survey Project

6.1.1 Background

In 2004, contaminated waste was lost from a DOE contractor's dump truck on a state highway in Tennessee. DOE conducted a Type B Accident Investigation to determine preventative measures. This investigation resulted in an agreement with the State of Tennessee Department of Environment and Conservation (TDEC) to construct a separate transportation route for these dump trucks. The Haul Road was constructed and is reserved solely for trucks transporting CERCLA low-level radioactive and hazardous waste.

DoR-OR staff perform surveys of the Haul Road and other waste transportation routes on the ORR used for carrying waste to the EMWMF for disposal to account for wastes or material that may have fallen from the trucks in transit. DoR-OR personnel perform walk over inspections of different segments of the nine-mile-long Haul Road and associated access roads on a bimonthly basis. Anomalous items noted along the roads are scanned for radiation, logged, marked with contractor's ribbon, and their descriptions and locations submitted to the DOE for disposition.

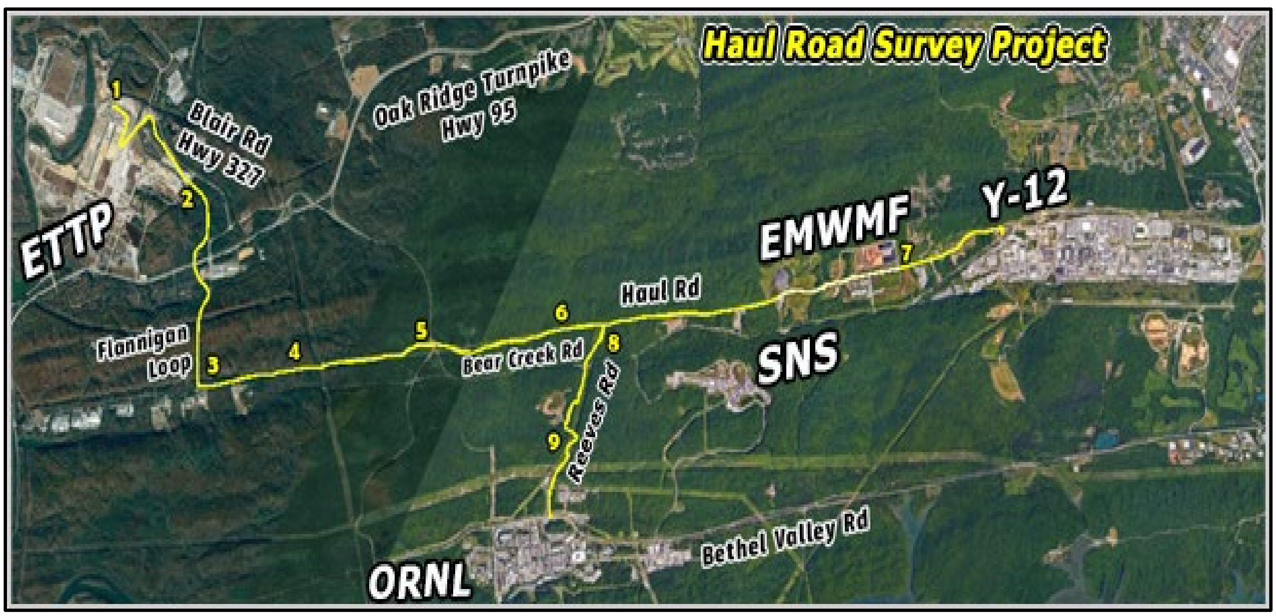

Figure 6.1.2.1: Haul Road Overview

6.1.2 Problem Statements

In FY24, remedial activities and construction continued to increase on the ORR, especially on the Y-12 and ORNL campuses. This increase in waste production also increases the probability of a waste hauling truck potentially loosing contaminated waste items onto transportation routes.

6.1.3 Goals

The primary goal is to prevent the spread of contamination resulting from the transportation of radioactive and hazardous waste being transported from the originating clean up locations on the ORR to the waste disposal location. More specifically, the objectives included the following:

1) To assess the radiological conditions of the Haul Road and objects that may have fallen from trucks.

2) To ensure DOE and their contractors continue their waste transportation in a manner that limits potential environmental concerns for the Haul Road and the surrounding areas.

6.1.4 Scope

The scope of this project was to locate, survey, and report to DOE any ORR derived waste materials that were lost from waste-hauling trucks. The Haul Road and all associated access roads being used to transport waste were incrementally surveyed during FY24. The dates and locations of the surveys are outlined in the table below, Table 6.1.4.1.

Table 6.1.4.1: Haul Road Survey Locations and Dates Performed

Section	Description	Date Performed
1	K-25 to Zirconium Road	10/26/2023
2	Zirconium Road to Firing Range Cut Off	11/14/2023
3	Firing Range Cut Off to Heavy Equipment Staging area	02/01/2024
4	Heavy Equipment Staging Area to Hwy. 95	02/21/2024
5	Hwy. 95 to Reeves Road	02/29/2024
6	Reeves Road to EMWMF West Gate	03/18/2024
7	EMWMF East Gate to Y-12	*Not surveyed as this section, was not utilized during FY24*
8	Reeves Road on Y-12 Side	04/18/2024
9	Reeves Road on ORNL Side	05/30/2024

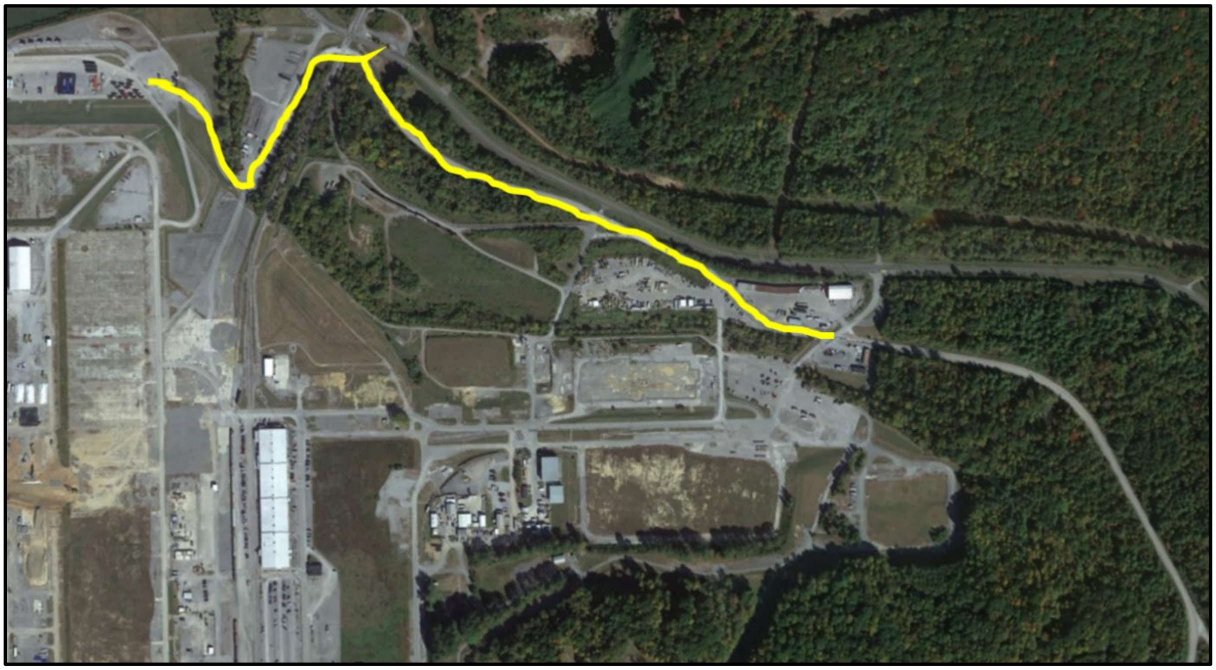

Figure 5.4.2.1: Haul Road Section 1

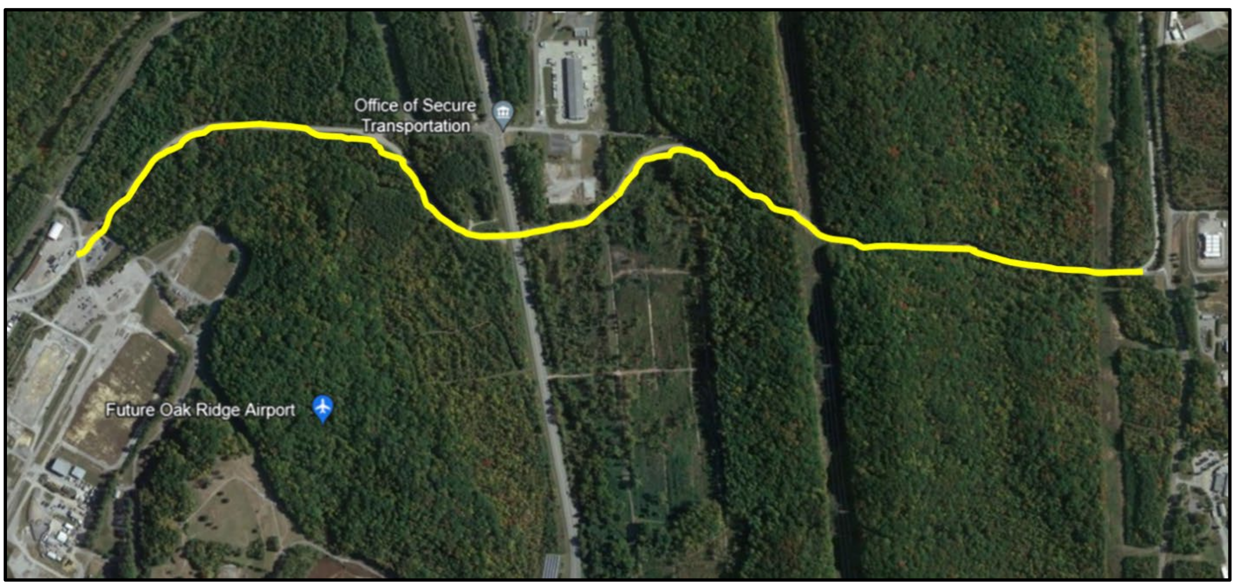

Figure 5.4.2.2: Haul Road Section 2

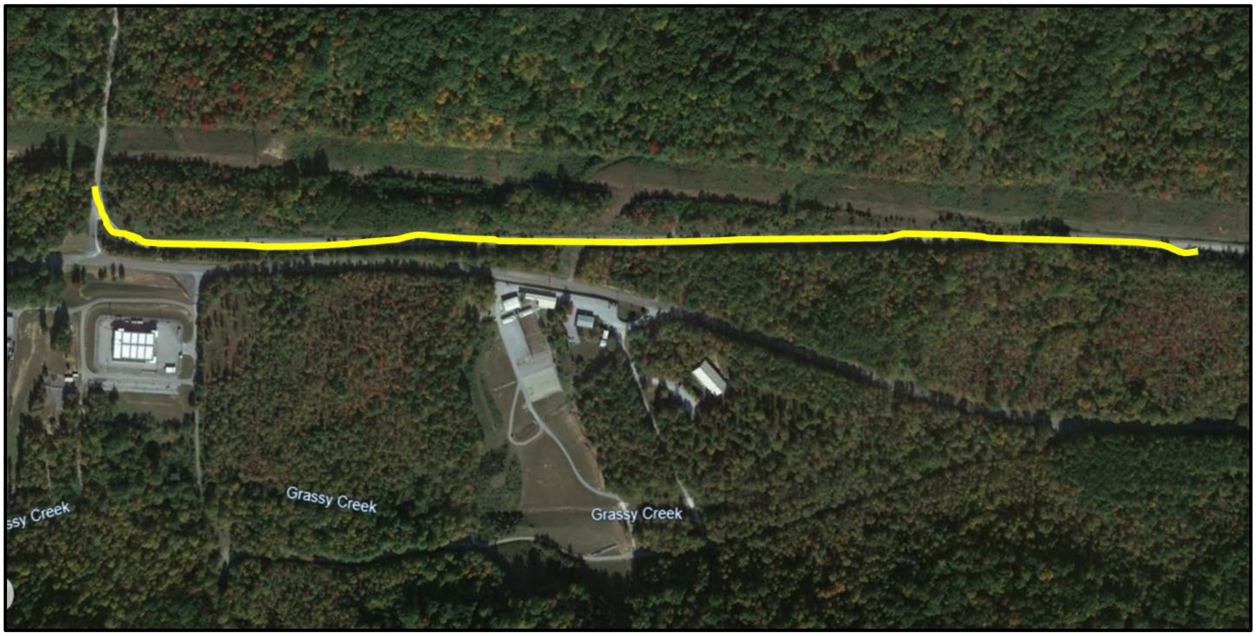

Figure 5.4.2.3: Haul Road Section 3

Figure 5.4.2.4: Haul Road Section 4

Figure 5.4.2.5: Haul Road Section 5 (Hwy 95 to Reeves Road)

Figure 5.4.2.6: Haul Road Section 6

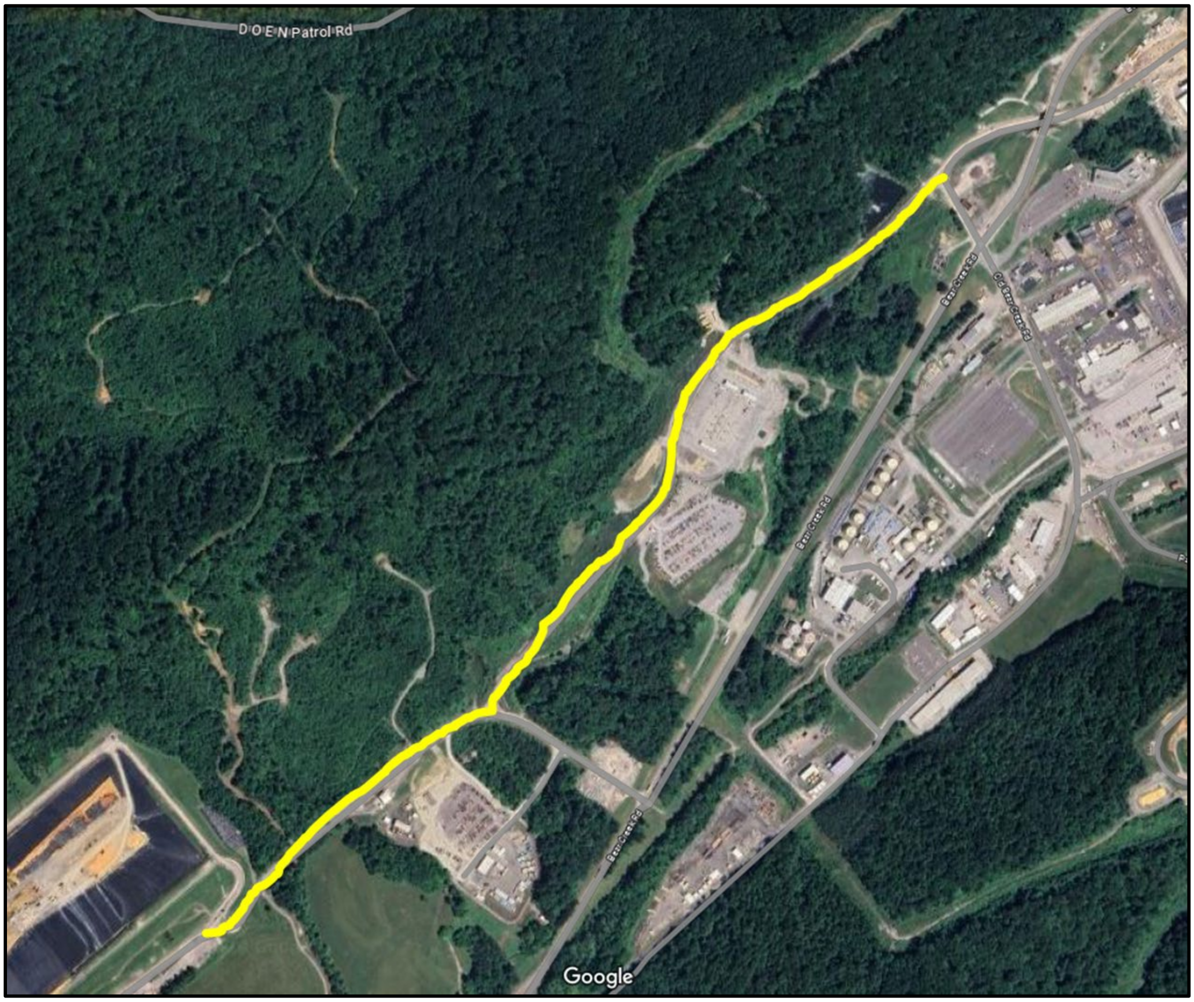

Figure 5.4.2.7: Haul Road Section 7

Figure 5.4.2.8: Haul Road Section 8

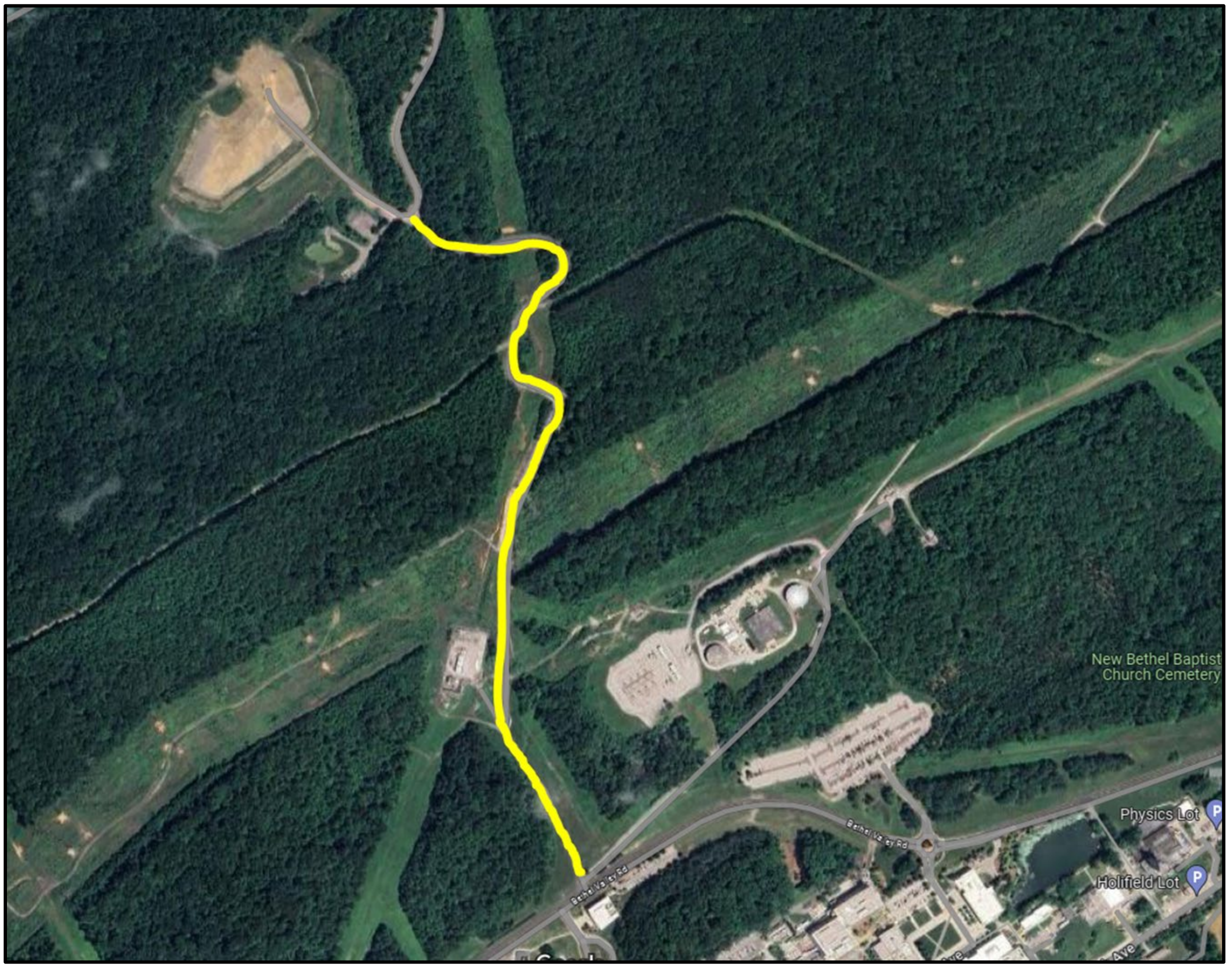

Figure 5.4.2.9: Haul Road Section 9

6.1.5 Methods, Materials, Metrics

The nine-mile-long Haul Road was surveyed in segments, typically consisting of one to two miles per survey event in accordance with SOP DoR-OR-T-560. The Reeves Road access to the Haul Road connects ORNL with the main stem of the Haul Road (Section 8 and 9). Reeves Road was also surveyed in FY24.

For safety reasons, DoR-OR staff always coordinated with Haul Road site personnel prior to all surveys. UCOR, as DOE's main contractor, was responsible for providing briefings to surveyors on road conditions and on any known situation that could present a safety hazard. When UCOR was not available, survey staff called the designated DOE site safety office. On occasions when excessive traffic presented a safety concern, the survey was postponed to a later date. In these instances, alternate entrances were sometimes used to survey the road with DOE approval, but the basic requirements remain the same.

When DoR-OR staff members arrived at the segment of the road to be surveyed, the vehicle was parked completely off the road and as far away from vehicular traffic as possible. No fewer than two staff performed each of the surveys. During some survey events, both staff surveyed using meters while walking in a serpentine pattern along opposite sides of the road. During other surveys, one person walked in a serpentine pattern across the entire road accompanied by an approved safety buddy.

A Ludlum Model 2221 Scaler Ratemeter with a Model 44-10 2”x2” Sodium-Iodine Gamma Scintillator probe was used in accordance with SOP T-525 and T-540. The surveyor held the probe approximately six inches above the ground’s surface. The road segment was scanned for radioactive contaminants as the walkover proceeded.

Another detection meter, a Ludlum 2224 Scaler with a Model 43-93 Alpha/Beta dual detector, was also used, and operated in accordance with SOP T-525 and T-532, to investigate potential surface contamination and on any anomalous items found along the road that may be associated with waste shipments. Any areas or items with elevated contamination levels are noted for further investigation. Elevated levels are defined below:

1) 200 dpm/100 cm^2 removable beta
2) 1,000 dpm/100 cm^2 total beta
3) 20 dpm/100 cm^2 removable alpha
4) and/or 100 dpm/100 cm^2 total alpha

Potential waste items were marked with contractor’s ribbon and returned to the side of the road. A description of each item and its location were logged and reported to DOE for disposition. These items potentially contained non-radiological hazardous constituents as well. A survey form was completed for each walkover and was retained by DoR-OR. When survey staff conducted subsequent inspections, they performed a follow-up inspection of items found and reported during previous weeks. Items that remained on the road were included in subsequent reports until the item was removed by DOE or until DOE confirms that the item(s) are free of radioactive and hazardous constituents.

Eight (8) individual surveys were completed over a 12-month period. Surveyors scheduled around any waste hauling activity on the waste transit routes.

6.1.6 Deviations from the Plan

Section 7, EMWMF West Gate to Y-12 was not surveyed because it was not used for hauling waste in FY24. This section of road was blocked with concrete barricades. Surveys will resume when waste hauling activities begin using this road again.

6.1.7 Results and Analysis

During FY24, the project team's eight (8) survey events only found one (1) anomalous item along waste transit routes. On February 29, 2024, a radiological tag was located on Section 5 of the Haul Road (i.e. road segment from Hwy 95 to Reeves Road). The radiological tag was surveyed, found to be free of radiological contamination, and was provided to RCT for appropriate disposal.

Radiological detection meter screenings show that the total alpha and total beta contamination levels were below the threshold needed for further investigation. No surface contamination readings exceeded the free release limits as outlined in 10 CFR 835. All ambient high energy gamma readings were also within the normal background range for the area.

Figure 6.1.7.1: Anomalous Item on Haul Rd

6.1.8 Conclusions

The periodic surveys of the transit roads to EMWMF indicated that waste items are intermittently lost from trucks transporting waste. The discovery of one (1) item during eight (8) survey events indicates a potential for future incidents. Even though the item was within agreed-upon limits, the surveys were by no means exhaustive. Items could potentially remain on the side of the road for 2 months or more.

On the other hand, alpha and beta levels of these items were within free release limits. These results verify that DOE waste transport protocols were efficient in FY24.

6.1.9 Recommendations

DOE increasing the amount of construction, decommissioning, demolition, and other remedial actions on the ORR campuses in the coming years. These remediation actions have transitioned to focus heavily at Y-12 and ORNL. The waste produced from all these activities will be transported on the Haul Road to EMWMF, and eventually EMDF (see Section 5.1).

Based on the increase in remedial activities at Y-12 and ORNL and the FY24 findings, the DoR-OR recommends the continuation of the *Haul Road Survey Project* to ensure DOE protocols remain sufficiently protective the sections of the Haul Road (Sections 6-9) that are likely to be heavily used to support these clean-up actions. The accidental release of anomalous items from dump trucks occurs regularly and has the potential to increase over the next few years. This transit system should be monitored continuously and closely to protect human health and the environment.

6.1.10 References

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6.2 AMBIENT GAMMA RADIATION MONITORING

6.2.1 BACKGROUND

During early operations, leaks and spills were common at industrial facilities within the three ORR campuses. Contaminants, including radioactive materials, were released from operations as gaseous, liquid, and solid effluents, sometimes with little to no treatment (ORAU, 2003). Currently, D&D activities may also re-release these contaminants into the environment. The DoR-OR *Ambient Gamma Radiation Monitoring Project* focuses on measuring and determining radioactive exposure rates at some of these locations. One main concern of these selected locations is that gamma emissions can potentially be expected to fluctuate. Therefore, consistent gamma air monitoring within proximity to these structures is a valuable assessment tool for evaluation of potential impacts of remaining historical contaminants and to help assess and insure protection of human health and the environment during present day operations.

Additionally, while DOE conducts ambient gamma sampling along the ORR perimeter, this project is conducted closer to potential sources and would be an indication of potential onsite influences. Sampling closer to the sources would more likely give an indication of the effect to onsite members of the public.

6.2.2 PROBLEM STATEMENTS

Facilities on the ORR have the potential to emit variable amounts of gamma radiation. These emissions are known to fluctuate substantially over relatively short periods of time and cannot be predicted. D&D and demolition activities would most likely increase this variability.

6.2.3 GOALS

The *Ambient Gamma Radiation Monitoring Project* monitored gamma emissions close to internal ORR source areas to achieve the following goals:

1) Maintain adequate monitoring to understand potential for human exposure to elevated doses and verify that levels were kept below the 10 CFR 835.208 dose limits for protecting members of the public (i.e. 100 mrem/year).

2) Project data tracks gamma emissions exposure at specific areas of concern associated with ongoing remediation and active operations within the ORR.

3) Improved collaboration with DOE to allow for readily shared gamma emissions data.

4) Review of verification data validates existing radiological controls in selected areas at ORR.

6.2.4 Scope

This project's scope currently includes five GammaTRACER® units deployed at five different stations, in accordance with *SOP T-553*.

<u>Description of the Gamma Monitoring Stations:</u>

1) ***Fort Loudoun Dam (Background):*** to record naturally occurring data, used for comparison.

2) ***EMWMF (Environmental Management Waste Management Facility):*** landfill for waste disposal from CERCLA activities, located in Bear Creek Valley.

3) ***ORNL Building 3026***: centrally located on ORNL's main campus and in proximity to pedestrian and vehicular traffic, monitors for potential radiological releases during the demolition of high-risk facilities.

4) ***MSRE (Molten Salt Reactor Experiment):*** the major source of the measured gamma radiation dose above background is assumed to result from a salt probe being temporarily stored in the radiation area, adjacent to the monitoring station.

5) ***SNS (Spallation Neutron Source)***: the exposure rate monitor is located approximately 25' above the ground on the central exhaust stack used to vent air from process areas inside the linear accelerator (LINAC). Exposure rates vary based on the operational status of the accelerator. During periods when the accelerator is offline, the rates are similar to background measurements. However, much higher levels are recorded during operational periods.

Ambient gamma monitoring was conducted at four ORR stations and one background location, as shown below (Figure 6.2.4.1). These stations were placed near areas where D&D, remediation, waste disposal, or active operations are most likely to contribute dose to the environment or human receptors.

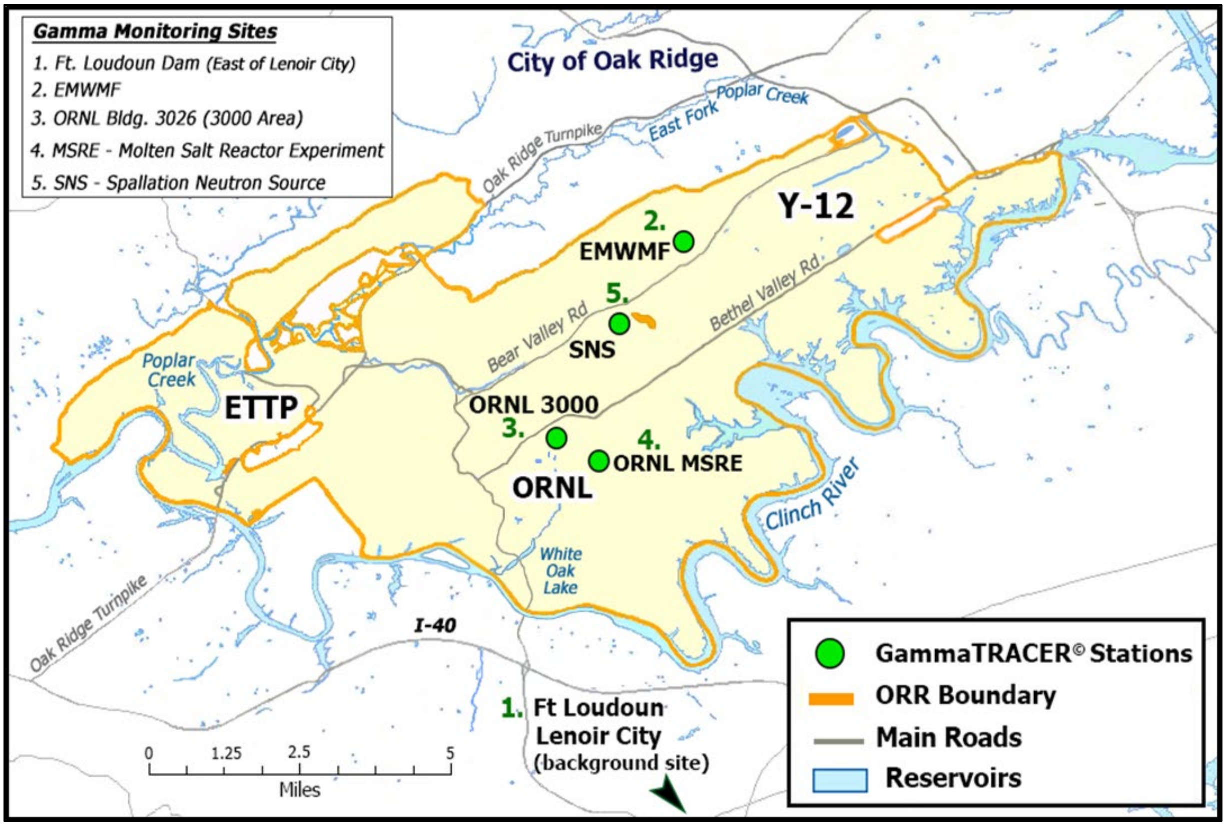

Figure 6.2.4.1: DOE Stations and DoR-OR GammaTRACER® Stations

6.2.5 Methods, Materials, Metrics

The GammaTRACER® unit contains (1) two Geiger-Mueller tubes for gamma detection, (2) a microprocessor-controlled data logger to store exposure rates, and (3) lithium batteries, all sealed in a weather resistant case to protect internal components. The detectors are programmable and record at 5-minute intervals, with an automatic shift to 1-minute intervals above a set threshold of radiological activity. Data was downloaded at least once per month following established DoR-OR protocols (TDEC, 2023).

The results from each monitoring location were derived by averaging the gamma exposure rates and examining minimum and maximum dose rates for each location on a daily basis. ORR detector data was quantified to determine the maximum dose exposure per station. ORR results were also compared to the background station at Fort Loudoun Dam, which is co-located with the DOE background gamma monitor.

The gamma dose exposure rates were also compared to the 10 CFR 835 limit of 100 mrem (1 mSv) in a year (i.e. consecutive 12-month period). This comparison determines the maximum dose exposure to an unrestricted, or publicly accessible area.

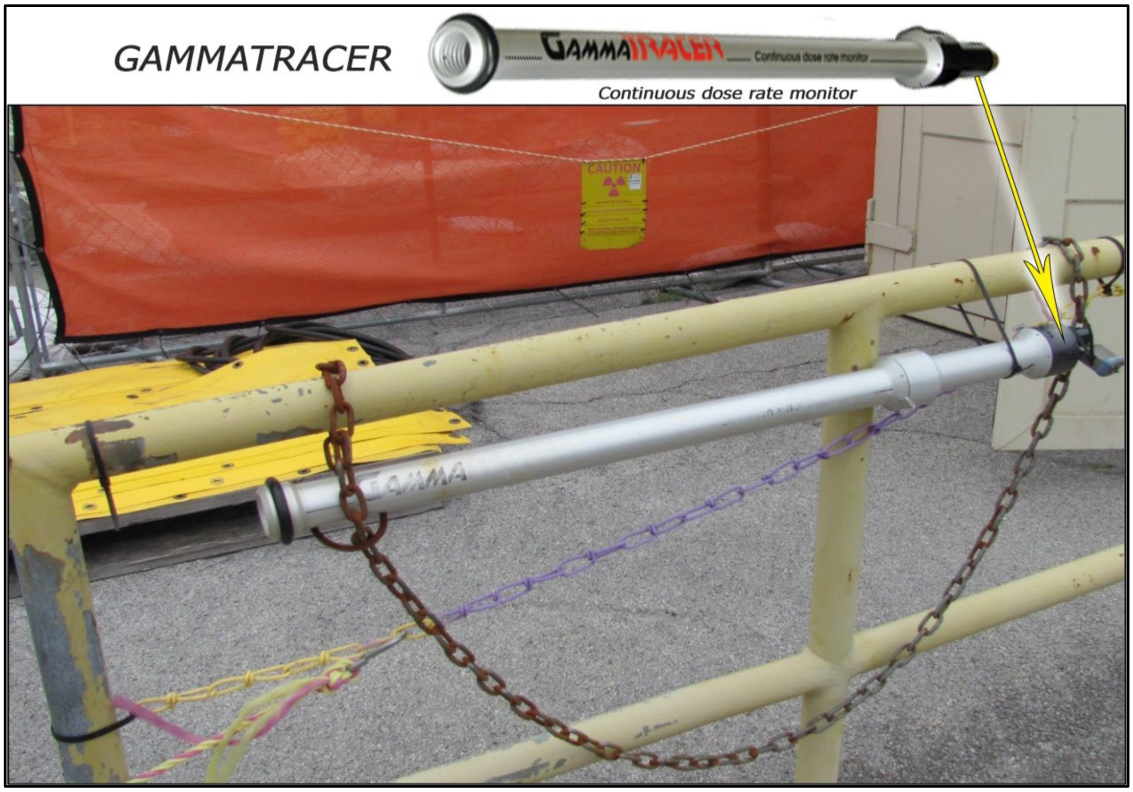

Figure 6.2.5.1: GammaTRACER® Mounted on the Handrail at ORNL 3000 Area

Table 6.2.5.1. Radiation Dose Limits Per Occupation

Regulation	Occupation	Dose Limits
DOE Order 458.1	Employee	**100** mrem/yr. whole body **1,500** mrem/yr. lens of eye **5,000** mrem/yr. skin or organ
10 CFR 835C § 835.208	*Members Public*	**100** mrem in a year (in controlled area)
https://www.directives.doe.gov/directives-documents/400-series/0458.1-BOrder/@@images/file https://www.ecfr.gov/current/title-10/chapter-III/part-835/subpart-C/section-835.208		

6.2.6 Deviations from the Plan

No deviations from the plan were identified during FY24.

6.2.7 Results and Analysis

The GammaTRACER® collects data continuously, 24-hours per day and 365 days per year, which equates to 8,766 hours. It is reasonably assumed that a Member Public would only spend up to 2,000 hours per year (i.e. 40 hours per week for 50 weeks a year) at the ORR. To calculate the estimated annual dose to Members Public, the annual dose, based on the daily average, is divided by 8,766 hours. The resulting number is the average hourly dose, which is then multiplied by 2,000 hours for annual dose to an unmonitored member of the public working on the ORR.

All monitoring locations had yearly dose averages that were below the regulatory limits except for the SNS. The estimated gross dose-to-public at SNS is 119 mrem. The estimated net dose (minus background) to public at SNS is 101 mrem. This dose is above the annual limit for dose-to- public; however, the location of the detector was approximately 25' above the ground on the stack at SNS. This is not a typical location for the public to be accessing and much of this dose would dissipate by the time it reached ground level.

Table 6.2.7.1: Gamma Radiation Data from FY24

FY24 Exposure Rates over 364 Days (07/01/2023-06/30/2024)					
GammaTRACER® Location	***Total of Entries***	***Rates*** *(μrem/hour)*		***Annual Dose Based on Daily Average*** *(mrem)*	***Calculated Annual Dose to Public*** *(mrem)*
		Avg	***Range***		
1. Ft. Loudoun	39, 542	8.72	4-15	78	18
2. EMWMF	51,552	8.18	3 - 15	72	16
3. ORNL Bldg. 3026	26,295	16.77	9 - 59	152	35
4. MSRE	39,537	11.12	7 - 18	98	22
5. SNS	50,648	64.14	3 - 473	521	119
Entries at each site were averaged daily for comparison with the background site. Annual Dose to Public was calculated by taking the Total Annual Dose divided by 8,766 hours and then multiplying the product by 2,000 hours.					

Comparison of Gamma Exposure Rates: Background Versus Sample Site:

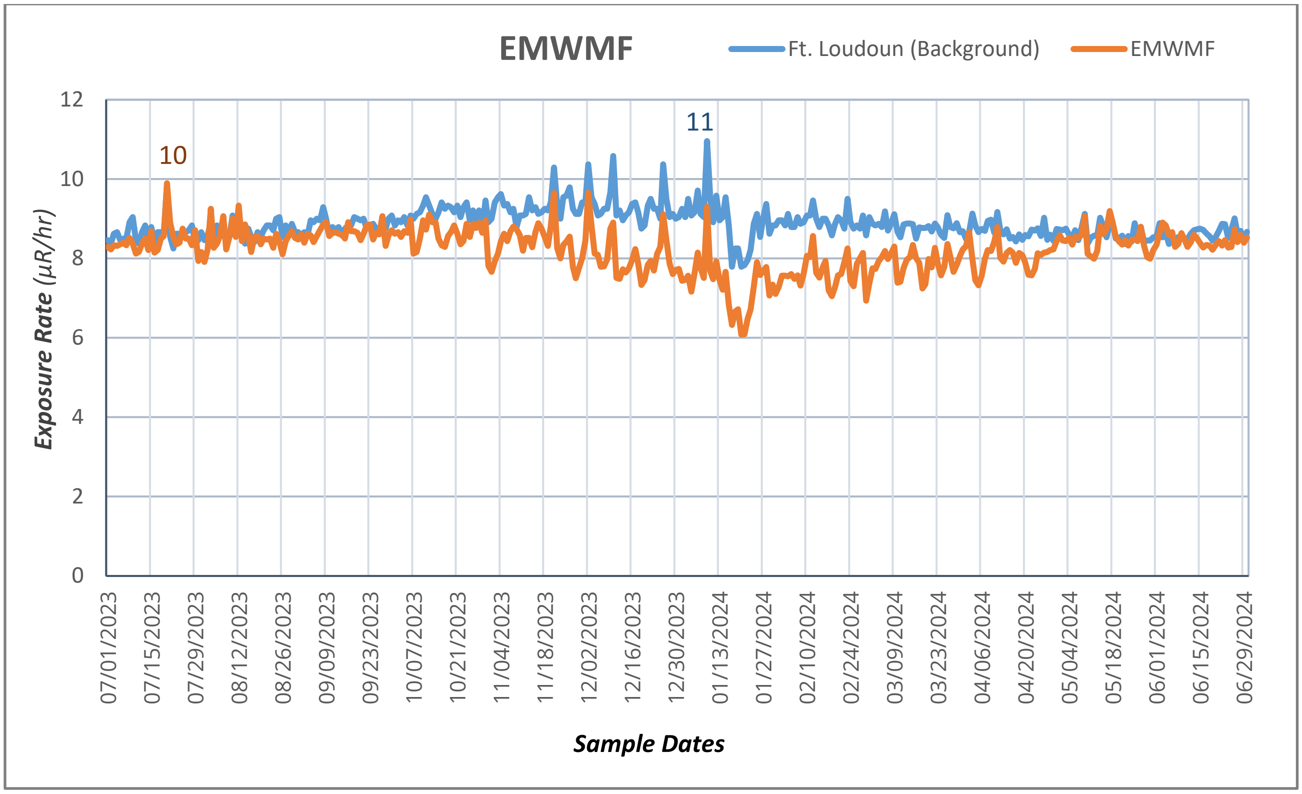

Figure 6.2.7.2: Gamma Exposure Rates at EMWMF

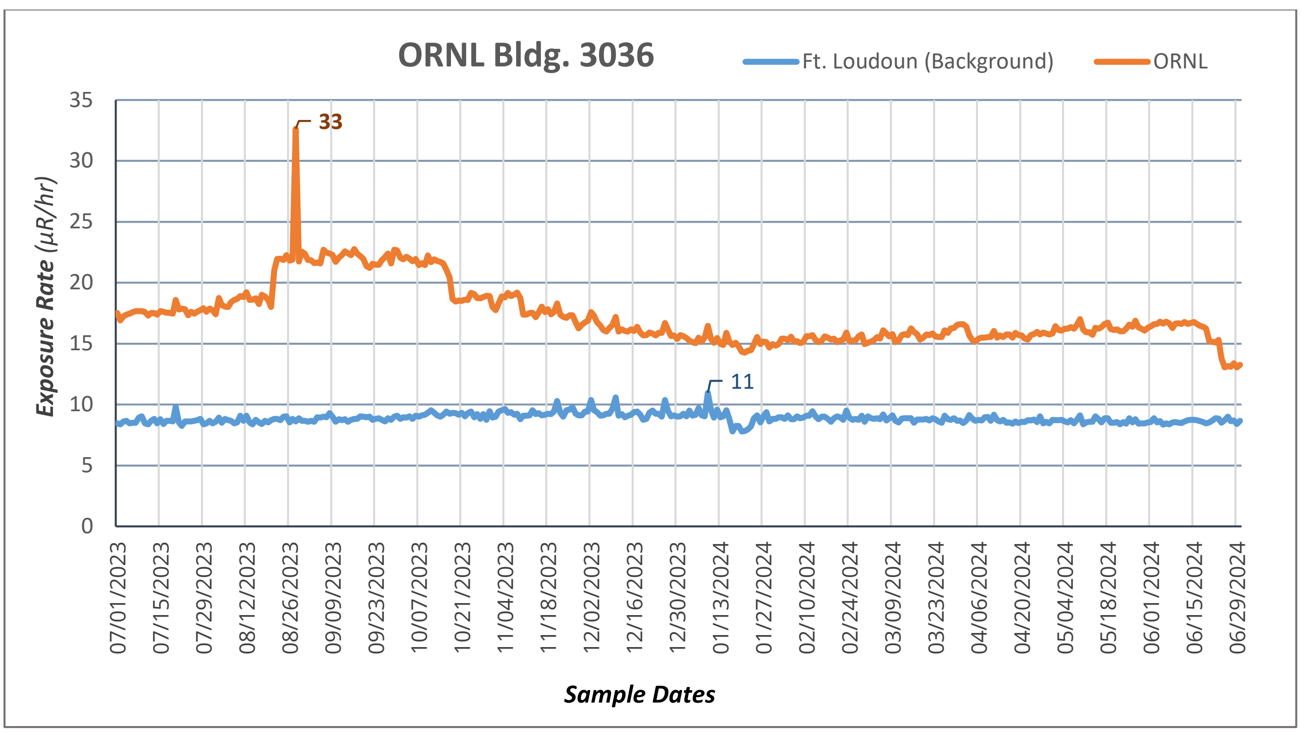

Figure 6.2.7.3: Gamma Exposure Rates at ORNL Central Campus Building 3026

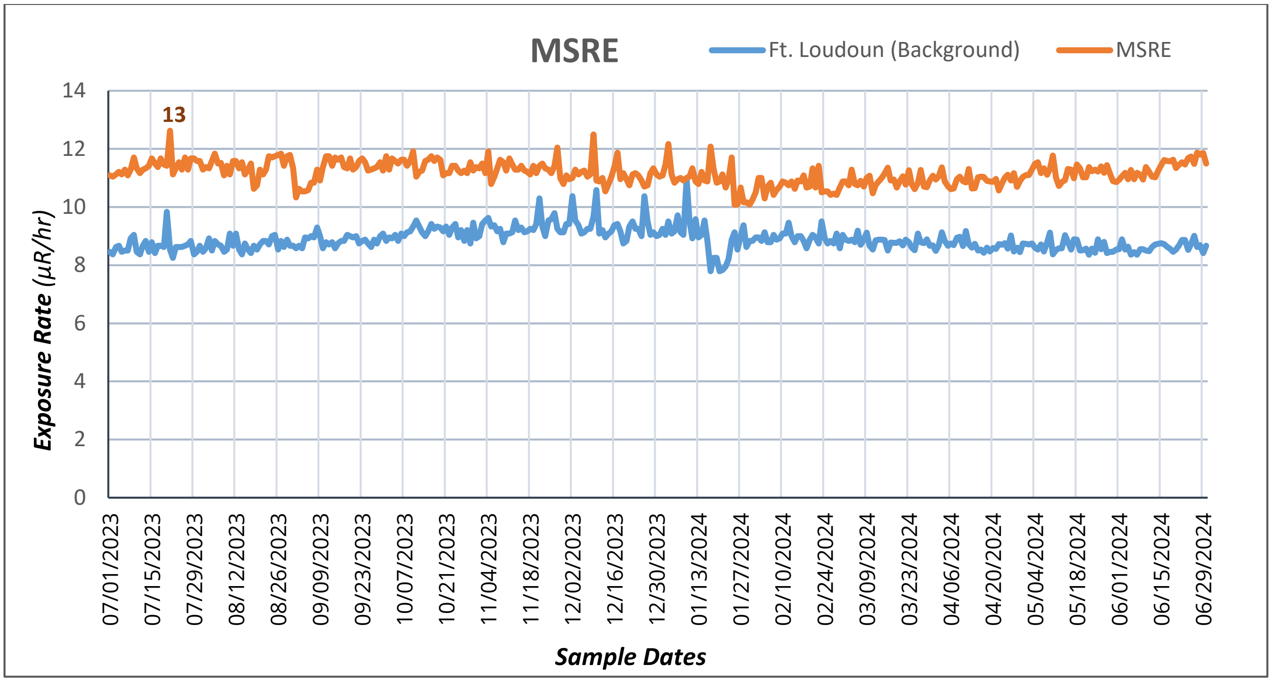

Figure 6.2.7.4: Gamma Exposure Rate at Molten Salt Reactor Experiment (MSRE)

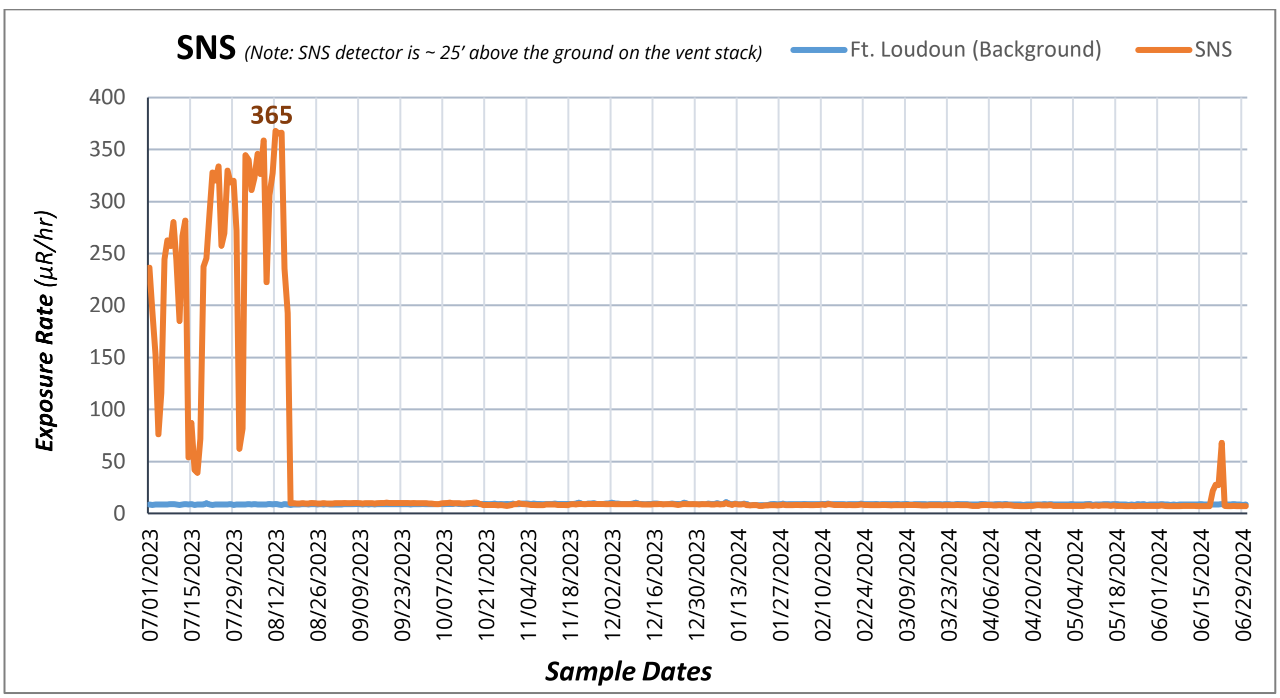

Figure 6.2.7.5: Gamma Exposure Rate at Spallation Neutron Source (SNS)

<u>Two important results:</u>

1) No monitored location exceeded the 2 mrem limit in any single-hour period.

2) SNS exceeded the 100 mrem/year limit for Members Public.

6.2.8 Conclusions

In conclusion, the project team has found no reason to alter current gamma radiological monitoring locations. While 3 monitored locations exceed dose measured at the background location, none, except for SNS, exceeded the gamma radiation annual dose limit. As noted, SNS did exceed the gamma radiation exposure annual limit, but the detector at SNS is located approximately 25' above the ground level on the exhaust stack. This placement does not represent typical gamma radiation exposure conditions to workers in that area.

6.2.9 Recommendations

1) This project should continue to monitor gamma radiation at the established locations.

2) Monitoring stations should be updated based on upcoming DOE activities on the ORR.

3) It is recommended to change the SNS monitoring location to ground level to better represent a location where personnel or public individuals may be working. As remedial and construction activities increase at Y-12 and ORNL, monitoring stations may need to be moved to better capture any potential contaminant releases.

6.2.10 References

10 CFR 20. *Title 10 of the Code of Federal Regulations, Chapter 1, Subpart D, § 20.1301 Dose limits for individual members of the public.* National Archives. Washington, DC. https://www.ecfr.gov/current/title-10/chapter-I/part-20/subpart-D/section-20.1301.

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6.3 Surplus Sales Verification

6.3.1 Background

As remediation and clean-up work continues, there is a continual need for DOE to update and replace existing equipment as it becomes worn and/or is no longer ideal for a project. Operating under the goal to recycle and reuse equipment and materials whenever possible, DOE staff collects ORR surplus items for resale at auction. Verification that ORR surplus materials are safe to be sold to the public is an important protective measure. When requested by DOE, DoR-OR conducts an independent radiological survey of specified ORR surplus items.

DOE Radiation Control Personnel (RCPs) are tasked with the initial survey of all items. The goal is to isolate any equipment with elevated radiation levels or removable contamination. Radiological detection meters are used for these thorough scans by RCPs. DOE seeks to prevent the spread of contaminants from surplus equipment to members public.

Once items are checked, and cleaned if warranted, they are displayed for resale. DoR-OR is then invited to perform an additional scan on surplus items. Finally, DOE staff invite contractors that have been pre-approved to bid on surplus materials.

DoR-OR staff occasionally find material with elevated radiological activity. Based on these rare finds, DoR-OR will work collaboratively with DOE to verify through spot checks and secondary surveys that all materials staged for auction are free of radiological contamination.

DOE Radiation Control personnel scan most materials before they are submitted for auction at ORNL or Y-12 surplus sales. Process knowledge may also be a factor used for judging the appropriateness of release of certain equipment or materials to the public.

6.3.2 Problem Statements

1) <u>Associated contaminated items</u>: When incidental radiological contamination is present, the source is most likely related to activities in the area where the material was being used. Any material or equipment from that same area should be located and scanned to ensure that no contaminated equipment is accidentally sold.

2) <u>Radon:</u> Items with surface activity may not ultimately prove to possess any COCs. Sometimes elevated levels are attributed to naturally occurring radon (Rn) and its daughter isotopes. These isotopes are considered Naturally Occurring Radioactive Material (NORM), or Technically Enhanced Naturally Occurring Radioactive Materials (TENORM). Project staff should be trained to evaluate items for radon and other NORMs and TENORMs.

6.3.3 Goals
The overarching goal of this project is to verify that DOE has adequately screened surplus items for potential radiological surface contamination and to prevent contaminated items from being sold to the public.

The verification process serves to train maintain skill proficiencies of DoR-OR staff through hands-on experience to become conversant with measuring radioactivity using the proper methods. This skillset can be used in several DOE funded monitoring projects at DoR-OR and, thereby, potentially provide more accurate data to DOE.

6.3.4 Scope
Upon request, DoR-OR staff performed pre-auction verification surveys. On average, no more than eight (8) events occur during a calendar year. There were only three (3) requests during FY24. The dates of these surveys were 11/02/2023, 02/21/2024, and 05/22/2024.

6.3.5 Methods, Materials, Metrics
DoR-OR radiological contamination survey meters were calibrated, and source checked before the project team left for the auction site in accordance with TDEC DoR-OR SOPs T-525, T-530 and T-532. Scans on well-used items were performed more frequently than items that looked new. Areas on well-used items that were damaged, unclean, or stained were targeted by scans. Well-maintained items were scanned based on their prior usage and former location. Not all items nor all surfaces of scanned items could be surveyed for potential radiological contamination. When radiological activity (alpha or beta/gamma) measured above the contamination limit, that item was then brought to the attention of the Property Excessing Team (PET). The PET had any identified items resurveyed by ORNL Radiological Control Technicians (RCTs).

Also, while DoR-OR did not attempt to determine if an item met DOE release criteria, project staff actively tried to locate any contaminated items. With regards to certain radionuclides, there is always the possibility that an item will never meet unrestricted release criteria set forth by TDEC Division of Radiological Health (DRH). These items would also be removed from auction if found.

DOE and its contractors followed procedures for unrestricted release of material and equipment using process knowledge; therefore, the purpose of DoR-OR's efforts was to verify that procedures were followed and provide built-in redundancy to catch any human error.

Table 6.3.5.1: Appendix D to Part 835: Surface Contamination Values

SURFACE CONTAMINATION VALUES IN DPM/100 CM

Source: https://www.ecfr.gov/current/title-10/chapter-III/part-835/

Radionuclide	Removable	Total (Fixed + Removable)
U-nat, U-235, U-238, and associated decay products	1,000	5,000
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20	500
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200	1,000
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	1,000	5,000
Tritium and STCs	10,000	

6.3.7 Deviation from the Plan

There were no deviations from the plan. The three survey events were conducted according to standard procedures.

6.3.8 Results and Analysis

Project staff responded to a total of three (3) *Surplus Sales Survey*s requests in FY24. During these three (3) visits to the Property Excessing Facility at 115 Union Valley Road, one (1) item was identified with activity above the ambient background. This item was a CRT type television monitor, and the elevated reading was possibly the result of NORM or TENORM activity. The DoR-OR survey results were shared with ORNL in an e-mail message and a trip report was drafted and uploaded to DoRWay.

6.3.8 Conclusions

The independent DoR-OR *Surplus Sales Verification Project* team provided a useful service by conducting an additional, final check of equipment and materials. All the Surplus Lots were adequately scanned by ORNL RCTs; however, there is a potential that some small, attached parts with activity exceeding the ambient background may pass unidentified by the ORNL RCTs. These independent DoR-OR surveys have assisted DOE in deciding whether equipment met release criteria.

6.3.9 Recommendations

DoR-OR staff recommends that the *Surplus Sales Verification Project* be continued because this service is useful to DOE and provides an extra layer of protection for the public. Additional scans provided a way for DOE to have independent confirmation of their own scans.

The verification process also serves to maintain skill proficiencies for staff through hands-on experience to become conversant with measuring radioactivity using the proper methods. This skillset can be used in several DOE funded research projects at DoR-OR and, thereby, potentially provide more accurate data to DOE.

6.3.10 References

DOE. 2013. *Multi-Agency Radiation Survey and Assessment of Materials and Equipment (MARSAME).* US Department of Energy and Oak Ridge Associated Universities (ORAU). Oak Ridge, TN.

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TDEC. 2023*. SOP: T-530 Operation and Use of a Ludlum Model 3 and 44-9 Probe (Pancake).* Tennessee Department of Environment and Conservation, Division of Remediation, Oak Ridge Office (TDEC DoR-OR). Oak Ridge, Tennessee.

TDEC. 2023*. Standard Operating Procedure T-532 Operation and Use of a Ludlum Model 2224 -1 and 43-93 Probe (Dual Phosphorous Meter).* Tennessee Department of Environment and Conservation, Division of Remediation, Oak Ridge Office (TDEC DoR-OR). Oak Ridge, Tennessee.

7.0 Surface Water Monitoring

7.1 Ambient Surface Water Parameters

7.1.1 Background

Legacy waste across the ORR is responsible for a large portion of the contamination to surface water via releases of hazardous wastes (e.g. metals, organics, and radioactive materials). Current projects and processes at ORR sites also have the potential to significantly contribute to surface water contamination (DOE, 1992; DOE, 2021; Pickering et al, 1970; Turner et al, 1999). DOE performs environmental surveillance around the ORR facility boundaries to comply with their internal requirements to protect the public and the environment from undue risks associated with DOE activities (DOE, 2022). As part of the *Environmental Surveillance Oversight Agreement* (ESOA) between DOE and the State of Tennessee, TDEC performs additional oversight monitoring in and around the ORR.

The TDEC-DoR-OR *Ambient Surface Water Parameter Project* was first implemented in 2005 to supplement DOE's monitoring effort by helping to measure physical water quality parameters of several streams that exit the ORR. By measuring water quality parameters (e.g. conductivity, dissolved oxygen, pH, turbidity, and temperature), a basic understanding of stream health and positive or negative trends can be gained.

Monitoring efforts from this project have been ongoing for nearly 19 years and provide a baseline from which to determine significant changes in water quality, both positive and negative. In turn, these data help to distinguish potential impacts from DOE activities. For FY24, DoR-OR continued this monitoring effort and measured stream water quality parameters monthly to establish and build upon a database of parameters for three (3) ORR exit-pathway streams (Bear Creek, East Fork Poplar Creek, Mitchell Branch) and one (1) background stream (Mill Branch).

7.1.2 Problem Statements

ORR exit-pathway streams and ultimately the Clinch River are subject to contaminant releases from previous and current ORR activities at ETTP, ORNL, and Y-12. These releases can be detrimental to both the environment and to human health.

Identified concerns include, but are not limited to, the following:

- Approximately 100 metric tons of ***Mercury (Hg)*** was released from Y-12 into East Fork Poplar Creek (EFPC) from 1950 to 1963. Mercury exited Y-12 via spills, leakage from subsurface drains, purposed discharge of wastewater, and leaching from contaminated building foundations and soils (Turner and Southworth, 1999).

- Other ***metals*** (e.g. cadmium, chromium, lead, nickel, silver, and zirconium) are present in elevated concentrations in exit pathway streams (DOE, 1992).

- ***Uranium*** contaminated nitric acid wastes and other liquid wastes (roughly 7.5 million L/yr) were disposed of in the S3 ponds from 1951 to 1984 near the headwaters of Bear Creek (Moss et al, 1999).

- Solid and liquid wastes, including approximately 18 million kg of ***uranium metal*** and 1 million L of ***waste oils and chlorinated solvents***, were disposed of in the unlined Bear Creek Burial Grounds (BCBG) between 1955 and 1989. BCBG is adjacent to Bear Creek (Moss et al, 1999).

- The ORR has a history of undesired releases of contaminants such as ***chlorine*** and ***mercury*** from activities on the ORR.
    - In November 1986 and July 1987, fish kills related to chlorine and mercury extended over a period of 2 to 3 weeks killing 1148 and 747 fish, respectively (ORNL, Etnier et al, 1994).

    - On June 8, 2013, a high-volume release of chlorinated water from a line break occurred leading to a fish kill where 8,318 dead fish were counted (DOE, 2013).

    - A large fish kill occurred during June through August of 2018 due to releases of mercury to East Fork Poplar Creek from demolition activities at Y-12 (DOE, 2020).

    - Additionally, fish kills from chlorine leaks or releases occurred on January 10, 2021, March 9, 2021, and March 15, 2021, where 2186 dead fish, 376, and 1346 dead fish were identified respectively (ORNL, 2021)

DOE's surface water monitoring program puts a lot of focus on the Clinch River (DOE, 2022). While other exit pathway streams are sampled by DOE as part of CERCLA actions or for NPDES permits, often these sampling events are not as routine and may not measure water quality parameters. A data gap exists for higher frequency water quality monitoring for ORR exit pathway streams.

7.1.3 Goals

The goal of DoR-OR's *Ambient Surface Water Parameters Project* is to measure physical surface water quality parameters in EFPC, Bear Creek (BC), and Mitchell Branch (MI) within the ORR. These monitoring results can assist in the evaluation of site activities and can also be used to supplement DOE's surface water monitoring program.

In addition to monitoring goals, this project recorded ambient conditions that can be used as a baseline of *expected* conditions for each stream reach. This database can then be used in the event of an unintentional release to determine impacts to surface water.

Another long-term project goal is to conduct frequent monitoring of ORR streams. While water quality parameters are taken in conjunction with other surface water projects (e.g. *Ambient Surface Water Sampling*), this project will function as a routine monthly monitoring, which provides adequate data for analyzing statistical trends on ORR streams.

7.1.4 SCOPE

This project specifically focuses on the characterization of physical stream parameters of three (3) ORR exit-pathway streams (EFPC, BC, and MI) and one (1) offsite background stream (MB). Ten (10) stream locations (see Figure 7.1.4.1) were measured monthly during FY24.

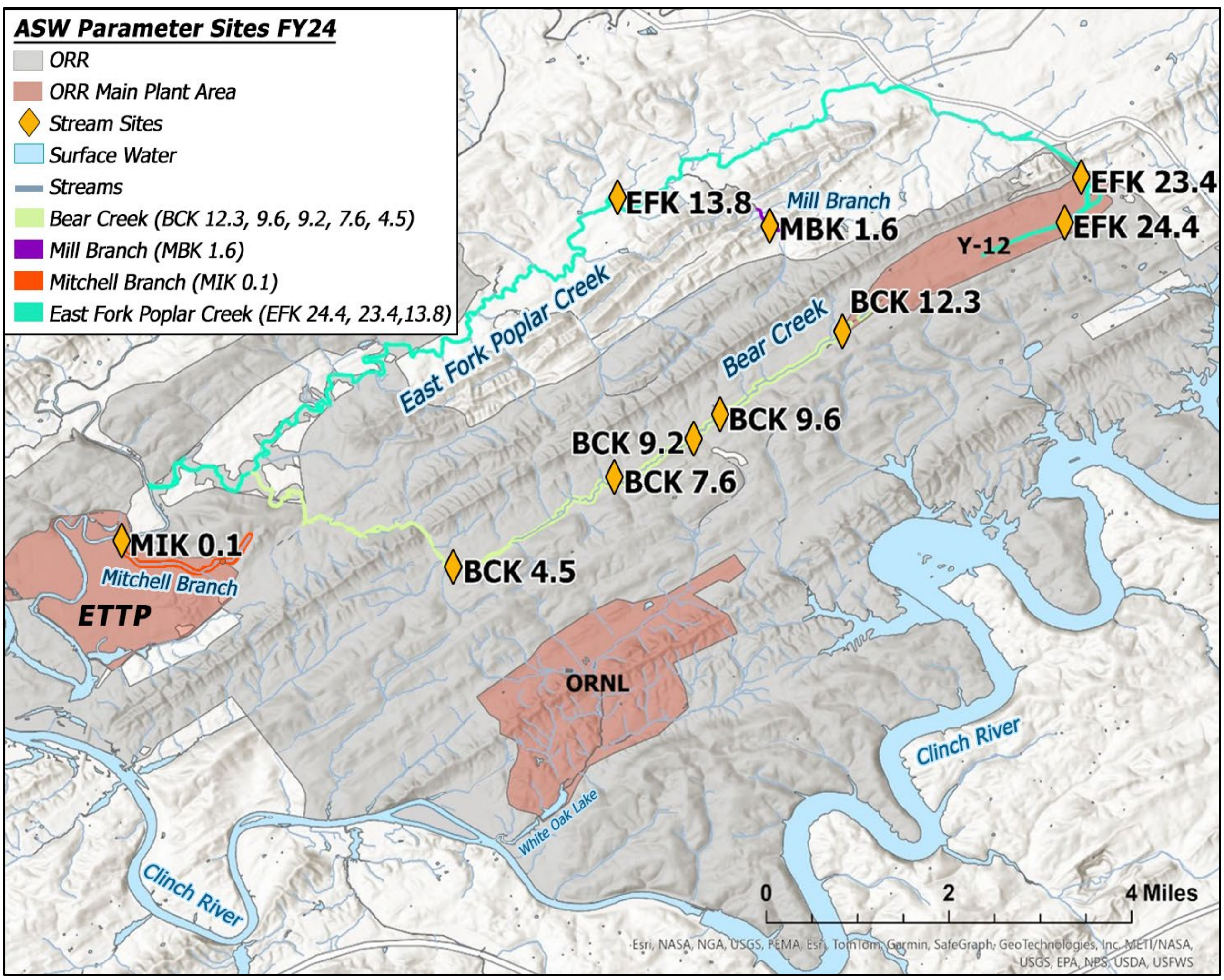

Figure 7.1.4.1: Surface Water Parameter Sites

7.1.5 Methods, Materials, Metrics

Field Parameter Measurements

At each site, physical water parameters were measured using a YSI Pro-DSS multiple parameter water quality meter. Conductivity (µS/cm), dissolved oxygen (mg/L), pH, and temperature (°C) were recorded along with the time of measurement Turbidity (NTU) was measured using a HF Scientific MicroTPW Handheld Turbidimeter. Measurements were taken in accordance with internal SOP *DoR-OR T-703 Field Use for Water Quality Parameters Instrument* (TDEC, 2023).

Data Evaluation

Parameter measurements were stored in a database. Using R programming language, several statistical analyses were performed to better understand the results. Trend analysis was performed using linear regression to identify any changes in data. Basic descriptive statistics (mean, median, minimum, maximum, etc.) were also assessed.

The selected ORR streams were compared to Mill Branch (MB), the background reference stream. Statistical approaches, such as an *analysis of variance*, were used to determine if corresponding water quality measurements were statistically similar. Lastly, data were compared to Tennessee's general water quality criteria (TDEC, 2019).

7.1.6 Deviations from the Plan

Only a few deviations from the original project plan occurred.

1) The most significant deviation was the inability to collect turbidity measurements for one-fourth of the fiscal year, during December 2023 through February 2024. Missing data collections were due to a turbidity sensor malfunction. Once a new turbidity sensor was procured, turbidity measurements were resumed for all subsequent events.

2) At EFK 23.4, measurements could not be taken during the January 2024 event due inaccessibility of the site. The city of Oak Ridge was performing construction in this area making conditions unsafe to access the creek.

3) Another deviation occurred due to a lack of stream volume. Location BCK 9.6 was dry in October and November of 2024, making measurements impossible.

Besides these technical and environmental deviations, all other monitoring was performed as planned.

7.1.7 Results and Analysis

As stated above, field parameters were collected monthly during FY24 from the ten (10) monitoring locations (Figure 7.1.7.1). These data generally followed similar patterns over time for each respective parameter. However, at a few monitoring locations, there were deviations for certain parameters. Any significant differences among streams will be analyzed and discussed below.

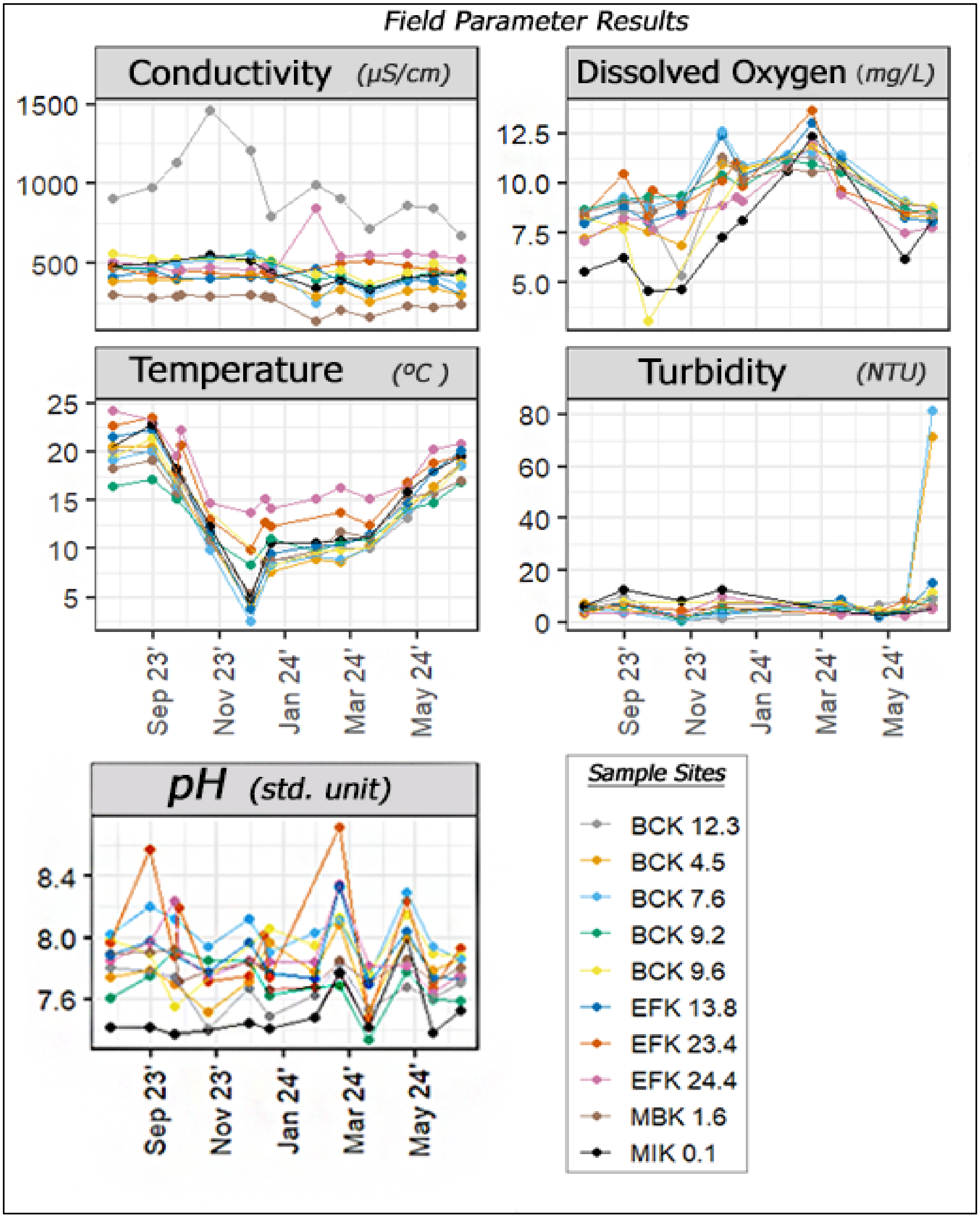

Figure 7.1.7.1: FY 2024 Field Parameter Results

Conductivity

One of the field parameters with significant differences among streams was conductivity. Mean conductivity values from measurements collected July 2023 to June 2024 ranged from 959 to 255 μS/cm among all of the monitoring sites. Bear Creek sites BCK 12.3 and BCK 9.6 had the higher mean conductivity values measured at 959 and 474 μS/cm, respectively. These two (2) locations have been consistently high in previous years. Further downstream, BCK 4.5 had a lower mean value of 357 μS/cm. On EFPC, a new location for this project, EFK 24.4, yielded an average of 526 μS/cm, which was the second highest of all streams measured. EFK 24.4 had an uncharacteristic spike in February 2024, which influenced this higher average. EFK 23.4, near the eastern border of the Y-12 NSC, had a mean conductivity of 452 μS/cm. Downstream of EFK 23.4, site EFK 13.8 had a lower mean value of 398 μS/cm. The Mitchell Branch site MIK 0.1 at ETTP had a mean conductivity value of 449 μS/cm. Lastly, Mill Branch (MBK 1.6), an ecological reference site, had the lowest conductivity among all streams measured with a mean value of 255 μS/cm.

An *analysis of variance* (ANOVA) was performed to determine if mean conductivity differed significantly among streams. Results from the ANOVA indicated statistically significant differences with $p < 0.05$. A post hoc Tukey Test was performed to distinguish which monitoring sites are significantly different in conductivity. Results indicate that Bear Creek site BCK 12.3 is statistically significantly higher in conductivity than all other monitored sites with $p < 0.05$ (see Table 7.1.7.1). Similarly, the ecological reference site, Mill Branch (MBK 1.6), was found to be statistically significantly lower in conductivity than all other monitored sites with $p < 0.05$, except for BCK 4.5. These findings are consistent with historical comparisons of these streams.

Table 7.1.7.1: *Tukey Test*: Conductivity Results

Site	Mean Conductivity (μS/cm)
BCK 2.3 *	**959**
EFK 24.4 †	**526**
BCK 9.6 † ‡	**474**
BCK 9.2 † ‡	**459**
EFK 23.4 † ‡	**452**
MIK 0.1 † ‡	**449**
BCK 7.6 † ‡	**429**
EFK 13.8 ‡	**398**
BCK 4.5 ‡ §	**357**
MBK 1.6 §	**255**
Notes: ***, †, ‡, §**: *symbols to represent statistically similar groupings as defined by Tukey test with p < 0.05. If a site does not share a grouping with another site, then they are considered statistically different.*	

Dissolved Oxygen (DO)

DO values were also evaluated from measurements collected in FY24. Mean values of DO ranging from 10.2 to 7.7 mg/L. Bear Creek, site BCK 7.6, had the highest dissolved oxygen concentration among all sites. The ETTP Mitchell Branch site, MIK 0.1, had the lowest mean concentration of DO. In general, streams were quite similar in DO concentrations.

An ANOVA was performed to determine if any significant differences exist among streams for DO concentrations. Results from the ANOVA indicated statistically significant differences with $p < 0.05$. A post hoc Tukey Test was performed to distinguish which monitoring sites were significantly different. While all sites were relatively similar, only location BCK 7.6 significantly differed from MIK 0.1. Mean DO concentrations for each site are shown below (Table 7.1.7.2).

Table 7.1.7.2: *Tukey Test*: Dissolved Oxygen (DO) Results

Site		Mean Dissolved Oxygen (mg/L)
BCK 7.6	*	**10.2**
EFK 13.8	* †	**9.8**
EFK 23.4	* †	**9.8**
MBK 1.6	* †	**9.7**
BCK 9.2	* †	**9.7**
BCK 12.3	* †	**9.3**
BCK 4.5	* †	**9.3**
BCK 9.6	* †	**9.1**
EFK 24.4	* †	**8.8**
MBK 0.1	†	**7.7**

Notes: ***, †**: *symbols represent statistically similar groupings as defined by Tukey test with p < 0.05. If a site does not share a grouping with another site, then they are considered statistically different.*

pH

Mean pH values ranged from 8.02 to 7.50 among all sites. BC site BCK 7.6 had the highest average pH readings. Mitchell Branch site MIK 0.1, while similar to other streams, was lower with an average pH of 7.50. Average pH values are shown in Table 7.1.7.3 below.

Table 7.1.7.3: Average pH

Site	Mean pH (Std. Unit)
BCK 7.6	8.02
EFK 23.4	7.99
BCK 9.6	7.93
EFK 13.8	7.88
EFK 24.4	7.88
MBK 1.6	7.80
BCK 4.5	7.79
BCK 9.2	7.69
BCK 12.3	7.66
MIK 0.1	7.50

TEMPERATURE

Temperature data were evaluated for all sites measured in FY24. Mean water temperatures ranged from 18 to 12.7 degrees Celsius with EFPC being the warmest and Bear Creek being the coolest among all sites. With large variation due to seasonality, an ANOVA indicated no statistically significant differences in water temperature among sites (see Table 7.1.7.4).

Table 7.1.7.4: Average Temperatures

Site	Mean Temperature (°C)
EFK 24.4	18.0
EFK 23.4	16.5
MIK 0.1	14.7
BCK 9.6	14.5
EFK 13.8	14.3
BCK 12.3	13.2
MBK 1.6	13.2
BCK 4.5	13.2
BCK 9.2	13.0
BCK 7.6	12.7

TURBIDITY

Turbidity was measured at each stream location. Averages ranged from 13.6 to 4.3 NTU. Of all stream locations, BCK 7.6 and BCK 4.5 yielded the highest average turbidity. While the average turbidity was around 13 NTU at these locations, individual measurements jumped up to over 70 and 80 NTU in June 2024 at BCK 7.6 and BCK 4.5, respectively. EFK 24.4 yielded the lowest average turbidity among all locations measured. Due to large variation in turbidity data, an ANOVA did not indicate any statistical differences in mean turbidity.

Table 7.1.7.5: Average Turbidity

Site	Mean Turbidity (NTU)
BCK 7.6	13.6
BCK 4.5	13.1
MIK 0.1	6.9
BCK 9.6	6.6
EFK 13.8	6.1
BCK 12.3	5.8
MBK 1.6	5.5
EFK 23.4	5.3
BCK 9.2	5.0
EFK 24.4	4.3

FIELD PARAMETER SUMMARY

The above-mentioned FY24 field parameter data were also analyzed in conjunction with data collected annually from 2005 to 2024 (Figure 7.1.7.2).

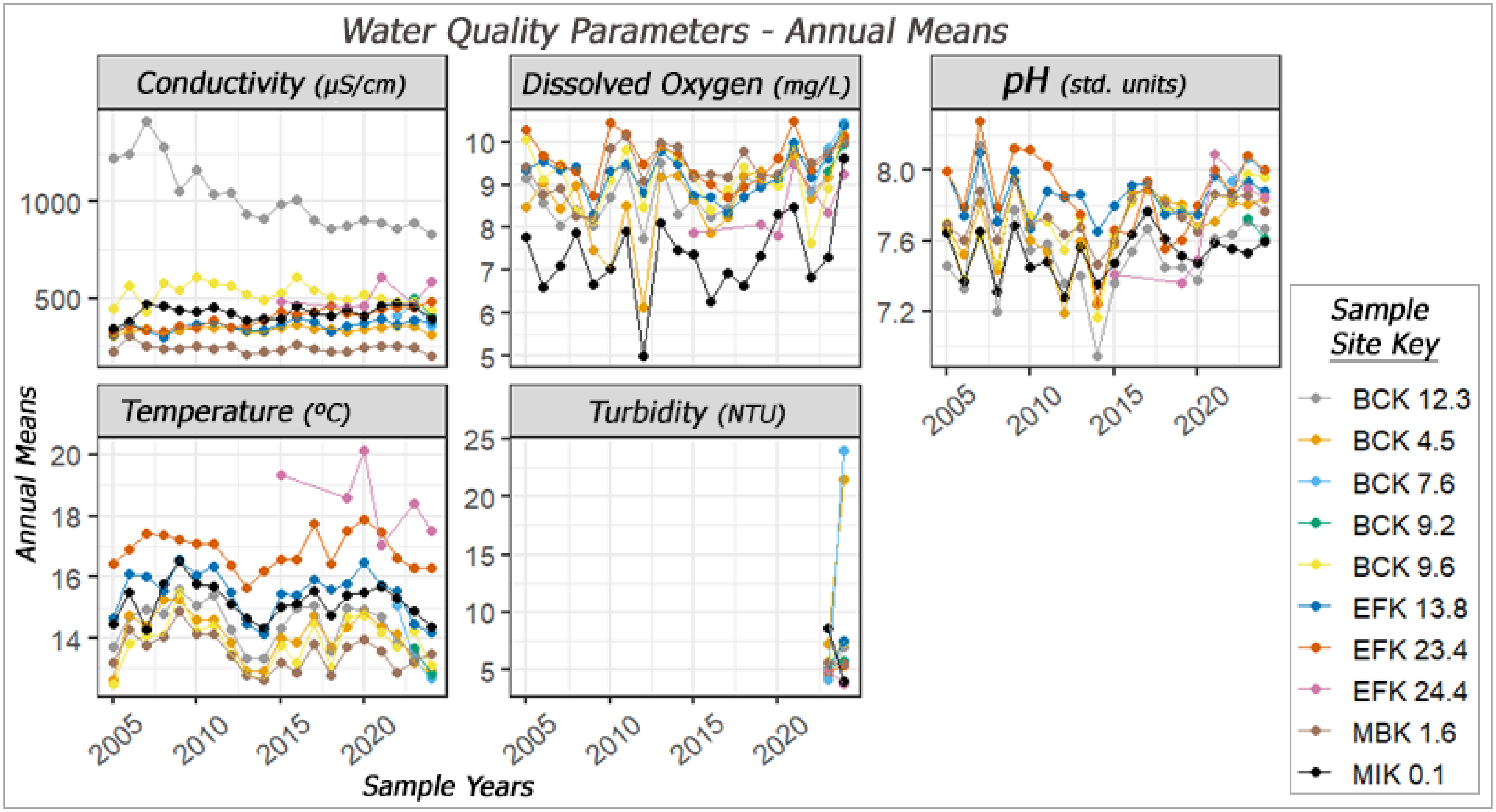

Figure 7.1.7.2: Mean Annual Parameter Values from 2005 to 2024

Data were evaluated for significant increasing or decreasing trends with data for each parameter averaged by year since 2005. Significant linear trends with $p < 0.05$ were found for conductivity at two different stations. A statistically significant negative correlation was found between mean annual conductivity and time for BCK 12.3 with $p < 0.05$. This correlation was found through linear regression, with mean annual conductivity as the dependent variable and time as the independent variable. The coefficient of determination (R^2) was 0.78, indicating a good fit. This indicates that there is a trend of decreasing conductivity with time for site BCK 12.3. The slope of the regression line illustrates that this decrease is occurring at roughly 25 µS/cm annually. Similarly, a statistically significant positive correlation was found with mean annual conductivity and time for EFK 23.4 with $p <0.05$. The coefficient of determination (R^2) was 0.86, which indicates the regression fits the data well. This trend illustrates that conductivity has increased with time since 2005 for EFK 23.4. The slope of the regression line shows that this increase is occurring at roughly 8 µS/cm annually (Figure 7.1.7.3).

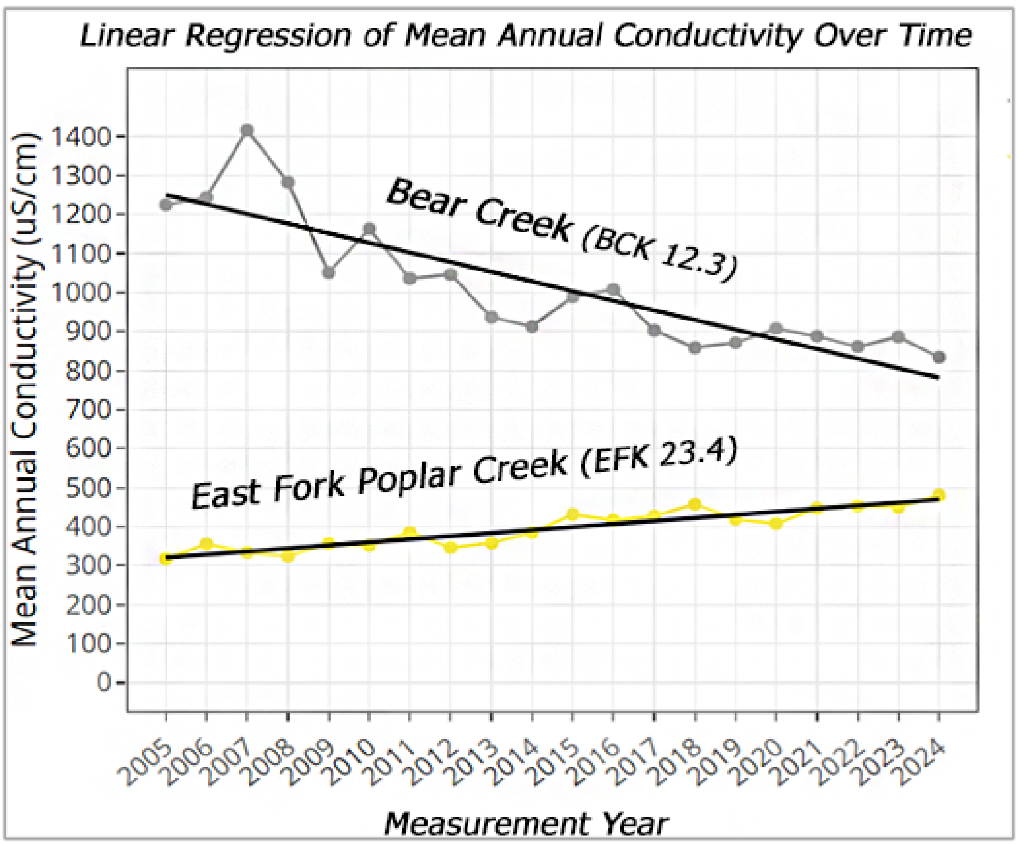

Figure 7.1.7.3: Mean Annual Conductivity at BCK 12.3 and EFPC 23.4 (2005-2024)

7.1.8 Conclusions

In FY24, all measurements were within the *State of Tennessee Water Quality Criteria* (TDEC, 2019). Significant findings were identified for conductivity and DO. Turbidity also yielded elevated readings at BCK 7.6.

Conductivity

BCK 12.3

While there is no existing *State of Tennessee Water Quality Criteria* for conductivity, Bear Creek site BCK 12.3 conductivity was found to be statistically significantly higher than all other streams. Despite this site having a higher conductivity, historical data (2005-2024) indicate that BCK 12.3 has a decreasing trend in conductivity. This decrease is occurring at an average rate of 28 μS/cm annually.

One possible explanation for this elevated conductivity may be related to the proximity of this site to the capped S-3 ponds and the Y-12 West End Water Treatment Facility. The S-3 ponds are known to have an ongoing release of contaminants to groundwater, which ultimately influences Bear Creek conductivity.

This area is also known for containing high concentrations of metals (Brooks, 2001). The decrease in conductivity at BCK 12.3 since 2005 may be the result of attenuation of these contaminant sources.

EFK 23.4

On the other hand, East Fork Poplar Creek, site EFK 23.4, has shown a steadily increasing trend of conductivity through time, albeit a small increase. This trend has been increasing at an average rate of roughly 8 μS/cm annually. The reason(s) for this increase have not yet been determined.

MBK 1.6

Alternatively, Mill Branch (MBK 1.6), which is an ecological reference site, was statistically significantly lower in conductivity than all ORR streams measured, except for location BCK 4.5. This lower conductivity is likely attributed to the lack of solute and contaminant loading in this background stream that is otherwise seen in many of the ORR exit-pathway streams.

Dissolved Oxygen (DO)

MIK 0.1

Mitchell Branch (MIK 0.1) was found to have lower dissolved oxygen levels relative to other streams measured around the ORR. These dissolved oxygen levels were especially low during the summer months when the weather is hotter. For a typical stream, an increase in water temperature results in a decrease in dissolved oxygen concentrations. These higher water temperatures, which would be typical for this time of year, could perhaps explain this decrease in oxygen concentrations. One explanation for low DO at MIK 0.1 may be the growth of oxygen demanding plants that may be more likely to thrive in warmer weather. Algae was identified covering much of the stream during the summer months.

EFK 23.4 & 13.8

Sites on EFPC, specifically EFK 23.4 and EFK 13.8, maintain higher water temperatures than Mitchell Branch for much of the year, yet these EFK sites still maintain higher dissolved oxygen concentrations than MIK.

Turbidity

BCK 7.6 & BCK 4.5

Turbidity was much higher at BCK 7.6 and BCK 4.5 than other streams. The June 2024 measurement yielded very high turbidity of nearly 80 NTU. This was linked to poor erosional management of the EMDF worksite, ultimately causing high turbidity to occur immediately downstream at BCK 7.6 and persist downstream to BCK 4.5. This monitoring effort helped identify this erosion management issue which in turn, promoted better management practices by DOE and its contractors.

7.1.9 Recommendations

As legacy DOE ORR pollution has negatively impacted East Fork Poplar Creek, Bear Creek, and Mitchell Branch, TDEC recommends continued physical parameter monitoring at the ten monitoring stations to identify, categorize, and interpret changing trends such as the upward trend of conductivity in East Fork Poplar Creek at site EFK 23.4 and the downward trend of conductivity at Bear Creek site BCK 12.3. In addition, continued monitoring can help to identify rapid changes such as high turbidity identified at BCK 7.6. This is especially important with upcoming construction projects and demolition of buildings at Y-12 and other ORR facilities that may influence ORR exit-pathway water quality.

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7.2 Ambient Surface Water & Shallow Groundwater Sampling

7.2.1 Background

Activities at the three ORR campuses, from inception to present day, have resulted in the discharge of hazardous substances (e.g., metals, organics, and radioactive materials) causing contamination of waterbodies on the ORR and in the surrounding watershed (DOE, 1992; DOE, 2022a; Pickering, 1970; Turner & Southworth, 1999).

While legacy waste across the ORR may be responsible for a larger percentage of contamination to surface water, current projects and processes at these sites also have the potential to significantly contribute to and exacerbate overall surface water contamination. To monitor for potential ongoing contamination in waterways, the DoR-OR *Ambient Surface Water Sampling Project* has been implemented each year since 1993. This monitoring project began by investigating the water quality of the Clinch River at five locations near the ORR. The sampling locations for this project have been modified throughout the years, sometimes adding or discontinuing sampling at a particular location to better focus on sights of concern. Most recently, monitoring has focused on BC, EFPC, and the CR.

As in previous years, the *Ambient Surface Water Project* for FY24 will focus on monitoring surface water in the CR. Additionally, to support TDEC's *Holistic East Fork Poplar Creek Assessment Project*, this project will also include monitoring surface water and shallow floodplain groundwater in EFPC. Lastly, surface water in Upper East Fork Poplar Creek (UEFPC) within the Y-12 boundary will be monitored to evaluate potential impacts from a proposed D&D project.

7.2.2 Problem Statements

Clinch River

The 2020 US census estimated that nearly 1.1 million people live in the counties surrounding the ORR (Figure 1.3.1) (DOE, 2020a). A large percentage of these residents are direct downstream receptors of streams that drain from the ORR. As part of the lower Clinch River watershed, all ORR streams eventually flow to the Clinch River, either directly or through some other tributary. The Clinch River is an important drinking water source for these communities. The Clinch River surface waters are also used by facilities at Y-12, ORNL, and ETTP. It is important to monitor these exit-pathway streams, as well as the Clinch River, to better understand the ORR's impact on the region's widely used water resources.

East Fork Poplar Creek

Mercury Contamination

Mercury is and has been a major contaminant of EFPC. It is estimated that over 20 million pounds of mercury were used at Y-12 in the 1950s and 1960s for lithium processing. Of that 20 million pounds, 700,000 pounds are suspected to have been released into buildings, including the Alpha-2 Complex, and the surrounding environment (DOE, 2020a). Discharges of mercury through spills, leaks, or even intentional discharges of mercury bearing wastewater added nearly 100 metric tons of mercury directly to EFPC (Southworth et al, 2010). While several DOE remedial actions have helped address mercury in soils and sediments, mercury is still present at elevated concentrations.

Throughout the past 10 years, mercury in surface water has consistently exceeded all *TN 0400-40-03* surface water criteria (TDEC, 2019) and even EPA's drinking water MCL (a conservative reference level) (EPA, 2009). For example, in the most recent DOE *Remediation Effectiveness Report (RER)*, DOE determined that the mercury flux at EFK 23.4 ranged from 5.3 to 21.5 kg/yr from 2012 to 2021 with an average of 11.75 kg/yr (Figure 7.2.2.1) (DOE, 2022b).

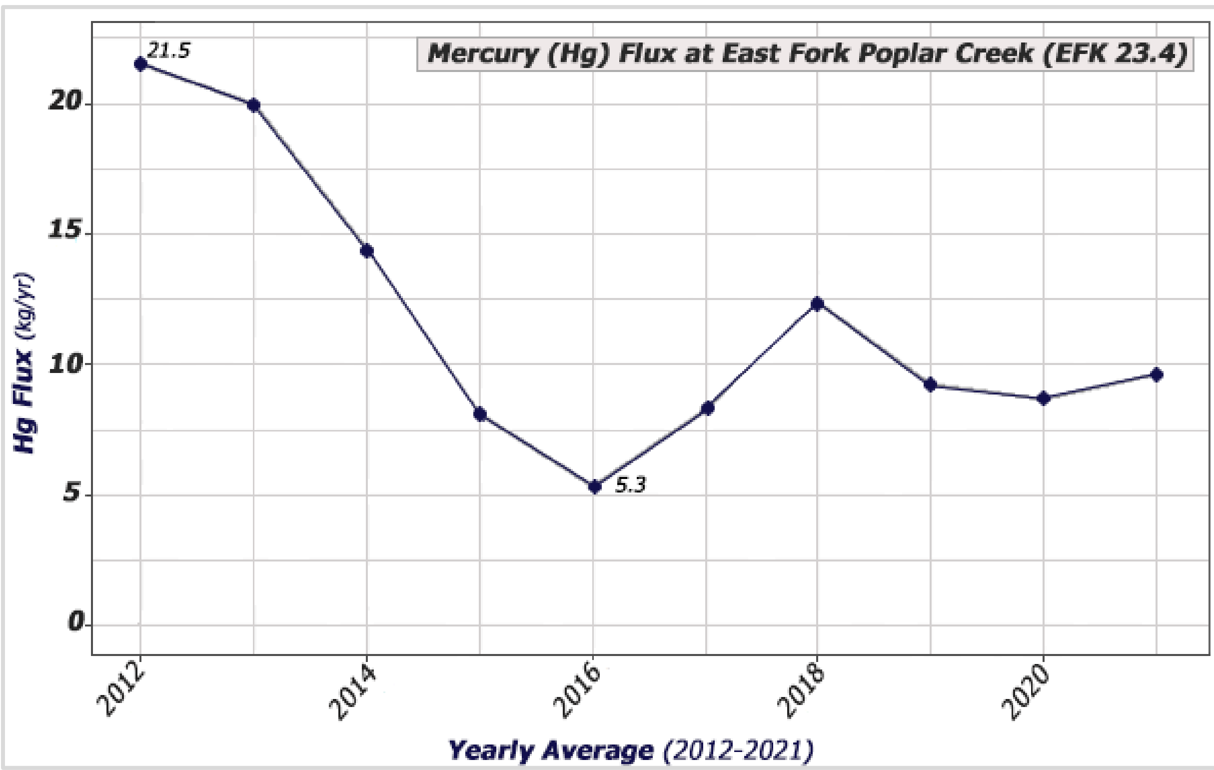

Figure 7.2.2.1: Mercury Flux at EFK 23.4

The loading of mercury in EFPC has affected downstream biota, floodplain soils, sediments, and surface water. In 1996 and 1997, remedial actions (RAs) were performed by DOE to clean up mercury contaminated sediments at the NOAA and Bruner sites which are located downstream of Y-12 (Figure 7.2.4.1). The remediation objective was to excavate mercury contaminated soil from the EFPC floodplain. The RAs removed a combined total of approximately 35,000 cubic yards (CY) (in-situ) of mercury contaminated sediments from both sites (DOE, 2000). While this excavation was performed at a large scale, mercury remains in sediments at or below 400 mg/kg.

In an effort to understand mercury flux in EFPC, ORNL performed a small study looking at groundwater in floodplain soils near the NOAA and Bruner site locations (Watson et al, 2016). While this study identified lower dissolved mercury concentrations in groundwater relative to surface water, the scope was limited. An evaluation of the shallow groundwater and surface water near these remaining sediments is warranted to better understand the floodplain environments in relation to mercury.

UPPER EFPC: Y-12'S ALPHA-2 COMPLEX D&D

In addition to general mercury sampling in EFPC, DOE is planning on conducting additional surface water monitoring for mercury as part of the removal action for demolition of the mercury-contaminated Alpha-2 Complex (Building 9201-2). DOE plans to cease operation of the basement sump pump, which has been operating for many years. Operation of this sump pump has likely resulted in a cone of depression beneath the Alpha-2 Complex, thus minimizing mercury-contaminated groundwater from migrating to EFPC. It is unknown what impact turning off the sump will have on groundwater and surface water resources in the vicinity of the Alpha-2 Complex. Preliminary modeling by DOE was presented during the September 21, 2022, meeting with the Y-12 Project Team. Modeling suggests that concentrations of mercury in groundwater will increase to levels greater than the EPA MCL while impacts to surface water will be minimal.

As part of this removal action, DOE has proposed collecting weekly grab samples from two UEFPC locations to monitor mercury concentrations in surface water both upstream and downstream of the facility. Samples will be taken before, during, and after demolition, which is slated to begin in 2024 (DOE/OR/01-2479&D1/A13/R2). An additional sampling effort by the State is warranted to support the baseline data prior to D&D activities.

7.2.3 GOALS

Goals for this project include:

- **Clinch River**
    - Evaluate mercury concentrations in Clinch River surface water to provide an external quality control for the DOE's required quarterly sampling

- **East Fork Poplar Creek**
    - Assess surface water and shallow floodplain groundwater to better understand mercury migration within these systems at different locations along the creek, especially near the NOAA and Bruner site locations

- Monitor surface water chemistry and metal concentrations in Upper East Fork Poplar Creek immediately adjacent to proposed D&D activities at the mercury-contaminated Alpha-2 Complex to help collect baseline data

7.2.4 Scope

The scope for each sampling area is as follows:

1. ***Clinch River (CRK 66 to CRK 16.1):***
   - One of four sites monitored each quarter; each site sampled at least once in FY24.

2. ***East Fork Poplar Creek:***
   - <u>Upper EFPC (EFK 25.1 to EFK 23.4):</u> Surface water was monitored quarterly.

   - <u>Middle EFPC (NOAA site: EFK 22.4 to EFK 15.7):</u> Co-located surface water and shallow floodplain groundwater samples were collected. Surface water samples were collected quarterly. Hyporheic groundwater samples were collected in March and June 2024 near the NOAA and Bruner sites.

   - <u>Lower EFPC (EFK 6.3 to EFK 2.2):</u> Co-located surface water and shallow floodplain groundwater samples were collected. Surface water samples were collected quarterly. Hyporheic groundwater samples were collected in March and June 2024.

3. ***Mill Branch (MBK 1.6; background stream):***
   - Surface water samples were collected quarterly.

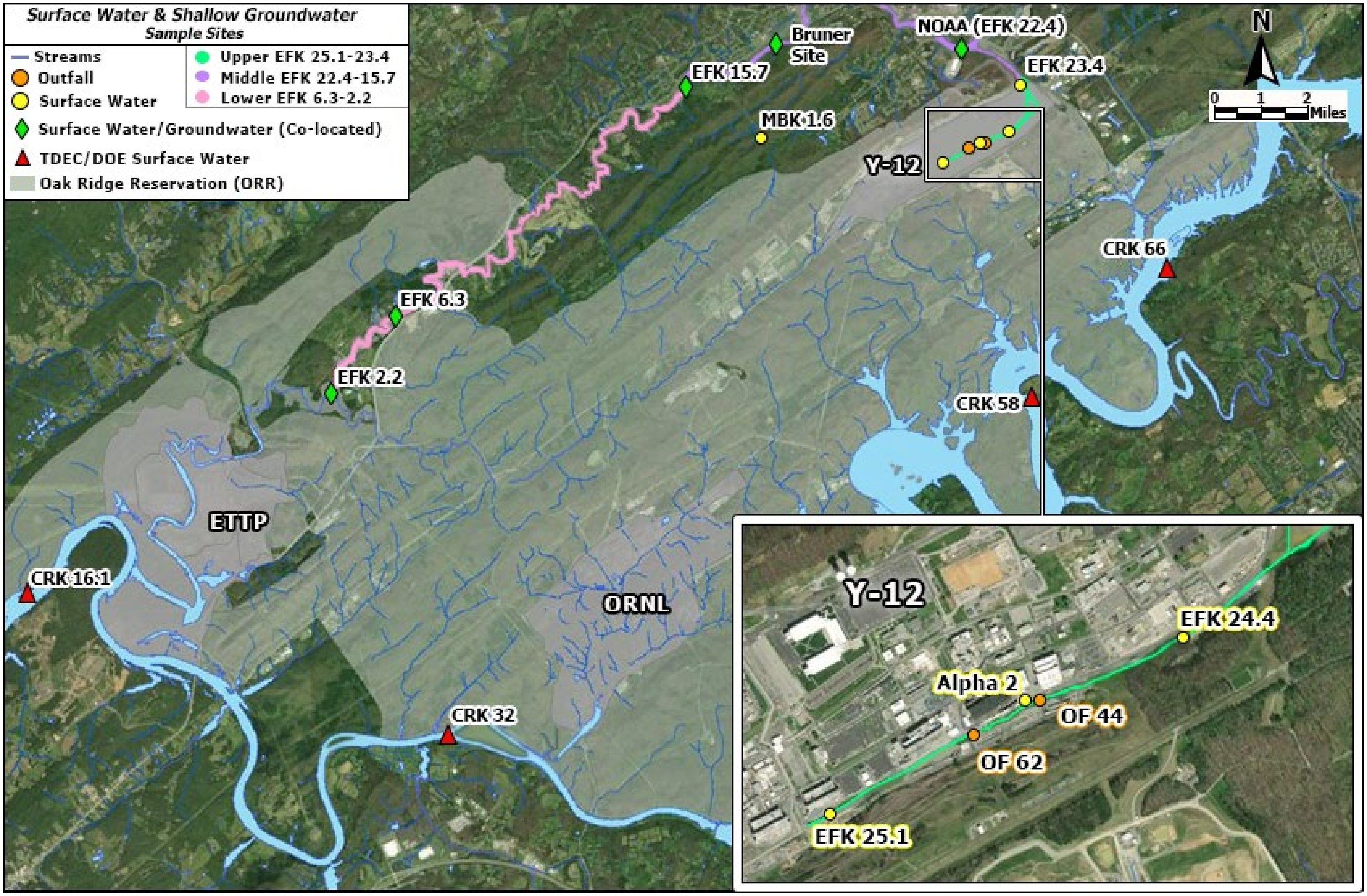

Figure 7.2.4.1: FY24 Surface Water & Shallow Groundwater Sampling Locations

7.2.5 Methods, Materials, Metrics

Types of sampling:

Surface Water Sampling (CR, EFPC, MB)

Surface water samples were collected at thirteen (13) different locations (Table 7.2.5.1) and submitted for analysis of major cations and anions, total and dissolved metals, and radionuclides (Table 7.2.5.1). Filtered and unfiltered samples were collected and analyzed for metals at the four co-located groundwater locations. Filtered samples were passed through 0.45-micron high-capacity filters. This additional step was done to help distinguish the percentage of a metal in the dissolved phase versus the percentage sorbed to sediment. Analytical methods for sample analysis are shown in Table 7.2.5.2.

Shallow Groundwater-Hyporheic Zone Sampling (EFPC)

Shallow temporary groundwater boreholes were hand-augured at EFK 22.4 (NOAA site), EFK 15.7 (ORNL study location), EFK 6.3, and EFK 2.2 using a stainless-steel decontaminated hand auger. Boreholes were located 5 to 10 feet from the stream bank and advanced to roughly 7 feet below ground surface, or until water was encountered. Shallow groundwater samples were collected during two sampling events (March and June 2024) at these four co-located locations and submitted for analysis of major cations and anions, total and dissolved metals, and gross alpha/beta (Table 7.2.5.1). Total and dissolved metals were determined by collecting filtered and unfiltered samples.

Similar to surface water samples, the filtered groundwater samples were also passed through 0.45-micron high-capacity filters. Unfiltered samples represent the total metal and filtered samples represent the percentage of sample in the dissolved phase. This analysis can help determine to what extent turbidity is influencing the concentration of a sample. Analytical methods for sample analysis are shown in Table 7.2.5.2.

Standard Operating Procedures (SOPs):

Quality assurance/quality control (QA/QC) samples were collected for every 10th sample of any given analyte (Table 7.2.5.1). Surface water sampling protocols followed the TDEC-DWR SOPs for *Chemical and Bacteriological Sampling of Surface Water* (TDEC, 2022). All groundwater samples were collected in accordance with internal SOPs.

Streams and Sampling Rationale:

Clinch River

The Clinch River was monitored quarterly with each site sampled at least once throughout the project. Monitoring was in conjunction with DOE sampling to provide an external quality control for the DOE's required quarterly sampling.

EFPC

Upper EFPC: Surface water within this section was monitored quarterly to understand potential impacts from the proposed D&D, including cessation of the basement sump, of the Alpha-2 Complex. Surface water sampling provides a baseline dataset prior to demolition activities.

Middle EFPC: Co-located surface water and shallow floodplain groundwater samples were collected to complement historic surface water monitoring efforts within this zone, and to evaluate surface water/groundwater interaction and potential impacts to shallow floodplain groundwater due to transport of contaminated sediments from Y-12. The NOAA and Bruner sites were remediated up to 400 mg/kg, but some mercury remains in soils at or below this level which may influence water concentrations.

Lower EFPC: This section was evaluated to help understand what contaminants are leaving EFPC before entering Poplar Creek and to identify potential impact to shallow floodplain groundwater. Co-located surface water and shallow floodplain groundwater samples will be collected in this section.

MILL BRANCH

Mill Branch will be used as a background comparison site.

Table 7.2.5.1: FY24 Samples Sites & Analyses

			Sampled FY24						
Description	**Site**	**Type**	**Sr-90**	**Gross α/β**	**LL Hg***	**MeHg**	**Anions***	**Cations***	**Metals ***
Clinch River Mile 10.0	CRK16.1	SW		1	1				
Clinch River Mile 19.7	CRK 32	SW	1	1	1				
Clinch River Mile 36	CRK 58	SW		1	1				
Clinch River Mile 41	CRK 66	SW		1	1				
East Fork Poplar Creek Mile 15.6	EFK 25.1	SW		4	4		4	4	4
East Fork Poplar Creek (Alpha-2)	EFK 24.9	SW		4	4		4	4	4
East Fork Poplar Creek Mile 15.2	EFK 24.4	SW		4	4		4	4	4
East Fork Poplar Creek Mile 14.5	EFK 23.4	SW		4	4		4	4	4
East Fork Poplar Creek Mile 14.5	EFK 23.4	SW		4	2	1	1	1	2
East Fork Poplar Creek Mile 13.9	PZ-EFK 22.4	GW		4	8		4	3	8
East Fork Poplar Creek Mile 13.9	*EFK 22.4*	*SW*		4	4	2	2	2	4
East Fork Poplar Creek Mile 9.8	PZ-EFK 15.7	GW		4	8		4	3	8
East Fork Poplar Creek Mile 9.8	EFK 15.7	SW		4	4	2	2	2	4
East Fork Poplar Creek Mile 3.9	*PZ-EFK 6.3*	*GW*		4	8		4	3	8
East Fork Poplar Creek Mile 3.9	EFK 6.3	SW		4	4	2	2	2	4
East Fork Poplar Creek Mile 1.4	*PZ-EFK 2.2*	*GW*		4	8		4	3	8
East Fork Poplar Creek Mile 1.4	EFK 2.2	SW		4	4		4	4	4
Mill Branch Mile 1.0	MBK 1.6	SW		5	11	1	5	5	8
Field Duplicate	FD			5	11	1	5	5	8

*****NOTES:***

DOE Co-Sample	*Anions: Nitrate/Nitrite, Total Phosphorus, Sulfate, Alkalinity (Total), Chloride, Fluoride*
Ambient	*Cations: Sodium, Potassium, Calcium, Magnesium*
QA/QC	*Metals: Metals digestions, Uranium, Cadmium;*
SW = Surface Water; GW = Groundwater	*(Total & Dissolved Metals taken at co-located SW/GW Sites)*

Table 7.2.5.2: Analysis Method and Detection Level of Parameters

Lab Analyses and Detection Levels					
Metals					
Parameter	**Description**	**Method**	**MDL**	**MQL**	**Unit**
Methylmercury	Methylmercury in Water by Distillation	EPA 1630	0.0002	-	ug/L
Mercury, Low-Level	Mercury in Water CVAF Spectrometry	EPA 1631	0.00185	0.005	ug/L
Metals Digestion	ICP Digestion (Water)	EPA 200.2	-	-	-
Calcium	ICP-OES	EPA 200.7	0.0897	0.1	mg/L
Magnesium	ICP-OES	EPA 200.7	0.029	0.1	mg/L
Potassium	ICP-OES	EPA 200.7	0.051	0.1	mg/L
Sodium	ICP-OES	EPA 200.7	0.025	0.1	mg/L
Cadmium	ICP-MS	EPA 200.8	0.219	1	ug/L
Uranium	ICP-MS	EPA 200.8	0.143	1	ug/L
Inorganics (General)					
Alkalinity, Total	Alkalinity by Titration	2320-B	10	10	mg/L
Chloride	Inorganic Anions by Ion Chromatography	EPA 300M	1.11	2.5	mg/L
Fluoride	Inorganic Anions by Ion Chromatography	EPA 300M	0.0224	0.1	mg/L
Sulfate	Inorganic Anions by Ion Chromatography	EPA 300M	1.35	2.5	mg/L
Nitrate/Nitrite	Nitrate-Nitrite Nitrogen by Automated Colorimetry	EPA 353.2	0.0241	0.1	mg/L
Phosphorus, Total	Phosphorus by Semi-Automated Colorimetry	EPA 365.1	0.00829	0.01	mg/L
Radionuclides					
Gross Alpha/Beta	*Liquid Scintillation Counting (LSC)*	*ASTM D7283-17*	-	-	*pCi/L*
Strontium-89, 90	*Radioactive Strontium in Drinking Water*	*EPA 905*	-	-	*pCi/L*
Notes: *MDL: method detection limit MQL: minimum quantification level*					

FIELD PARAMETER MEASUREMENTS

At each site, during the time of sampling, physical water quality parameters were measured using a properly calibrated multiple parameter water quality meter. Parameters of conductivity (μS/cm), dissolved oxygen (mg/L), pH, temperature (°C), ORP (mV), and turbidity (NTU) were recorded along with the time of measurement. For groundwater samples, field parameters were recorded once stabilized within the borehole by using a flowthrough cell and a peristaltic pump.

DATA METRICS

Results of groundwater and surface water sampling were compared to several regulatory criteria to help determine impacts to human health and the environment. These included the TDEC Ambient Water Quality Criteria (AWQC) for surface water and the EPA Maximum Contaminant Levels (MCLs) for groundwater (EPA, 2009; TDEC, 2019). In addition, nutrients within surface water were also compared to results from a TDEC study involving all streams within Eco Region 67f, which is the valley and ridge region of Tennessee (TDEC, 2004). This study used sample results from all streams within this region to determine nutrient concentrations at different quantiles (e.g., 90th percentile). Thus, by comparing sample results to this study, a relative comparison to other streams within the region can help identify whether a stream is above or below regional norms.

7.2.6 Deviations from the Plan

The following deviations from the project plan occurred:

- Due to project approval issues, the first two planned quarters of hyporheic shallow groundwater sampling did not occur. Surface water samples were still collected at these locations for all quarters.

- During the June 2024 sampling event, numerous attempts to advance the borehole at PZ EFK 22.4 into groundwater were unsuccessful due to refusal of the auger in gravel and competent rock layers above the water table; therefore, a groundwater sample was unable to be collected at this location.

- For surface water samples, dissolved metal samples were not collected during the third quarter event at the groundwater and co-located surface water sites. Similarly, the third quarter event surface water samples were not analyzed for cations due to lab communication issues.

7.2.7 Results and Analysis

<u>Surface Water</u>

Nutrients

Nutrients such as nitrate, phosphorus, and sulfate were collected quarterly at several stream locations (Figure 7.2.7.1). In EFPC, high concentrations of these nutrients were prevalent near the Y-12 boundary and generally decreased downstream. However, nitrate and phosphorus concentrations were elevated again at EFK 6.3 and EFK 2.2. Sulfate concentrations did not rise but continued to decrease. In general, all nutrients sampled (nitrate, phosphorus, and sulfate) were significantly higher than background levels (MBK 1.6). For example, concentrations of nitrates at EFK 6.3 and EFK 2.2 were very elevated, nearing 7 mg/L. Concentrations were also very high at EFK 25.1, nearing 5.5 mg/L. These nitrate concentrations were well over the TN 90th percentile of all streams within the Eco Region 67f, which is 1.22 mg/L (TDEC, 2004). Sulfate concentrations at EFK 25.1 were 52 mg/L with much of UEFPC having concentrations around 50 mg/L. This was much higher than the background stream which had 16 mg/L. Lastly, phosphorus was also sampled and was elevated relative to background levels. Phosphorus concentrations were around 0.7 mg/L at EFK 6.3 and 0.44 mg/L at EFK 2.2, which surpasses the non-detected concentrations at MBK 1.6. Phosphorus levels were well above the TN 90th percentile of all streams within the Eco Region 67f, which is 0.04 mg/L.

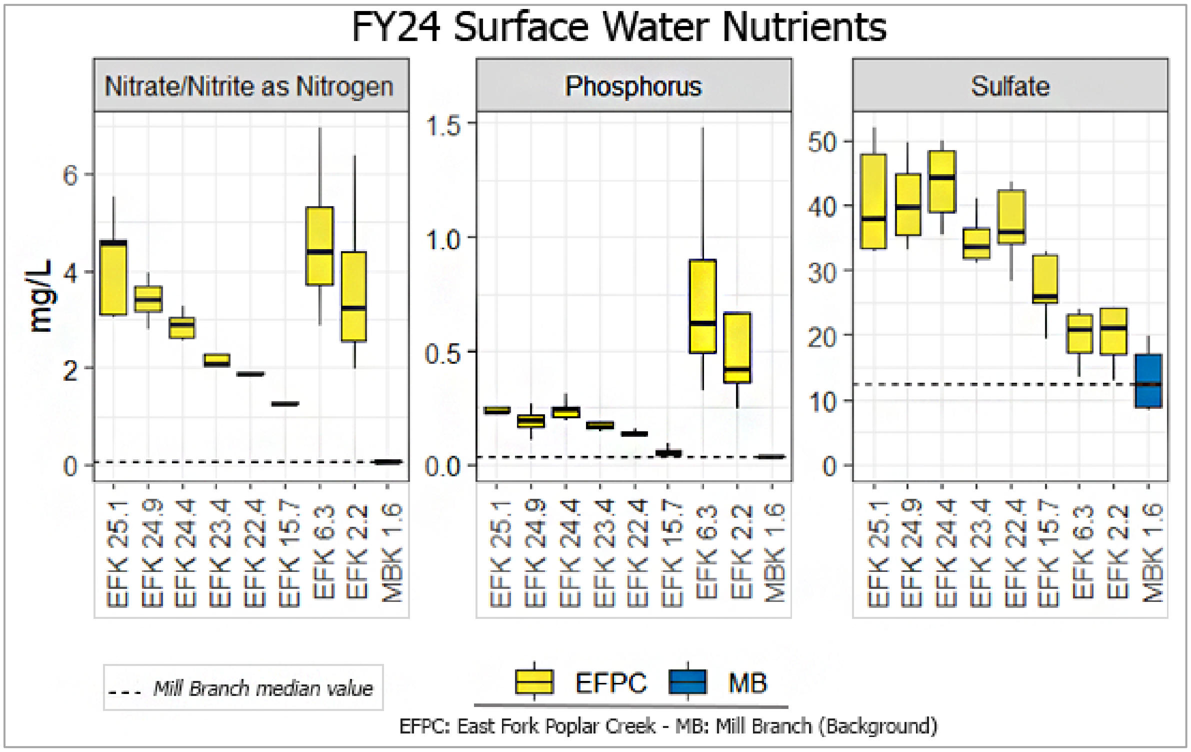

Figure 7.2.7.1: FY24 Surface Water Nutrient Boxplots

RADIONUCLIDES

Radionuclides were sampled at several EFPC locations between 2023 and 2024 (Figure 7.2.7.2). Radionuclides do not have specific surface water criteria but can be related to EPA Drinking Water MCLs as a comparison (EPA, 2009). In EFPC, only those locations within the Y-12 boundary were elevated above the EPA 15 pCi/L MCL. In general, radionuclide activities were higher upstream and decreased downstream. All locations were higher in activity than the Mill Branch background stream. Beta activity was relatively low at all locations but was generally higher than the background stream. Beta activities were relatively higher upstream and decreased downstream. Strontium-90 was sampled only at CRK 32 and yielded activities at or below background.

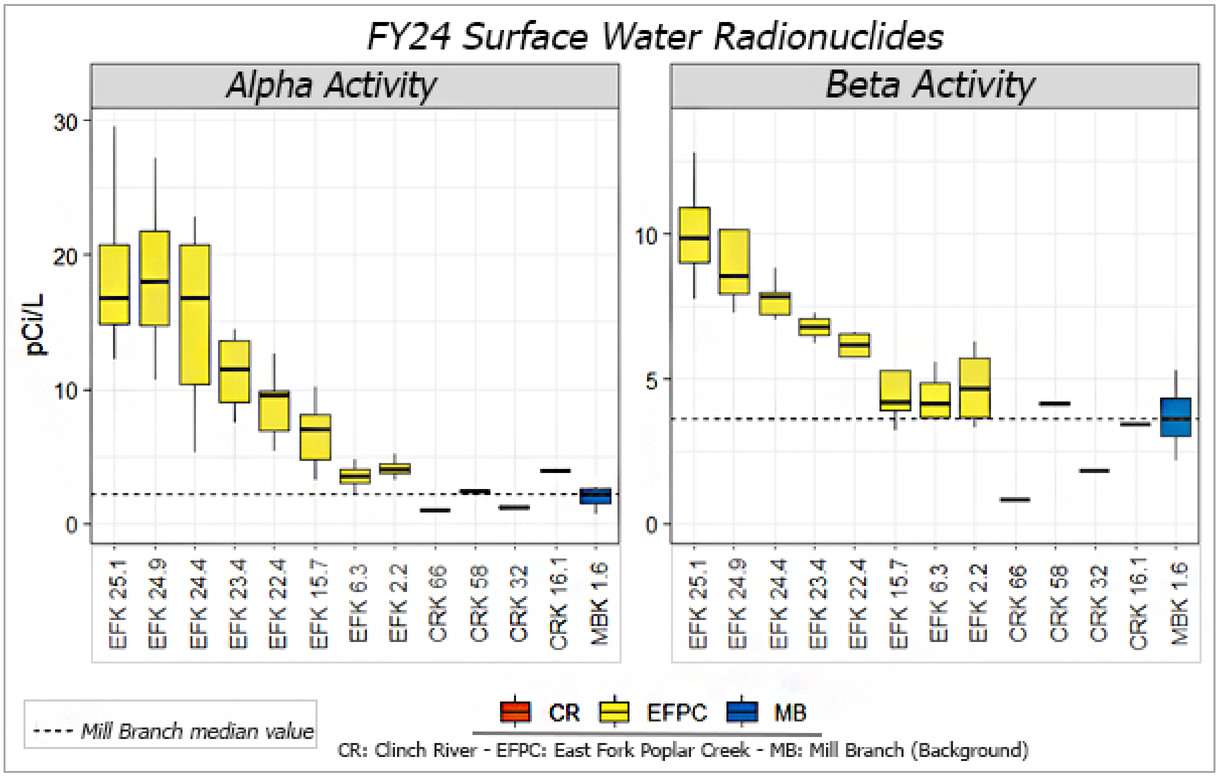

Figure 7.2.7.2: FY24 Surface Water Radionuclide Boxplot

METALS

Metals such as cadmium, mercury, and uranium were collected at several locations along EFPC (Figure 7.2.7.3). Cadmium was elevated above background levels at EFK 25.1, EFK 24.9, and EFK 24.4. All stations downstream of EFK 23.4 were similar to background concentrations other than one elevated result at EFK 2.2 in June 2024. No AWQC exceedances were identified for cadmium.

Mercury was detected at all EFPC locations. Many of the stream locations had concentrations well above the 0.051 ug/L AWQC for fish and aquatic life (TDEC, 2019). Mercury concentrations were highest in UEFPC and decreased dramatically downstream. In December 2023, EFK 25.1 and EFK 24.9 yielded the highest concentrations of all sampling events reaching 0.59 ug/L and 0.79 ug/L, respectively. These concentrations are nearly 12 and 15 times more than the Mercury AWQC of 0.051 ug/L for fish and aquatic life, respectively. Downstream locations were lower in concentration relative to UEFPC, but they were still higher than the AWQC. All locations were elevated in mercury concentrations relative to the Mill Branch background stream, which was essentially always below detectable levels (Figure 7.2.7.3). On the Clinch River, mercury was only detected at CRK 16.1, which was similar to background MB levels.

From 2023 to 2024, several samples exceeded EPA's drinking water MCL of 30 ug/L for uranium. While EFPC is not used for drinking water, the EPA criterion is used only as a reference. These exceedances occurred at EFK 25.1, EFK 24.9, EFK 24.4, and EFK 23.4. In general, concentrations tend to be higher at upstream locations and decrease downstream. In several instances, concentrations were well over 60 ug/L in UEFPC, which is twice the screening criterion (EPA, 2009). Downstream locations, although not exceeding this screening criterion, were still elevated compared to the reference stream. Mill Branch, as a comparison, yielded non-detects or very low estimated detections at all sampling events.

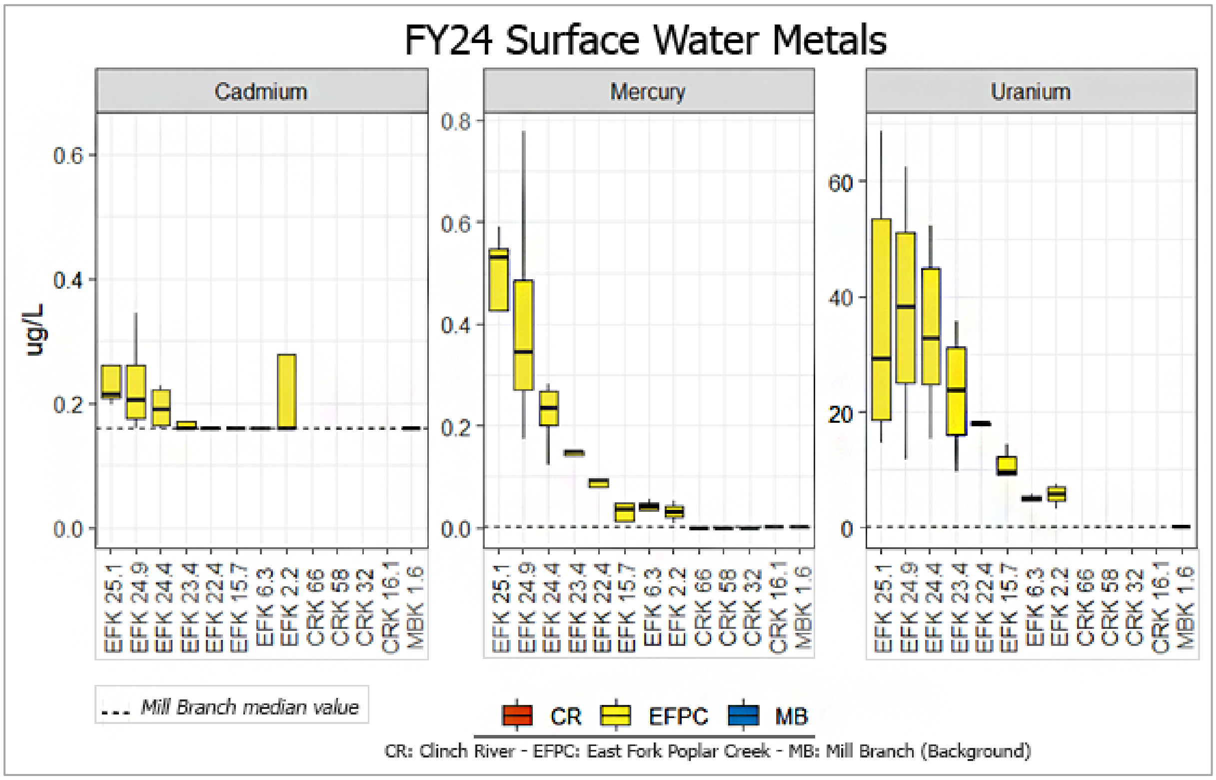

Figure 7.2.7.3: FY24 Surface Water Metals Boxplots

Surface Water and Shallow Floodplain Groundwater Comparison

Water Geochemistry

Major geochemistry analyses were completed for the shallow groundwater and surface water samples at the four co-located sites (Figure 7.2.4.1). Surface water samples and groundwater samples generally had similar geochemical properties. In general, both surface water and groundwater are calcium and magnesium rich carbonate water with smaller amounts of sodium chloride (Figure 7.2.7.4). However, the calcium, magnesium, and carbonate quantity was sometimes much higher in the groundwater samples. It should be noted that shallow groundwater samples typically yielded much higher turbidity relative to the surface water.

Nutrients such as nitrate and sulfate were ***more*** prevalent in the surface water samples compared to the shallow floodplain groundwater. Shallow groundwater at EFK 22.4 and EFK 2.2 did not yield any sulfate similar to that of the adjacent surface water samples.

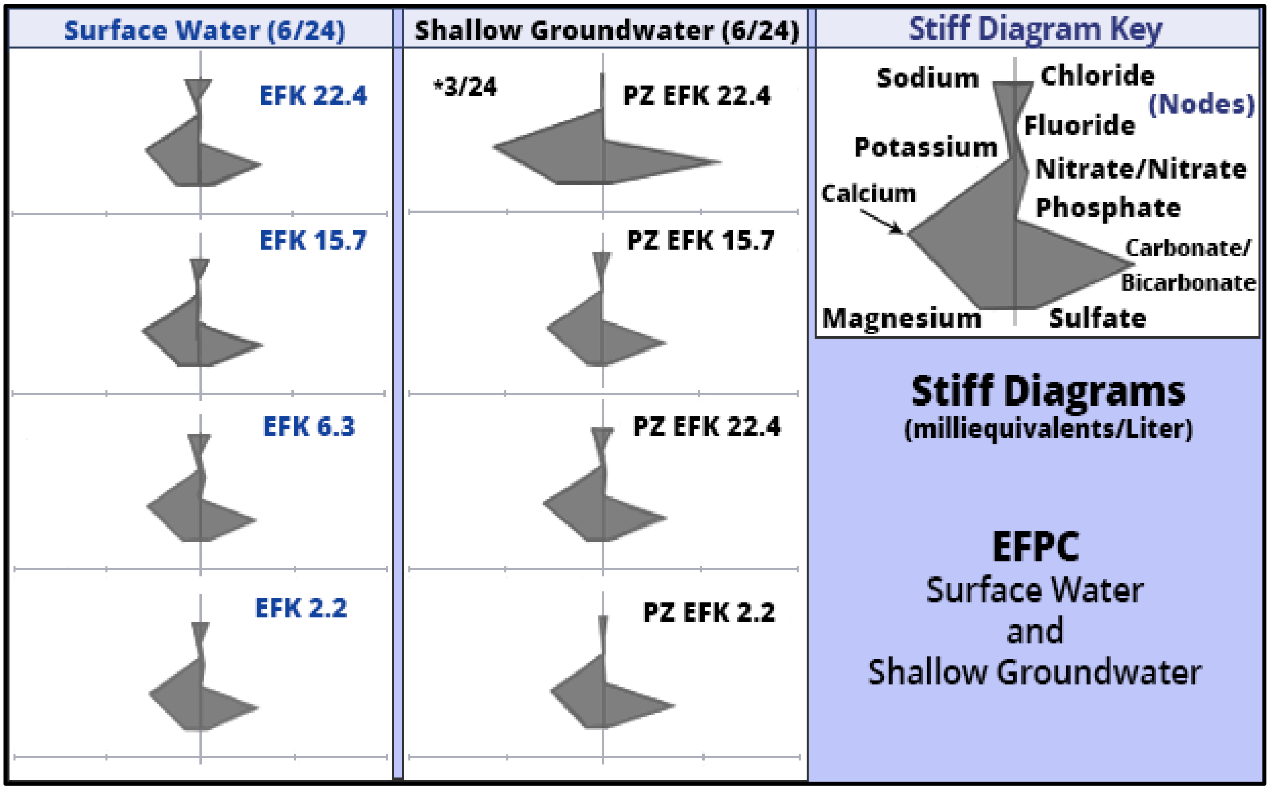

Figure 7.2.7.4: Stiff Diagrams - Surface Water & Shallow Floodplain Groundwater

METALS

Metals such as cadmium, mercury, and uranium were also analyzed in both filtered and unfiltered samples in surface water and in adjacent shallow groundwater at EFK 22.4, EFK 15.7, EFK 6.3, and EFK 2.2 (Figure 7.2.7.5 – 7.2.7.8). Groundwater samples were only collected at two sampling events while surface water was collected at all quarterly events.

Cadmium results were mostly non-detects to low detections at all locations for filtered and unfiltered surface water. Shallow groundwater yielded higher concentrations relative to surface water. Results were generally low, except for an unfiltered sample that yielded a high cadmium result of 8.2 ug/L at PZ EFK 15.7, which is over the EPA MCL of 5 ug/L.

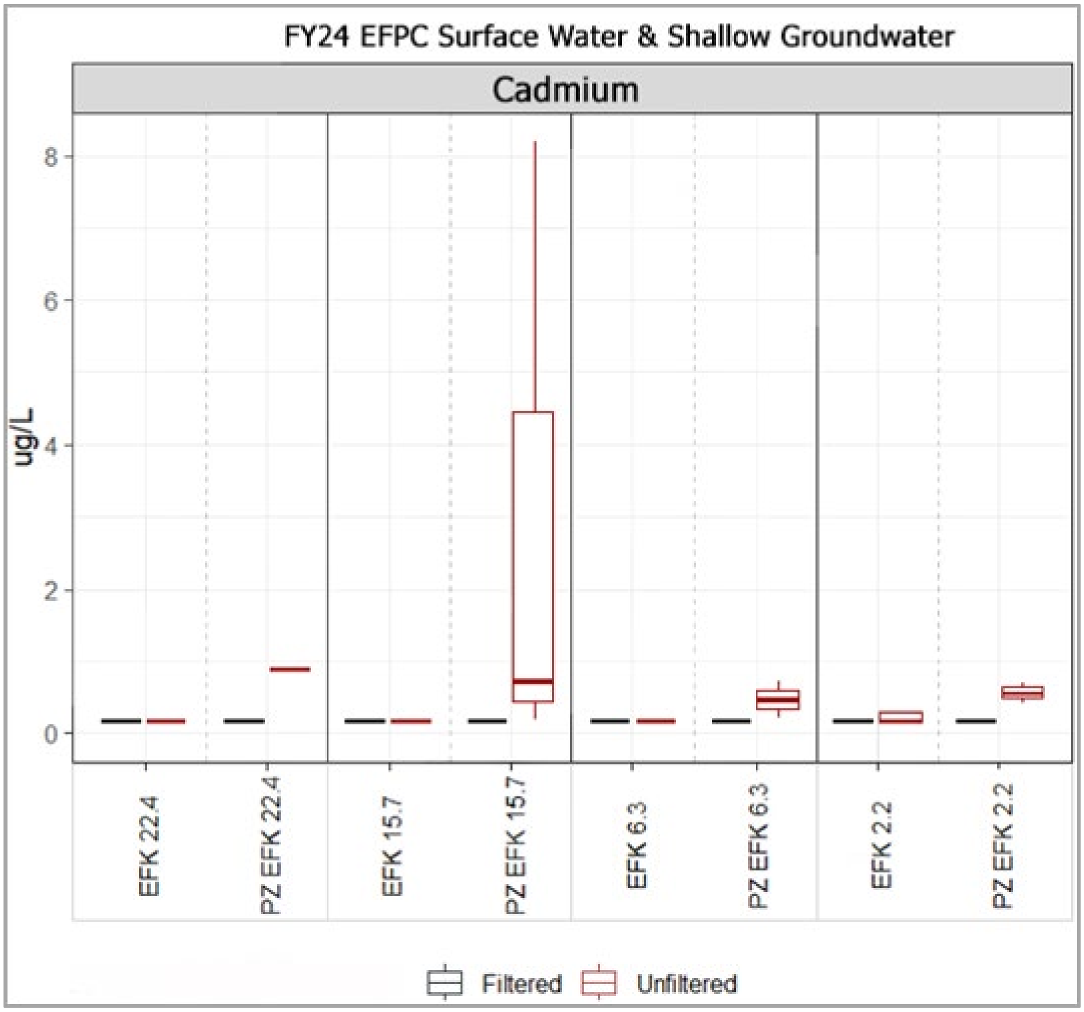

Figure 7.2.7.5: FY24 Cadmium – EFPC Surface Water & Shallow Groundwater

Surface water generally yielded slightly higher concentrations of mercury in unfiltered samples relative to filtered samples. In general, surface water had roughly 30% of mercury in the dissolved phase at each site. Surface water exceeded the TN AWQC of 0.051 ug/L at all stream locations. Locations EFK 6.3 and EFK 2.2 did not however exceed the AWQC at every sampling event. No filtered sample exceeded this criterion. Shallow groundwater had much higher concentrations in unfiltered samples relative to filtered samples. Only approximately 1 percent of shallow groundwater was in the dissolved phase for mercury upon filtration. All groundwater samples were below the EPA Drinking Water MCL of 2 ug/L except for an unfiltered mercury sample at PZ EFK 2.2, which yielded 5.03 ug/L in June 2024.

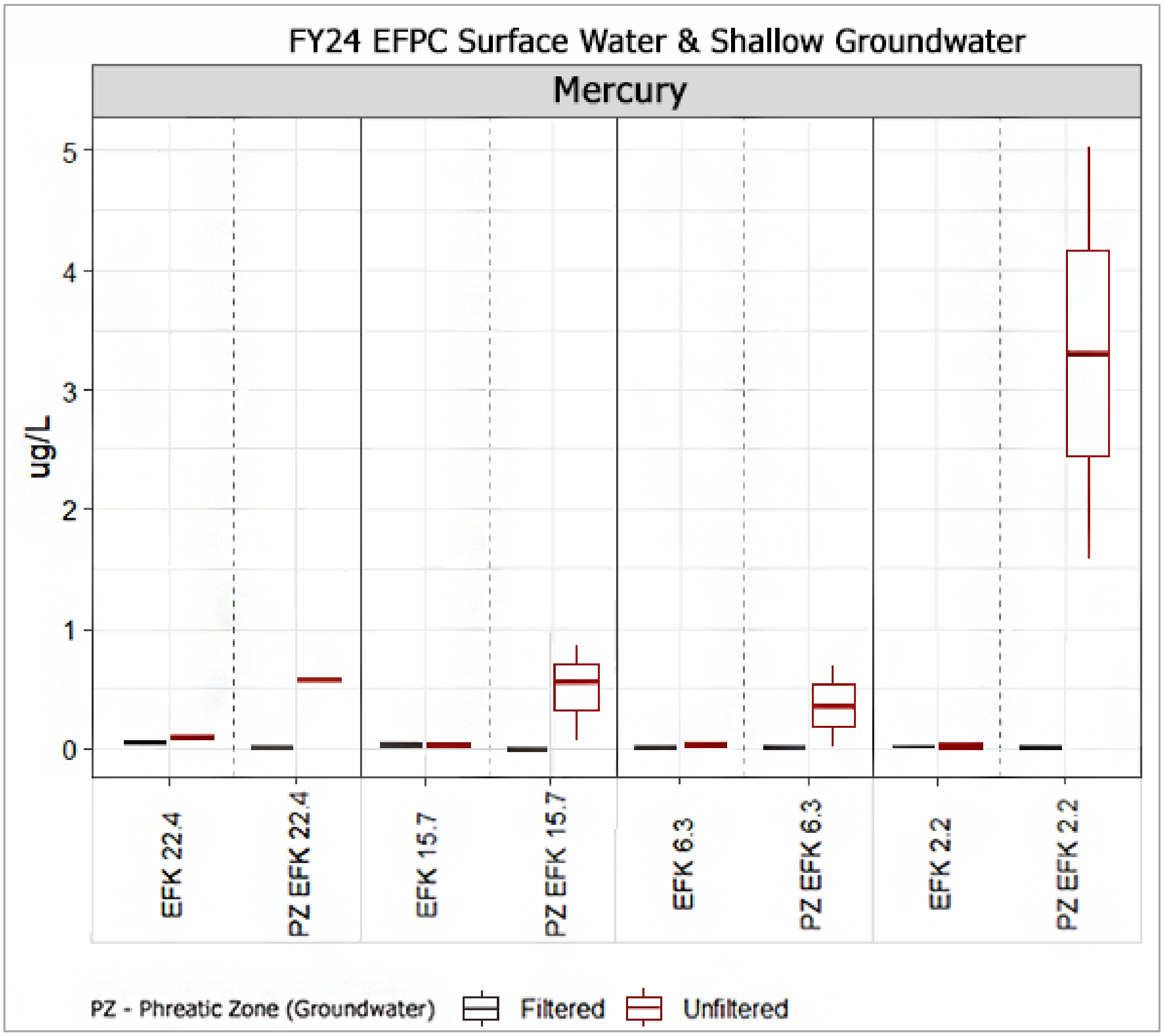

Figure 7.2.7.6: FY24 Mercury - EFPC Surface Water & Shallow Groundwater

Shallow Groundwater – Mercury and Methylmercury

Methylmercury was analyzed along with total mercury for the unfiltered shallow groundwater samples. Results of methylmercury were very low compared to total mercury concentrations. Methylmercury accounted for <1% of the total mercury at all groundwater locations. PZ EFK 6.3 had the highest percentage of methylmercury in the floodplain shallow groundwater.

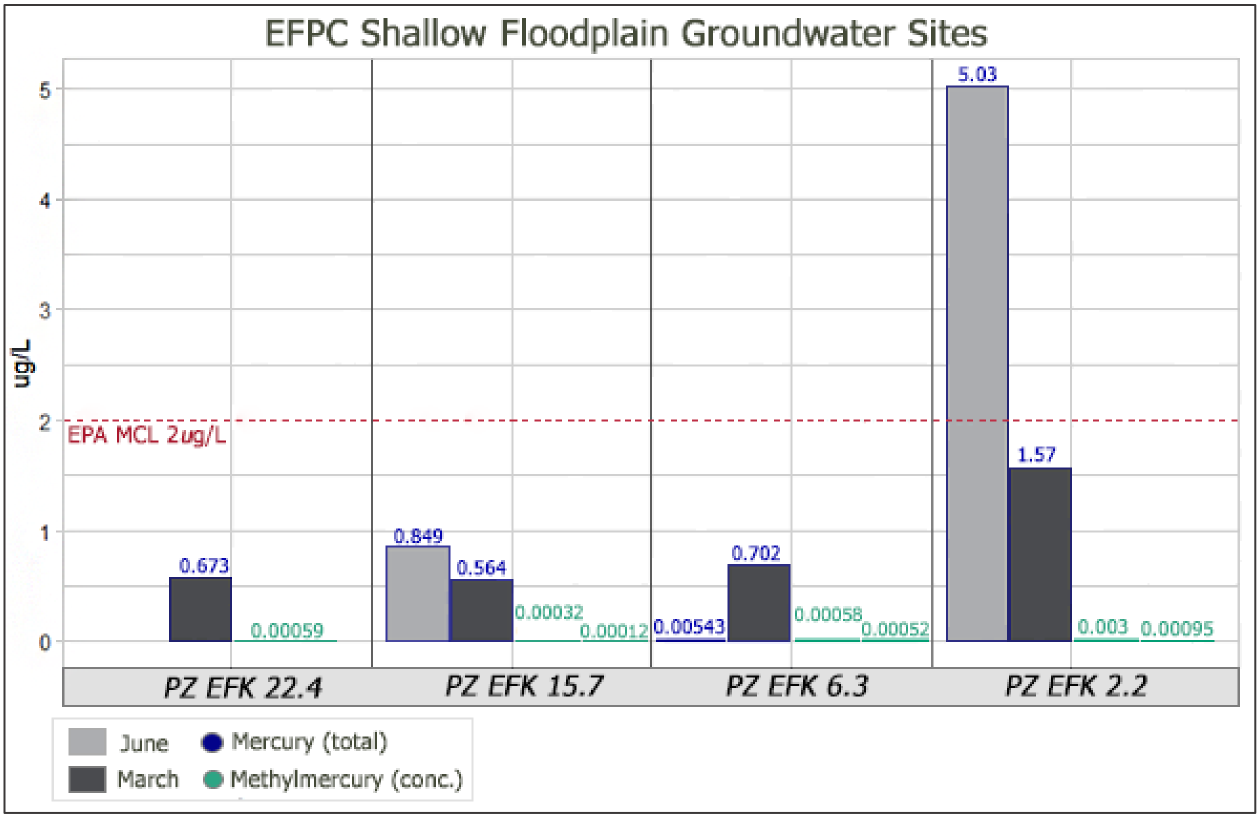

Figure 7.2.7.7: FY24 Total Mercury & Methylmercury – EFPC Shallow Groundwater

Surface water samples yielded relatively similar concentrations of uranium in both unfiltered and filtered samples. In general, uranium was typically 99% in the dissolved phase in surface water. Generally, shallow groundwater had higher concentrations in unfiltered samples relative to filtered samples. Uranium in the dissolved phase upon filtration varied greatly among each location with PZ EFK 22.4 having 45% dissolved uranium, PZ EFK 15.7 with 14% dissolved, PZ EFK 6.3 with 44% dissolved, and PZ EFK 2.2 with 24% dissolved uranium on average. All groundwater samples were below the EPA Drinking Water MCL of 30 ug/L except for PZ EFK 22.4, which yielded an unfiltered uranium concentration of 50.6 ug/L.

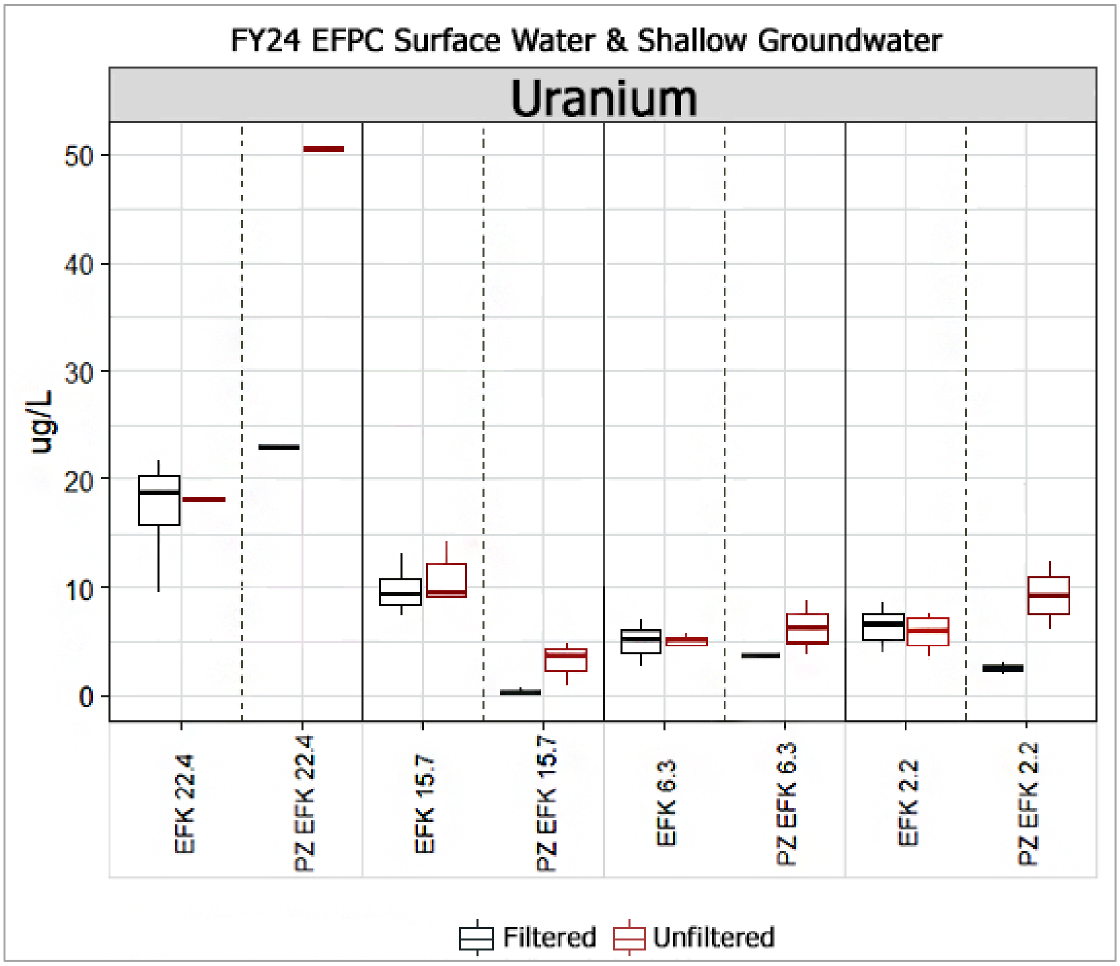

Figure 7.2.7.8: FY24 Mercury - EFPC Surface Water & Shallow Groundwater

Water Quality Parameters

Water quality parameters were measured in surface water and groundwater at these four locations (Figure 7.2.7.9). In general, conductivity was slightly higher in shallow groundwater compared to surface water at all locations. EFK 2.2, however, had lower conductivity in groundwater compared to surface water. Dissolved oxygen was typically much lower in the shallow groundwater samples compared to surface water. At EFK 22.4, both yielded similar dissolved oxygen levels. ORP was significantly lower, and with negative values, for groundwater at all locations. The pH of groundwater was much lower than all surface water measurements. Temperature was generally consistent between the shallow groundwater and surface water measurements at all locations with EFK 2.2 yielding cooler temperature in groundwater compared to other locations. Turbidity was significantly higher in all groundwater samples compared to surface water.

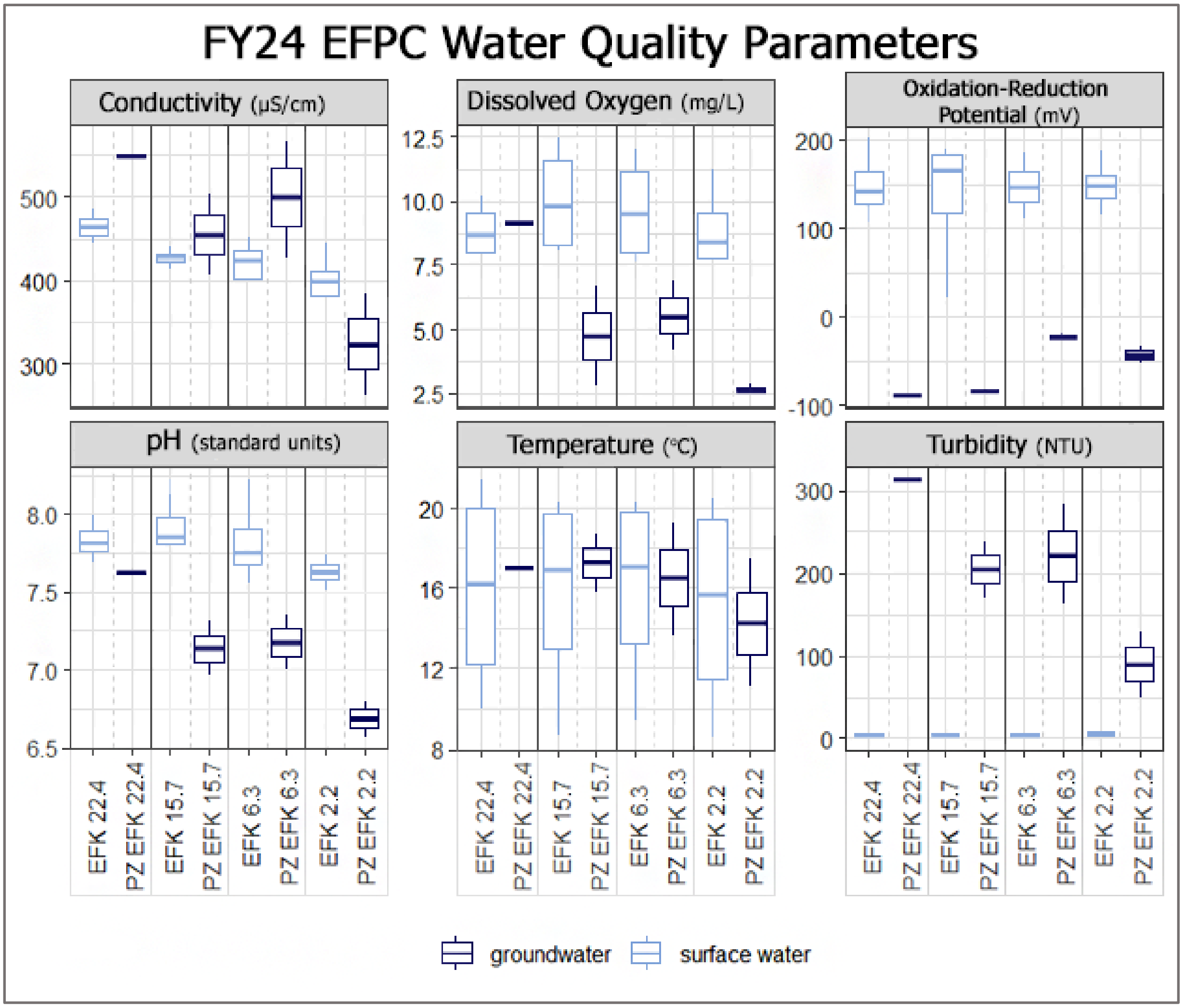

Figure 7.2.7.9: FY24 EFPC Water Quality – Surface Water & Shallow Groundwater

7.2.8 Conclusions

Clinch River

The Clinch River was sampled for metals and radionuclides at the same locations sampled by DOE for their annual site evaluation report. All metals and radionuclides were low to non-detects at the sampled locations. These findings are consistent with DOE's results and provides an external quality control to their required sampling.

EFPC

EFPC was monitored along all reaches of the stream from the headwaters in UEFPC to LEFPC. In UEFPC, surface water conditions were monitored immediately adjacent to the proposed D&D activities at the mercury-contaminated Alpha-2 Complex. General water chemistry was evaluated along with mercury concentrations. Mercury trends at the sampled interval showed higher concentrations during winter months, which perhaps is related to increased groundwater inputs into the stream typical of this time of year. On average, mercury yielded 0.41 μg/L throughout the year. The highest mercury concentrations were identified in UEFPC, with concentrations up to 15 times more than the Mercury AWQC of 0.051 ug/L for fish and aquatic life. These high concentrations in UEFPC, specifically near the Alpha-2 Complex, can partially be attributed to overflow of the Big Springs Water Treatment System. This system treats one of the largest mercury point sources to EFPC, but has a finite capacity. When higher flows occur within Big Spring, the treatment system can reach capacity causing untreated water to flow to the creek through an overflow bypass. Despite these higher concentrations of mercury, these chemical and general chemistry data can be used as a benchmark to help understand the effects of future D&D work in this area, and ultimately the effects of termination of the sump pump under the building.

In the middle to lower portion of EFPC, surface water was compared to shallow groundwater within flood plain soils. In general, groundwater was found to have a similar geochemical makeup as surface water. Both were a calcium and magnesium rich carbonate water with smaller amounts of sodium chloride. While the surface water had high concentrations of nutrients (e.g., nitrate, phosphorus, sulfate), especially at EFK 6.3 and EFK 2.2, shallow groundwater seemed to lack these nutrients which were prevalently found in surface water. This lack of nutrients in groundwater may be due to reducing conditions, as indicated by the low ORP values, within the floodplain soils. A visual correlation can be seen between nutrients and ORP. When ORP is very negative, the nutrients are not present, perhaps due to reducing bacteria or some other factor.

Metal concentrations of cadmium, mercury, and uranium were elevated in shallow groundwater samples relative to surface water samples. However, these levels can likely be attributed to high turbidity in the groundwater samples. This elevated turbidity may have driven the unfiltered sample results to be high, increasing metal concentrations from soil particulates. Turbidity may have been reduced if a different approach was taken to install the piezometers, such as with the use of a sand pack or pre-packed screens. The drive-point method for installing piezometers did not allow for proper development of the piezometer resulting in very high turbidities. High mud content easily clogged the screen allowing high turbidity to persist throughout sampling.

While metals were often elevated, one interesting finding was the percent of uranium in the dissolved phase. In surface water, uranium was found to be nearly 99% in the dissolved phase. For groundwater samples, uranium varied greatly with averages ranging from 14% - 45% by location. In some cases, such as at EFK 22.4, filtered samples unexpectedly yielded slightly higher concentrations compared to unfiltered samples. This may be due to the transient nature of flowing surface water causing slight variability between samples, or it could potentially be due to sample chemistry changes potentially linked to filtration, despite sample preservation.

Methylmercury was also sampled in shallow floodplain groundwater and was found to be very minor relative to the total mercury percent. However, methylmercury concentrations were higher at the EFK 6.3 location relative to other sampled locations.

In all, high turbidity levels in the groundwater samples made it difficult to identify true groundwater contaminant concentrations, as the results were highly biased by substrate particulates. While the contaminants evaluated were detected, the levels at which these contaminants reside in the natural aquifer environment is uncertain. Despite this high turbidity which can inflate metal concentrations in groundwater, mercury concentrations only exceeded the MCL of 2 μg/L at PZ EFK 2.2, uranium (unfiltered) only exceeded the MCL of 30 ug/L at PZ EFK 22.4, and cadmium (unfiltered) only exceeded the MCL of 5 ug/L at PZ EFK 15.7. All other locations were below these values.

In general, the surface water of EFPC was found to be impacted by nitrate, phosphorus, and mercury. Uranium and alpha activity, while they do not have AWQCs, were also elevated and may have a negative impact on the stream environment. For all contaminants sampled, the highest concentrations were found within the Y-12 area and decrease downstream. Unlike the other contaminants, nutrients spike in concentration downstream near EFK 6.3 and EFK 2.2. These two locations are both downstream of a large acreage recreational land-use area that likely receives large quantities of fertilizer to maintain the facility. Nitrates and phosphates are commonly found at high levels in fertilizers. Excessive use or poor timing of application relative to precipitation at this facility or within the facility's surrounding residential neighborhoods has the potential to influence the nutrient load to EFPC. Additionally, EFK 2.2 is also downstream of the confluence of BC and EFPC. This allows any nutrients from BC to load this portion of EFPC. BC is known to have elevated nitrate concentrations.

7.2.9 Recommendations

It is recommended to re-evaluate the shallow floodplain groundwater using a more appropriate piezometer development and sampling approach that allows control of turbidity. While this effort was worthwhile and shows relatively low concentrations of contaminants in many of the filtered samples, it would be beneficial to collect low turbidity unfiltered samples that may be more representative of actual shallow groundwater conditions.

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7.3 WHITE OAK CREEK RADIONUCLIDES

7.3.1 BACKGROUND

White Oak Creek (WOC) was initially monitored under the *Ambient Surface Water Sampling Project* (Chapter 7.2); however, since 2020, DoR-OR has focused on this stream under a separate project. As a Clinch River tributary, WOC became a focal ORR exit-pathway stream due to specific concerns regarding the elevated radionuclide strontium-90 (Sr-90). Sr-90 was first detected at a CR sampling station (CRK 33.5) in 2017. CRK 33.5 is located at the WOC-CR confluence, immediately downstream of the WOC Embayment (WOE) sediment retention structure (SRS) (Figure 7.3.7.3). Because this radionuclide entered the Clinch River via WOC, DoR-OR has prioritized monitoring WOC surface water quality. These results also supplement DOE's ongoing investigations of Sr-90 migration and CR monitoring.

The ORR exit-pathway streams, such as WOC, and the CR have historically been, and are currently, subject to contaminant releases from activities at Y-12, ORNL, and ETTP. Monitoring WOC provides a better understanding of its contributions to CR surface water contamination and may provide insights into helping protect human health and the environment.

7.3.2 PROBLEM STATEMENTS

Approximately 1.1 million people live in the counties containing the ORR (DOE, 2021). Migration of contaminants from WOC to CR has the potential to impact its municipal and recreational waters. Legacy contaminant migration along with continued industrial releases from the ORR campuses into WOC can also be detrimental to the environment and to human health. Identified concerns for WOC include, but are not limited to the following:

1) Release of low-level radioactive liquid wastes to the CR via WOC since 1943 (Pickering, 1970).

2) Release of approximately 665 curies of cesium-137 to the CR from WOC between 1954 and 1959 (DOE, 1992).

3) Continued release of Sr-90 from the Process Waste Treatment Complex (PWTC) which does not entirely remove Sr-90 from the waste stream and ultimately discharges treated wastewater containing elevated levels of Sr-90 into WOC through Outfall X12 (Figure 7.3.7.3) (DOE, 2022a).

4) Historic and ongoing discharges of Sr-90 and Cs-137 into WOC. Known sources include, but are not limited to, impacted floodplain soils from the former Surface Impoundment Operable Unit (SIOU) area (Figure 7.3.7.3) and baseflow groundwater seepage into WOC (DOE, 2022c).

5) Evaluating potential strontium-90 surface water impacts to 5th Creek if the sump pump at Building 3042 is turned off. Sampling along 5th Creek (DOE station name = "*5TH CR*" aka "*FFK 0.2*") has been conducted since at least 1987, with semi-annual sampling currently being conducted (DOE, 2022b).

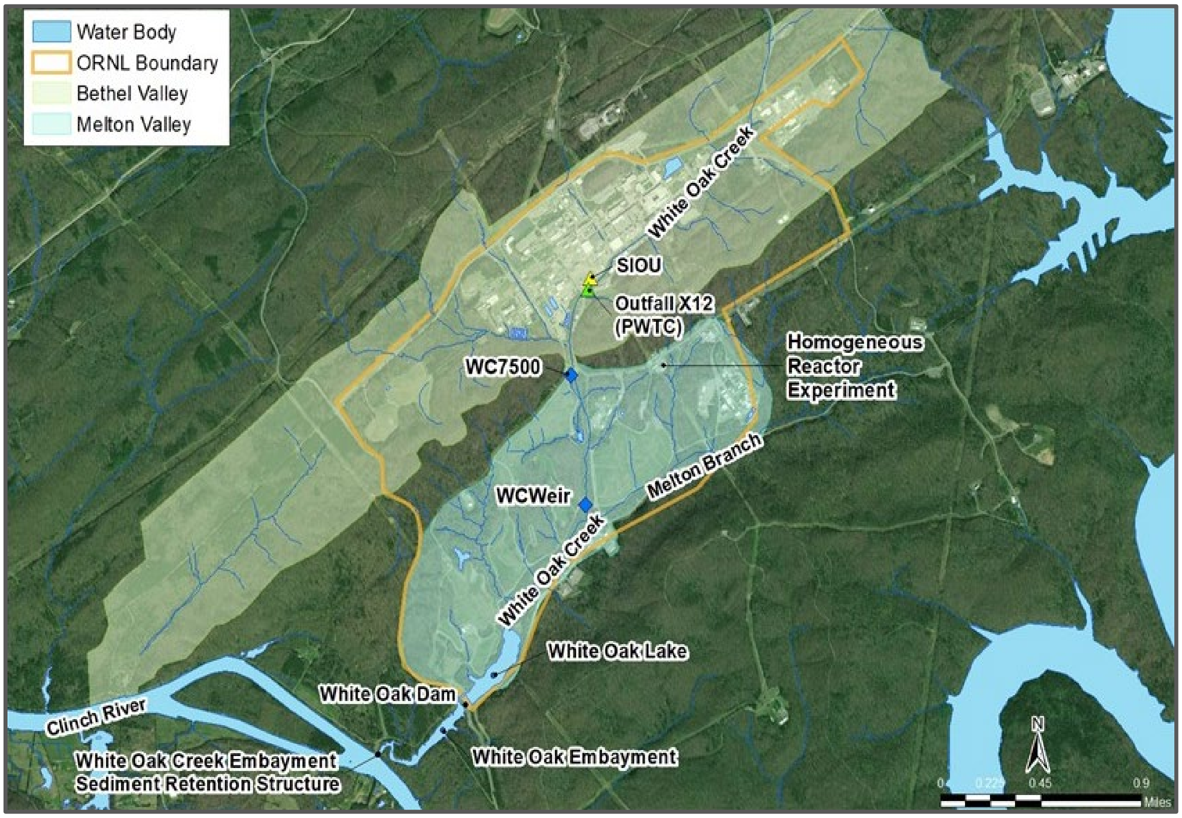


Figure 7.3.2.1: White Oak Creek Map and Pertinent Features

7.3.3 GOALS

The goal of the *White Oak Creek Radionuclides Monitoring Project* is to evaluate the impacts of DOE ORR contamination to WOC, its tributaries, and the mainstem CR at the WOC confluence. This project involves collecting surface water samples at the locations illustrated on Figure 7.3.3.1.

7.3.4 SCOPE

The scope of this project was to collect surface water samples quarterly at eight (8) monitoring locations. Four (4) monitoring locations (WCK 6.8, WCK 3.9, WCK 3.4, WCK 2.3) were along the WOC, one (1) monitoring location (CRK 33.5) was at the confluence of WOC and the CR, and two (2) monitoring locations (HRT-3, MEK 0.3) were WOC tributaries (Figure 7.3.3.1). This year, per recommendations in the previous EMR, the Fifth Creek tributary sample location (FFK 0.2).

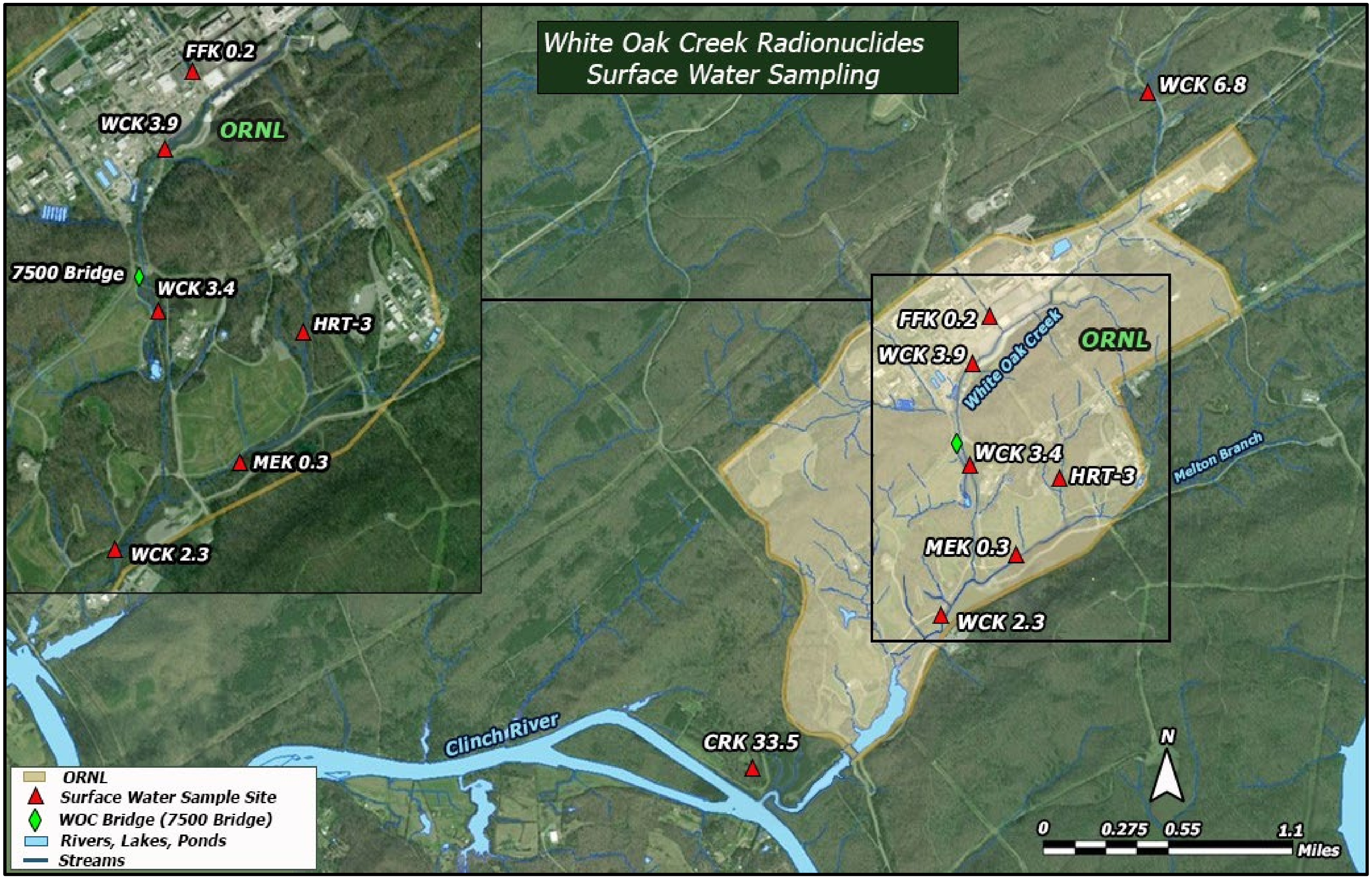


Figure 7.3.4.1: DoR-OR White Oak Creek (WOC) Surface Water Sampling Locations

7.3.5 Methods, Materials, Metrics

Streamflow

Although streamflow was not directly measured in the field, TDEC DoR-OR downloaded available streamflow records for WOC from the Oak Ridge Environmental Information System (OREIS) to evaluate the hydrologic regime of WOC. TDEC DoR-OR identified two DOE maintained weirs (Figure 7.3.7.3), WC7500 and WCWeir, that had daily streamflow measurements for the period of record between 2009 and 2023.

Field Water Quality Parameter Measurements

At each site, water quality parameters were measured in the field at the time of sampling using a properly calibrated multi-parameter water quality meter. The following water quality parameters were measured: pH, temperature, specific conductivity, oxidation reduction potential (ORP), and dissolved oxygen.

Surface Water Analytical Sampling

Surface water samples were collected quarterly at eight (8) monitoring sites (WCK 6.8, WCK 3.9, WCK 3.4, WCK 2.3, CRK 33.5, FFK 0.2, HRT-3, MEK 0.3) illustrated on Figure 7.3.3.1. Samples were submitted for laboratory analysis of Sr-90, isotopic uranium, isotopic plutonium, and gamma isotopes. Sampling protocols followed the TDEC Division of Water Resources (DWR) *Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water* (TDEC, 2022).

7.3.6 Deviations from the Plan

Sr-90 Laboratory Evaluation

During the previous fiscal year (FY23) sampling event, it was noted that Sr-90 activities observed during the fourth quarter were significantly lower at all sample locations than activities measured during the first three quarters. This was initially attributed to increased surface runoff due to a heavy precipitation event and a dilution effect. Further evaluation of Sr-90 trends noted that the sudden decrease in reported Sr-90 activity coincided with a change of laboratories. Based on this, it was suspected that there may be some difference in the laboratory analytical methods or procedures to cause low results.

To evaluate this premise, TDEC collected split samples during the January 2024 sampling event from two (2) locations (WCK 3.9 and HRT-3) and sent them to both the new laboratory (Lab 1) and the TDEC state lab (TDH) for Sr-90 analysis. Based on the preliminary results, the Sr-90 activities were reported an order of magnitude less from the Lab 1 versus the state lab from both sample locations. To confirm these results, a second spilt collection was performed in March 2024 at the same locations with three (3) split samples being taken and sent to Lab 1, TDH, and Lab 2. The results confirmed that Lab 1 was reporting Sr-90 at activities an order of magnitude less.

Table 7.3.7.2 Summary Table of SR-90 Lab Evaluation

Results of Sr-90 Lab Evaluation					
Sample Location	*Date*	*TDH*	*Lab 1*	*Lab 1 (rev)*	*Lab 2*
HRT-3	1/11/2024	72	13.6	NA	NA
WCK 3.9	1/11/2024	21.1	2.88	NA	NA
HRT-3	3/6/2024	60	3.8	56.7	61.6
WCK 3.9	3/7/2024	6	1.8	5.19	4.17
Notes: all results are pCi/L					

Lab 1 was apprised of this issue. The review of their analytical results "showed that excessive concentrations of dissolved interferences in the samples interfered with the precipitation process wherein sulfates are added to precipitate Strontium from solution. These interferences caused incomplete precipitation of Strontium in solution." Based on their review of the selected data, the laboratory found that only approximately 30% of the Strontium was precipitated using their standard method, leaving the remainder in solution. Because of this, the sample activities were biased low, generally resulting in activity levels an order of magnitude lower than the split samples sent to other laboratories. Lab 1 issued a Corrective Action Report that proposed "additional chemical processes designed to facilitate adequate precipitation of Sr so that chemical recovery is more complete." Lab 1 was able to reanalyze the sample from the second split sample event, and the results were more consistent with the results from the other two laboratories. A summary of the results from the Sr-90 laboratory evaluation is provided in Table 7.3.7.2.

7.3.7 Results and Analysis

Streamflow

The average annual flow was 8.0 cubic feet per second (cfs) at WC7500 and 16.4 cfs at WCWeir. Figure 7.3.7.1 presents daily streamflow data for the period from June 1, 2019, to September 30, 2023. The streamflow data available in OREIS did not coincide with the entire FY24 period, however, the data coincides with historic TDEC DoR-OR's WOC surface water sampling efforts. As evident in this figure, streamflow is highly variable, likely because of precipitation events.

Additionally, the streamflow data presented in Figure 7.3.7.1 suggests WOC is a gaining stream, evident by the increase in measured streamflow moving downstream from the weir at the 7500 Bridge (WC7500) to the WCWeir. Increases in streamflow moving downstream are likely a result of various contributions such as smaller tributaries/drainages, outfalls, baseflow groundwater seepage, and/or other influx.

Although not part of the scope for this investigation, it has been important to evaluate the stream flow during the ongoing TDEC sampling periods for future calculation of contaminant flux. Streamflow for the WOC has been compiled during this and previous years sampling events to eventually be used in a mass flux calculation into the CR.

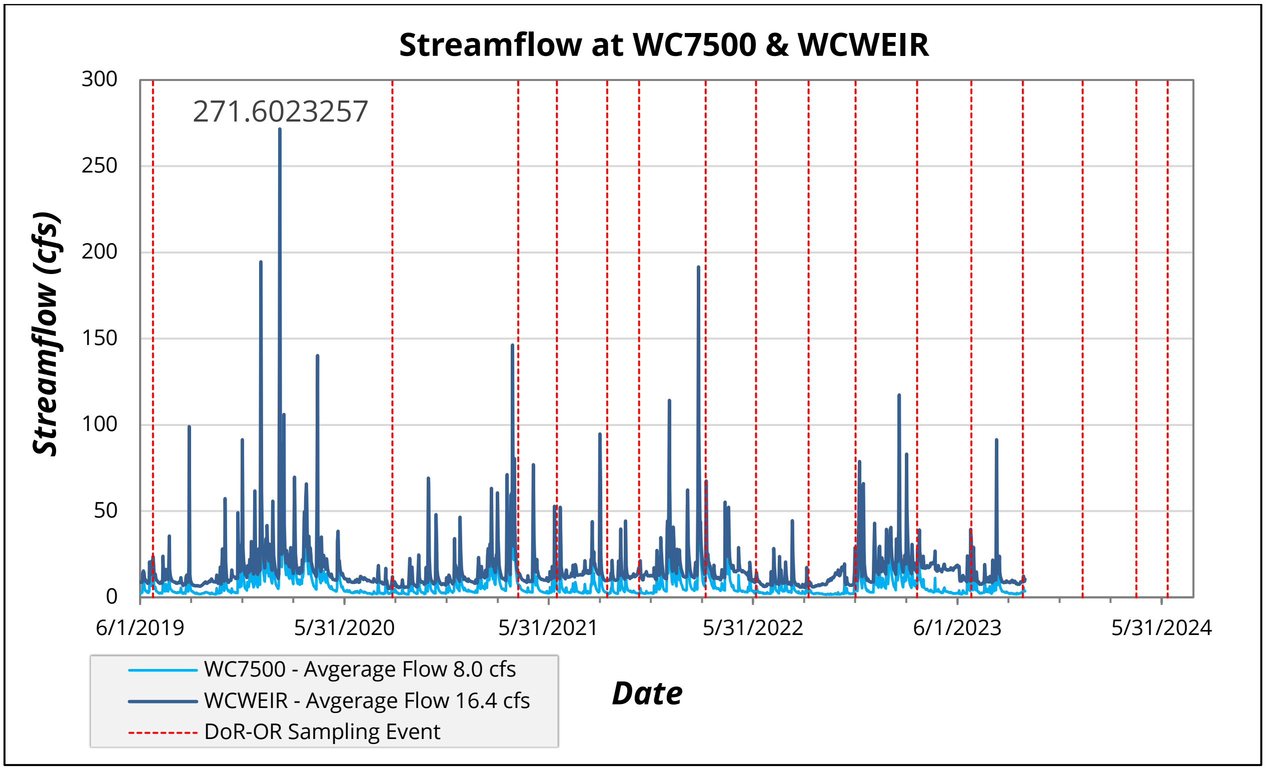
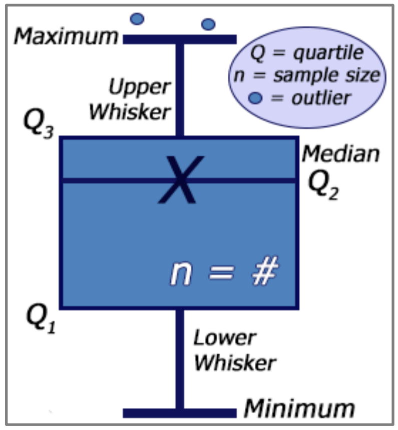


Figure 7.3.7.1: WC7500 Weir & WCWeir Streamflow (2019-2024)

FIELD WATER QUALITY PARAMETERS

Water quality parameters of pH, temperature, and specific conductivity were measured in the field during sample collection. A summary of the measured water quality parameters during the FY24 sampling events is provided below and the variability of these field parameters across the five surface water sampling locations are visually displayed using box plots. A box plot is generated using five numbers which include the minimum, 25th percentile (Q_1), median, 75th percentile quartile (Q_3), and maximum. During generation of these plots, outliers are visually illustrated but are not included when calculating the five numbers.



As shown above in the generic box plot, the top and bottom horizontal lines are the maximum and minimum values, the top and bottom of the box are the lower (Q_1) and upper quartiles (Q_3), the horizontal line in the box is the median (Q_2), the "X" marker displays the mean value, and the dots represent outlier values. The sampling station labels on the box plots includes the sample size (n) at each sampling location.

pH

The pH is a measure of the hydrogen ion concentration and is measured on a logarithmic scale between 0 and 14, with pH 7 being neutral. Values measured over the four quarters ranged from 6.96 (FFK 0.2) to 8.19 (WCK 3.4). As illustrated in Figure 7.3.7.2, the mean pH values across the seven sample locations are very similar.

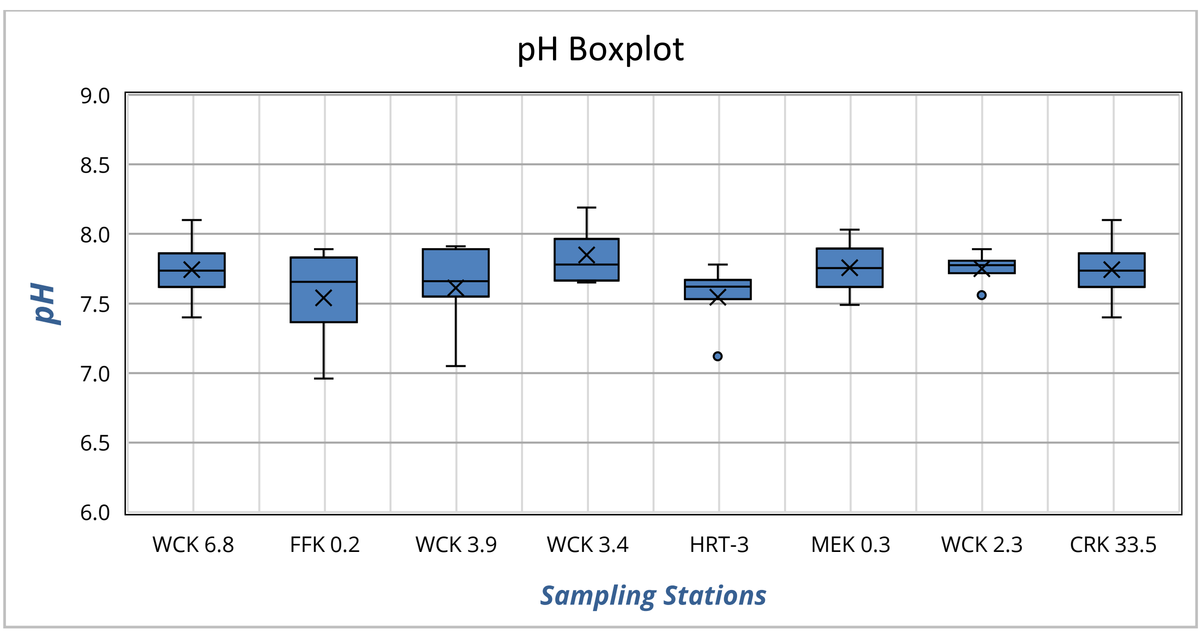


Figure 7.3.7.2: pH Boxplot from WCK 6.8 Downstream to CRK 33.5

Temperature

Surface water temperatures ranged from 6.3 degrees Celsius (ºC) at HRT-3 to 21.1 ºC at MEK 0.3. In general, as shown on Figure 7.3.7.3, the median temperature among the seven sample stations is similar. Outliers and minimums occurred during the cold month of January.

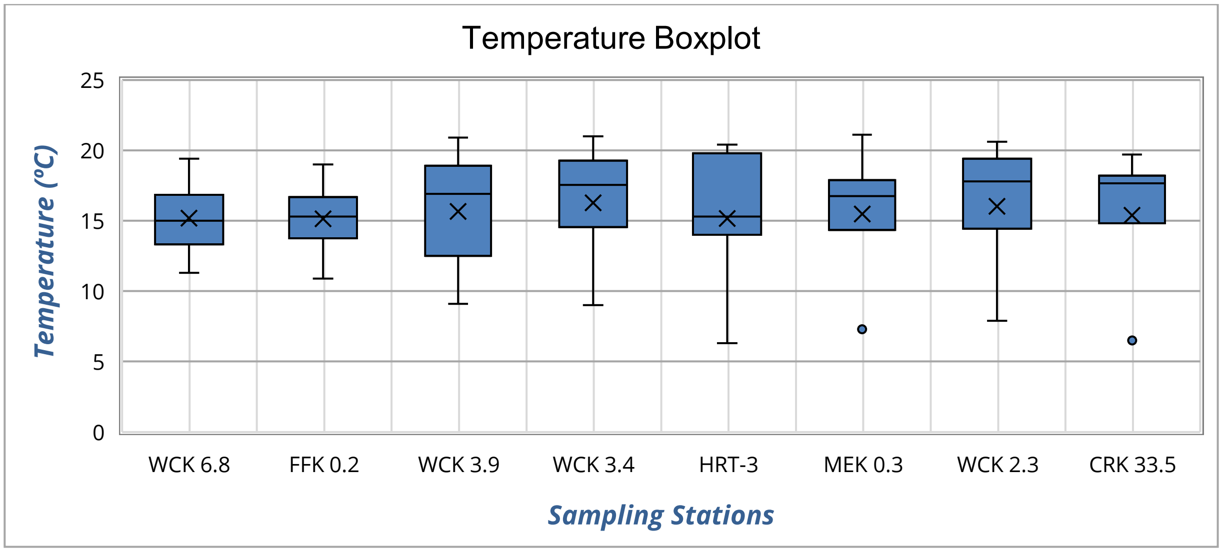


Figure 7.3.7.3: Temperature Boxplot from WCK 6.8 Downstream to CRK 33.5

Specific Conductivity

Specific conductivity is an indirect measurement of the concentration of dissolved ions in solution. Higher specific conductivity values can indicate more dissolved minerals or salts in the water. Specific conductivity values ranged from 177 micro siemens per centimeter (µS/cm) at WCK 3.9 to 1,110 µS/cm at MEK 0.3. As illustrated in Figure 7.3.7.4, the median specific conductivity values at WCK 6.8, FFK 0.2, WCK 3.9, WCK 3.4, WCK 2.3, and CRK 33.5 were generally similar ranging from approximately 275 µS/cm and 420 µS/cm. Between WCK 6.8 and WCK 3.4, there is a general increasing trend in specific conductivity. The median specific conductivity for MEK 0.3 was significantly higher at 550.7 µS/cm. MEK 0.3 also demonstrated the highest variation in specific conductivity having a minimum of 248.8 µS/cm and a maximum of 1,110 µS/cm.

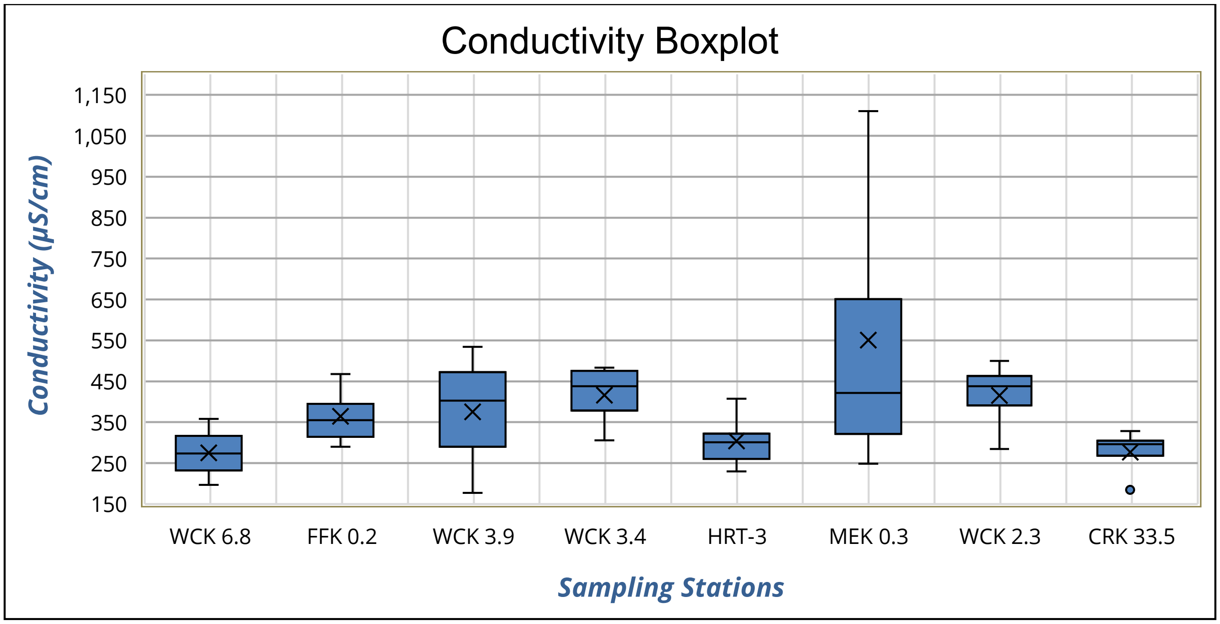


Figure 7.3.7.4: Specific Conductivity from WCK 6.8 Downstream to CRK 33.5

Surface Water Analytical Results

Analytical testing of surface water at WCK 6.8, FFK 0.2, WCK 3.9, WCK 3.4, HRT-3, MEK 0.3, WCK 2.3, and CRK 33.5 indicated the following results:

- Analytical testing of surface water revealed that select gamma isotopes (cesium-137, cobalt-60, europium-154, plutonium-238, plutonium-239/240, potassium-40) were infrequently observed. All reported activities were well below their derived MCLs.

- The uranium isotopes, uranium-234, uranium-235, and uranium-238 were measured in all surface water samples. The combined activities of uranium-234 and uranium-238, which have an established EPA derived drinking water standard of 30 pCi/L, were reported well below this value for each sample location.

- Elevated Sr-90 activities were observed at WCK 3.9, WCK 3.4, HRT-3, MEK 0.2, WCK 2.3, and CRK 33.5. All surface water samples collected at these six locations had Sr-90 measured at levels greater than the EPA derived drinking water standard of 8 pCi/L.

- Sr-90 activities were the highest in samples collected from HRT-3. The second highest concentrations were present in samples collected from WCK 2.3 and CRK 33.5, which are downgradient from HRT-3. It should be noted that the closest downgradient location, MEK 0.2, had one of the lowest activities except for the background location WCK 6.8.

- Sr-90 activities increased from upstream (WCK 6.8) to downstream (WCK 2.3) locations along WOC. The CR sample station (CRK 33.5) exhibited a slight decrease in Sr-90 compared to WCK 2.3, likely due to dilution since this sample was collected within the CR immediately downgradient of the WOCE sediment retention structure.

- The absence of elevated levels of radiological contaminants in surface water at WCK 6.8 was most likely due to this sample location being located upstream from the ORNL campus (background location).

The analytical results are summarized in Table 7.3.7.1 below.

Table 7.3.7.1 Summary Table of the Quarterly Surface Water Analytical Results (pCi/L)

		Cs-137	Co-60	Eu-154	Pu-238	Pu-239/240	K-40	Sr-89	Sr-90	U-234	U-235	U-238
MCL 1, 2		200	100	60	NE	NE	NE	20	8	30	NE	30
FFK 0.2	1	5.47 ± 15	3.93 ± 20	0.0 ± 24	0.021 ± 0.06	0.021 ± 0.06	45.8 ± 238	-1.06 ± 1.6	1.91 ± 0.67 Δ			
	2	-0.503 ± 4.8	-2.54 ± 5.0	2.70 ± 14	-0.003 ± 0.03	0.034 ± 0.06	34.1 ± 55	-1.37 ± 2.0	4.06 ± 0.91 Δ	0.246 ± 0.13	0.021 ± 0.06	0.128 ± 0.09
	3	---			---	---		-1.2 ± 1.1	15.8 ± 5.7	0.335 ± 0.28	0.197 ± 0.26	0.045 ± 0.19
	4	---			---	0.046 ± 0.13		---	17.3 ± 3.0	1.01 ± 0.34	0.396 ± 0.24	0.342 ± 0.19
WCK 6.8	1	- 2.16 ± 16	6.09 ± 12	4.05 ± 58	-0.014 ± 0.05	-0.00 5± 0.05	143 ± 221	-0.34 ± 0.88	0.78 ± 0.36 Δ			
	2	-3.13 ± 6.6	3.78 ± 8.3	-0.94 ± 21	-0.005 ± 0.03	-0.003 ± 0.03	42 ± 59	2.60 ± 1.1	1.04 ± 0.32 Δ	0.633 ± 0.23	0.89 ± 0.10	0.180 ± 0.12
	3	—			—	—		1.9 ± 1.3	—	0.452 ± 0.35	0.099 ± 0.19	0.346 ± 0.29
	4	—			—	-0.032 ± 0.03		—	1.47 ± 1.4	0.356 ± 0.20	0.214 ± 0.17	0.126 ± 0.12
WCK 3.9	1	6.22 ± 15	9.44 ± 8.3	-41.9 ± 60	0.041 ± 0.06	0.007 ± 0.05	104 ± 164	-0.46 ± 2.1	5.09 ± 1.07 Δ			
	2	6.14 ± 4.7	7.07 ± 4.4	11.4 ± 23	0.004 ± 0.03	0.0 ± 0.04	35.6 ± 47	-0.24 ± 1.3	2.88 ± 0.56 Δ	0.987 ± 0.25	0.027 ± 0.05	0.174 ± 0.10
	3	—			—	0.131 ± 0.22		2.40 ± 1.5	26.0 ± 10	2.84 ± 0.84	0.321 ± 0.30	0.421 ± 0.30
	4*	—			—	0.273 ±0.23		—	25.4 ± 4.2	2.35 ± 0.55	0.320 ± 0.21	0.533 ± 0.24
WCK 3.4	1	0.93 ± 15	-6.93 ± 15	7.35 ± 48	-0.025 ± 0.06	0.024 ± 0.06	-28.6 ± 146	-0.63 ± 0.93	1.95 ± 0.45 Δ			
	2	5.99 ± 4.6	5.02 ± 6.2	-11.1 ± 23	0.034 ± 0.05	0.015 ± 0.04	98.7 ± 78	-1.24 ± 1.1	2.82 ± 0.52 Δ	1.54 ± 0.31	0.013 ± 0.03	0.222 ± 0.11
	3	2.36 ± 3.0			---	---		2.40 ± 1.5	37.0 ± 13	2.32 ± 0.75	0.177 ± 0.23	0.630 ± 0.38
	4	5.95 ± 3.1			---	0.037 ± 0.10		—	31.9 ± 4.9	2.40 ± 0.54	0.078 ± 0.10	0.279 ± 0.17
HRT-3	1*	7.60 ± 10	5.98 ± 15	-38.2 ± 56	-0.041 ± 0.06	0.028 ± 0.08	117 ± 112	0.16 ± 1.3	8.27 ± 1.3 Δ			
	2	4.20 ± 4.0	3.18 ± 4.8	-1.45 ± 13	0.085 ± 0.07	0.015 ± 0.04	85.3 ± 57	3.50 ± 2.1	13.6 ± 2.0 Δ	0.049 ± 0.05	0.0 ± 0.04	0.064 ± 0.06
	3	---						1.70 ± 1.6	79.0 ± 28	0.241 ± 0.23	0.449 ± 0.36	0.293 ± 0.25
	4	---				0.052 ± 0.10		—	110 ± 16	0.745 ± 0.30	0.187 ± 0.18	0.517 ± 0.25
MEK 0.3	1	1.98 ± 2.0	-4.27 ± 12	5.18 ± 43	0.017 ± 0.05	-0.004 ± 0.05	77.0 ± 148	-1.22 ± 1.8	0.94 ± 0.74 Δ			
	2	1.23 ± 4.9	-2.64 ± 4.8	-8.81 ± 14	-0.003 ± 0.03	0.00 ± 0.04	52.1 ± 50	0.70 ± 0.81	0.76 ± 0.28 Δ	0.228 ± 0.11	0.030 ± 0.05	0.075 ± 0.06
	3	—			---	0.078 ± 0.22		-1.5 ± 1.1	10.4 ± 3.9	1.13 ± 0.54	0.442 ± 0.39	0.298 ± 0.29
	4	—			---	0.039 ± 0.11		—	6.90 ± 1.9	0.335 ±0.20	0.067 ± 0.11	0.240 ± 0.16
WCK 2.3	1	15.2 ± 11	0.0 ± 28	2.59 ± 40	-0.053 ± 0.06	-0.009 ± 0.05	-21.6 ± 122	0.55 ± 2.6	8.91 ± 1.6 Δ			
	2	4.70 ± 4.2	-0.085 ± 1.7	6.80 ± 12	0.012 ± 0.03	0.027 ± 0.04	73.2 ± 74	-0.53 ± 1.3	4.53 ± 0.76 Δ	1.07 ± 0.26	0.002 ± 0.03	0.243 ± 0.11
	3*	—			—	—		-0.30 ± 1.6	74.0 ± 27	3.34 ± 0.96	0.371 ± 0.34	0.660 ± 0.41
	4	—			—	0.032 ± 0.09		—	38.6 ± 5.8	2.60 ± 0.59	0.097 ± 0.13	0.466 ± 0.22
CRK 33.5	1	-0.495 ± 11	1.89 ± 11	-17.2 ± 45	-0.014 ± 0.06	0.0 ± 0.08	46.4 ± 120	-0.35 ± 1.1	2.36 ± 0.54 Δ			
	2*	0.412 ± 5.1	5.04 ± 5.4	-1.67 ± 15	0.037 ± 0.05	0.040 ± 0.05	29.4 ± 56	-0.71 ± 0.97	2.77 ± 0.43 Δ	0.0795 ± 0.07	0.031 ± 0.05	0.115 ± 0.08
	3	3.89 ± 4.6			—	0.062 ± 0.17		-1.70 ± 2.1	53.0 ± 36	1.18 ± 0.52	0.097 ± 0.19	0.345 ± 0.28
	4	2.66 ± 3.1			—	—		—	22.4 ± 3.6	1.28 ± 0.42	0.024 ± 0.08	0.477 ± 0.25

Cs Cesium; Co Cobalt; Eu Europium; Pu Plutonium; K Potassium; Sr Strontium; U Uranium: Sample Dates 1- 9/29/23, 2- 1/11/24, 3- 4/16/24, 4- 6/11/24; NE = no standardized limit
Red result = result above MCL; Results rounded to 3 significant figures; Δ= Sr-90 QC review failed so results omitted; ***** *= duplicate has highest activity; MCL: minimum concentration limit*
1 = Derived standards of beta/photon emitters in drinking water (NBS Handbook 69); 2 = EPA isotopic uranium standards for mill tailing sites are U-234 + U-238; — = non-detect

As illustrated in Figure 7.3.7.5, elevated activities of Sr-90 were observed in surface water samples collected at FFK 0.2, WCK 3.9, WCK 3.4, HRT-3, WCK 2.3, MEK 0.3, and CRK 33.5. All activities exceeded the derived drinking water standard of 8 pCi/L during the third and fourth quarterly sampling events. It should be noted that some of the Sr-90 results from the first and second quarters were not included in the graph as they failed laboratory review. This is further discussed in Section 7.3.6 Deviations from the Plan.

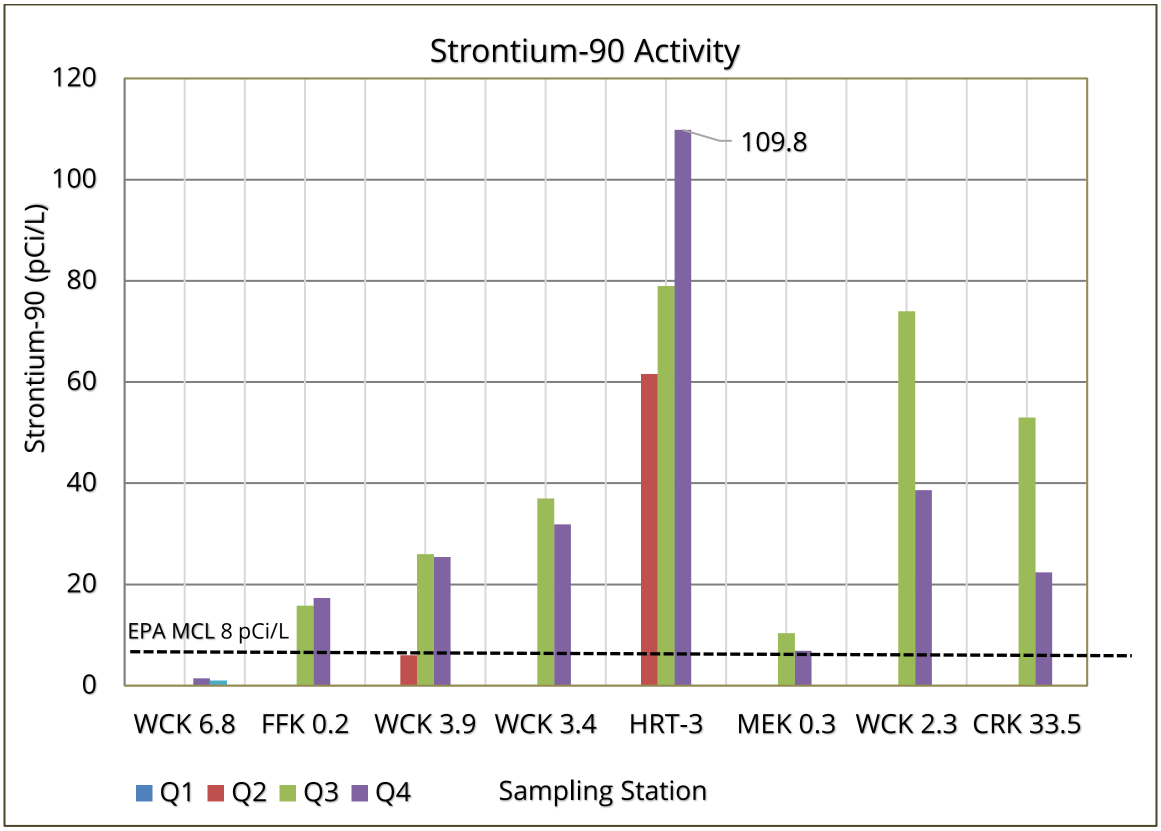


Figure 7.3.7.5: Strontium-90 Quarterly Activity from WCK 6.8 Downstream to CRK 33.5

Based on the results of the Sr-90 laboratory evaluation, the project team reviewed the historic Sr-90 results for samples collected from WOC, and several historic low detections were flagged as “laboratory fail.” The failed Sr-90 results from FY24 sampling (9/23/2023 and 1/11/2024) are included and flagged in Table 7.3.7.1. Historic “laboratory fails” for Sr-90 includes samples dated 3/30/2021 and 6/26/2023. Failed Sr-90 results have been omitted from mean calculations and from the graphs in Figures 7.3.7.5 and 7.3.7.7.

The Sr-90 activities ranged from -0.43 pCi/L at WCK 6.8 to 110 pCi/L measured at HRT-3, a tributary of Melton Branch which originates near the Homogeneous Reactor Experiment (HRE) site in Melton Valley. The highest mean Sr-90 activities were measured from samples collected from HRT-3 (70.3 pCi/L). The mean Sr-90 activities downgradient of the confluence of HRT-3 were higher at WCK 2.3 (52.9 pCi/L), and CRK 33.5 (37.7 pCi/L), compared to WCK 6.8 (0.522 pCi/L). Activities at MEK 0.3, despite being the closest downstream sample location to HRT-3, were much lower (8.65 pCi/L). A box plot illustrating Sr-90 data collected during FY24 is provided as Figure 7.3.7.6. The trend between sampling stations was consistent with the quarterly data collected during FY23. The explanation for this is not known at this time and should be evaluated in future sampling.

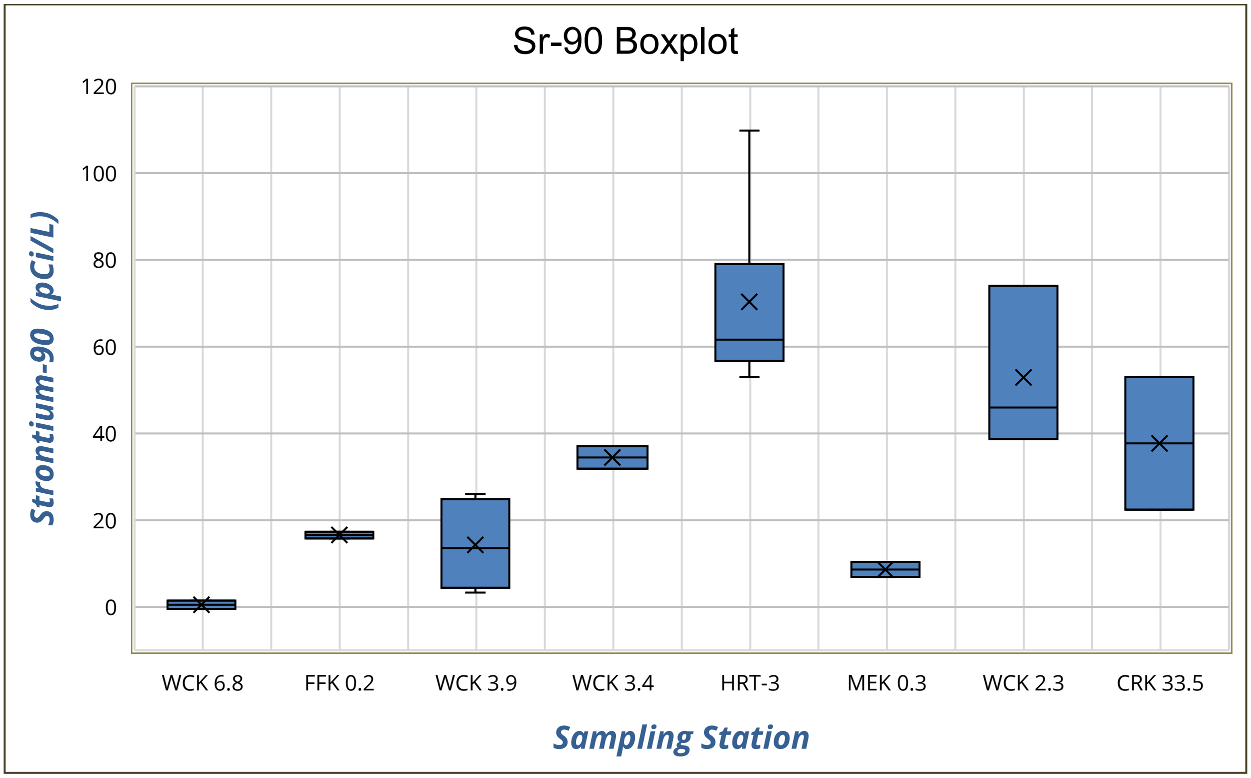


Figure 7.3.7.6: Sr-90 Box Plot from WCK 6.8 Downstream to CRK 33.5 (2019-2024)

TREND ANALYSIS

A sampling timeline illustrating Sr-90 activities measured between June 2019 and June 2024 at the seven sampling stations is provided as Figure 7.3.7.7. A trend analysis was performed to determine if Sr-90 activities are increasing or decreasing over time. As mentioned in the section above, failed Sr-90 results have been omitted from the graph.

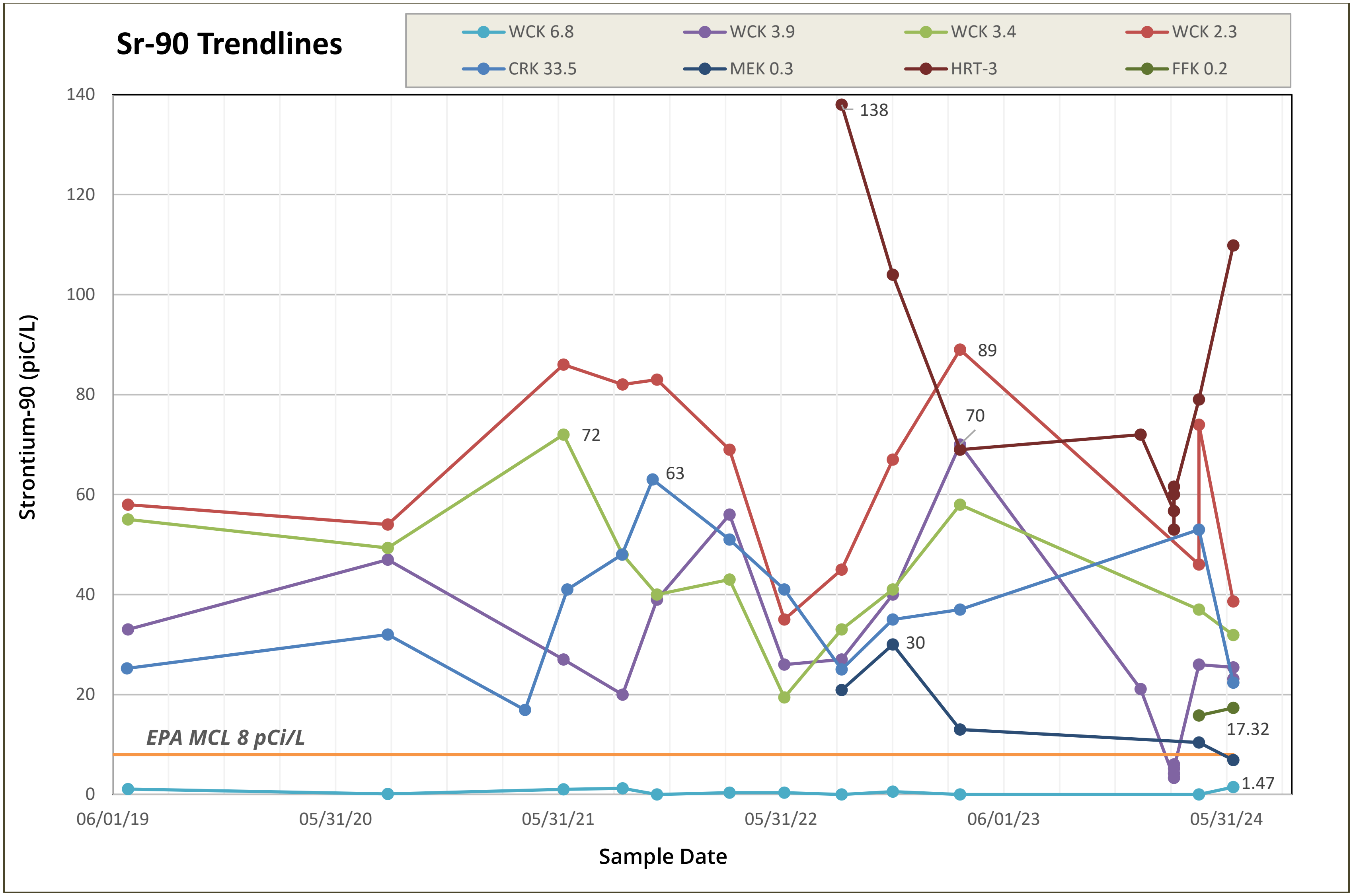


Figure 7.3.7.7: Strontium-90 Trends (2019-2024)

The above graph was analyzed for linear trends by evaluating a trendline for each series. All locations show a general decreasing trend except for CRK 33.5, which showed an increasing trend. FFK 0.2 showed an overall pattern of increasing Sr-90; however, there are only two data points to make this evaluation. Further sampling is needed to confirm this trend.

7.3.8 CONCLUSION

In conclusion, analytical testing of surface water at WCK 6.8, FFK 0.2, WCK 3.9, WCK 3.4, HRT-3, MEK 0.3, WCK 2.3, and CRK 33.5 revealed the following:

- The uranium isotopes, uranium-234, uranium-235, and uranium-238 were observed in all surface water samples. Uranium-234 activities ranged from 0.049 picocurie per liter (pCi/L) (HRT-3) to 3.34 pCi/L (WCK 2.3), uranium-235 activities ranged from 0.00 pCi/L (HRT-3) to 0.449 pCi/L (HRT-3), and uranium-238 activities ranged from 0.045 pCi/L (FFK 0.2) to 0.660 pCi/L (WCK 2.3). The combined activities of uranium-234 and uranium-238 at each location were below the EPA derived drinking water standard of 30 pCi/L.

- Sr-90 activities were the highest in samples collected from HRT-3. The second highest concentrations were present in samples collected from WCK 2.3 and CRK 33.5, which are downgradient from HRT-3. It should be noted that the closest downgradient location, MEK 0.2, had one of the lowest activities except for the background location WCK 6.8. This anomalous “skip” may be related to the anomalously high conductivity readings and range that are also associated with this location. This anomalous low may be from some other reason not yet evaluated, such as natural geochemistry. Further data is needed to evaluate.

- Contributions of Sr-90 from the past and current activities have impacted WOC at activity levels above the derived MCL. Sr-90 levels are also above the derived MCL within the CR at the point of discharge from WOC (CRK 33.5).

7.3.9 RECOMMENDATIONS

As mentioned in the Problem Statement, due to the potential for turning off the sump pump during D&D of Building 3042 located in Bethel Valley and for general monitoring of the WOC, DoR-OR recommends continuing monitoring WOC and Melton Branch and its tributaries for radiological contaminants of concern.

Because of the ongoing discharge of radioisotopes (specifically Sr-90) into the CR, future projects should seek to gauge the discharge at the CRK 33.5 location or develop a hydrologic budget of the WOC and its tributaries to estimate the flow rate into the CR. This would aid in calculations of the actual mass of radioisotopes into the CR from WOC.

Based on anomalous Sr90 activity and specific conductivity measurement between HRT-3 and MEK-0.3, evaluation of these parameters this area of the creek for and other tributaries in this vicinity is warranted.

7.3.10 References

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7.4 CERCLA Site Investigation

7.4.1 Background

Stormwater runoff has the potential to transport various contaminants, including sediments, nutrients, organic and inorganic chemicals, metals, and bacteria, into waterways, resulting in water quality issues and environmental function degradation (Marsalek, 2002). Therefore, the monitoring of stormwater is especially important in areas where legacy contaminants are present and could potentially be disturbed by DOE ORR activities.

In FY24, the *CERCLA Site Investigation Project* focused on a stormwater initiative to monitor three areas where legacy COCs were documented near current DOE activities. This project evaluated water contaminants in runoff discharged from two D&D sites and for one construction site. The two buildings undergoing D&D and demolition actions were evaluated for potential impacts of contaminated stormwater runoff to surface water. TDEC data is reviewed alongside monitoring data collected by DOE for a qualitative assessment of surface water quality prior to and after D&D and construction activities. TDEC's independent sampling provides additional samples for independent verification of DOE's findings with respect to potential water quality impacts.

Second, the EMDF construction site in Central Bear Creek Valley (CBCV) was assessed for any contaminated stormwater that could potentially impact the surrounding watershed. In addition to any D&D impacts, construction activities introduced sediments, debris, and other chemicals by disturbing the land. These freed contaminants were either transported by stormwater into a sewer system or directly into nearby surface water. Turbidity levels, along with other measured water quality parameters, were monitored in the stream receiving stormwater from the EMDF construction site.

7.4.2 Problem Statement

DOE D&D Stormwater Monitoring

DOE D&D monitoring BMPs required independent review to verify their protectiveness of human health and the environment. Protocols should be evaluated independently based on whether they adequately prevent contaminants to spread at elevated rates.

In FY24, DOE's D&D stormwater monitoring was conducted at two sites: (1) ORNL Building 2523 Complex, and (2) Y-12 Alpha-2 Complex. Stormwater analyses for Buildings 2523 and Annex 2523A focused solely on radionuclide content; however, other contaminants are known to be present at this site.

D&D SITES STORMWATER INVESTIGATION

Stormwater flowing through ORR demolition sites could potentially pick up contaminants and carry them into stormwater collection systems at both ORNL and Y-12. Once inside the collection system, the stormwater is discharged directly into streams thereby serving as a primary medium of contaminant migration.

1) ORNL

Buildings 2523 and Annex 2523A are located in the southern portion of ORNL at the junction of the White Oak Avenue and First Street (Figure 7.4). The nearest surface water conveyances to Buildings 2523 and Annex 2523A are First Creek to the west and White Oak Creek (WOC) to the south.

Figure 7.4.2.1: ORNL Building 2523 & Annex 2523A

Building 2523 was built in 1955 and served as the ORNL decontamination laundry facility. Annex 2523A is a small, add-on trailer on the north side of Building 2523. Building 2523 is considered low-level radiological facilities. The potential COCs for Building 2523 include radionuclides (U-isotopes, gross alpha/beta), metals (beryllium, lead, cadmium, copper, zinc, low-level mercury), suspended solids, and PCBs. Annex 2523A is an uncontaminated trailer and served as a general storage area (DOE, 2023). Since 2523 includes 2523A as a support facility, the facilities will be referenced as Building 2523 for simplicity in this report.

The structure demolition activities, involving miscellaneous structures around Bldg. 2523, started July 2024. Demolition is now complete, and site stabilization is underway. Sampling activities during FY24 focused on collecting pre-demolition stormwater data.

2) Y-12

The Alpha-2 complex consists of Building 9201-2 (Alpha-2), Building 9732-2, and Building 9501-2 and is in the eastern portion of Y-12. Alpha-2 is a three-story building with a partially concrete basement located north of Upper East Fork Poplar Creek (UEFPC) (Figure 7.4.2.2). Alpha-2 was constructed in 1943 and initially used for the electromagnetic separation of uranium (DOE, 2021). Initial DOE pre-demolition stormwater monitoring at this site indicated potential environmental concerns related to contaminants such as U-isotopes, mercury, beryllium, and PCBs (UCOR, 2024). Consequently, it is necessary to continue monitoring the stormwater discharged from the Alpha-2 site as the demolition work is initiated and progresses.

Figure 7.4.2.2: Location of Alpha-2 Complex

The pre-demolition activities at Alpha-2 began in late 2020 and structure demolition is set for November 2024. Sampling activities during FY24 focused on collecting pre-demolition stormwater data.

EMDF: ENVIRONMENTAL MANAGEMENT DISPOSAL FACILITY LANDFILL

The *Environmental Management Disposal Facility* (EMDF) is the proposed landfill for the disposal of low-level radioactive waste (LLRW) and hazardous waste generated by future remediation activities on the ORR; it is operated under the authority of CERCLA and DOE. The EMDF site is located in Central Bear Creek Valley (CBCV) within an upland area located between north-south trending valleys of Northwest Tributary (NT) -10 and NT-11. Surface water drainages near the site include NT-9, NT-10, and NT-11. Water flow in these drainage channels flows from Pine Ridge to Bear Creek. The drainage includes precipitation, surface runoff, and groundwater that discharges via springs and seeps. (DOE, 2024).

Land disturbances within the EMDF footprint are ongoing as part of Early Site Preparation activities and preparation for the Groundwater Field Demonstration (GWFD). DOE implemented BMPs as part of these construction activities. Bear Creek should be monitored at its confluences with CBCV tributaries to evaluate the effectiveness of the BMPs. The major COCs of EMDF construction were sediments, dust, and debris which can be monitored by measuring turbidity in Bear Creek.

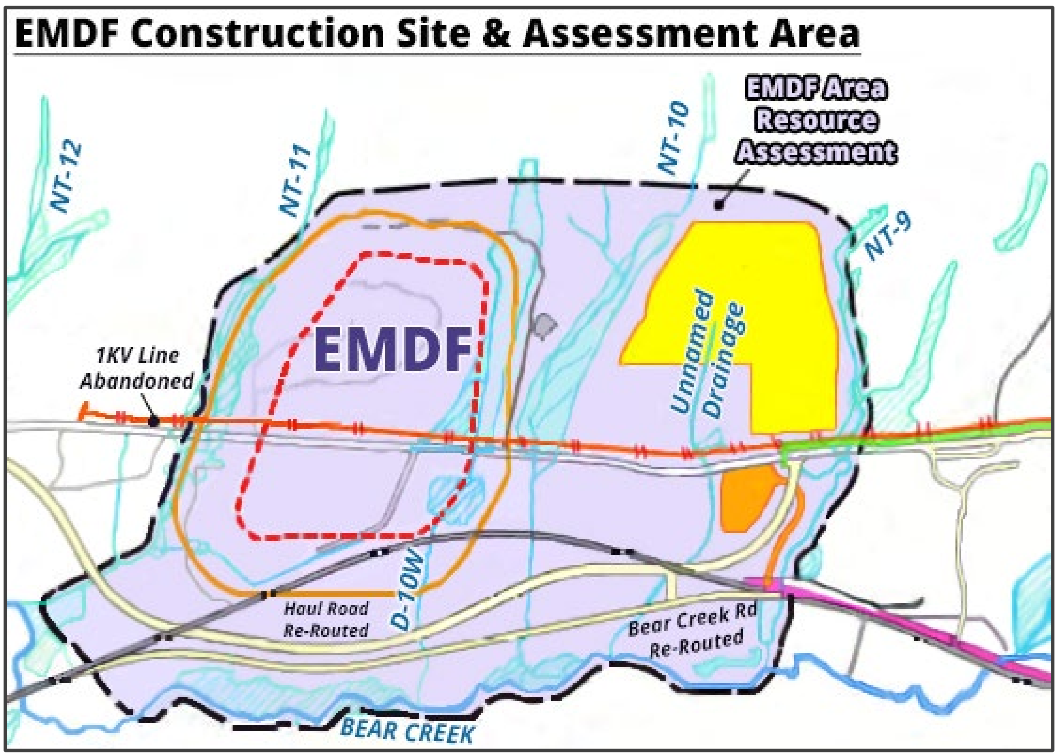

Figure 7.4.2.3: EMDF Construction Site in CBCV (DOE, 2022)

7.4.3 Goals

The planned objectives of this project include:

1) Perform stormwater assessments on D&D projects in ORNL (Bldg. 3005) and Y-12 (Alpha2) to identify COCs potentially carried out from the demolition sites.

2) Conduct surface water investigations on Fifth Creek and EFPC to assess potential environmental impacts caused by D&D activities in ORNL and Y-12, respectively.

3) Conduct groundwater co-sampling at ORNL, Y-12, NT-8 to evaluate impacts of remedial activities, as needed.

4) Perform oversight/assessments on various projects throughout the reservation, including but not limited to accumulated water management, stormwater runoff sampling, surface stream sampling, well sampling/monitoring.

5) Conduct oversight actions to include Review/QC of sampling procedures outlined in DOE/Contractor documentation to determine sampling and monitoring requirements and verify DOE sampling results adhere to negotiated and agreed-upon release criteria.

7.4.4 Scope

D&D Sites Stormwater Investigation

Building 2523 has three (3) stormwater sampling sites and Alpha-2 had two (2) stormwater sampling sites. The locations of these sampling sites are illustrated on Figures 7.4.4.1 and 7.4.4.2 and the analyses for each site are listed in Table 7.4.4.1. One stormwater sampling event was conducted at Building 2523 on June 5, 2024, and two sampling events were conducted for Alpha-2 on August 3, 2023, and January 9, 2024. All three D&D site sampling events were conducted **before** demolition was initiated and these data were utilized to establish a pre-demolition baseline, in combination with DOE's sampling data, prior to the planned D&D activities to ensure demolition compliance with work plans, SOPs, and stormwater BMP performance.

Table 7.4.4.1: FY24 Stormwater Sampling Sites and COCs

Campus	*D&D Bldg.*	*Sites*	*Analyses*
ORNL	*Bldg. 2523*	*2523-SE* *2523-S** *2523-W*	*Metals:* *Beryllium*, ***Lead***, *Cadmium*, ***Copper***, ***Zinc***, *Low Level Mercury (LL Hg)* *Radionuclides:* *α, β, U-isotope* *PCBs:* ***1016, 1221, 1232, 1242, 1248, 1254, 1260*** *Inorganics:* ***Total Suspended Solids***
Y-12	*Alpha-2 9201-2*	*OF-64* *OF-48*	*Metals:* *Ti, Hg*, ***Cu***, ***Pb***, ***Zn*** *PCBs:* ***1016***, ***1221***, ***1232***, ***1242***, ***1248***, ***1254***, ***1260***, *TTL PCBs* *Inorganics:* ***Total Suspended Solids***
** No water sample collected on June 5, 2024, due to insufficient runoff flow; OF = Outfall;* ***Bolded:*** *shared analyses*			

Figure 7.4.4.1: ORNL Building 2523 Complex Sampling Sites

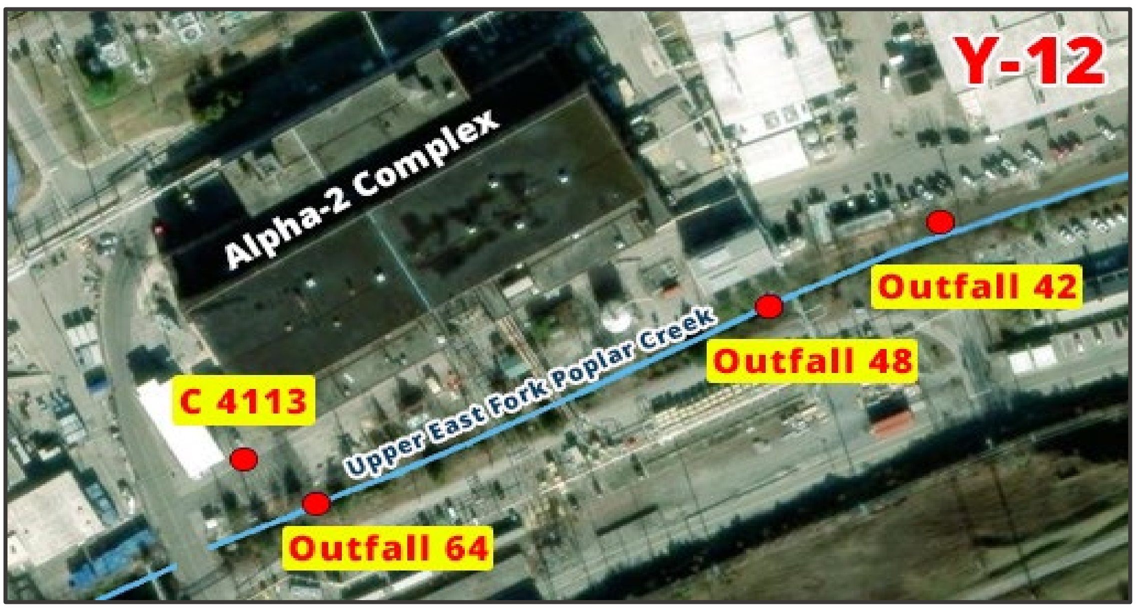

Figure 7.4.4.2: Y-12 Alpha-2 Complex Sampling Sites

EMDF Turbidity Survey

For the EMDF turbidity survey, 10 sampling sites were selected along Bear Creek to allow for comparison of turbidity upstream (U) and downstream (D) of each tributary from NT-9 to NT-12. Sampling sites are listed in Table 7.4.4.2 and the locations are illustrated on Figure 7.4.4.3. Additional water quality parameters were also monitored (Table 7.4.7.6).

Table 7.4.4.2: FY24 EMDF Site Construction Turbidity Parameters

Campus	*Survey Stream*	*Survey Sites*	*Water Quality Parameters*
EMDF	***Bear Creek (BCK) @NT Confluences*** *U – upstream* *D - downstream*	*1. NT-9U* *2. NT-9D* *3. NT-10U* *4. NT-10D* *5. NT-10WU* *6. NT-10WD* *7. NT-11U* *8. NT-11D* *9. NT-12U* *10. NT-12D*	• *pH* • *Temperature* • *Specific Conductivity* • *Dissolved Oxygen (DO)* • *Oxidation-reduction Potential* • *Turbidity*

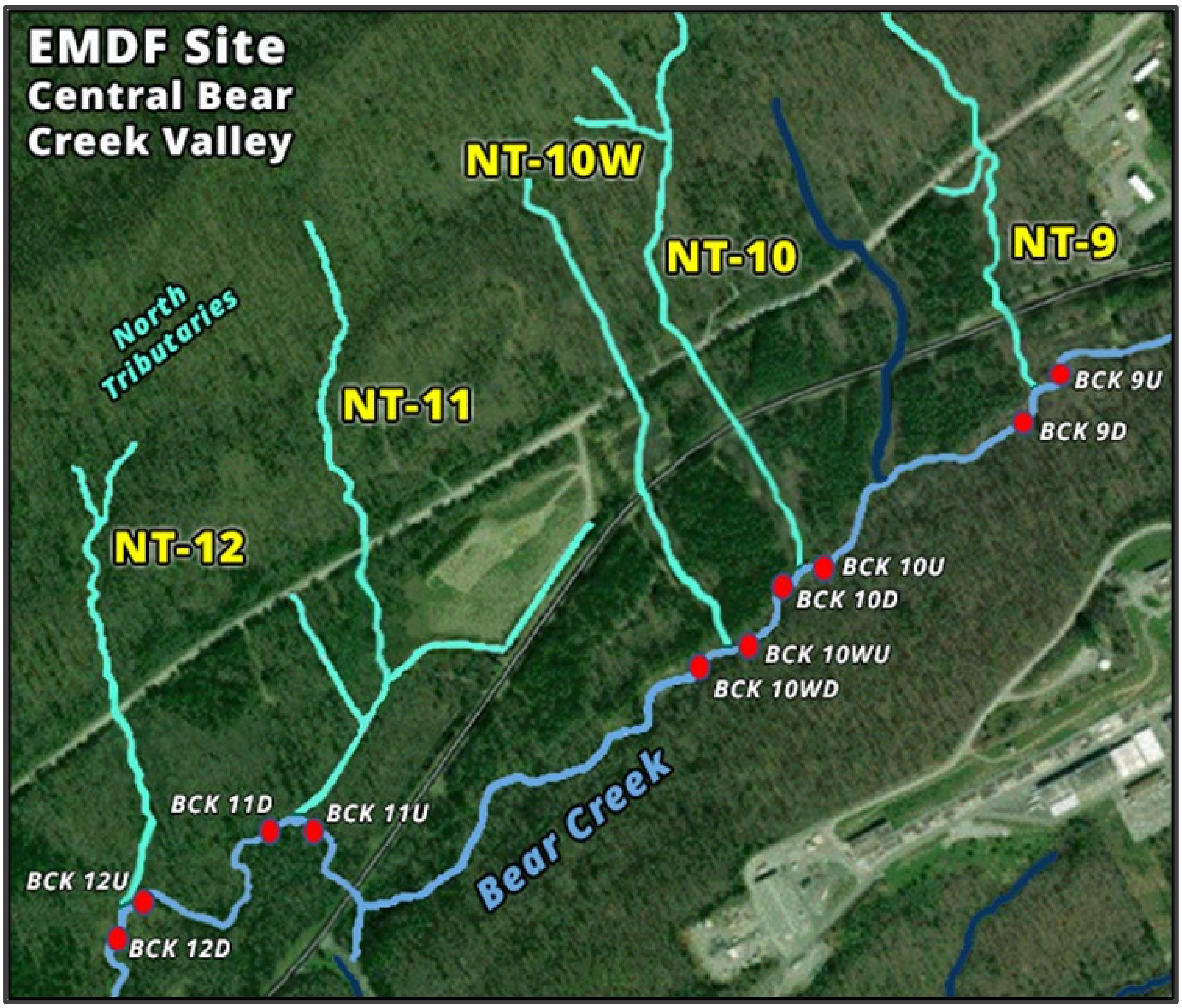

Figure 7.4.4.3: EMDF Turbidity Survey Sites - BCK@NT Confluences

7.4.5 Methods, Materials, Metrics

D&D Site Stormwater Investigation

Sampling protocols, site selection, sampling intervals, and sample sizes followed the guidelines of the *DoR-OR SOP T-710 Stormwater Sampling* and *EPA NPDES Storm Water Sampling Guidance* (EPA, 1992). QA/QC measures, safety protocols, and data analyses followed the procedures outlined in *DoR-OR SOP T710-Stormwater Sampling*.

Stormwater sampling was conducted after qualifying precipitation events. A qualifying event is defined as a rain event that, (1) produces 1 inch or more of measured rainfall within a 24-hour period, (2) causes runoff toward the outfall, and (3) occurs after a dry period, defined as no prior, measurable rainfall (i.e., < 0.1 inch) within a 72-hour period. Stormwater sampling information for D&D sites were summarized in Table 7.4.5.1.

Table 7.4.5.1: Stormwater Sampling Information

Sample Storage	Sample Storage		COCs Sampled
1	250 mL Plastic Bottle [HNO_3]		Copper, Lead, Zinc, Cadmium, Beryllium
2	250 mL Glass Bottle [HNO_3]		Low Level (LL) Mercury
3	500 mL Plastic Bottle [HNO_3]		Gross Alpha, Gross Beta
4	1L Plastic Bottle [HNO_3]		U-isotopes
5	1L Plastic Bottle		TSS: Total concentration of suspended solids
6	100 mL Amber Glass Bottle		PCBs
7	250 mL Plastic Bottle [HNO_3]		Mercury, Copper, Lead, Zinc, Thallium
Sample Types	**D&D Facility**	**Sample Dates**	**Sample Sites**
1-6	Bldg. 2523	06/05/24	ORNL: 2523-SE, 2523-S, 2523-W
5-7	Alpha-2	08/03/23 01/09/24	Y-12: Outfall-64, Outfall-48
[HNO_3]: preservative			

Stormwater samples at site 2523-W were collected with a sampling pole, while a peristaltic pump was used for site 2523-SE. Stormwater samples at Outfall-64 were collected using a grab method, and surface water samples at Outfall-48 were collected with an extension sampling pole.

EMDF Turbidity Survey

Seven (7) EMDF turbidity survey events were conducted, and each turbidity survey was conducted after a precipitation event. The survey dates, field water quality parameters, and associated field meter are listed in Table 7.4.5.2. Field measurements were conducted following the *DoR-OR SOP T-703 Field Use for Water Quality Parameters Instrument* and *DoR-OR SOP T-153 Water Quality Field Instrument Calibration and Maintenance*.

Table 7.4.5.2: EMDF Water Quality Parameters Summary

Water Quality Meter		**Parameters**
YSI Pro DSS Water Quality Meter		pH
		Temperature
		Specific conductivity
		Dissolved Oxygen (DO)
		Oxidation-reduction potential (ORP)
HF Sci Micro TPW Turbidimeter		Turbidity
Streams	**Survey Dates** *(7)*	**Survey Sites** *(10)*
Bear Creek (BCK) Upstream (U) and Downstream (D) of Confluences with Northwest Tributaries at EMDF	07/13/23 08/08/23 11/22/23 12/04/23 12/11/23 04/04/24 06/24/24	**BCK@N-T9:** BCK-9U, BCK-9D **BCK@NT-10**: BCK-10U, BCK-10D **BCK@NT-10W:** BCK-10WU, BCK-10WD **BCK@NT-11:** BCK-11U, BCK-11D **BCK@NT-12:** BCK-12U, BCK-12D
*Notes: **U**: Upstream; **D:** downstream; **NT:** Northwest Tributary of Bear Creek*		

7.4.6 DEVIATIONS FROM THE PLAN

- Bldg. 3005 and Fifth Creek (OF 420) sampling were postponed to FY25 due to changes in the UCOR sampling protocol requirements and modifications to site access requirements in Spring 2024.
  - This sampling was completed in November 2024 following additional coordination with DOE and its contractors, but results will be reported in the FY25 EMR.

- In FY24, shallow groundwater hyporheic-zone sampling was conducted at EFPC. As a result, it was determined that additional groundwater sampling work would be redundant and unnecessary, leading to the decision to cancel groundwater sampling proposed in FY24 EMP. In addition, NT-8 water chemistry and toxicity analysis were conducted by other coworkers.

- No water samples were collected at ORNL site 2523-S on 06/05/2024 due to insufficient runoff flow.

7.4.7 Results and Analysis

D&D Sites Stormwater Investigation

1) ORNL Building 2523

On June 5, 2024, stormwater samples were collected from 2523-W and 2523-SE. The results of this co-sampling event will supplement DOE's pre-demolition baseline data to compare data collected during demolition and post-demolition. Water samples were submitted for analysis of metals, radiological contaminants, TSS, and PCBs. Results are presented in Tables 2.5 and 2.6. PCBs were undetected at both sites.

Table 7.4.7.1: Bldg. 2523 Stormwater - Metals and TSS Results

Date	***Sampling Sites***	***TSS*** *(mg/L)*	***Beryllium*** *(μg/L)*	***Cadmium*** *(μg/L)*	***Copper*** *(μg/L)*	***Lead*** *(μg/L)*	***Zinc*** *(μg/L)*	***LL Hg*** *(μg/L)*
06/05/24	2523-SE	9.07	0.308 J	0.932 J	72.4	8.97	0.00077	9.90
	2523-W	37.6	0.190 U	0.308 J	5.35	5.71	0.000413 O1	6.81

U*: Non-detect;* ***J****: Estimated between method detection limit (MDL) and method quantitation limit (MQL}*
O1*: Analyte failed the method required serial dilution test and/or subsequent post-spike criteria, matrix interference.*
LL Hg*: low-level mercury*

Table 7.4.7.2: Bldg. 2523 Stormwater - Radionuclides Results

Sample Date	**Sampling Sites**	*Radionuclides Unit: pCi/L*				
		Alpha	***Beta***	***U-233/234***	***U-235/236***	***U-238***
06/05/2024	2523-SE	1.59	5.39	0.229 J	0.0253 U	0.344
	2523-W	0.785 J	3.10	0.143 J	-0.0179 U	0.0318 U

U*: Non-detect;* ***J****: Estimated between method detection limit (MDL) and method quantitation limit (MQL)*

These pre-demolition data will be compared to data collected during Building 2523 demolition and post-demolition to evaluate potential impacts to surface water quality resulting from this D&D work. Demolition and post-demolition sampling results will be recorded in the FY25 EMR.

DOE conducted co-sampling with TDEC DoR-OR during the same day; the co-sampling data was focused on radionuclides only. The laboratory results for the co-sampling event have not been received at the time of this report; therefore, the co-sampling data comparison will be incorporated into the FY25 EMR report.

2) Y-12 Alpha-2 Complex

Outfall-64 and Outfall-48 have been sampled by DoR-OR since January 25, 2023. Sampling data was recorded in the FY23 EMR and presented in the tables below. In FY24, the outcome of sampling events is detailed in Table 7.4.7.3. For Outfall-48, metals including copper, zinc, mercury, and lead were higher than the level detected at Outfall-64. For copper, mercury, and lead, the highest concentrations were detected at site Outfall-48 on January 9, 2024.

With demolition work scheduled to begin in November 2024, these data can serve as baseline information for future Alpha-2 D&D analysis and comparison.

Table 7.4.7.3: Alpha-2 Complex Stormwater – Metals & Inorganics Results

Sampling Site	*Date*		*TSS (mg/L)*	*Zinc (µg/L)*	*Copper (µg/L)*	*Lead (µg/L)*	*Thallium (µg/L)*	*Mercury (µg/L)*
OF-64	FY23	1/25/2023	-*	29.1	4.31	1.07	0.579 U	-
	FY24	8/03/2023	-	0.0421	8.12	1.62 J	0.121 U	0.100 U
		1/09/2024	2.50 U	0.0186 J	2.92 J	0.849 U	0.121 U	0.100 U
OF-48	FY23	1/25/2023	-	33.3	5.73	0.633 J	0.579 U	-
	FY24	8/03/2023	-	0.0446	12.6	1.88 J	0.121 U	0.233
		1/09/2024	58.8	0.0321	19.4	2.01	0.121 U	0.357
**There was no data analyzed at this sampling event due to insufficient runoff volume.*						***OF**: outfall*		

In FY24, DOE conducted one (1) pre-demolition sampling event at site C4113 and nine (9) pre-demolition sampling events at site Outfall-42 (see Table 7.4.7.4). DOE sampling location C-4113 (Figure 2.5) is a catch basin that diverts water to a stormwater conveyance pipe which discharges into UEFPC at Outfall-64. Outfall-42 is located in UEFPC, approximately 200 ft downstream of Outfall-48. Stormwater data collected at C-4113 and Outfall-42 were obtained from Oak Ridge Environmental Information System (OREIS). The combined DOE and TDEC DoR-OR data can serve as a reference for the stormwater quality for the Alpha-2 site prior to demolition.

Table 7.4.7.4: DOE Alpha-2 Complex Stormwater Monitoring (FY24)

Site	**Date**	***(mg/L)***	***(µg/L)***				
		TSS	**Zinc**	**Copper**	**Lead**	**Thallium**	**Mercury**
C-4113	3/07/2024	3.83 J	16.6	3.83	0.5 U	0.125 U	0.00747
OF- 42*	7/13/2023	2.34 J	39.2	8.72	0.5 U	0.125 U	0.39
	8/15/2023	3	13.7	4.04	0.5 U	0.178 J	0.504
	9/11/2023	1.7 J	33.1	13	0.5 U	0.223 J	0.454
	10/17/2023	7.42 J	32.6	12.2	0.5 U	0.125 U	0.739
	11/07/2023	1.7 J	33.4	7.21	0.5 U	0.125 U	0.65
	12/04/2023	1.52 J	20.1	5.85	0.5 U	0.125 U	0.543
	1/04/2024	1.5 J	21.7	11.3	0.5 U	0.125 U	0.479
	2/15/2024	3.70	16.3	12	0.5 U	0.125 U	0.492
	3/21/2024	3.5	22.2	24	0.5 U	0.125 U	0.448
							0.177
*OF: Outfall; * Samples were collected instream (UEFPC), adjacent to the Outfall-42*							

EMDF Turbidity Survey

To measure EMDF landfill construction impact on Bear Creek, the turbidity was measured along Bear Creek between BCK-9U to BCK-12D (Table 7.4.7.5). The variability of turbidity across the ten sites demonstrated in a Figure 7.4.7.1and Figure 7.4.7.2.

Turbidity

Sediment from construction related activities can be washed out and carried into nearby streams, increasing turbidity in the water. The turbidity in the stream can be impacted by multiple factors such as precipitation duration, intensity, dry days, change of land use, as well as land disturbance. Some states require turbidity downstream of construction activities not to exceed 5 NTU over background measurements when the background is 50 NTU or less. Increases in turbidity cannot exceed 10% when the background turbidity is greater than 50 NTU (EPA, 2022a), (WSDOT, 2018). The EPA has set a turbidity benchmark of 50 NTU for nearby streams affected by construction activities (EPA, 2022b). This report uses the EPA 50 NTU turbidity benchmark for comparison since the State of Tennessee does not have aquatic life turbidity criteria in freshwater.

Table 7.4.7.5: EMDF Turbidity

BCK Sites	*Turbidity (NTU)*						
	7/13/23	*8/8/23*	*11/22/23*	*12/4/23*	*12/11/23*	*4/4/24*	*6/24/24*
BCK-9U	3.52	18.85	8.66	11.83	30.04	7.67	7.49
BCK-9D	-*	19.1	8.91	12.08	29.8	10.71	2.85
BCK-10U	3.49	18.54	9.32	11.7	30.13	8.82	2.62
BCK-10D	3.32	20.25	12.57	16.75	31.78	21.88	3.47
BCK-10WU	3.55	20.31	9.42	11.19	30.26	9.08	5.36
BCK-10WD	4.36	19.95	24.64	11.29	43.62	10.25	6.1
BCK-11U	3.8	17.38	12.26	11.0	30.02	8.47	5.89
BCK-11D	2.96	17.17	15.11	11.18	29.59	26.53	5.08
BCK-12U	3.93	19.22	23.42	11.21	30.74	8.81	-
BCK-12D	6.99	18.25	29.1	13.76	30.76	9.48	-
** There are no data collected at this site*							

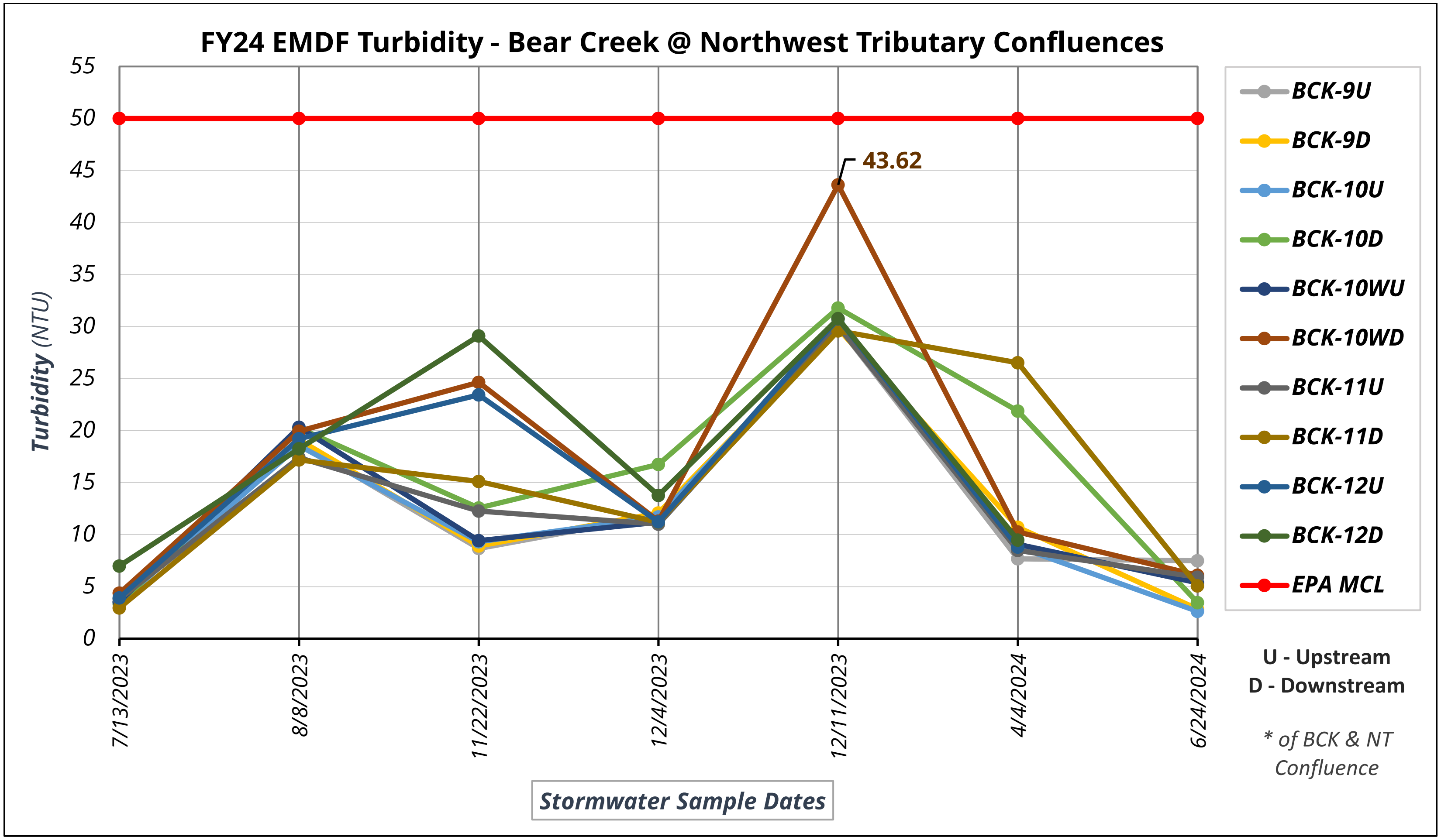

Figure 7.4.7.1: EMDF Turbidity

This report uses a line chart and box plot to visually illustrate the turbidity levels monitored at Bear Creek. Line charts connect data points to show changes after precipitation events, while box plots show the distribution of numeric data values, especially when comparing them between each site.

As shown in Figure 7.4.7.1, the highest turbidity (43.62 NTU) was detected at BCK-10WD on December 11, 2023. This value does not exceed the 50 NTU EPA benchmark turbidity criteria. The peak turbidity over all ten sites was measured on December 11, 2023, while the lowest turbidity was measured on July 13, 2023, for all sites except site BCK-9D and BCK-10U. The box plot (Figure 7.4.7.2) indicates that site BCK-12D has the highest mean turbidity values compared with all other sites. The mean and median turbidity values across other sample locations were very similar.

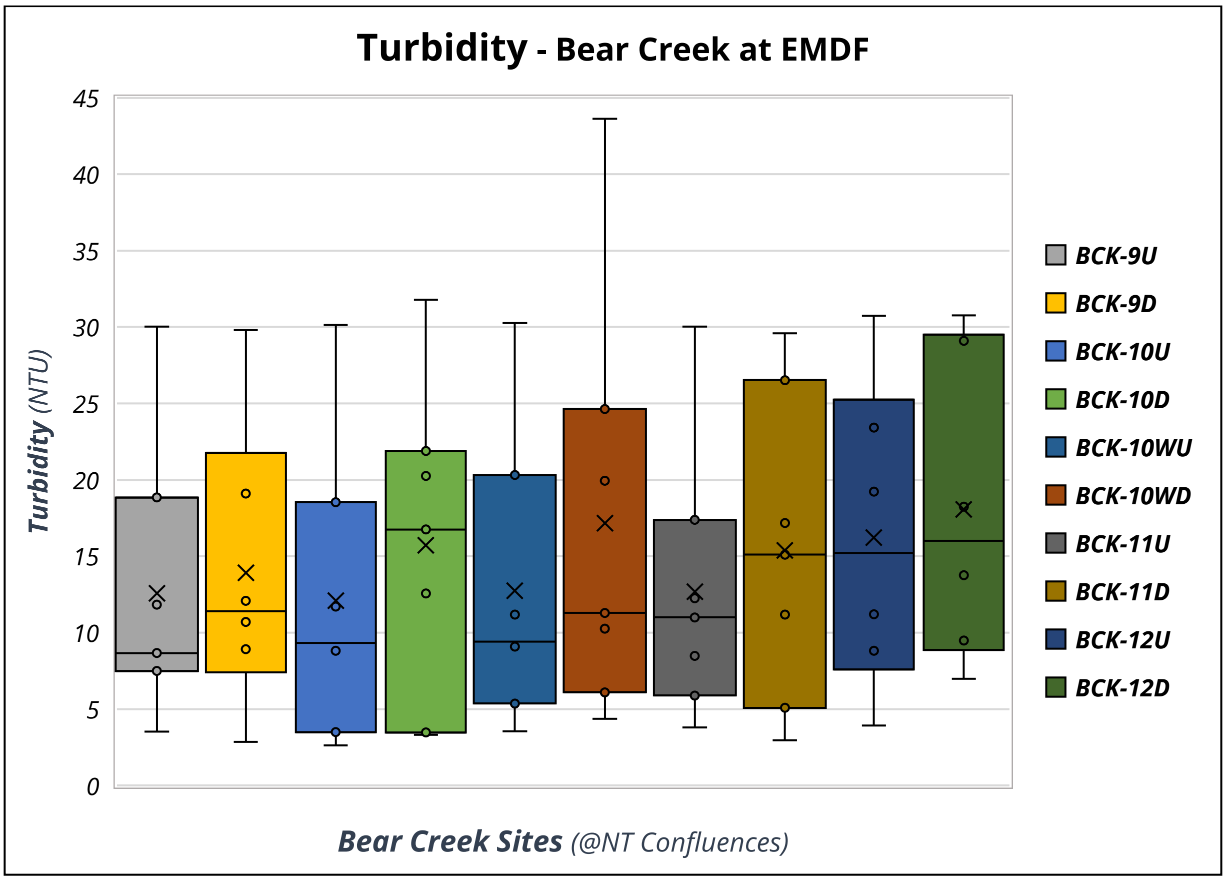

Figure 7.4.7.2: EMDF Turbidity

Additional water quality parameters, including pH, specific conductivity, DO, temperature, and ORP, were monitored along Bear Creek in addition to turbidity. The water quality parameter data collected along Bear Creek from July 2023 to June 2024 are listed in Table 7.4.7.6.

Table 7.4.7.6: EMDF *Water Quality Parameter – Monitoring Results

Site	*	Monitoring Data						
		07/13/23	08/08/23	11/22/23	12/04/23	12/11/23	04/04/24	06/24/24
BCK-9U	**pH** (Std. Unit)	7.82	7.73	7.44	7.54	7.47	7.66	7.89
BCK-9D		-	7.75	7.5	7.57	7.43	7.65	7.9
BCK-10U		8.23	7.85	7.77	7.71	7.63	7.83	8.09
BCK-10D		8.77	7.82	7.72	7.62	7.55	7.81	8.11
BCK-10WU		8.3	7.92	7.83	7.86	7.58	7.91	8.16
BCK-10WD		8.3	7.9	7.83	7.93	7.61	7.93	8.17
BCK-11U		8.28	7.99	7.85	7.87	7.64	7.98	8.16
BCK-11D		8.32	7.98	7.91	7.84	7.62	8.18	8.18
BCK-12U		8.33	8.02	7.84	7.94	7.71	8.09	-
BCK-12D		8.27	8.01	7.77	7.9	7.76	7.97	-
BCK-9U	**Conductivity** (uS/cm)	467.3	393.7	505	484.5	362.5	365.1	493
BCK-9D		-	393.4	506	485	362.8	364.6	492.5
BCK-10U		524.9	397.4	499.8	484.5	360	348.5	491.3
BCK-10D		521.7	373.1	497.6	473.5	358.2	241.3	492.3
BCK-10WU		518	386.1	491.5	483.9	357.4	336	490.2
BCK-10WD		518.2	385.7	491.4	483.8	357.3	318.5	490.1
BCK-11U		511.4	318.7	455	481.2	350.9	331.2	485.9
BCK-11D		508.1	379.6	451.6	479.4	351.1	329.9	481.3
BCK-12U		497.4	370.5	433.9	474	346.3	319.9	-
BCK-12D		497.2	370.3	429	470	343	313.9	-
BCK-9U	**DO** (mg/L)	7.47	8.66	8.74	9.58	10.65	10.92	8.96
BCK-9D		-	8.69	8.73	9.68	10.58	10.57	9.07
BCK-10U		6.72	8.96	9.61	10.23	10.88	10.87	8.93
BCK-10D		8.12	8.91	9.41	9.67	10.81	10.64	8.87
BCK-10WU		8.58	9.08	9.63	10.42	10.91	10.89	8.89
BCK-10WD		8.57	9.1	9.69	10.35	10.94	10.69	8.93
BCK-11U		8.49	9.2	9.61	10.58	11.09	11.2	8.61
BCK-11D		7.78	9.2	9.7	10.62	10.97	11.16	8.43
BCK-12U		8.37	9.33	9.58	11.07	11.09	11.12	-
BCK-12D		7.55	9.34	9.56	10.81	11.06	11.9	-
BCK-9U	**Temperature** (°C)	15.3	20	12.5	11.7	9.4	11.9	17.2
BCK-9D		-	20	12.5	11.6	9.4	11.9	17.4
BCK-10U		16.3	20.1	-	10.8	9.2	11.8	18.8
BCK-10D		16.2	20.3	11.8	10.7	9.2	11.4	18.8
BCK-10WU		16.5	20.4	11.5	10.5	9.1	11.7	19
BCK-10WD		16.7	20.4	11.5	10.5	9.1	11.8	19.3
BCK-11U		18.5	20.9	11.2	9.9	8.5	11.5	22.3
BCK-11D		18.8	21	11.1	9.9	8.5	11.5	22.4
BCK-12U		21.6	21.3	11.1	9.6	8.5	11.4	-
BCK-12D		21.3	21.3	11.1	9.7	8.5	11.5	-

Site	*	EMDF Monitoring *Water Quality Parameter – Results (Continued)						
		07/13/23	08/08/23	11/22/23	12/04/23	12/11/23	04/04/24	06/24/24
BCK-9U	ORP (mv)	205	182	160.9	253.8	206.1	156.3	192.9
BCK-9D		-	130.9	178.8	248.3	209.2	153.1	185.9
BCK-10U		175.6	152.7	183.6	218.2	229.4	185.6	161.2
BCK-10D		174.4	142.9	193.5	219.4	230.4	176.9	159.9
BCK-10WU		174.3	176.1	168.9	238.9	213.1	176	172.9
BCK-10WD		173.6	153.7	169.1	219.8	208.3	149	167.8
BCK-11U		177.4	186.4	197.5	144.9	241.2	192.5	164
BCK-11D		120.4	163	198.1	170.8	234.2	174.7	154.4
BCK-12U		161.9	152.8	181.3	219.2	130.7	206.5	-
BCK-12D		159.6	153.4	187.7	217	111.1	200.3	-

pH

In streams, pH is a measure of the activity of the hydrogen ion (H+). U.S. EPA water quality criteria for pH in freshwater suggest a range of 6.5 to 9.0 (EPA, 2024). Freshwater lakes, ponds and streams usually have different pH levels depending on the surrounding soil and bedrock, season, precipitation, and/or human activities. The measured pH values in Bear Creek ranged from 7.43 (BCK-9D) to 8.77 (BCK-10D). As illustrated in Figure 7.4.7.3, the lowest and highest mean pH value was measured in BCK-9D and site BCK-11D.

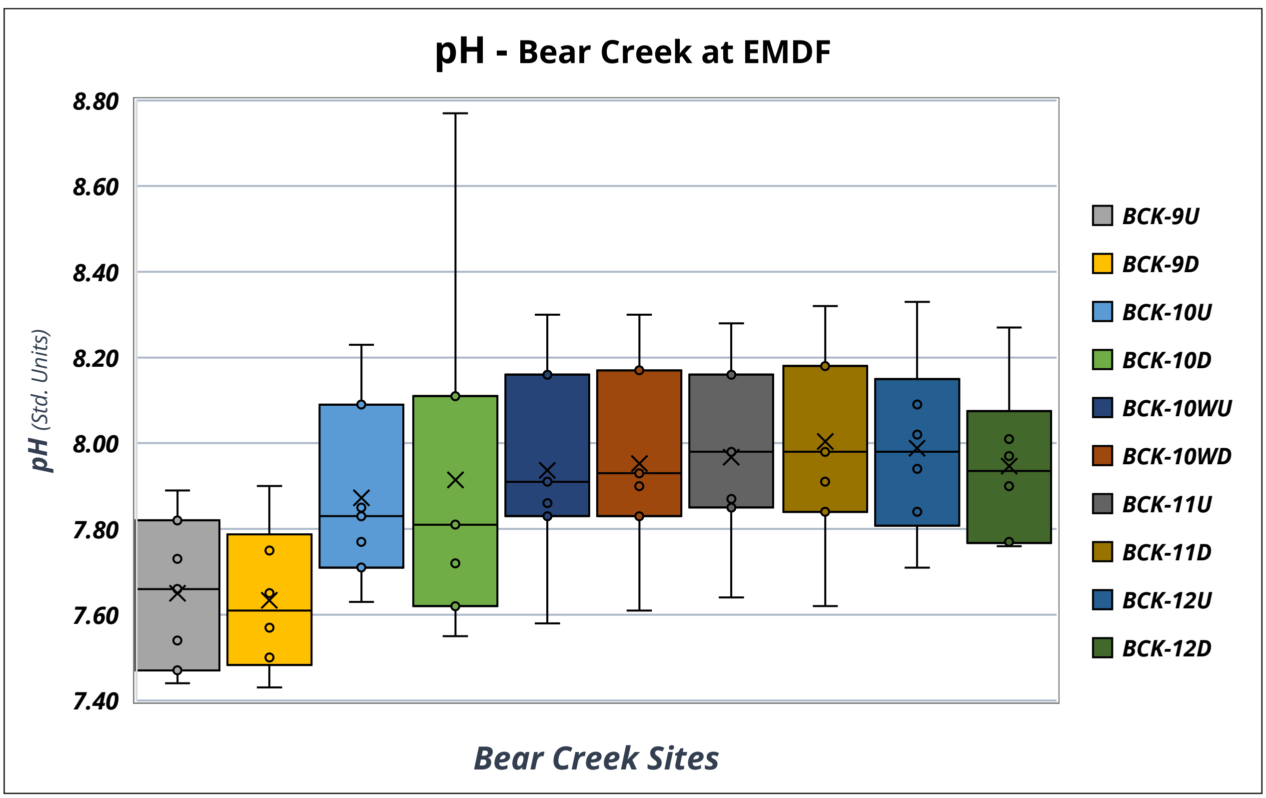

Figure 7.4.7.3: EMDF pH

Temperature

Water temperature is an important physical property of surface water. Seasonal variations in stream temperature may be caused by changing air temperature, solar angle, precipitation, and human activities related to the stream and watershed. The highest and lowest average water temperature (Fig. 7.4.7.4) was measured at site BCK-11D and site BCK-9D, respectively.

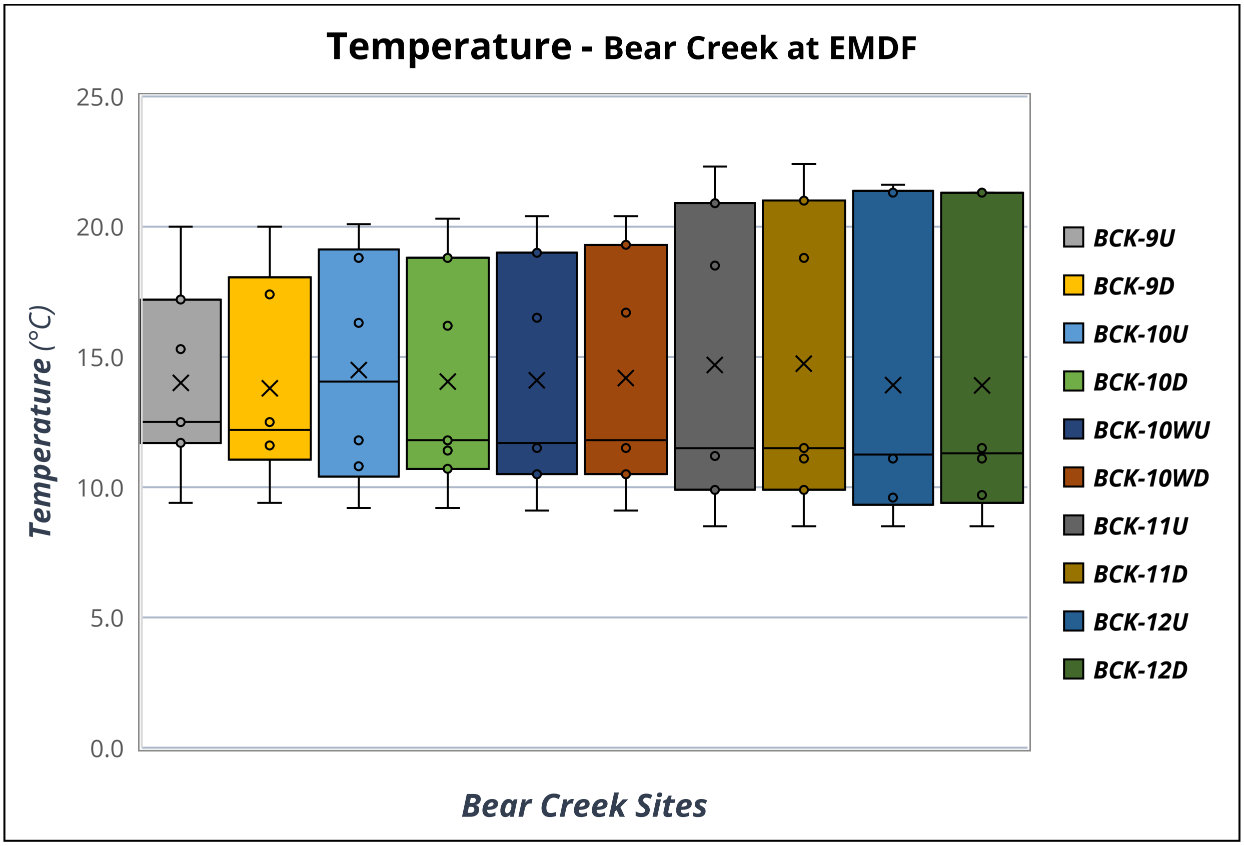

Figure 7.4.7.4: EMDF Temperature

Conductivity

Conductivity is a measure of the ability of water to pass an electrical current. Conductivity in water is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, phosphate anions, calcium, iron, and aluminum. For most major rivers, the mean conductivity is between 200 to 1000 µS/cm. The highest conductivity among all the monitoring sites was measured at site BCK-10U with a value of 524.9 µS/cm on July 13, 2023 (Figure 7.4.7.5).

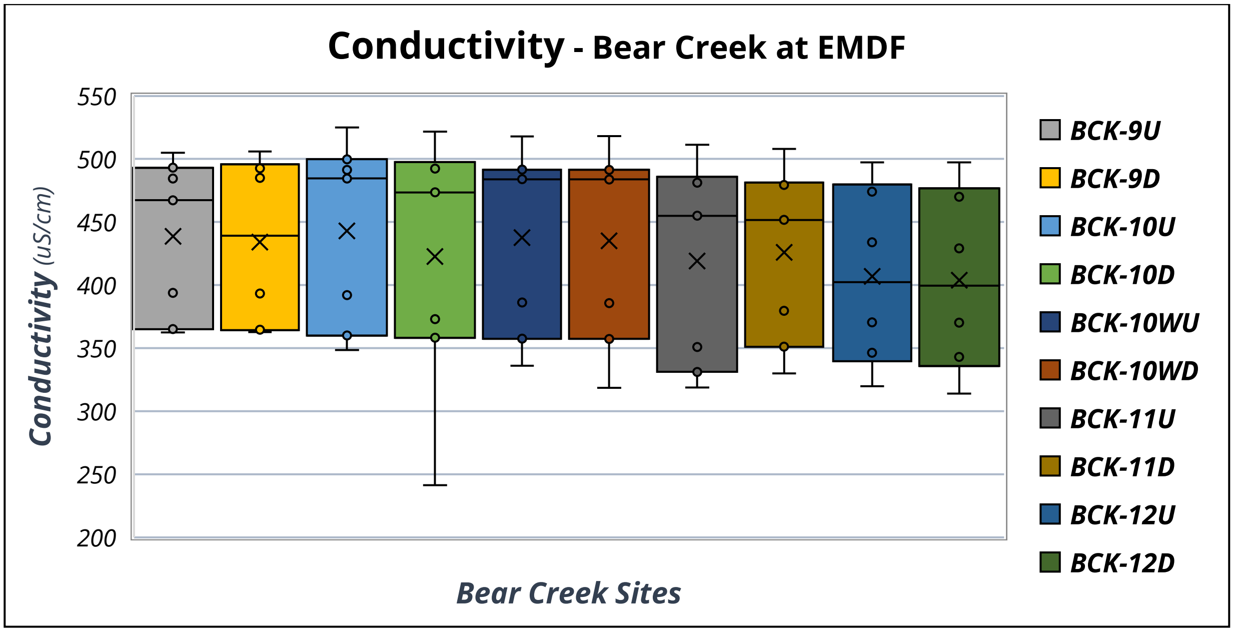

Figure 7.4.7.5: Conductivity in Bear Creek

Dissolved Oxygen

DO indicates oxygen gas concentration incorporated in water. It represents the metabolic activities of aquatic organisms and serves as an important indicator of water quality. DO values were collected July 2023 to June 2024. Mean values of DO range from 9.28 to 10.09 mg/L (Figure 7.4.7.6). Site BCK-12U had the highest mean oxygen concentration, while BCK-9U was measured with the lowest mean concentration of DO over all sites.

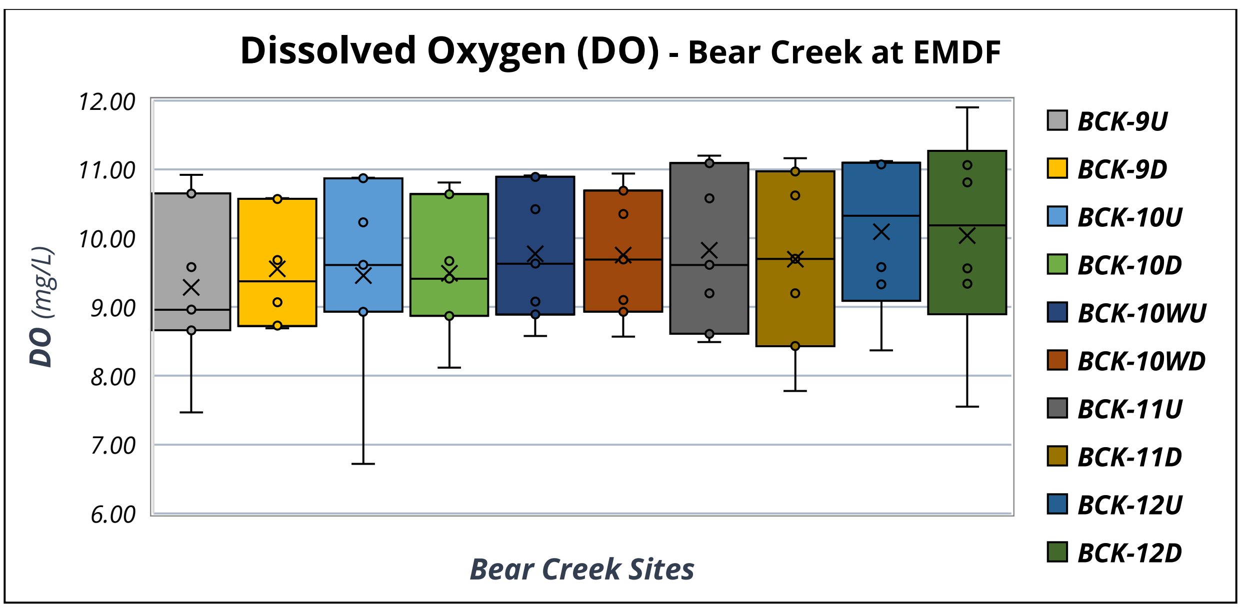

Figure 7.4.7.6: DO in Bear Creek

ORP

Oxidation-reduction potential (ORP) measures the ability of a surface water to break down waste products, such as contaminants, dead plants, and animals (Government of Northwest Territories, 2024). A higher ORP value means higher levels of oxygen content in the water. In this report, the mean ORP value was between 171.5 to 193.9 mv (Fig. 7.4.7.7).

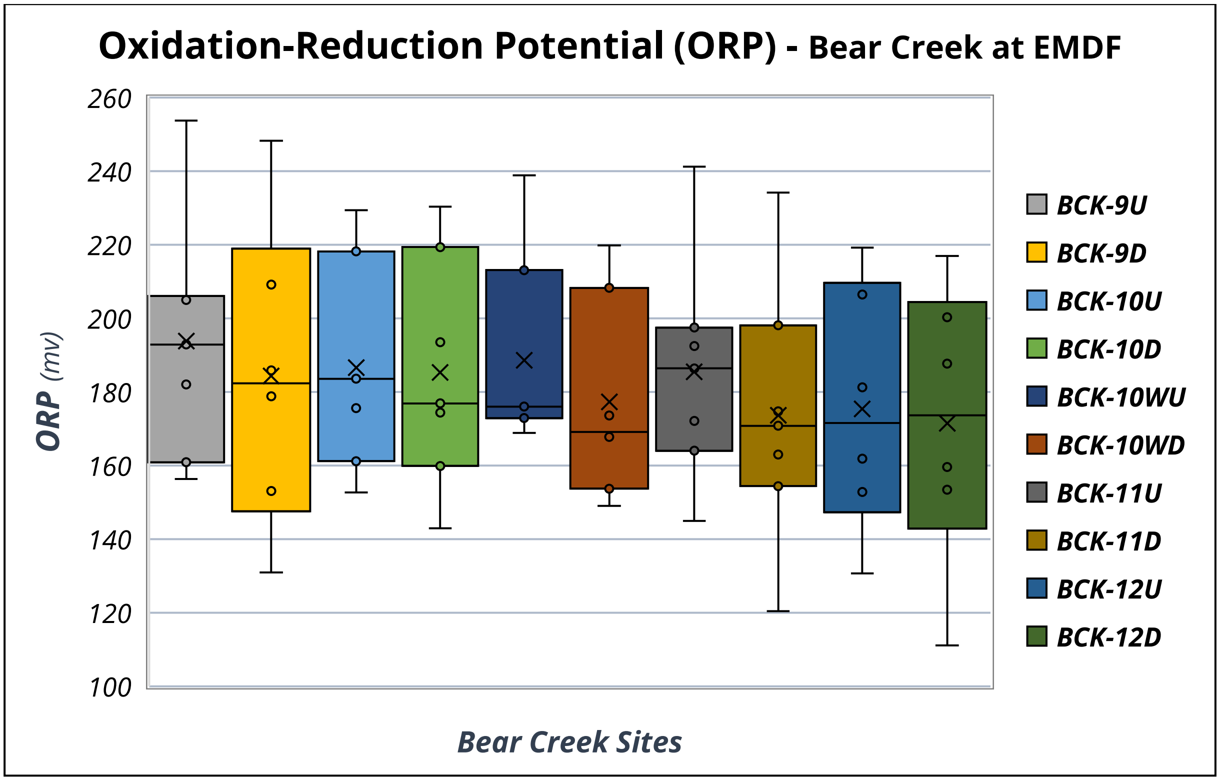

Figure 7.4.7.7: ORP in Bear Creek

7.4.8 Conclusion

In FY24, TDEC DoR-OR initiated the collection of stormwater samples from two distinct D&D sites: Building 2523 at ORNL, as well as Alpha-2 at Y-12. This assessment project was aimed at supplementing a DOE pre-demolition baseline dataset reflecting the existing conditions before the demolition activities at Building 2523 and Alpha-2. This report also provides additional Alpha-2 D&D stormwater data collected by DOE for reference.

Based on the EMDF turbidity survey data, all FY24 turbidity measurements from Bear Creek were less than the 50 NTUs (i.e. EPA turbidity MDL).

All data reported in this FY24 EMR represent pre-demolition conditions and will be compared to water quality during demolition and post-demolition conditions in FY25 or future EMRs.

7.4.9 Recommendation

As D&D activities progress and transition to new locations within ORNL and Y-12, there exists the potential for adverse impacts on the surrounding surface waters due to stormwater runoff discharge from the demolition sites. Thus, DoR-OR recommends the continued stormwater monitoring oversight of landfill construction as well as D&D activities at both Y-12 and ORNL. TDEC will continue to address potential concerns related to contaminant mobility that may arise during these ongoing activities.

7.4.10 References

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8.0 SEDIMENT SAMPLING

8.1 SUSPENDED SEDIMENT SAMPLING PROJECT

8.1.1 BACKGROUND

Sediment is an important part of aquatic ecosystems. Many aquatic organisms depend on sediment for habitat, sustenance, and reproduction. Anthropogenic chemicals and waste materials, such as metals, radionuclides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and agricultural chemicals that are introduced into aquatic systems often accumulate in sediments. Contaminants may accumulate in sediments such that their concentrations are higher than in the water column. Some sediment contaminants may be directly toxic to benthic organisms or may bioaccumulate in the food chain, creating health risks for wildlife and humans. Sediment analysis is an important aspect of environmental quality and impact assessment for rivers, streams, and lakes.

Sediment samples were collected at East Fork Poplar Creek (EFK 23.4, EFK 2.2), Bear Creek (BCK 7.6, BCK 3.3), and at a tributary to Bear Creek, Northwest Tributary-5 (NT-5). Mill Branch is a tributary of East Fork Poplar Creek (EFPC) and is used as a background stream (MBK 1.6). Figure 8.1.4.1 shows the locations of the TDEC DoR-OR sediment traps. Sediment samples collected in FY24 were analyzed for radiological activity and metals. The discussion below also includes data collected as far back as 2021 in order to evaluate trends over a period of time.

DOE does not currently monitor suspended stream sediment in ORR streams. The contaminant concentrations in suspended stream sediment help fill a gap in DOE's data and provides further insight into contaminant movement through the environment.

8.1.2 PROBLEM STATEMENTS

ORR exit pathway streams are subject to contaminant releases from activities at ETTP, ORNL, and Y-12. These contaminant releases have been detrimental to stream health in the past and present. Identified issues include:

- Large quantities (11 million kilograms) of elemental mercury were used at the Y-12 plant from 1950 to 1963 for a lithium isotope separation process. Loss of mercury to the air, soil and to East Fork Poplar Creek (EFPC) are estimated to be 3% of the mercury used at the site. Mercury continues to be released to the creek from contaminated soil and groundwater sources at Y-12 (Brooks and Southworth, 2011).

- The headwaters of EFPC contribute roughly 1,000 ng/L chronic base flow concentrations of total mercury to the stream (Southworth et al., 2013).

- Besides mercury, other metals that have been found in ORR exit pathway streams at levels greater than background are cadmium, chromium, lead, nickel, silver, and zirconium (DOE, 1992).

8.1.3 Goals

The *Suspended Sediment Monitoring Project* monitors contaminants in suspended sediments due to releases from the various DOE operations across the ORR. The data obtained from the sediment traps is used to assess the extent of sediment transport contamination in both Bear Creek and EFPC to provide a baseline of data to compare to future data.

The goal of the suspended sediment project is to evaluate a component of stream health through sampling and analysis of contaminants in suspended sediment. Additionally, analytical data is used to assess site remediation efforts through long-term monitoring of contaminant concentrations. Finally, data trends are evaluated, based on findings, to make recommendations in order to improve sediment quality and the health of affected streams.

8.1.4 Scope

This project evaluates the concentrations of contaminants of concern (COCs) in suspended sediments in EFPC and Bear Creek. Stream sediment is collected via passive sediment collectors (sediment traps) at three locations in Bear Creek (BCK 3.3, BCK 7.6, and NT-5), two locations in EFPC Valley (EFK 2.2 and EFK 23.4), and one location in Mill Branch (MBK 1.6) the reference stream. The data discussed includes FY24 as well as four years of prior data. This project does not have a comparable DOE counterpart at the present time. As such, it provides independent data to assist in the evaluation of suspended sediments.

Table 8.1.4.1: Sample Sites

Site Description	Name	Latitude	Longitude
East Fork Poplar Creek Kilometer 23.4	EFK 23.4	35.99596	-84.24004
East Fork Poplar Creek Kilometer 2.2	EFK 2.2	35.95169	-84.3716
Bear Creek Kilometer 3.3	BCK 3.3	35.94354	-84.34911
Bear Creek Kilometer 7.6	BCK 7.6	35.95094	-84.31455
Northwest Tributary 5 of Bear Creek	NT-5	35.96633	-84.29031
Mill Branch Kilometer 1.6	MBK 1.6	35.98560	-84.28722

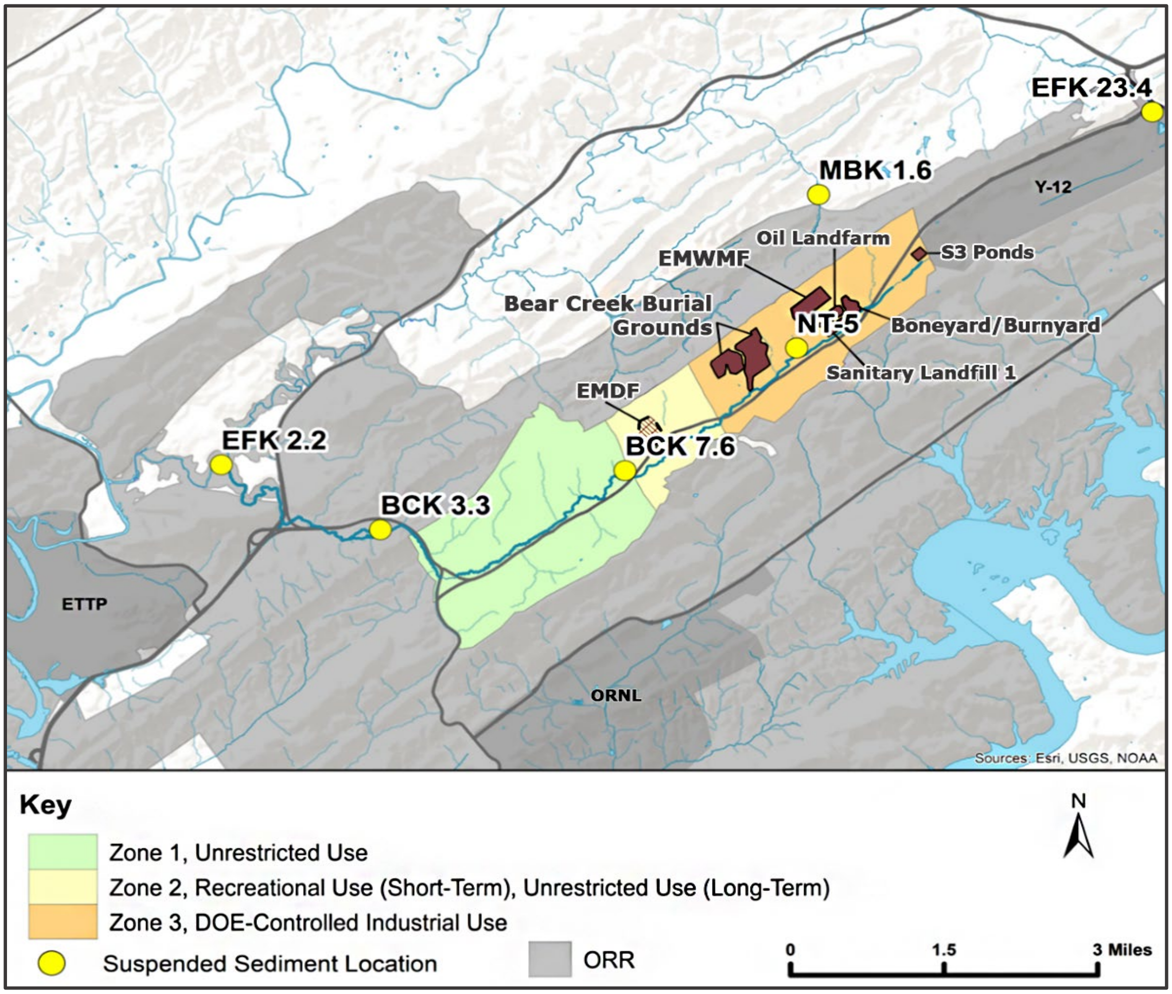

Figure 8.1.4.1: Suspended Sediment Sampling Locations

The locations of each sediment trap were selected in order to monitor the specific ORR components as detailed below.

- The sediment trap at NT-5 is used to detect contaminant releases from EMWMF.

- The sediment traps at BCK 7.6 and BCK 3.3 provides important baseline data for assessing the condition of sediments leaving the Bear Creek watershed and emptying into the Clinch River. The Clinch River and the lower segments of Bear Creek are publicly accessible and there may be exposure to sediments for users of these waterways.

- EFK 23.4 provides information about suspended contaminants leaving Y-12 via the EFPC watershed.

- EFK 2.2, just downstream of the Bear Creek embayment, provides data about the confluence of suspended sediments from EFPC and Bear Creek.

- Mill Branch (MBK1.6) provides background reference data.

8.1.5 Methods, Materials, Metrics

To monitor changes in contaminant flow through suspended sediment transport, sediment traps were deployed at EFK 23.4, EFK 2.2, BCK 7.6, NT-5, BCK 3.3, and at MBK 1.6.

The procedure used for this project is the TDEC DoR-OR *Standard Operating Procedure for Sediment Sampling* (TDEC DoR-OR, 2022). Suspended sediment samples are collected via fixed sediment collection devices (traps). Sediment traps are installed in a stream bed and positioned to accommodate the most considerable flow through the body of the trap. Suitable sites are limited in a stream; thus, careful consideration must be given to the selection of installation locations for the sediment traps. For optimal functioning of the sediment traps, water flow and depth must be sufficient to provide a strong flow into the trap while keeping the trap submerged at both ends so that the entry and exit ports are underwater. Sediment traps are regularly maintained to ensure there are no clogs preventing sediment accumulation within the collection device.

Following a period of time to allow for sediment accumulation (minimum of five months), the collected sediment is emptied from a sediment trap and is transferred to a clean bucket where the sediment is allowed to settle for three days. The sediment samples are preserved during the settling process with an ice bath surrounding the sample containers. After the sediment has settled, the supernatant water is carefully drawn off from the sample with a peristaltic pump. Sediment samples are spooned from the bucket into sample containers of appropriate size and material for the requested analyses.

The sediment traps were sampled on May 3, 2024. Sediment samples were analyzed for metals (cadmium, lead, mercury, and uranium) and radiological parameters (gross alpha, gross beta, and isotopic uranium). The metals data were compared with the *Consensus-Based Sediment Quality Guidelines (CBSQGs)* (MacDonald et al, 2000) using the Probable Effect Concentration (PEC) and to EPA RSLs when the CBSQGs were not available. Radiological data were compared to the EPA Preliminary Remediation Goals (PRGs) and to the data from the background location (MBK 1.6) when PRGs were not available.

8.1.6 Deviations from the Plan

Two sampling events were planned for collection of suspended sediment, however in FY24 only one sampling event was conducted. Samples were not collected in the fall of 2023. Additionally, during one sampling event it was planned to analyze samples for polychlorinated biphenyls

(PCBs), and per- and polyfluoroalkyl substances (PFAS) compounds. Due to the missed collection in fall of 2023 the PCB and PFAS analyses were not conducted.

8.1.7 RESULTS AND ANALYSIS

The CBSQGs PECs were used for comparison to the metals data. The PECs are concentrations above which harmful effects are likely to be observed (MacDonald et al. 2000). Harmful effects, in this case, refer to the effects on benthic macroinvertebrate species only (WDNR 2003). The CBSQGs are considered protective of human health and wildlife except where bioaccumulative or carcinogenic organic chemicals, such as PCBs or methylmercury, are involved.

In the case that CBSQGs were not available, EPA RSLs or PRGs were utilized. RSLs and PRGs are risk-based screening levels that correspond to fixed levels of risk in soil, air, and water. These concentrations are derived from standardized equations combining exposure information assumptions with EPA toxicity data (EPA 2022). Screening criteria are not cleanup standards, but are used to identify areas, contaminants, and conditions that require attention at a site (EPA 2022). For selection of the screening criteria a residential scenario was utilized with a Target Risk (TR) of 10^{-5} and Target Hazard Quotient (THQ) of 1.0.

In addition, sample results were compared to data from MBK 1.6, the background site. The following graphs and associated charts follow the sediment data through recent years. Blanks in the following charts (Figure 8.1.7.1 - 8.1.7.9), signify the parameter was not analyzed in that year.

CADMIUM

Cadmium concentrations from suspended sediment samples collected from 2021 through 2024 were below the CBSQG's PEC of 4.98 mg/kg. While all samples were below the screening criteria, suspended sediment from all locations were above the background concentrations of the MBK 1.6 samples. EFK 23.4 had the greatest quantification of cadmium in suspended sediment samples. The NT-5 cadmium concentrations slightly exceeded background. Overall, cadmium concentrations decrease in downstream sampling locations (EFK 2.2, BCK 3.3) as compared to upstream sampling locations (EFK 23.4, BCK 7.6).

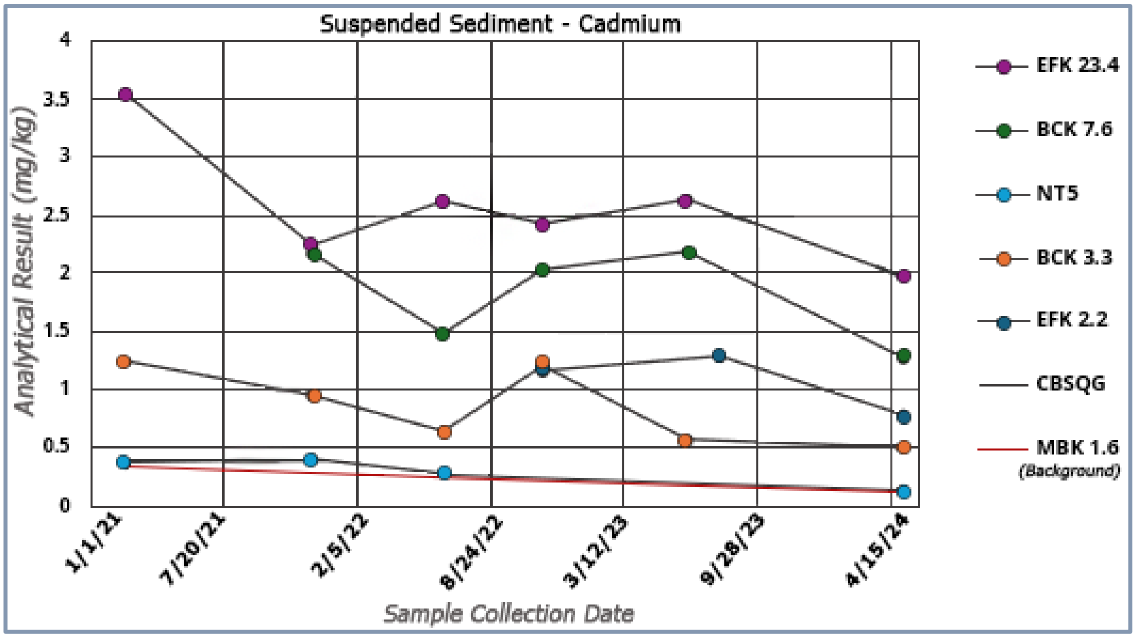

Figure 8.1.7.1: Suspended Sediment – Cadmium (2021 – 2024)

MERCURY

Mercury concentrations from samples collected in Bear Creek (BCK 7.6, BCK 3.3, and NT-5) were below the CBSQG's PEC (1.06 mg/kg) and were similar to concentrations observed in the background sample (MBK 1.6). However, samples collected from EFPC (EFK 23.4 and EFK 2.2) had mercury concentrations that significantly exceeded the CBSQG.

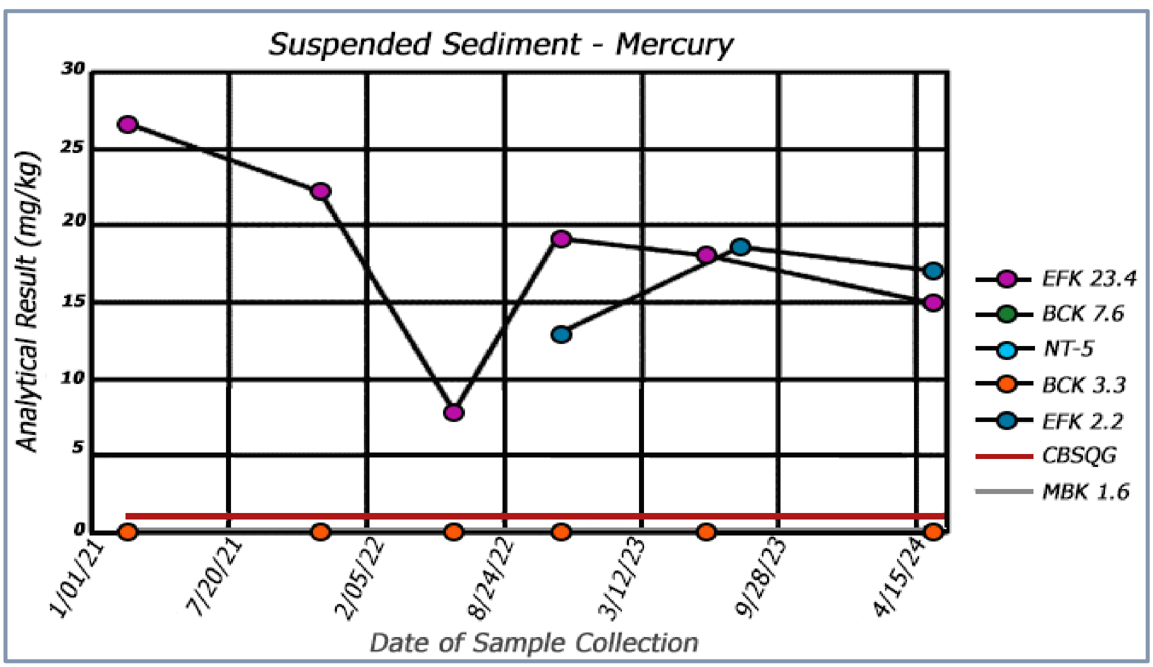

Figure 8.1.7.2: Suspended Sediment – Mercury (2021-2024)

Uranium

The highest concentrations of uranium were in the samples from BCK 7.6. Uranium quantification from BCK 7.6 exceeded the EPA RSL of 15.6 mg/kg in the sample from June 13, 2022 (16.4 mg/kg) and May 3, 2024 (16.6 mg/kg). Uranium in all samples collected since 2021 exceed the background concentrations in the samples collected from MBK 1.6. Overall, uranium concentrations decrease in downstream sampling locations (EFK 2.2, BCK 3.3) as compared to upstream sampling locations (EFK 23.4, BCK 7.6).

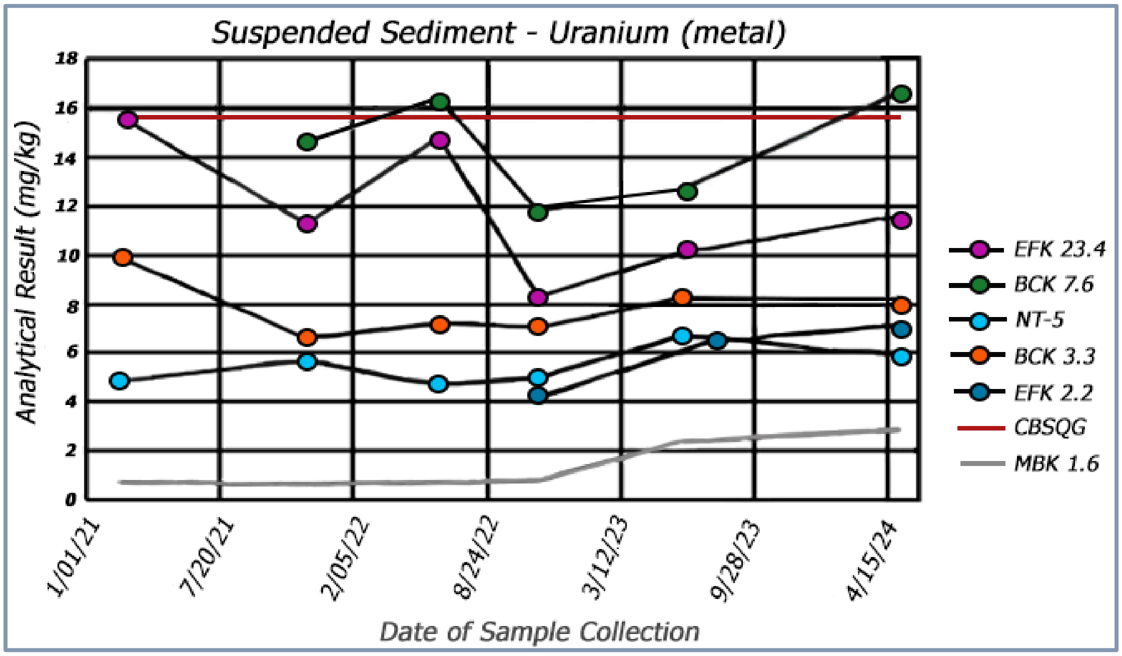

Figure 8.1.7.3: Suspended Sediment – Uranium (2021 – 2024)

Lead

Lead concentrations in all samples collected from 2021 through 2024 were below the CBSQG's PEC (128 mg/kg). However, concentrations from all samples exceeded background concentrations in samples from MBK 1.6 (with the exception of the BCK 3.3 sample collected on May 3, 2024, which was equal to the background concentration [11.7 mg/kg]). In general, lead concentrations were higher in samples collected from EFPC (EFK 23.4 and EFK 2.2 [only one data point available]) in comparison to samples collected in Bear Creek (BCK 7.6, BCK 3.3, and NT-5).

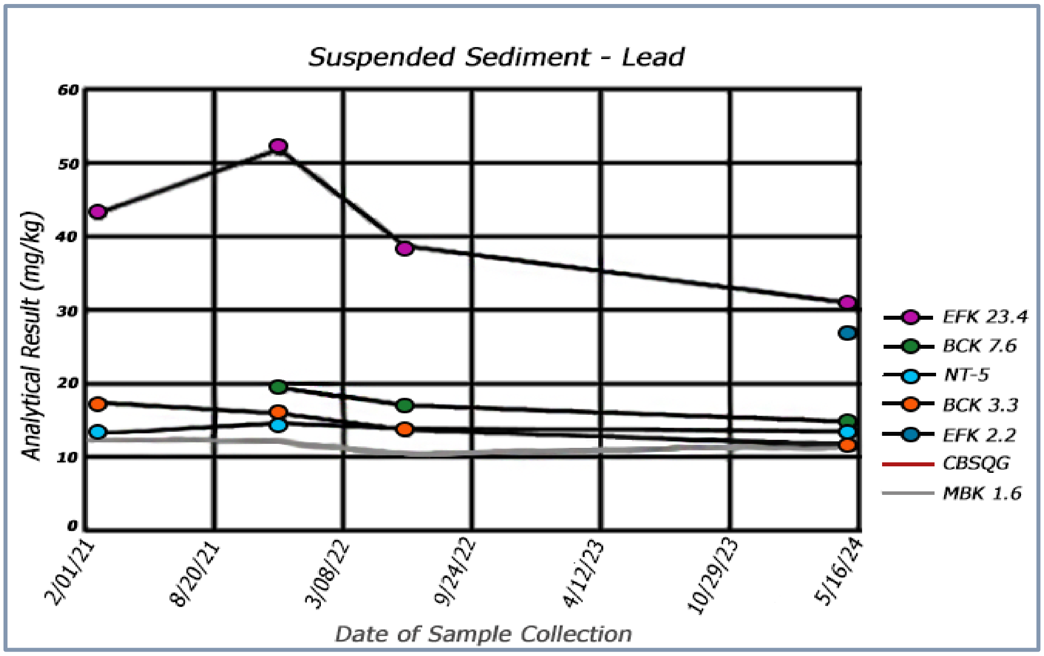

Figure 8.1.7.4: Suspended Sediment – Lead (2021 – 2024)

Gross Alpha

Generally, gross alpha activity in all suspended sediment samples collected was greater than background activity. Highest gross alpha activity was in samples collected from EFK 23.4, the most upstream location on EFPC closest to Y-12. Samples collected on May 3, 2024, had gross alpha at activities significantly lower than previously reported.

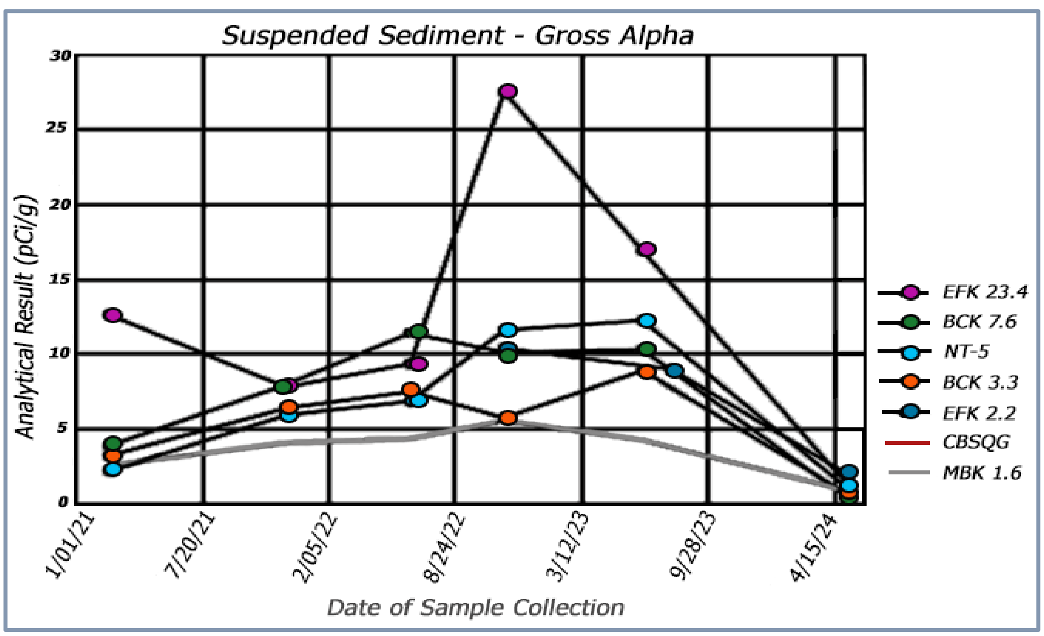

Figure 8.1.7.5 Suspended Sediment – Gross Alpha (2021 – 2024)

GROSS BETA

Gross beta activities were greatest in samples collected from NT-5. Activity has decreased since 2021 where gross beta in NT-5 was 113.2 pCi/g in the February 22, 2021, sample to 3.04 pCi/g in the May 3, 2024, sample. In recent years (2022 – 2024) downstream sampling locations, BCK 3.3 and EFK 2.2, have been below or near background activity. Samples collected on May 3, 2024, had gross beta at activities significantly lower than previously reported.

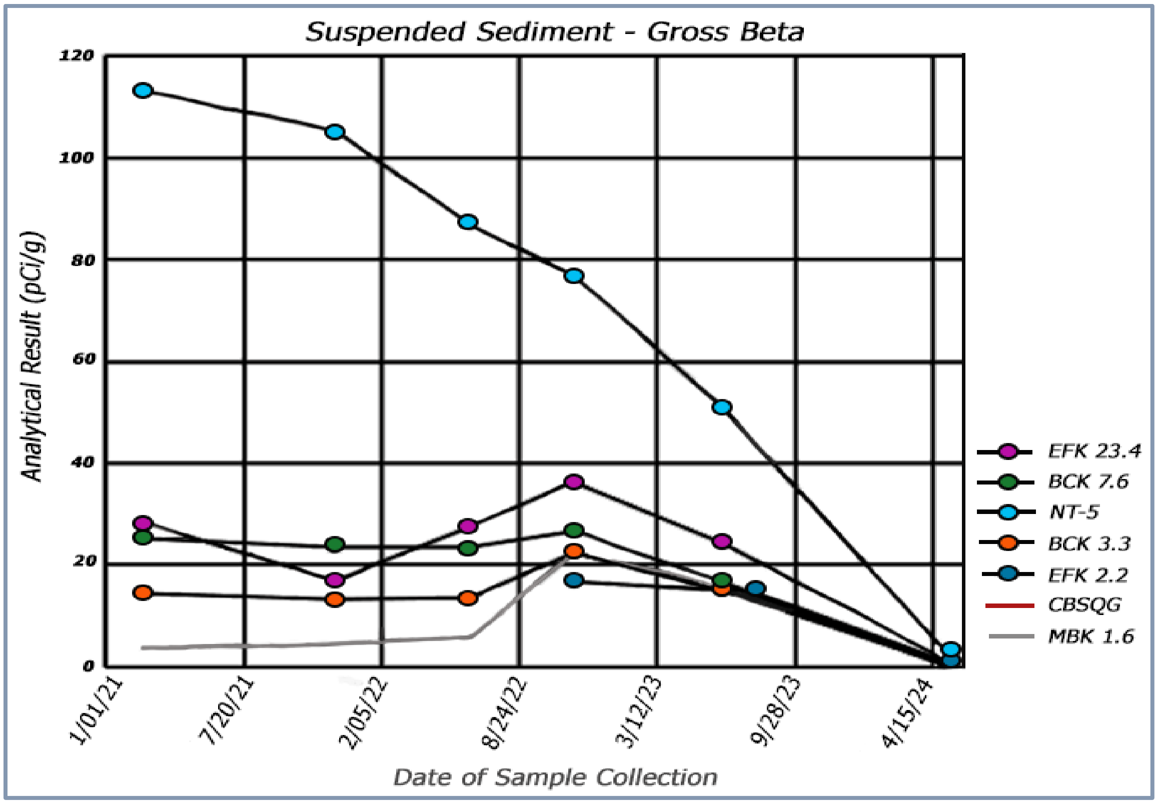

Figure 8.1.7.6: Suspended Sediment – Gross Beta (2021 – 2024)

URANIUM ISOTOPIC

Isotopic uranium data is available at all sampling locations from 2021 through 2024, with the exception of EFK 2.2. Isotopic uranium results are available from EFK 2.2 beginning in the fall of 2022. Overall, all samples collected since 2021 exceed the respective EPA PRG's for U-234 (0.03 pCi/g), U-235 (0.06 pCi/g), and U-238 (0.018 pCi/g). In all but one case, the background samples from MBK 1.6 also exceeded the screening criteria. U-234 activity had the highest levels at NT-5 followed by the upstream locations (EFK 23.4 and BCK 7.6). U-238 activity was the highest at the upstream locations (EFK23.4 and BCK 7.6), while NT-5 had the lowest activity of all sampling sites aside from the background location. No data trends are apparent from the U-235 quantifications.

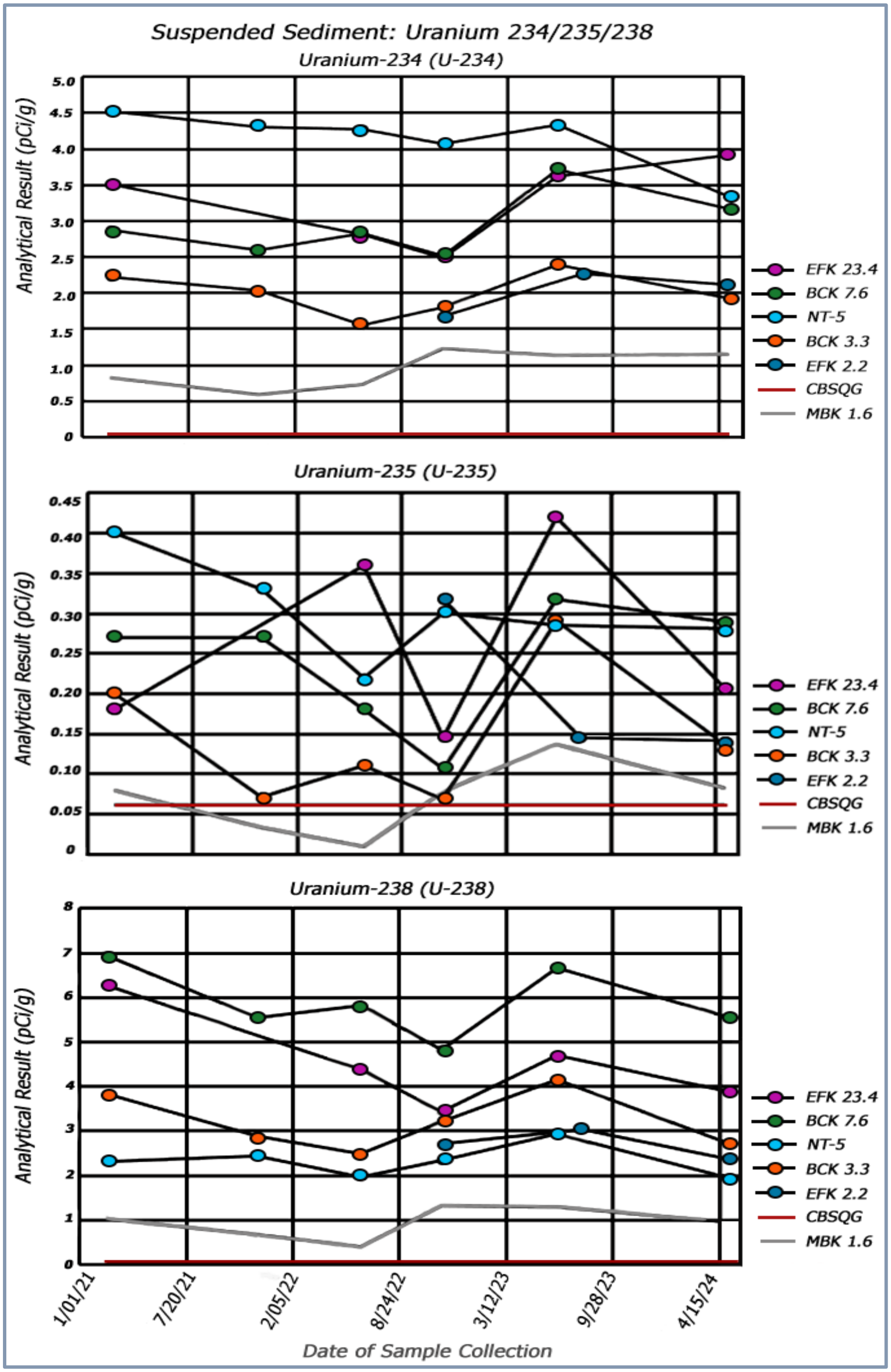

Figure 8.1.7.7: Suspended Sediment – Uranium-234/235/238 (2021 – 2024)

8.1.8 Conclusions

Suspended sediment samples collected from within Bear Creek and EFPC from 2021 through 2024 were evaluated. Analytical results were compared to screening levels and background concentrations over the four-year period to identify data trends. Suspended sediment samples collected since 2021 have cadmium and lead below the respective screening levels, but above background concentrations.

Large quantities (11 million kilograms) of elemental mercury were used at the Y-12 plant from 1950 to 1963 for a lithium isotope separation process. Loss of mercury to the air, soil and to EFPC are estimated to be 3% of the mercury used at the site. Mercury continues to be released to the creek from contaminated soil and groundwater sources at Y-12 (Brooks and Southworth 2011). Concentrations of mercury from sediment samples collected within EFPC (EFK 23.4 and EFK 2.2) have consistently exceeded the CBSQG, while samples collected from within Bear Creek (BCK 7.6, NT-5, and BCK 3.3) have been near background concentrations.

Uranium is a dense, silver-white, radioactive metal in its pure state. It is found in the environment in rocks, soil, water, and air in very small amounts. Uranium became more prevalent in the environment with the development of nuclear energy applications, such as nuclear power plants and weaponry. Nuclear power plant accidents (i.e. unintentionally releases) can result in the release of enriched uranium to the environment.
Uranium concentrations have been below the CBSQG, with the exception of two samples collected from BCK 7.6.

Gross alpha and gross beta activities exceeded background concentrations throughout the study period, with some exceptions at downstream sampling locations. The highest gross beta activity was in samples collected from NT-5, concentrations in NT-5 appear to be decreasing since 2021. The highest gross alpha activity was in the samples collected from EFK 23.4. Isotopic uranium exceeded the respective screening levels in all samples analyzed.

8.1.9 Recommendations

Sediment traps capture suspended sediments that are being carried by the stream. Analysis of the sediments collected in this manner shows changes in direct response to environmental contaminant discharges in the period that the trap was deployed. Sediment traps provide an intermediary form of information between sediment grab sampling and surface water sampling. It is the purpose of this project to stay abreast of the quality of sediment being transported in the ORR exit pathway streams. The TDEC DoR-OR trapped sediment project is needed to provide this information. In the coming years, it is anticipated there will be many projects involving decontamination and decommission (D&D) as well as construction projects in the upper EFPC watershed. To provide critical information about both the East Fork Poplar Creek and Bear Creek in the years ahead, suspended sediment sampling is recommended for continuation twice per year. This sampling is an integral part of stream monitoring on the ORR and fills a gap in DOE's data.

8.1.10 References

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9.0 WATERSHED ASSESSMENTS (HOLISTIC) MONITORING

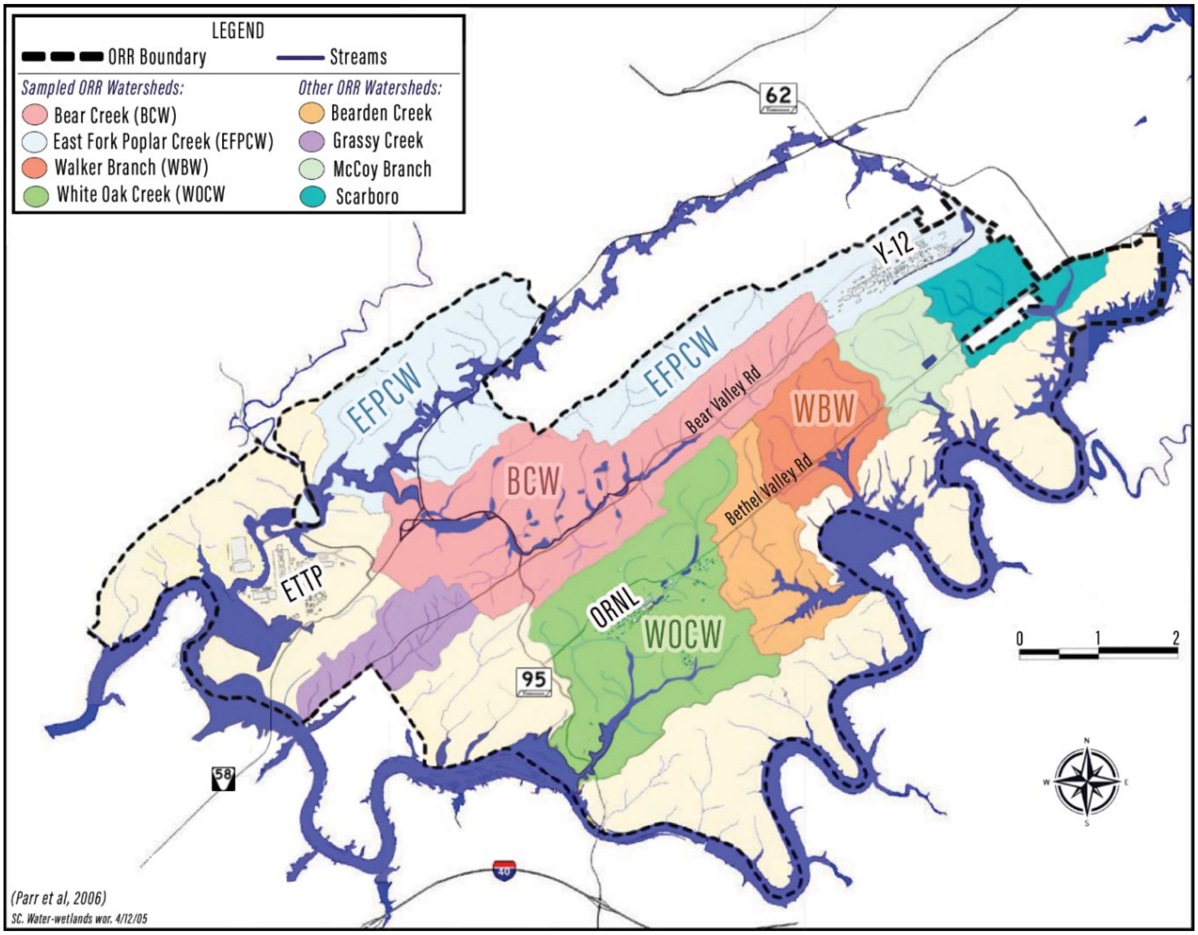

Figure 9.0.1: ORR Watersheds

9.1 EAST FORK POPLAR CREEK ASSESSMENT PROJECT (EFPCAP) PHASE 2

9.1.1 BACKGROUND

The ORR resides in the Valley and Ridge physiographic province. This province is distinguished by series of northeast-southwest trending ridges and interceding valleys (Miller, 1974), which affect weather and streamflow.

The headwaters of EFPC are located within the Y-12 NSC where mercury (Hg) and uranium (U), among other contaminants, are a concern. Upon completion. the EFPCAP will serve as a comprehensive evaluation of these COCs and the ecological health of this entire watershed. To accomplish this holistic assessment, the EFPCAP has been organized into several progressive phases.

1) **Phase 1** involved researching and compiling existing data.
    a. Acquisition, review, summarization, and interpretation of historical information for upper and lower EFPC (UEFPC and LEFPC, respectively).

    b. Examination and compilation of available types of environmental data including: (1) surface water, (2) shallow floodplain groundwater, (3) suspended sediment, (4) soils, (5) benthic macroinvertebrates (6) terrestrial biota [bird eggs, spiders, flying insects, snakes, ground beetles], (7) toxicity/ biomonitoring, (8) fish tissue.

2) **Phase 2** is the focus of this report. This phase included new sampling and subsequent analysis of monitoring data collected in Phase 1. In Phase 2, the above-mentioned projects (1b.) focused on EFPC. In addition, mercury uptake sampling included ground beetle monitoring. Shallow groundwater sampling results were also incorporated. Phase 2 projects discussed in this report include projects 1-5:
    1. Surface Water and Shallow Floodplain Groundwater (combined for one project, *Ch. 7.2*)
    2. Suspended Sediment (*Ch. 8.1*)
    3. Soils (*current chapter*)
    4. Benthic Macroinvertebrate Community Health (*Ch. 3.2*)
    5. Mercury Uptake in (1) Biota (*Ch. 3.3*) and (2) Terrestrial Invertebrates (*Ch. 3.4*)
    6. Toxicity Biomonitoring (*FY23 EMR*)
    7. Fish Tissue (*FY23 EMR*)

3) **Phase 3** will use the analytical data obtained from Phases 1 and 2 to produce a comprehensive report. If data gaps are present after Phase 2, there will be further sampling and analysis.

4) **Phase 4** will address any areas requiring additional field sampling for a more comprehensive analysis and interpretation of all watershed data.

As stated above, Phase 2 is the focus of this report. In FY24, DoR-OR collected data to support the EFPCAP Phase 2. These sampling projects, along with the continuation of ongoing projects, have and will continue to add to the body of environmental knowledge regarding EFPC.

9.1.2 Problem Statements

Mercury (Hg) continues to migrate into EFPC from Y-12 subsurface drains, contaminated building foundations, and soils. DOE estimated that EFPC discharges approximately 0.2 metric tons of mercury to the Clinch River every year (DOE, 1992). This mercury has migrated into soils in the floodplain and into the food web. Although mercury concentrations in EFPC water have decreased 85% from the 1980s, methylmercury (MeHg) concentrations in water and in fish tissue have not declined, even with efforts to improve water quality (Brooks and Southworth, 2011).

The second COC, uranium, continues to be identified in the vicinity of Y-12 that impacts EFPC. Activities from uranium processing and burial of uranium waste have also caused groundwater plumes to form in UEFPC and Bear Creek (BC), which feeds into LEFPC (DOE 2013).

9.1.3 Goals

1) Holistic assessment of ORR contaminants.

2) Support the evaluation of risk to wildlife and the environment.

3) Provide an environmental assessment benchmark to gauge the effects of future DOE remediation activities in the EFPC watershed.

9.1.4 Scope – Phase 2

The EFPCAP Phase 2 scope is to obtain all the monitoring data to sufficiently provide a holistic view of the EFPC watershed. The project team will also address any areas requiring additional field sampling for a more comprehensive analysis and interpretation of all watershed data. Also, this assessment required the assistance of other DoR-OR project teams to collect and share data. For this data-sharing to be applicable, each individual program needed to shift their focus to include, as needed, sampling locations in the EFPC Watershed (Figure 9.1.4.1). For biota sampling, Lower EFPC (LEFPC) was divided into three impacted zones, and with Freels Bend acting as a reference zone (Figure 9.1.4.2).

Surface water, sediment, soils, benthic macroinvertebrate, and biota sampling results are the only remaining media not yet reported to complete the EFPCAP assessment scope. Except for soils sampled at two additional locations during FY24, each of these environmental media are reported in their respective chapters listed above and referenced accordingly below. Only the new soils sampling will be discussed in the report below; all other media are reported elsewhere in the FY24 EMR or were reported previously (soils, toxicity/biomonitoring, fish tissue sampling) in the FY23 EMR.

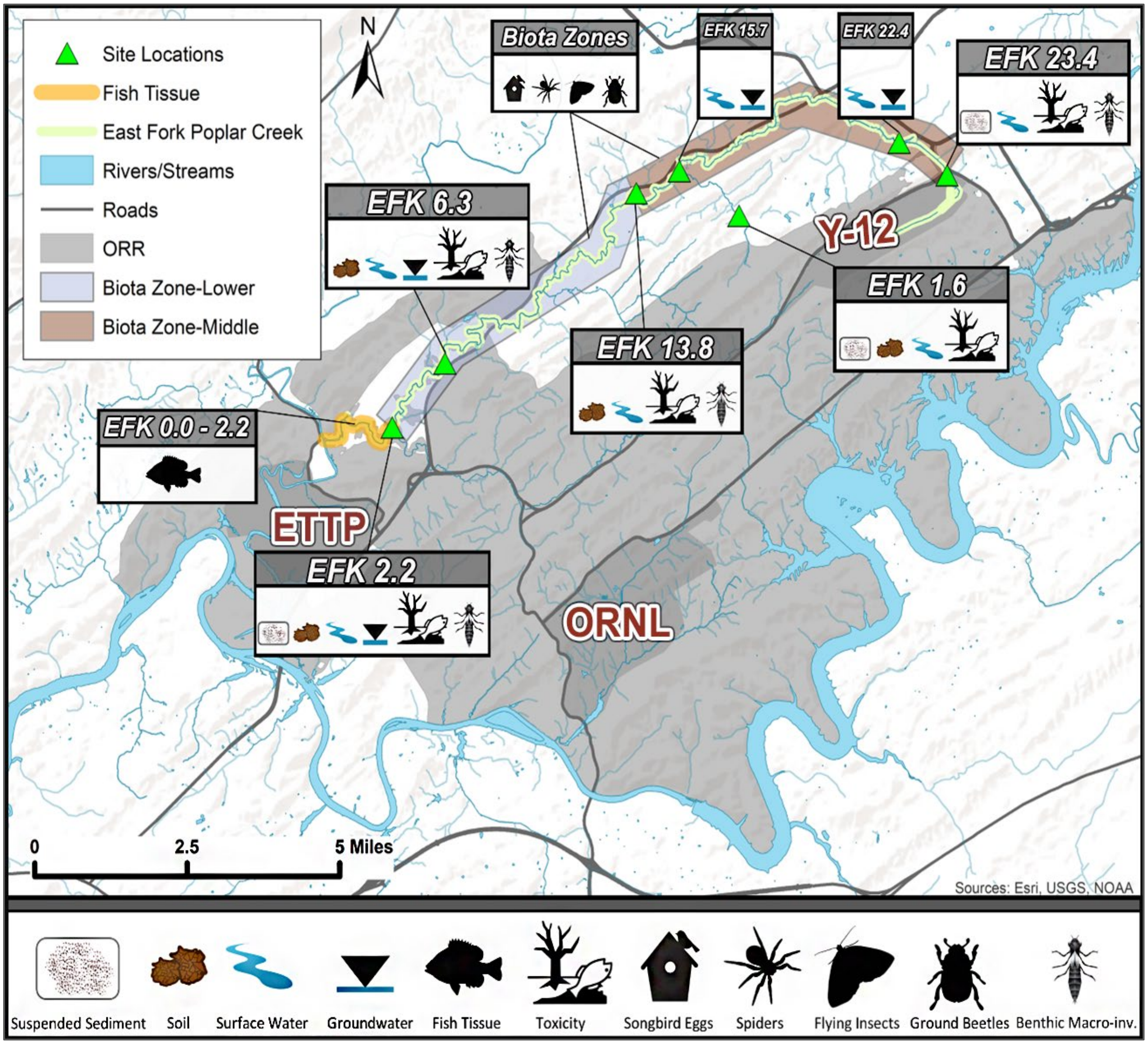

Figure 9.1.4.1: EFPCAP Phase 2 Sampling Sites

Figure 9.1.4.2: EFPC Biota Sample Sites (3 Zones)

9.1.5 Methods, Materials, Metrics

Phase 2 Projects

1) ***Surface Water and Shallow Floodplain Groundwater*** *(see Ch. 7.2)*

Please refer to the *Ambient Surface Water Project* section of this EMR for information about methods, materials, and metrics for sampling of surface water and shallow floodplain groundwater within the EFPC watershed.

2) ***Suspended Sediment*** *(see Ch. 8.1)*

Information about the *Suspended Sediment Project* and associated sediment sampling in the EFPC watershed can be found in Chapter 8.1 of this document.

3) ***Soils*** *(current chapter)*

The soils sampling project was conducted specifically for the EFPCAP and will be discussed here in-full. The soil samples were collected at five sites, in total, on EFPC (i.e., EFK 21.8, EFK 18.5, EFK 13.8, EFK 6.3, and EFK 2.2) and at one background location, Clear Creek (CCK 1.6). Soils from EFKs 13.8, 6.3, and 2.2 were collected and analyzed during FY23, and analytical results are reported in the FY23 EMR. Sites EFK 21.8 and 18.5 were sampled in FY24 and are the focus of this FY24 report. Sample locations were in the flood plain adjacent to each surface water sampling site. Each soil sample was collected by CEC using the *Incremental Sampling*

Methodology (ISM) and a grid of 30 1-meter square cells. CCK 1.6 samples were collected during the FY23 sampling year. Reference site data are reported again here for comparison purposes.

Since the samples were analyzed for PFAS, special care was taken to prevent the inadvertent contamination of the samples. Staff used the guidelines from *PFAS Soil Sampling Guidance* issued by the Michigan Department of Environmental Quality (November 2018). This guide outlined the required sampling technique in detail. For example, the project team was instructed on how to choose PFAS-free clothing and footwear for the field sampling (MDEQ 2018).

Overall, sampling was conducted in accordance with the Interstate Technology Regulatory Council (ITRC) ISM that was published in February 2012 and the updated version released in October 2020. Incremental sampling uses a normalized composite sampling and processing approach to reduce variability. ISM provides a relatively unbiased representation of the average constituent concentration in the sample material and over the assessed area. This approach leads to more consistent and reproducible results that are more representative of the assessed area.

This method of soil collection involved staking out a sample grid at each of the three EFPC sample locations. The result was a 30-point bulk sample for laboratory processing and subsampling. Soil sampling equipment consisted of nickel-plated metal sampling tubes that were purchased new from *JMC Soil* for the sampling events. Sampling tubes were first washed with a solution of *ThermoFisher Scientific* certified PFAS-free water and *Alconox*, then rinsed with PFAS-free water. The PFAS-free water used for equipment decontamination was *Optima-LCMS Grade Water*. After cleaning, the sampling tubes were left to air dry and then placed into gallon-size Ziploc brand bags. Soil samples were placed directly into laboratory-provided PFAS-free containers. Equipment and sample containers were shuttled to and from the sample locations in food-grade 5-gallon buckets that had been washed by the same method as the sampling tubes (CEC 2023).

Sample increments were collected using a *JCM Back-saver Handle* outfitted with a dedicated 1.25-inch inside diameter by 8-inch-long core barrel that had been marked with a metal file for sampling to a depth of 6 inches. New core sampler barrels were purchased for each site and pre-cleaned using the same cleaning method as above.

Beginning with the grid cell designated as cell 1, an approximately 6-inch-deep soil increment was collected from a random quadrant as determined using a random number generator tool in *Microsoft Excel*. Random secondary, tertiary, and quaternary quadrant selections were also available in case a full increment could not be collected from a cell due to obstructions such as roots or rocks. Sample increments were removed from the soil corer with a gloved hand and placed directly into a labeled, laboratory-provided PFAS-free bulk container (*QEC* 64 oz. HDPE wide-mouth containers). At locations where a field duplicate or matrix spike/matrix spike duplicate sample was being collected, additional increments were subsequently collected from the same quadrant and placed into the respective containers. After all increments had been collected from cell 1, this process was repeated in each subsequent cell until 30 increments had been collected (CEC 2023).

The soil samples were processed by Pace Analytical Laboratory according to strict ISM protocols and were analyzed for metals (arsenic, cadmium, mercury, and uranium), radionuclides (gross alpha/beta, gamma spectroscopy, and isotopic uranium), and organics (PCBs and PFAS) (CEC 2023).

Soil and sediment data were compared to EPA risk-based screening levels (SLs). SLs are risk-based chemical concentrations that correspond to risk associated with fixed levels of contaminants in soil, air, and water. These concentrations are derived from standardized equations combining exposure information assumptions with EPA toxicity data. SLs are protective of human health over a lifetime, but do not address ecological impacts (EPA 2022a). SLs are not cleanup standards, but are used to identify areas, contaminants, and conditions that require attention at a site (EPA 2022a).

4) ***Benthic Macroinvertebrates*** *(see Ch. 3.2)*

Benthic macroinvertebrate sampling methodology can be reviewed in the *Benthic Macroinvertebrate Community Health* chapter of this report.

5) ***Mercury Uptake in Biota*** *(see Chapters 3.3 and 3.4)*

Please refer to the *Mercury Uptake in Biota* and *Terrestrial Invertebrate Community Health* chapters of this document for information on methods used to evaluate impacts to ecological receptors in the EFPC watershed.

6) ***Toxicity and Biomonitoring*** *(see EMR FY23)*

Toxicity/biomonitoring was conducted for the EFPCAP, and methodology and results were reported in the FY23 EMR.

7) ***Fish Tissue*** *(see EMR FY23)*

Fish tissue samples were collected from golden redhorse in the vicinity of EFK 2.2 to supplement fish tissue monitoring conducted by DOE, annually, to address potential human health risks and bioaccumulation of mercury and other COCs. The golden redhorse samples helped to evaluate the potential exposure risks to other ecological receptors. The methods and results of this sampling effort were reported in the FY23 EMR.

9.1.6 Deviations from the Plan

No deviations occurred for the soils sampling effort reported here. Discussions of deviations associated with other monitoring efforts supporting this holistic watershed assessment can be reviewed in the chapters reporting on those monitoring projects.

9.1.7 Results and Analysis

Phase 2 Projects in FY24:

Phase 2 sampling for the EFPCAP has been completed across two Fiscal sampling years (FY23 – FY24). The sections below describe the results from the FY24 sampling year.

Surface Water Sampling (Ch. 7.2)

Surface water sampling was conducted to characterize stream conditions and assess contaminant presence throughout the EFPC watershed. Mill Branch (MB) and Clear Creek (CC) were both sampled as background reference streams. Sampling and measurements were performed from FY23 through FY24. Results of these sampling efforts are reported in the *FY23 EMR* and in *Ch. 7.2* of this FY24 EMR.

Suspended Sediment (Ch. 8.1)

New FY24 suspended sediments results are discussed in the *Suspended Sediment Project* section of this report.

Soils

Soil sample results are summarized in Table 9.1.7.3.1. Except for results from the reference site (CCK 1.6), all non-detected results are not reported in the table. Resident Soil screening levels (Target Risk = 1e-06), risk-based and MCL-based groundwater soil screening levels, and preliminary remediation goal (PRG) levels were derived from the EPA PRG and RSL tables (EPA 2022a, EPA 2023b).

Analytics for Soils

Organics

No polychlorinated biphenyls (PCBs) were quantified in the sample from near Clear Creek; however, Aroclor 1260 was quantified in each of the samples from the floodplains near EFPC sites and were at concentrations less than the EPA risk-based SLs for residential soil under direct contact exposure. Aroclor 1260 concentrations from EFK 21.8 and EFK 18.5 both exceeded the risk-based soil screening level for the protection of groundwater (GW SSL).

PFAS

PFAS compounds PFBA and PFOS were quantified at low levels from each soil sampling location. Estimated concentrations of up to seven additional PFAS compounds were reported in the two samples from the EFPC locations. EPA risk-based SLs for residential soil have been established for five (5) of the PFAS compounds analyzed. Where SLs do exist, the quantified concentrations are reported below the established Resident Soil SLs, except for PFOA. PFOA concentrations from both EEFK 21.8 and EFK 18.5 exceeded the EPA Resident SL (1.9E-05). PFNA and PFOS additionally each exceeded at least one GW SSL.

METALS

Arsenic, Cadmium, Mercury, and Uranium were quantified in each of the soil samples. Arsenic levels were highest at CCK 1.6, with the concentration of 12.2 mg/kg reported above the SL of 0.68 mg/kg. Arsenic in the EFK 21.8 and EFK 18.5 samples were also quantified above the SL. All samples were quantified above the GW SSLs. It is unclear why the background site had such an elevated concentration of arsenic.

Cadmium soil concentrations at EFK 21.8 and EFK 18.5 were above the reference site. All sites were measured below the Resident SL; however, both LEFPC sites were above the EPA GW SSLs. Mercury at EFK 21.8 (15.3 mg/kg) and EFK 18.5 (48.5 mg/kg) was reported above the Resident SL of 11 mg/kg, as well as the GW SSLs.

Soil uranium metal concentrations are elevated at LEFPC sampling sites and exceeded the EPA risk-based GW SSL.

RADIONUCLIDES

Cs-137 is present at the LEFPC sites, but at activities below the reference site. All sites exceed the Resident Soil PRG (TR = 1e-06).

Uranium isotopes (U-234, U-235, U-238) were also detected at all sites, and all LEFPC sites exceeded the reference site activity levels. All sites were quantified above the EPA Resident Soil PRG and GW SSLs.

Table 9.1.7.3.1: FY23-24 Soil Sample Results for EFK 21.8 and EFK 18.5

Analytes	Unit	Parameter	Soil SL Target Risk =1e-06	GW SSL risk-based	GW SSL MCL-based	Site EFK 18.5	Site EFK 21.8	Reference Site
Metals	mg/kg	Arsenic	6.8E-01	1.5E-03	2.9E-01	4.65	5.72	12.2
		Cadmium	7.1E+00	1.4E-01	3.8E-01	2.38	0.868	0.0939
		Mercury	1.1E+01	3.3E-02	1.0E-01	48.5	15.3	0.0859
		Uranium	1.6E+01	1.8E+00	1.4E+01	5.92	5.16	2.86
Organics	mg/kg	PCB-1260	2.4E-01	5.5E-03	-	0.217	0.107	(U)
		PFBA	7.8E+01	6.5E-03	-	0.0004 (J)	0.00051 (J)	0.27(J)
		PFDS	-	-	-	0.0002 (J)	-	(U)
		PFDA	-	-	-	0.00026 (J)	-	(U)
		PFDoA	3.2E+00	1.7E-01	-	0.00024 (J)	-	(U)
		PFHpA	-	-	-	0.00023 (J)	-	(U)
		PFNA	1.9E-01	2.5E-04	4.2E-05	0.0002 (J)	0.0002 (J)	(U)
		PFOS	6.3E-03	1.5E-05	3.0E-05	0.0012	0.00089 (J)	0.53 (J)
		PFOA	1.9E-05	4.0E-08	6.1E-05	0.00067 (J)	0.0004 (J)	(U)
		PFPeA	-	-	-	0.00039 (J)	-	(U)
Radionuclides	PCi/g	Actinium-228	1.79E+02	6.93E-05	1.68E-02	1.13	0.703	1.1
		Alpha Activity	-	-	-	-	6.74	5.42
		Americium-241	4.80E-01	2.90E-05	5.18E-03	0.156	-	(U)
		Beryllium-7	6.63E+01	1.36E+02	5.94E+03	-	0.0228	0.38
		Beta Activity	-	-	-	-	14.1	10.2
		Bismuth-212	1.21E+16	4.69E+00	2.92E+00	0.799	1.71	1.92 (J)
		Bismuth-214	2.59E+03	8.58E-04	1.10E+00	0.785	0.641	1.19
		Cesium-134	1.14E-01	2.80E-03	8.16E-01	-	0.0413	(U)
		Cesium-137	4.01E-02	3.88E-03	2.04E+00	0.349	0.171	0.379
		Cobalt-60	2.85E-02	2.53E-01	4.80E+01	0.00729	0.00261	(U)
		Iridium-192	2.68E+00	4.24E-03	3.20E-01	0.00739	-	(U)
		Lead-210	4.41E-03	8.58E-04	2.19E+00	4.32	3.98	13.3
		Lead-212	8.75E+07	6.37E-02	2.92E+00	1.39	1.29	1.17
		Lead-214	1.92E+03	8.58E-04	1.10E+00	0.77	1.13	1.63
		Potassium-40	5.81E-03	1.67E-03	-	13.6	16.5	9.22
		Radium-226	1.92E-03	3.17E-05	5.96E-03	2.27	2.16	2.72
		Thallium-208	4.76E+23	6.23E+04	-	0.303	0.334	(U)
		Thorium-234	1.61E+02	2.39E-05	5.84E-03	-	2.19	1.71 (J)
		Uranium-234	3.00E-03	2.40E-05	5.84E-03	2.67	1.82	1.17
		Uranium-235	6.13E-03	3.44E-05	1.22E-02	0.256	0.24	0.136 (J)
		Uranium-238	1.75E-03	1.97E-05	2.97E-03	2.59	1.84	1.13

Reference Site: CCK 1.6 for Metals & Organics; CCK 1.4 for Radionuclides; Organics defined below
PFBA: Perfluorobutanoic Acid — *PFDoA: Perfluorododecanoic Acid* — *PFOS: Perfluorooctanesulfonic Acid*
PFDS: Perfluorodecanesulfonic Acid — *PFHpA: Perfluoroheptanoic Acid* — *PFOA: Perfluoroocatanoic Acid*
PFDA: Perfluorodecanoic Acid — *PFNA: Perfluorononanoic Acid* — *PFPeA: Perfluoropentanoic Acid*

BENTHIC MACROINVERTEBRATES (CH. 3.1)

Results of the EFPC benthic macroinvertebrate monitoring, calculated Tennessee Macroinvertebrate Index (TMI) scores, and associated biometrics are reported and discussed in the *Benthic Macroinvertebrate Community Health Project* section of this report.

BIOTA (CH. 3.3 & 3.4)

Results of biomonitoring efforts to understand bioaccumulation of contaminants impacting the EFPC watershed and impacts to terrestrial and riparian ecological receptors can be reviewed in the *Mercury Uptake in Biota Project* and *Terrestrial Invertebrate Community Health Project* reports, discussed in *Ch. 3.3* and *3.4* of this report.

TOXICITY & BIOMONITORING (FY23 EMR)

Surface water toxicity assessment results are discussed in the *FY23 EMR*.

FISH TISSUE (FY23 EMR)

Results of fish tissue sampling efforts and associated chemical analysis of those tissues are reported in the *FY23 EMR*.

9.1.8 CONCLUSIONS

PCBs were detected in EFPC soil samples and were at concentrations less than the EPA risk-based SLs for residential soil under direct contact exposure. However, PCBs did exceed a GW SSL, which could indicate a risk to PCBs leaching into groundwater sources. Several PFAS compounds were detected in the LEPFC floodplain soils. Of note, perfluorononanoic acid (PFNA), perfluorooctanesulfonic acid (PFOS), and perfluorooctanoic acid (PFOA) were detected in floodplain soils in concentrations that exceed at least one SL.

Arsenic, and mercury concentrations exceeded SLs at all LEFPC sites. Cadmium and uranium metal concentrations in EFPC floodplain soils were less than the SLs at all EFPC soil sampling locations but exceeded risk-based GW SSLs. Mercury contamination in EFPC floodplain soils has been studied extensively by DOE, and these TDEC data reinforce past findings.

9.1.9 RECOMMENDATIONS

Based on the holistic data compilation above plus the upcoming remedial actions at Y-12 there is potential for the release of legacy contaminants from EFPC and COC infiltration into the EFPC that could migrate through the watershed. Future flooding events at remedial and construction sites might deposit new contaminated layers of sediment on top of soils. This deposition could potentially increase COCs in soils. Newly contaminated floodplain soils could result in elevated human risk and ecological impacts. Considering the high concentrations of mercury and the presence of uranium in the surface water, soils, and sediments in the EFPC watershed, holistic environmental sampling is recommended periodically to monitor the EFPC watershed.

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APPENDICES: CONTRACTUAL SAMPLING OUTSIDE OF THE EMR'S SCOPE

Sampling and monitoring are conducted outside the scope of the EMP by TDEC's contractor. This sampling is often conducted in response to new information, to assist in the State's required independent oversight or to evaluate the effectiveness of completed remedies. During FY24 this work included treated wastewater sampling for polychlorinated biphenyl (PCBs), baseline surface water sampling of streams adjacent to the Environmental Management Disposal Facility (EMDF) site, vegetation and environmental media sampling at the Filled Coal Ash Pond in Chestnut Ridge, VOC sampling in Bear Creek Valley and toxicity sampling at NT-8.

A.1 PCB Sampling of Treated Wastewater

A.1 Background

Beta-1 is a large former uranium enrichment facility at the Y-12 National Security Site. Over time, groundwater has seeped into the basement resulting in complete flooding of contaminated water in the basement. In preparation for the demolition of Beta-1, this water must be removed. A mobile treatment system was installed to treat and discharge this water to Upper East Fork Poplar Creek. The samples were taken from the mobile treatment unit on the east side of the Beta-1 facility (noted as the red dot below).

Figure A.1.1: Beta-1 Building at Y-12

A.2 Scope

TDEC collected samples from a mobile treatment system to analyze treatment efficiency for PCBs. The State conducted this sampling to verify compliance with water quality standards as the DOE's selected PCB sampling methodology is not sufficiently sensitive to verify compliance of PCBs.

A.3 Sampling Summary

TDEC sampled the treated wastewater effluent on July 24, 2023, and November 6, 2023. Samples were tested by Eurofins using EPA Method 1668A as this method has an MDL less than the state's PCB water quality standard of 0.00064 µg/L.

A.4 Results

Total PCB concentrations in the effluent were 0.0002 µg/L (7/24/2023) and 0.00048 µg/L (11/6/2023) which are below the state's water quality standard.

B.1 Whole Effluent Toxicity (WET) Testing for NT-8

B.1 Background

DOE has initiated a removal action in Bear Creek Valley (BCV) to decrease contaminant levels transported from Northwest Tributary 8 (NT-8). This tributary runs adjacent to multiple burial grounds and eventually feeds into Bear Creek. Due to the complexity and diversity of potential wastes disposed throughout the Bear Creek Burial Grounds (BCBG), TDEC decided to pursue sampling and testing for Whole Effluent Toxicity (WET) and Toxicity Identification Evaluation (TIE). The goal of this testing was to understand the toxicity potential of NT-8 and to characterize the constituents that could be contributing to impaired toxicity (if observed) in Bear Creek to ensure the proper suite of analytes is being sampled.

B.2 Scope

TDEC partnered with CEC to collect surface water samples directly from NT-8, immediately prior to its confluence with Bear Creek. A single-sample event was performed for initial WET testing to determine if additional sampling was necessary. After determining additional sampling was necessary, 3 follow-up sampling events were conducted within a one-week period (Monday, Wednesday, and Friday).

B.3 Sampling Summary

The initial single-sample event was conducted at NT-8 on June 3, 2024. The follow-up sampling events took place on June 24th, June 26th, and June 28th. In addition to a second round of WET testing applied, the follow-up sampling events performed analysis for the following TIE Manipulations to determine what variables could be contributing to toxicity:

- EDTA Chelation – due to the soft water and metals
- Solid Phase Extraction with C18 – due to the soft water and metals
- GAC – to confirm organics are not an issue
- Oxidant reduction – due to the soft water and metals

B.4 Results

An initial sampling effort resulted in a 25% reduction in the reproduction of *Ceriodaphnia dubia* (*C. dubia*) at a water concentration of 4.57%. No toxicity effects were observed in the fat head minnow sample. Because toxicity was observed in the *C. dubia* samples, a second sampling event was planned. The analytical results from the initial sampling event were used to inform which TIE manipulations the laboratory should evaluate during the subsequent sampling event. However, Pace reported an IC25 (inhibition concentration 25% [the sample concentration that shows a 25% reduction in toxicity]) value of 100% for the *C. dubia* from the second round of sampling (i.e., at a concentration of 100% of the provided sample water, no toxicity effects were observed in the *C. dubia*). Because the second toxicity test passed as >100%, the TIE manipulations also passed, thus providing no indications about why the first sample failed.

These results were relatively inconclusive in determining which specific constituents could lead to higher levels of risk. TDEC worked with Civil & Environmental Consultants (CEC) to perform this sampling effort. CEC suggested that the inconsistency in results could be caused by a few variables, but *C. dubia* is typically more sensitive on the chronic toxicity testing than the fat head minnows.

Another possibility for the inconsistency in results could relate to water hardness in NT-8. The first sampling event had relatively soft water compared to the second sampling event. Hardness was quantified at 149 mg/L in the first sampling event, while in the second event hardness quantifications ranged from 179 mg/L – 224 mg/L. The difference in hardness may have had multiple effects:

- Soft water can exacerbate toxicity, especially of metals, but also other anions/cations. In soft water, metals can be more toxic at lower concentrations. That being said, a strong correlation of metals was not observed in the data. Comparing the sampling events, most metal concentrations are consistent throughout, with the exception of Manganese.

    - Manganese was quantified at 0.117 mg/L in the first sampling event, while in the second event quantifications ranged from 0.0831 mg/L to 0.0952 mg/L. A manganese concentration of 0.117 mg/L is relatively low, but it's toxicity may have been increased due to the water softness.

- *C. dubia* prefer brackish water (i.e., salinity increases as hardness increases). The low hardness observed in the first round of samples may have increased the toxicity of anions/cations present in the wastewater sample.
- The lab performs the chronic toxicity analysis on a range of concentrations of the effluent (0% effluent [the control], 6.25%, 12.5%, 25%, 50%, and 100% effluent are typical). At lower concentrations of the effluent (6.25% and 25%), reproduction of the *C. dubia* was the lowest (reproduction rates were significantly lower than that observed in the control sample). Higher concentrations of the effluent (50% and 100%) observed higher reproduction rates (closer to reproduction rates observed in the control).

    - Typically, one would expect reproduction to decrease as the effluent concentration increases. The reproduction rates observed may tie back to hardness related toxicity, such as can occur with metals. At a 6.25% effluent concentration, the remaining 93.75% of water is made up of laboratory control water with an average hardness of 94 mg/L.

- The added laboratory water significantly reduces the hardness which in turn can increase metal toxicity.

Results of a *Ceriodaphnia* (Genus) *dubia* (Species) 3-Brood, Survival & Reproduction Test (Type/Duration)

Conducted 6/25/2024 to 7/1/2024

Using Effluent from Outfall: Final Effluent

Test Solution	Percent Surviving (time intervals used - days)								# of Young	
	0	1	2	3	4	5	6	7	Total	Mean
Control	100	100	100	90	90	90	90		251	25.1
6.25% Effluent	100	100	100	100	100	100	100		292	29.2
12.5% Effluent	100	100	100	100	90	90	90		279	27.9
25% Effluent	100	100	100	100	100	100	100		323	32.3
50% Effluent	100	100	100	100	100	100	100		252	25.2
100% Effluent	100	100	100	90	90	90	90		277	27.7

Permit Limit: 100%

IC_{25} Value: >100% Survival >100% Reproduction

Confidence Limits

Upper Limit:

Lower Limit:

Confidence Limits

:Upper Limit

:Lower Limit

Coefficient of Variance (CV%): 38.3%

Statistical methods used to determine NOEC (if applicable):

not applicable for this evaluation

C.1 Filled Coal Ash Pond (FCAP) Engineered Wetland Monitoring

C.1 Background

The Filled Coal Ash Pond on Chestnut Ridge was a settling basin for coal ash generated at the Y-12 Steam Plant; it was capped and remediated under CERCLA to prevent coal combustion residuals and associated contaminants from continuing to discharge into Rogers Quarry and to protect human health and the environment. A primary component of selected CERCLA remedy was an engineered wetland. The FCAP wetland is used as a passive treatment system to treat leachate from the coal ash retention pond through a subsurface drainage system. This wetland, located at the base of the dam that was constructed to create the pond, discharges to Upper McCoy Branch and Rogers Quarry.

The *2016 Five Year Review* identified reduced arsenic uptake through the wetland system due to channelization around the edges of the wetland and invasive plants displacing the cattails which are utilized for the uptake of arsenic and other metals. Work was concluded in 2019 to restore the flow in the wetland and the cattail community.

C.2 Scope

TDEC contracted CEC to conduct additional sampling of the FCAP engineered wetland treatment system following a focused sampling effort, led by TDEC in FY2023 and reported in the FY23 TDEC Environmental Monitoring Report, that produced results suggestive of seasonal differences in treatment system efficacy. To further understand the potential for seasonal changes in effectiveness, a second sampling effort was completed.

C.3 Sampling Summary

Sampling was conducted in 2024 by CEC at the FCAP wetland treatment system. One sample each of vegetation, sediment, and surface water was collected in February and again in May. Testing of these samples was conducted for Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Fluoride, Lead, Lithium, Mercury, Molybdenum, Selenium, Thallium, Radium-228, and Radium-226. The tables below present the results from the sampling events.

C.4 Results

Table C.4.1: Metals Results for FCAP Treatment System

	Water *(mg/l)*		Sediment *(mg/kg)*		Vegetation *(mg/kg)*	
	2/20/2024	5/7/2024	2/20/2024	5/7/2024	2/20/2024	5/7/2024
Antimony	U	U	7.17	U	U	U
Arsenic	0.0103	0.0121	73.9	99.2	13.9	U
Barium	0.0529	0.0564	264	93.6	46.1	54.9
Beryllium	U	U	5.63	0.886	0.294 J	U
Cadmium	U	U	2.66	0.146 J	U	U
Chromium	U	U	94.7	16.5	4.68	U
Cobalt	0.000268 J	0.00107 J	17.7	20.2	3.25 J	1.88 J
Fluoride	0.071 J	0.0917 J	U	U	18.9	U
Lead	U	U	50.3	13.4	2.36	U
Lithium	0.0362	0.0424	41.8	22.3	8.18 J	U
Mercury	U	U	0.0873	0.131	U	U
Molybdenum	0.00286 J	0.00176 J	22.5	2.65	1.17 J	11.8
Selenium	0.00382	0.00139 J	19.9	7.05	8.15	U
Thallium	U	U	3.55	U	U	U

U: Not detected at the Reporting Limit (or Method Detection Limit where applicable)
J: The identification of the analyte is acceptable; the reported value is an estimate.

Table C.4.2: Radionuclides Results for FCAP Treatment System

	Water *(pCi/l)*		Sediment *(pCi/g)*		Vegetation *(pCi/g)*	
	2/20/24	*5/7/24*	*2/20/24*	*5/7/24*	*2/20/24*	*5/7/24*
Actinium-228 (Ra-228)	-	-	0.9	1.32	0.34 J	0.196 U
Bismuth-214 (Ra-226)	-	-	1.34	1.54	0.697	0.214 J
Radium-228	-0.0428 U	0.348 J	-	-	-	-
Radium-226	-0.0465 U	0.805	-	-	-	-

U: Not detected at the Reporting Limit (or Method Detection Limit where applicable)

J: The identification of the analyte is acceptable; the reported value is an estimate.

D. EMDF Baseline Sampling

D.1 Background

The Environmental Management Disposal Facility (EMDF) is being developed on the DOE Oak Ridge Reservation for future waste disposal. Surface water sampling was conducted at seven locations (indicated by blue diamonds on the map below) to establish baseline conditions before construction. TDEC initiated this work with CEC to address gaps in DOE's proposed baseline sampling and to provide more comprehensive environmental data collection, including upstream and downstream tributaries, to better delineate contamination sources in Bear Creek Valley. TDEC recommended that DOE perform this work sooner and expand the list of analytes; however, DOE declined, prompting TDEC to proceed with the sampling.

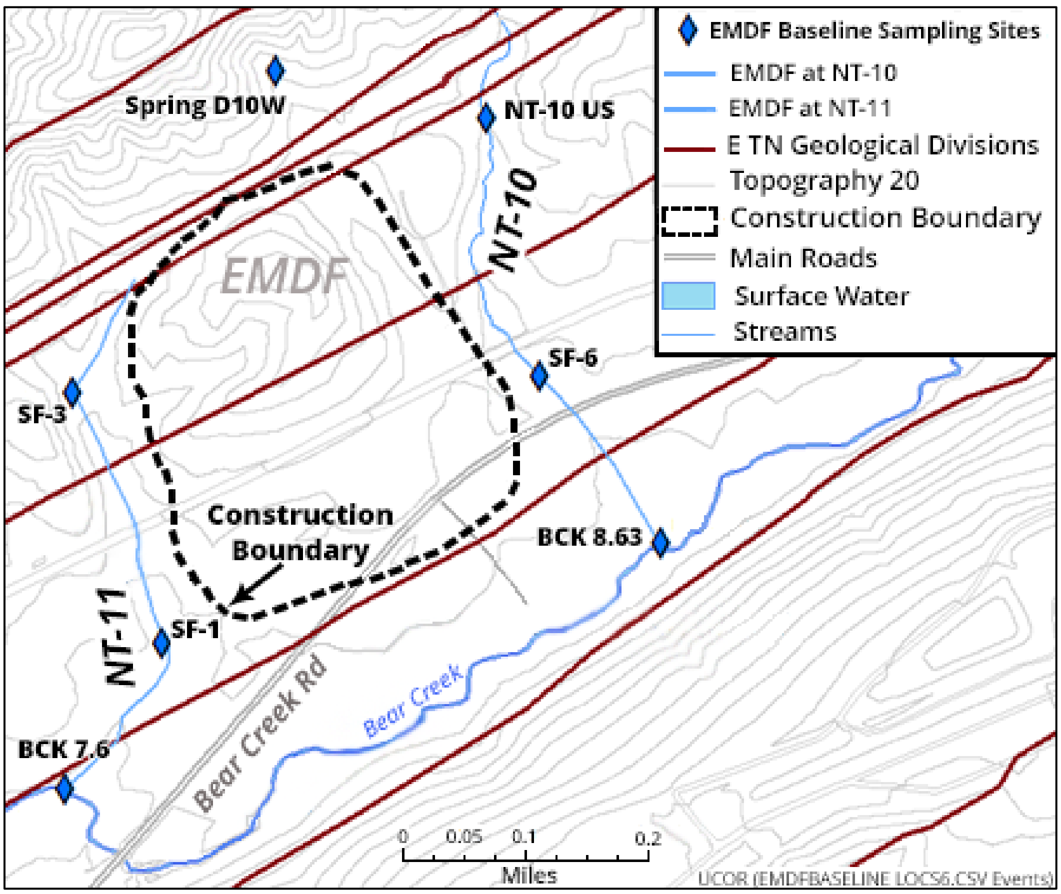

Figure D.1.1: EMDF Site Surface Water Sampling Sites

D.2 Scope

Sampling was conducted at three flumes (SF-1, SF-3, SF-6) on the tributaries, one spring (Spring D10W) upgradient of the landfill area, two Bear Creek sites (BCK 7.6, BCK 8.63), and one tributary site (NT10US). The goal was to capture baseline water quality in tributaries, groundwater discharges, and upstream/downstream waters on Bear Creek. TDEC and CEC conducted the sampling earlier than DOE's planned timeline, as DOE's schedule would have followed significant land-disturbing activities, potentially impacting surface water quality and compromising the representativeness of baseline conditions.

D.3 Sampling Summary

Numerous samples were collected in FY24, covering a range of potential analytes and contaminants typically associated with determining baseline conditions at hazardous waste landfills.

D.4 Results

The results below provide baseline data for pre-construction conditions near the proposed landfill.

Table D.2**: Wet Chemistry Results for EMDF Baseline Sampling April 2023. **Bold indicates result > Method Detection Limit (MDL).

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	**Alkalinity (as CaCO3)**	**123**	**mg/L**		**1**	**1**	**4/3/2023 11:21**	**4/10/2023 9:48**	**SM-2320 B**
BCK 7.6	**Bicarbonate**	**123**	**mg/L**		**1**	**1**	**4/3/2023 11:21**	**4/10/2023 9:48**	**SM-2320 B**
BCK 7.6	Carbonate	<2	mg/L	U	2	1	4/3/2023 11:21	4/10/2023 9:48	SM-2320 B
BCK 7.6	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 11:21	4/5/2023 15:00	SM-4500-NH3D
BCK 7.6	**Chloride**	**9.36**	**mg/L**		**0.245**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**EPA-300.0**
BCK 7.6	Cyanide Total	<0.005	mg/L	U	0.005	1	4/3/2023 11:21	4/5/2023 9:30	SM-4500CNE
BCK 7.6	**Nitrate (NO3-N)**	**1.6**	**mg/L**		**0.075**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**EPA-300.0**
BCK 7.6	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/3/2023 11:21	4/4/2023 12:30	EPA-300.0
BCK 7.6	**Nitrate+Nitrite-N**	**1.6**	**mg/L**		**0.046**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**EPA-300.0**
BCK 7.6	**Total Dissolved Solids**	**190**	**mg/L**		**51**	**1**	**4/3/2023 11:21**	**4/10/2023 18:24**	**SM-2540C**
BCK 7.6	**Total Suspended Solids**	**4**	**mg/L**		**3**	**1**	**4/3/2023 11:21**	**4/10/2023 10:05**	**SM-2540D**
BCK 7.6	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/3/2023 11:21	4/7/2023 13:33	SM-4500-N-ORG
BCK 7.6	**Total Nitrogen**	**1.6**	**mg/L**		**0.1**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**CALCULATION**
BCK 7.6	Phosphorus	<0.500	mg/L	U	0.5	1	4/3/2023 11:21	4/7/2023 13:33	EPA-365.4
BCK 7.6	**TOC**	**1.47**	**mg/L**		**1**	**1**	**4/3/2023 11:21**	**4/14/2023 2:48**	**SM-5310C**
BCK 7.6	**Sulfate**	**10.7**	**mg/L**		**0.328**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**EPA-300.0**
BCK 7.6	Arsenic	<0.297	µg/L	U	0.297	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	**Barium**	**62.2**	**µg/L**		**0.453**	**1**	**4/3/2023 11:21**	**4/5/2023 23:40**	**SW-6020B**
BCK 7.6	Cadmium	<0.350	µg/L	U	0.35	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	**Calcium**	**46.4**	**mg/L**		**0.5**	**1**	**4/3/2023 11:21**	**4/7/2023 0:25**	**SW-6010D**
BCK 7.6	**Chromium**	**0.667**	**µg/L**	**J**	**0.346**	**1**	**4/3/2023 11:21**	**4/6/2023 19:13**	**SW-6020B**
BCK 7.6	**Copper**	**0.65**	**µg/L**	**J**	**0.489**	**1**	**4/3/2023 11:21**	**4/6/2023 19:13**	**SW-6020B**
BCK 7.6	**Hardness as CaCO3(SM-2340B)**	**161**	**mg/L**		**0.1**	**1**	**4/3/2023 11:21**	**4/7/2023 0:25**	**SW-6010D**
BCK 7.6	Lead	<0.264	µg/L	U	0.264	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	**Magnesium**	**10.9**	**mg/L**		**0.1**	**1**	**4/3/2023 11:21**	**4/7/2023 0:25**	**SW-6010D**
BCK 7.6	**Nickel**	**0.702**	**µg/L**	**J**	**0.182**	**1**	**4/3/2023 11:21**	**4/6/2023 19:13**	**SW-6020B**
BCK 7.6	**Potassium**	**1330**	**µg/L**		**32.1**	**1**	**4/3/2023 11:21**	**4/5/2023 23:40**	**SW-6020B**
BCK 7.6	Selenium	<0.703	µg/L	U	0.703	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	Silver	<0.0570	µg/L	U	0.057	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	**Sodium**	**5810**	**µg/L**		**60.4**	**1**	**4/3/2023 11:21**	**4/6/2023 19:13**	**SW-6020B**
BCK 7.6	Thallium	<0.0610	µg/L	U	0.061	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	Acenaphthene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Acenaphthylene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Acetone	<20.0	µg/L	U	20	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Aldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Anthracene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Benzene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzoic Acid	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzyl alcohol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	beta-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Bromodichloromethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Bromoform	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Bromomethane	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Carbazole	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Carbon Disulfide	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chlordane	<0.200	µg/L	U	0.2	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	4-Chloroaniline	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Chlorobenzene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chloroform	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chloromethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	2-Chlorophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Chrysene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	44-DDD	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	44-DDE	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	44-DDT	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Dibenzofuran	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	11-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	12-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	11-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	12-Dichloropropane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Dieldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Diethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Ethylbenzene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Fluorene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Hexachloroethane	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	2-Hexanone	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Isophorone	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Methylene Chloride	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	2-Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	mp-Xylene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	2-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	3-Nitroaniline	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D

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BCK 7.6	4-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	2-Nitrophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	4-Nitrophenol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	o-Xylene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Pentachlorophenol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Phenanthrene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Phenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Pyrene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Styrene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Tetrachloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Toluene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	111-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	112-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Trichloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Vinyl Chloride	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Xylene (Total)	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chromium Hexavalent	<10	µg/L	U	10	1	4/3/2023 11:21	4/4/2023 11:00	SM-3500CrB (LOW)
BCK 7.6	**Mercury**	**3.08**	**ng/L**		**0.5**	**1**	**4/3/2023 11:21**	**4/6/2023 16:51**	**EPA-1631E**
BCK 7.6	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Anthracene	<0.00550	µg/L	U	0.0055	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Chrysene	<0.00820	µg/L	U	0.0082	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Fluorene	<0.0101	µg/L	U	0.0101	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Pyrene	<0.00960	µg/L	U	0.0096	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 8.63	**Alkalinity (as CaCO3)**	**133**	**mg/L**		**1**	**1**	**4/3/2023 12:37**	**4/10/2023 9:48**	**SM-2320 B**
BCK 8.63	**Bicarbonate**	**133**	**mg/L**		**1**	**1**	**4/3/2023 12:37**	**4/10/2023 9:48**	**SM-2320 B**
BCK 8.63	Carbonate	<2	mg/L	U	2	1	4/3/2023 12:37	4/10/2023 9:48	SM-2320 B
BCK 8.63	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 12:37	4/5/2023 15:00	SM-4500-NH3D
BCK 8.63	**Chloride**	**10**	**mg/L**		**0.245**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**EPA-300.0**
BCK 8.63	Cyanide Total	<0.005	mg/L	U	0.005	1	4/3/2023 12:37	4/5/2023 9:30	SM-4500CNE
BCK 8.63	**Nitrate (NO3-N)**	**1.78**	**mg/L**		**0.075**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**EPA-300.0**
BCK 8.63	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/3/2023 12:37	4/4/2023 12:56	EPA-300.0
BCK 8.63	**Nitrate+Nitrite-N**	**1.78**	**mg/L**		**0.046**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**EPA-300.0**
BCK 8.63	**Total Dissolved Solids**	**194**	**mg/L**		**51**	**1**	**4/3/2023 12:37**	**4/10/2023 18:24**	**SM-2540C**
BCK 8.63	**Total Suspended Solids**	**4**	**mg/L**		**3**	**1**	**4/3/2023 12:37**	**4/10/2023 10:05**	**SM-2540D**
BCK 8.63	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/3/2023 12:37	4/7/2023 13:27	SM-4500-N-ORG
BCK 8.63	**Total Nitrogen**	**1.78**	**mg/L**		**0.1**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**CALCULATION**
BCK 8.63	Phosphorus	<0.500	mg/L	U	0.5	1	4/3/2023 12:37	4/7/2023 13:27	EPA-365.4
BCK 8.63	**TOC**	**1.31**	**mg/L**		**1**	**1**	**4/3/2023 12:37**	**4/14/2023 4:04**	**SM-5310C**
BCK 8.63	**Sulfate**	**11.1**	**mg/L**		**0.328**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**EPA-300.0**
BCK 8.63	Arsenic	<0.297	µg/L	U	0.297	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	**Barium**	**64.4**	**µg/L**		**0.453**	**1**	**4/3/2023 12:37**	**4/5/2023 23:44**	**SW-6020B**
BCK 8.63	Cadmium	<0.350	µg/L	U	0.35	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	**Calcium**	**51.3**	**mg/L**		**0.5**	**1**	**4/3/2023 12:37**	**4/7/2023 0:30**	**SW-6010D**
BCK 8.63	**Chromium**	**0.555**	**µg/L**	**J**	**0.346**	**1**	**4/3/2023 12:37**	**4/6/2023 19:16**	**SW-6020B**
BCK 8.63	Copper	<0.489	µg/L	U	0.489	1	4/3/2023 12:37	4/6/2023 19:16	SW-6020B
BCK 8.63	**Hardness as CaCO3(SM-2340B)**	**179**	**mg/L**		**0.1**	**1**	**4/3/2023 12:37**	**4/7/2023 0:30**	**SW-6010D**
BCK 8.63	Lead	<0.264	µg/L	U	0.264	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B

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BCK 8.63	**Magnesium**	**12.3**	**mg/L**		**0.1**	**1**	**4/3/2023 12:37**	**4/7/2023 0:30**	**SW-6010D**
BCK 8.63	**Nickel**	**0.702**	**µg/L**	**J**	**0.182**	**1**	**4/3/2023 12:37**	**4/6/2023 19:16**	**SW-6020B**
BCK 8.63	**Potassium**	**1340**	**µg/L**		**32.1**	**1**	**4/3/2023 12:37**	**4/5/2023 23:44**	**SW-6020B**
BCK 8.63	Selenium	<0.703	µg/L	U	0.703	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	Silver	<0.0570	µg/L	U	0.057	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	**Sodium**	**6120**	**µg/L**		**60.4**	**1**	**4/3/2023 12:37**	**4/6/2023 19:16**	**SW-6020B**
BCK 8.63	Thallium	<0.0610	µg/L	U	0.061	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	Acenaphthene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Acenaphthylene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Acetone	<20.0	µg/L	U	20	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Aldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Anthracene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Benzene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzoic Acid	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzyl alcohol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	beta-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 8.63	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Bromodichloromethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Bromoform	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Bromomethane	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Carbazole	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Carbon Disulfide	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chlordane	<0.200	µg/L	U	0.2	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Chloroaniline	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Chlorobenzene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chloroform	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chloromethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	2-Chlorophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Chrysene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	44-DDD	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	44-DDE	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	44-DDT	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Dibenzofuran	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	11-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 8.63	12-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	11-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	**cis-12-Dichloroethene**	**1.77**	**µg/L**		**1**	**1**	**4/3/2023 12:37**	**4/8/2023 12:47**	**SW-8260B**
BCK 8.63	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	12-Dichloropropane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Dieldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Diethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Ethylbenzene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Fluorene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Hexachloroethane	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	2-Hexanone	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Isophorone	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 8.63	Methylene Chloride	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	2-Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	mp-Xylene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	2-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	3-Nitroaniline	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	2-Nitrophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Nitrophenol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	o-Xylene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Pentachlorophenol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Phenanthrene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Phenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Pyrene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Styrene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Tetrachloroethene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Toluene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	111-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	112-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Trichloroethene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Vinyl Chloride	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Xylene (Total)	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chromium Hexavalent	<10	µg/L	U	10	1	4/3/2023 12:37	4/4/2023 11:00	SM-3500CrB (LOW)
BCK 8.63	**Mercury**	**2.96**	**ng/L**		**0.5**	**1**	**4/3/2023 12:37**	**4/6/2023 17:45**	**EPA-1631E**
BCK 8.63	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 8.63	Anthracene	<0.00550	µg/L	U	0.0055	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Chrysene	<0.00820	µg/L	U	0.0082	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Fluorene	<0.0101	µg/L	U	0.0101	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Pyrene	<0.00960	µg/L	U	0.0096	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
NT10US	**Alkalinity (as CaCO3)**	**12**	**mg/L**		**1**	**1**	**4/10/2023 11:10**	**4/18/2023 10:30**	**SM-2320 B**
NT10US	**Bicarbonate**	**12**	**mg/L**		**1**	**1**	**4/10/2023 11:10**	**4/18/2023 10:30**	**SM-2320 B**
NT10US	Carbonate	<2	mg/L	U	2	1	4/10/2023 11:10	4/18/2023 10:30	SM-2320 B
NT10US	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 11:10	4/13/2023 12:16	SM-4500-NH3D
NT10US	**Chloride**	**0.767**	**mg/L**		**0.245**	**1**	**4/10/2023 11:10**	**4/11/2023 23:12**	**EPA-300.0**
NT10US	Cyanide Total	<0.005	mg/L	U	0.005	1	4/10/2023 11:10	4/13/2023 9:00	SM-4500CNE
NT10US	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/10/2023 11:10	4/11/2023 23:12	EPA-300.0
NT10US	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/10/2023 11:10	4/11/2023 23:12	EPA-300.0
NT10US	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/10/2023 11:10	4/11/2023 23:12	EPA-300.0
NT10US	**Total Dissolved Solids**	**36.9**	**mg/L**		**12.8**	**1**	**4/10/2023 11:10**	**4/17/2023 16:52**	**SM-2540C**
NT10US	**Total Suspended Solids**	**14**	**mg/L**		**2**	**1**	**4/10/2023 11:10**	**4/14/2023 18:04**	**SM-2540D**
NT10US	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/10/2023 11:10	4/17/2023 13:59	SM-4500-N-ORG
NT10US	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 11:10	4/11/2023 23:12	CALCULATION
NT10US	Phosphorus	<0.500	mg/L	U	0.5	1	4/10/2023 11:10	4/17/2023 15:02	EPA-365.4
NT10US	**TOC**	**1.2**	**mg/L**		**1**	**1**	**4/10/2023 11:10**	**4/19/2023 1:04**	**SM-5310C**
NT10US	**Sulfate**	**5.07**	**mg/L**		**0.328**	**1**	**4/10/2023 11:10**	**4/11/2023 23:12**	**EPA-300.0**
NT10US	Arsenic	<0.297	µg/L	U	0.297	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	**Barium**	**36.4**	**µg/L**		**0.453**	**1**	**4/10/2023 11:10**	**4/12/2023 22:38**	**SW-6020B**
NT10US	Cadmium	<0.350	µg/L	U	0.35	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	**Calcium**	**3.93**	**mg/L**		**0.5**	**1**	**4/10/2023 11:10**	**4/14/2023 1:35**	**SW-6010D**
NT10US	**Chromium**	**0.926**	**µg/L**	**J**	**0.346**	**1**	**4/10/2023 11:10**	**4/12/2023 22:38**	**SW-6020B**
NT10US	**Copper**	**0.767**	**µg/L**	**J**	**0.489**	**1**	**4/10/2023 11:10**	**4/12/2023 22:38**	**SW-6020B**
NT10US	**Hardness as CaCO3(SM-2340B)**	**18.4**	**mg/L**		**0.1**	**1**	**4/10/2023 11:10**	**4/14/2023 1:35**	**SW-6010D**
NT10US	**Lead**	**0.456**	**µg/L**	**J**	**0.264**	**1**	**4/10/2023 11:10**	**4/12/2023 22:38**	**SW-6020B**
NT10US	**Magnesium**	**2.08**	**mg/L**		**0.1**	**1**	**4/10/2023 11:10**	**4/14/2023 1:35**	**SW-6010D**
NT10US	**Nickel**	**1.56**	**µg/L**		**0.182**	**1**	**4/10/2023 11:10**	**4/12/2023 22:38**	**SW-6020B**
NT10US	**Potassium**	**1340**	**µg/L**		**32.1**	**1**	**4/10/2023 11:10**	**4/12/2023 22:38**	**SW-6020B**
NT10US	Selenium	<0.703	µg/L	U	0.703	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Silver	<0.0570	µg/L	U	0.057	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	**Sodium**	**1860**	**µg/L**		**60.4**	**1**	**4/10/2023 11:10**	**4/12/2023 22:38**	**SW-6020B**
NT10US	Thallium	<0.0610	µg/L	U	0.061	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Acenaphthene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Acenaphthylene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Acetone	<20.0	µg/L	U	20	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Aldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Anthracene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Benzene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzoic Acid	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzyl alcohol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	beta-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Bromodichloromethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Bromoform	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Bromomethane	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Carbazole	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Carbon Disulfide	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chlordane	<0.200	µg/L	U	0.2	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Chloroaniline	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Chlorobenzene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chloroform	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chloromethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	2-Chlorophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Chrysene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	44-DDD	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	44-DDE	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	44-DDT	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Dibenzofuran	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	11-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	12-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	11-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	12-Dichloropropane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Dieldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Diethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Ethylbenzene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Fluorene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Hexachloroethane	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	2-Hexanone	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Isophorone	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Methylene Chloride	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	2-Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	mp-Xylene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	2-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	3-Nitroaniline	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	2-Nitrophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Nitrophenol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	o-Xylene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Pentachlorophenol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Phenanthrene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Phenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Pyrene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Styrene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Tetrachloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Toluene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	111-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	112-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Trichloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Vinyl Chloride	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Xylene (Total)	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chromium Hexavalent	<10	µg/L	U	10	1	4/10/2023 11:10	4/11/2023 10:01	SM-3500CrB (LOW)
NT10US	**Mercury**	**9.57**	**ng/L**		**0.5**	**1**	**4/10/2023 11:10**	**4/14/2023 18:48**	**EPA-1631E**
NT10US	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Anthracene	<0.00550	µg/L	U	0.0055	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Chrysene	<0.00820	µg/L	U	0.0082	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Fluorene	<0.0101	µg/L	U	0.0101	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Pyrene	<0.00960	µg/L	U	0.0096	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
SF-1	**Alkalinity (as CaCO3)**	**37**	**mg/L**		**1**	**1**	**4/3/2023 13:16**	**4/10/2023 9:48**	**SM-2320 B**
SF-1	**Bicarbonate**	**37**	**mg/L**		**1**	**1**	**4/3/2023 13:16**	**4/10/2023 9:48**	**SM-2320 B**
SF-1	Carbonate	<2	mg/L	U	2	1	4/3/2023 13:16	4/10/2023 9:48	SM-2320 B
SF-1	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 13:16	4/5/2023 15:00	SM-4500-NH3D
SF-1	**Chloride**	**0.873**	**mg/L**		**0.245**	**1**	**4/3/2023 13:16**	**4/4/2023 11:39**	**EPA-300.0**
SF-1	Cyanide Total	<0.005	mg/L	U	0.005	1	4/3/2023 13:16	4/5/2023 9:30	SM-4500CNE
SF-1	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/3/2023 13:16	4/4/2023 11:39	EPA-300.0
SF-1	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/3/2023 13:16	4/4/2023 11:39	EPA-300.0
SF-1	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/3/2023 13:16	4/4/2023 11:39	EPA-300.0
SF-1	Total Dissolved Solids	<50.0	mg/L	U	50	1	4/3/2023 13:16	4/10/2023 18:24	SM-2540C

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-1	**Total Suspended Solids**	**9**	**mg/L**		**2**	**1**	**4/3/2023 13:16**	**4/10/2023 10:05**	**SM-2540D**
SF-1	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/3/2023 13:16	4/7/2023 13:30	SM-4500-N-ORG
SF-1	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 13:16	4/4/2023 11:39	CALCULATION
SF-1	Phosphorus	<0.500	mg/L	U	0.5	1	4/3/2023 13:16	4/7/2023 13:31	EPA-365.4
SF-1	**TOC**	**1.32**	**mg/L**		**1**	**1**	**4/3/2023 13:16**	**4/14/2023 1:32**	**SM-5310C**
SF-1	**Sulfate**	**7.97**	**mg/L**		**0.328**	**1**	**4/3/2023 13:16**	**4/4/2023 11:39**	**EPA-300.0**
SF-1	**Arsenic**	**0.496**	**µg/L**	**J**	**0.297**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	**Barium**	**74.4**	**µg/L**		**0.453**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	Cadmium	<0.350	µg/L	U	0.35	1	4/3/2023 13:16	4/5/2023 23:26	SW-6020B
SF-1	**Calcium**	**18.2**	**mg/L**		**0.5**	**1**	**4/3/2023 13:16**	**4/7/2023 0:15**	**SW-6010D**
SF-1	**Chromium**	**4.52**	**µg/L**		**0.346**	**1**	**4/3/2023 13:16**	**4/6/2023 18:58**	**SW-6020B**
SF-1	**Copper**	**2.02**	**µg/L**		**0.489**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	**Hardness as CaCO3(SM-2340B)**	**63.2**	**mg/L**		**0.1**	**1**	**4/3/2023 13:16**	**4/7/2023 0:15**	**SW-6010D**
SF-1	**Lead**	**1.85**	**µg/L**		**0.264**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	**Magnesium**	**4.3**	**mg/L**		**0.1**	**1**	**4/3/2023 13:16**	**4/7/2023 0:15**	**SW-6010D**
SF-1	**Nickel**	**3.63**	**µg/L**		**0.182**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	**Potassium**	**2050**	**µg/L**		**32.1**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	Selenium	<0.703	µg/L	U	0.703	1	4/3/2023 13:16	4/5/2023 23:26	SW-6020B
SF-1	Silver	<0.0570	µg/L	U	0.057	1	4/3/2023 13:16	4/5/2023 23:26	SW-6020B
SF-1	**Sodium**	**2430**	**µg/L**		**60.4**	**1**	**4/3/2023 13:16**	**4/6/2023 18:58**	**SW-6020B**
SF-1	**Thallium**	**0.107**	**µg/L**	**J**	**0.061**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	Acenaphthene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Acenaphthylene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Acetone	<20.0	µg/L	U	20	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Aldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-1	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Benzene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzoic Acid	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzyl alcohol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	beta-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Bromodichloromethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Bromoform	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Bromomethane	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Carbazole	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Carbon Disulfide	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chlordane	<0.200	µg/L	U	0.2	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Chloroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Chlorobenzene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chloroform	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chloromethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-1	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	2-Chlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Chrysene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	44-DDD	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	44-DDE	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	44-DDT	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Dibenzofuran	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	11-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	12-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	11-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	12-Dichloropropane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Dieldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Diethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-1	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Ethylbenzene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Fluorene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Hexachloroethane	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	2-Hexanone	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Isophorone	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Methylene Chloride	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	2-Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	mp-Xylene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	2-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	3-Nitroaniline	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	2-Nitrophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Nitrophenol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	o-Xylene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Pentachlorophenol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Phenanthrene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Phenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Styrene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-1	Tetrachloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Toluene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	111-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	112-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Trichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Vinyl Chloride	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Xylene (Total)	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chromium Hexavalent	<10	µg/L	U	10	1	4/3/2023 13:16	4/4/2023 11:00	SM-3500CrB (LOW)
SF-1	**Mercury**	**3.44**	**ng/L**		**0.5**	**1**	**4/3/2023 13:16**	**4/6/2023 16:28**	**EPA-1631E**
SF-1	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Anthracene	<0.00550	µg/L	U	0.0055	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Chrysene	<0.00820	µg/L	U	0.0082	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Fluorene	<0.0101	µg/L	U	0.0101	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Pyrene	<0.00960	µg/L	U	0.0096	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-3	**Alkalinity (as CaCO3)**	**4**	**mg/L**		**1**	**1**	**4/3/2023 13:58**	**4/10/2023 9:48**	**SM-2320 B**
SF-3	**Bicarbonate**	**4**	**mg/L**		**1**	**1**	**4/3/2023 13:58**	**4/10/2023 9:48**	**SM-2320 B**
SF-3	Carbonate	<2	mg/L	U	2	1	4/3/2023 13:58	4/10/2023 9:48	SM-2320 B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 13:58	4/5/2023 15:00	SM-4500-NH3D
SF-3	**Chloride**	**0.764**	**mg/L**		**0.245**	**1**	**4/3/2023 13:58**	**4/4/2023 12:04**	**EPA-300.0**
SF-3	Cyanide Total	<0.005	mg/L	U	0.005	1	4/3/2023 13:58	4/5/2023 9:30	SM-4500CNE
SF-3	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/3/2023 13:58	4/4/2023 12:04	EPA-300.0
SF-3	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/3/2023 13:58	4/4/2023 12:04	EPA-300.0
SF-3	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/3/2023 13:58	4/4/2023 12:04	EPA-300.0
SF-3	**Total Dissolved Solids**	**41.9**	**mg/L**		**12.6**	**1**	**4/3/2023 13:58**	**4/10/2023 18:24**	**SM-2540C**
SF-3	**Total Suspended Solids**	**28**	**mg/L**		**3**	**1**	**4/3/2023 13:58**	**4/10/2023 10:05**	**SM-2540D**
SF-3	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/3/2023 13:58	4/7/2023 13:31	SM-4500-N-ORG
SF-3	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 13:58	4/4/2023 12:04	CALCULATION
SF-3	Phosphorus	<0.500	mg/L	U	0.5	1	4/3/2023 13:58	4/7/2023 13:32	EPA-365.4
SF-3	**TOC**	**1.02**	**mg/L**		**1**	**1**	**4/3/2023 13:58**	**4/14/2023 2:10**	**SM-5310C**
SF-3	**Sulfate**	**5.13**	**mg/L**		**0.328**	**1**	**4/3/2023 13:58**	**4/4/2023 12:04**	**EPA-300.0**
SF-3	Arsenic	<0.297	µg/L	U	0.297	1	4/3/2023 13:58	4/5/2023 23:36	SW-6020B
SF-3	**Barium**	**38.1**	**µg/L**		**0.453**	**1**	**4/3/2023 13:58**	**4/5/2023 23:36**	**SW-6020B**
SF-3	Cadmium	<0.350	µg/L	U	0.35	1	4/3/2023 13:58	4/5/2023 23:36	SW-6020B
SF-3	**Calcium**	**3.25**	**mg/L**		**0.5**	**1**	**4/3/2023 13:58**	**4/7/2023 0:20**	**SW-6010D**
SF-3	**Chromium**	**1.26**	**µg/L**		**0.346**	**1**	**4/3/2023 13:58**	**4/6/2023 19:09**	**SW-6020B**
SF-3	**Copper**	**0.76**	**µg/L**	**J**	**0.489**	**1**	**4/3/2023 13:58**	**4/6/2023 19:09**	**SW-6020B**
SF-3	**Hardness as CaCO3(SM-2340B)**	**14.3**	**mg/L**		**0.1**	**1**	**4/3/2023 13:58**	**4/7/2023 0:20**	**SW-6010D**
SF-3	**Lead**	**0.411**	**µg/L**	**J**	**0.264**	**1**	**4/3/2023 13:58**	**4/5/2023 23:36**	**SW-6020B**
SF-3	**Magnesium**	**1.49**	**mg/L**		**0.1**	**1**	**4/3/2023 13:58**	**4/7/2023 0:20**	**SW-6010D**
SF-3	**Nickel**	**1.28**	**µg/L**		**0.182**	**1**	**4/3/2023 13:58**	**4/6/2023 19:09**	**SW-6020B**
SF-3	**Potassium**	**1340**	**µg/L**		**32.1**	**1**	**4/3/2023 13:58**	**4/5/2023 23:36**	**SW-6020B**
SF-3	Selenium	<0.703	µg/L	U	0.703	1	4/3/2023 13:58	4/5/2023 23:36	SW-6020B
SF-3	Silver	<0.0570	µg/L	U	0.057	1	4/3/2023 13:58	4/5/2023 23:36	SW-6020B
SF-3	**Sodium**	**1610**	**µg/L**		**60.4**	**1**	**4/3/2023 13:58**	**4/6/2023 19:09**	**SW-6020B**
SF-3	**Thallium**	**0.066**	**µg/L**	**J**	**0.061**	**1**	**4/3/2023 13:58**	**4/5/2023 23:36**	**SW-6020B**
SF-3	Acenaphthene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Acenaphthylene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Acetone	<20.0	µg/L	U	20	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Aldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Benzene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzoic Acid	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzyl alcohol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	beta-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Bromodichloromethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Bromoform	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Bromomethane	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Carbazole	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Carbon Disulfide	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chlordane	<0.200	µg/L	U	0.2	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Chloroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Chlorobenzene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chloroform	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chloromethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	2-Chlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Chrysene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	44-DDD	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	44-DDE	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	44-DDT	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Dibenzofuran	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	11-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	12-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	11-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	12-Dichloropropane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Dieldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Diethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Ethylbenzene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Fluorene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Hexachloroethane	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	2-Hexanone	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Isophorone	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Methylene Chloride	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	2-Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	mp-Xylene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	2-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	3-Nitroaniline	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	2-Nitrophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Nitrophenol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	o-Xylene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Pentachlorophenol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Phenanthrene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Phenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Styrene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Tetrachloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Toluene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	111-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	112-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Trichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Vinyl Chloride	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Xylene (Total)	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chromium Hexavalent	<10	µg/L	U	10	1	4/3/2023 13:58	4/4/2023 11:00	SM-3500CrB (LOW)
SF-3	**Mercury**	**4.52**	**ng/L**		**0.5**	**1**	**4/3/2023 13:58**	**4/6/2023 17:37**	**EPA-1631E**
SF-3	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Anthracene	<0.00550	µg/L	U	0.0055	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Chrysene	<0.00820	µg/L	U	0.0082	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Fluorene	<0.0101	µg/L	U	0.0101	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Pyrene	<0.00960	µg/L	U	0.0096	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-6	**Alkalinity (as CaCO3)**	**33**	**mg/L**		**1**	**1**	**4/10/2023 9:03**	**4/18/2023 10:30**	**SM-2320 B**
SF-6	**Bicarbonate**	**33**	**mg/L**		**1**	**1**	**4/10/2023 9:03**	**4/18/2023 10:30**	**SM-2320 B**
SF-6	Carbonate	<2	mg/L	U	2	1	4/10/2023 9:03	4/18/2023 10:30	SM-2320 B
SF-6	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 9:03	4/13/2023 12:16	SM-4500-NH3D
SF-6	**Chloride**	**0.692**	**mg/L**		**0.245**	**1**	**4/10/2023 9:03**	**4/11/2023 21:55**	**EPA-300.0**
SF-6	Cyanide Total	<0.005	mg/L	U	0.005	1	4/10/2023 9:03	4/13/2023 9:00	SM-4500CNE
SF-6	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/10/2023 9:03	4/11/2023 21:55	EPA-300.0
SF-6	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/10/2023 9:03	4/11/2023 21:55	EPA-300.0
SF-6	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/10/2023 9:03	4/11/2023 21:55	EPA-300.0
SF-6	**Total Dissolved Solids**	**52.1**	**mg/L**		**36.2**	**1**	**4/10/2023 9:03**	**4/17/2023 16:52**	**SM-2540C**
SF-6	**Total Suspended Solids**	**11**	**mg/L**		**2**	**1**	**4/10/2023 9:03**	**4/14/2023 18:04**	**SM-2540D**
SF-6	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/10/2023 9:03	4/17/2023 13:58	SM-4500-N-ORG
SF-6	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 9:03	4/11/2023 21:55	CALCULATION
SF-6	Phosphorus	<0.500	mg/L	U	0.5	1	4/10/2023 9:03	4/17/2023 15:16	EPA-365.4
SF-6	**TOC**	**1.54**	**mg/L**		**1**	**1**	**4/10/2023 9:03**	**4/18/2023 22:32**	**SM-5310C**
SF-6	**Sulfate**	**5.48**	**mg/L**		**0.328**	**1**	**4/10/2023 9:03**	**4/11/2023 21:55**	**EPA-300.0**
SF-6	**Arsenic**	**0.316**	**µg/L**	**J**	**0.297**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Barium**	**42.7**	**µg/L**		**0.453**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	Cadmium	<0.350	µg/L	U	0.35	1	4/10/2023 9:03	4/12/2023 22:23	SW-6020B
SF-6	**Calcium**	**10.7**	**mg/L**		**0.5**	**1**	**4/10/2023 9:03**	**4/14/2023 1:45**	**SW-6010D**
SF-6	**Chromium**	**1.31**	**µg/L**		**0.346**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Copper**	**0.734**	**µg/L**	**J**	**0.489**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Hardness as CaCO3(SM-2340B)**	**38.1**	**mg/L**		**0.1**	**1**	**4/10/2023 9:03**	**4/14/2023 1:45**	**SW-6010D**
SF-6	**Lead**	**0.459**	**µg/L**	**J**	**0.264**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Magnesium**	**2.77**	**mg/L**		**0.1**	**1**	**4/10/2023 9:03**	**4/14/2023 1:45**	**SW-6010D**
SF-6	**Nickel**	**1.32**	**µg/L**		**0.182**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Potassium**	**1280**	**µg/L**		**32.1**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	Selenium	<0.703	µg/L	U	0.703	1	4/10/2023 9:03	4/12/2023 22:23	SW-6020B
SF-6	Silver	<0.0570	µg/L	U	0.057	1	4/10/2023 9:03	4/12/2023 22:23	SW-6020B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	**Sodium**	**2590**	**µg/L**		**60.4**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Thallium**	**0.0683**	**µg/L**	**J**	**0.061**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	Acenaphthene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Acenaphthylene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Acetone	<20.0	µg/L	U	20	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Aldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Anthracene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Benzene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzoic Acid	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzyl alcohol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	beta-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Bromodichloromethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Bromoform	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Bromomethane	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Carbazole	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Carbon Disulfide	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chlordane	<0.200	µg/L	U	0.2	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Chloroaniline	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Chlorobenzene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chloroform	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chloromethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	2-Chlorophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Chrysene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	44-DDD	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	44-DDE	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	44-DDT	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Dibenzofuran	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	11-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	12-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	11-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	12-Dichloropropane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Dieldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Diethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Ethylbenzene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Fluorene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Hexachloroethane	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	2-Hexanone	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Isophorone	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Methylene Chloride	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	2-Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	mp-Xylene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	2-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	3-Nitroaniline	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	2-Nitrophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Nitrophenol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	o-Xylene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Pentachlorophenol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Phenanthrene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Phenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Pyrene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Styrene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Tetrachloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Toluene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	111-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	112-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Trichloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Vinyl Chloride	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Xylene (Total)	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	**Mercury**	**4.08**	**ng/L**		**0.5**	**1**	**4/10/2023 9:03**	**4/14/2023 16:54**	**EPA-1631E**
SF-6	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Anthracene	<0.00550	µg/L	U	0.0055	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	Chrysene	<0.00820	µg/L	U	0.0082	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Fluorene	<0.0101	µg/L	U	0.0101	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Pyrene	<0.00960	µg/L	U	0.0096	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Chromium Hexavalent	<0.002	mg/L	U	0.002	1	4/13/2023 12:13	4/14/2023 8:07	SM-3500CrB
Spring D10W	**Alkalinity (as CaCO3)**	**14**	**mg/L**		**1**	**1**	**4/10/2023 10:05**	**4/18/2023 10:30**	**SM-2320 B**
Spring D10W	**Bicarbonate**	**14**	**mg/L**		**1**	**1**	**4/10/2023 10:05**	**4/18/2023 10:30**	**SM-2320 B**
Spring D10W	Carbonate	<2	mg/L	U	2	1	4/10/2023 10:05	4/18/2023 10:30	SM-2320 B
Spring D10W	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 10:05	4/13/2023 12:16	SM-4500-NH3D
Spring D10W	**Chloride**	**1.03**	**mg/L**		**0.245**	**1**	**4/10/2023 10:05**	**4/11/2023 22:46**	**EPA-300.0**
Spring D10W	Cyanide Total	<0.005	mg/L	U	0.005	1	4/10/2023 10:05	4/13/2023 9:00	SM-4500CNE
Spring D10W	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/10/2023 10:05	4/11/2023 22:46	EPA-300.0
Spring D10W	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/10/2023 10:05	4/11/2023 22:46	EPA-300.0
Spring D10W	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/10/2023 10:05	4/11/2023 22:46	EPA-300.0
Spring D10W	**Total Dissolved Solids**	**46.7**	**mg/L**		**12.6**	**1**	**4/10/2023 10:05**	**4/17/2023 16:52**	**SM-2540C**
Spring D10W	**Total Suspended Solids**	**6**	**mg/L**		**2**	**1**	**4/10/2023 10:05**	**4/14/2023 18:04**	**SM-2540D**
Spring D10W	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/10/2023 10:05	4/17/2023 13:55	SM-4500-N-ORG
Spring D10W	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 10:05	4/11/2023 22:46	CALCULATION
Spring D10W	Phosphorus	<0.500	mg/L	U	0.5	1	4/10/2023 10:05	4/17/2023 14:57	EPA-365.4
Spring D10W	TOC	<1.00	mg/L	U	1	1	4/10/2023 10:05	4/18/2023 23:48	SM-5310C
Spring D10W	**Sulfate**	**6.68**	**mg/L**		**0.328**	**1**	**4/10/2023 10:05**	**4/11/2023 22:46**	**EPA-300.0**
Spring D10W	Arsenic	<0.297	µg/L	U	0.297	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	**Barium**	**42.3**	**µg/L**		**0.453**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	Cadmium	<0.350	µg/L	U	0.35	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	**Calcium**	**3.77**	**mg/L**		**0.5**	**1**	**4/10/2023 10:05**	**4/14/2023 1:40**	**SW-6010D**
Spring D10W	**Chromium**	**0.815**	**µg/L**	**J**	**0.346**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	Copper	<0.489	µg/L	U	0.489	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	**Hardness as CaCO3(SM-2340B)**	**19.5**	**mg/L**		**0.1**	**1**	**4/10/2023 10:05**	**4/14/2023 1:40**	**SW-6010D**
Spring D10W	Lead	<0.264	µg/L	U	0.264	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	**Magnesium**	**2.46**	**mg/L**		**0.1**	**1**	**4/10/2023 10:05**	**4/14/2023 1:40**	**SW-6010D**
Spring D10W	**Nickel**	**0.757**	**µg/L**	**J**	**0.182**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	**Potassium**	**2080**	**µg/L**		**32.1**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	Selenium	<0.703	µg/L	U	0.703	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	Silver	<0.0570	µg/L	U	0.057	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	**Sodium**	**2100**	**µg/L**		**60.4**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	Thallium	<0.0610	µg/L	U	0.061	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	Acenaphthene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Acenaphthylene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Acetone	<20.0	µg/L	U	20	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Aldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Anthracene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Benzene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzoic Acid	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzyl alcohol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	beta-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Bromodichloromethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Bromoform	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Bromomethane	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Carbazole	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Carbon Disulfide	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chlordane	<0.200	µg/L	U	0.2	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Chloroaniline	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Chlorobenzene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chloroform	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chloromethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	2-Chlorophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Chrysene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	44-DDD	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	44-DDE	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	44-DDT	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Dibenzofuran	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	11-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	12-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	11-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	12-Dichloropropane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Dieldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Diethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Ethylbenzene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Fluorene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Hexachloroethane	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	2-Hexanone	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	Isophorone	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Methylene Chloride	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	2-Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	mp-Xylene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	2-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	3-Nitroaniline	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	2-Nitrophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Nitrophenol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	o-Xylene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Pentachlorophenol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Phenanthrene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Phenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Pyrene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Styrene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Tetrachloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Toluene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	111-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	112-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Trichloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Vinyl Chloride	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Xylene (Total)	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chromium Hexavalent	<10	µg/L	U	10	1	4/10/2023 10:05	4/11/2023 10:01	SM-3500CrB (LOW)
Spring D10W	**Mercury**	**1.24**	**ng/L**		**0.5**	**1**	**4/10/2023 10:05**	**4/14/2023 18:41**	**EPA-1631E**

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Anthracene	<0.00550	µg/L	U	0.0055	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Chrysene	<0.00820	µg/L	U	0.0082	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Fluorene	<0.0101	µg/L	U	0.0101	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Pyrene	<0.00960	µg/L	U	0.0096	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)

MDL - Method Detection Limit: The minimum concentration detectable by the method but not precisely quantifiable below this threshold.
PQL - Practical Quantitation Limit: The lowest concentration that can be reliably measured with acceptable precision and accuracy under routine lab conditions.
U: Analyte not detected above MDL
J: Analyte detected above MDL but below reporting limit
DF: Dilution Factor

Table D.2: *Uranium metal Results for EMDF Baseline Sampling April 2023.* ***Bold indicates result > Method Detection Limit (MDL).***

Station ID	Analyte	Result	Units	Qualifier	MDL	PQL	DF	Collection Date	Analysis Date	Method
SF-1	**Uranium**	**0.146**	**ug/L**	**J**	**0.067**	**0.2**	**1**	**04/03/23 13:16**	**04/07/23 00:37**	**EPA 200.2**
SF-3	Uranium	<0.067	ug/L	U	0.067	0.2	1	04/03/23 13:58	04/07/23 01:00	EPA 200.2
BCK 7.6	**Uranium**	**27**	**ug/L**		**0.067**	**0.2**	**1**	**04/03/23 11:21**	**04/07/23 01:03**	**EPA 200.2**
BCK 8.63	**Uranium**	**29.7**	**ug/L**		**0.067**	**0.2**	**1**	**04/03/23 12:37**	**04/07/23 01:07**	**EPA 200.2**
SF-6	**Uranium**	**0.1**	**ug/L**	**J**	**0.067**	**0.2**	**1**	**04/10/23 09:03**	**04/16/23 09:11**	**EPA 200.2**
Spring D10W	Uranium	<0.067	ug/L	U	0.067	0.2	1	04/10/23 10:05	04/16/23 09:18	EPA 200.2
NT10US	Uranium	<0.067	ug/L	U	0.067	0.2	1	04/10/23 11:10	04/16/23 09:20	EPA 200.2

MDL - Method Detection Limit: The minimum concentration detectable by the method but not precisely quantifiable below this threshold.
PQL - Practical Quantitation Limit: The lowest concentration that can be reliably measured with acceptable precision and accuracy under routine lab conditions.
U: Analyte not detected above MDL
J: Analyte detected above MDL but below reporting limit
DF: Dilution Factor

***Table D.3**: Radionuclide Results for EMDF Baseline Sampling April 2023.*

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
BCK 7.6	Cobalt-60	-1.30	pCi/l	3.44	3.44	5.92	04/03/23 11:21	4/11/2023	EPA 901.1 Modified
BCK 7.6	Cesium-137	0.24	pCi/l	4.80	4.80	7.84	04/03/23 11:21	4/11/2023	EPA 901.1 Modified
BCK 7.6	Europium-154	-11.27	pCi/l	14.26	14.27	5.96	04/03/23 11:21	4/11/2023	EPA 901.1 Modified
BCK 7.6	Americium-241	0.15	pCi/l	0.17	0.17	0.24	04/03/23 11:21	4/14/2023	EML Am-01 Modified
BCK 7.6	Carbon-14	-2.36	pCi/l	2.28	2.30	3.98	04/03/23 11:21	4/21/2023	ENIC Modified
BCK 7.6	Chlorine-36	1.36	pCi/l	0.87	0.91	1.37	04/03/23 11:21	4/14/2023	4500-Cl-B
BCK 7.6	Tritium	139.13	pCi/l	215.58	215.72	364.27	04/03/23 11:21	4/15/2023	EPA 906.0 Modified
BCK 7.6	Iodine-129	1.17	pCi/l	0.79	0.79	1.20	04/03/23 11:21	4/27/2023	EPA 902.0 Modified
BCK 7.6	Neptunium-237	0.05	pCi/l	0.10	0.10	0.18	04/03/23 11:21	4/14/2023	EIChroM ACW08 Mod
BCK 7.6	Plutonium-238	0.01	pCi/l	0.07	0.07	0.21	04/03/23 11:21	4/13/2023	EML Pu-02 Modified
BCK 7.6	Plutonium-239/240	-0.01	pCi/l	0.07	0.07	0.14	04/03/23 11:21	4/13/2023	EML Pu-02 Modified
BCK 7.6	Radium-226	-0.04	pCi/l	0.15	0.15	0.35	04/03/23 11:21	4/12/2023	EPA 903.0 Modified
BCK 7.6	Radium-228	0.23	pCi/l	0.50	0.50	1.03	04/03/23 11:21	4/13/2023	EPA 904.0
BCK 7.6	Strontium-90	0.47	pCi/l	0.34	0.34	0.67	04/03/23 11:21	4/26/2023	EIChroM SRW01 Modified
BCK 7.6	Technetium-99	8.14	pCi/l	1.86	2.03	2.91	04/03/23 11:21	4/13/2023	EIChroM TCW01 Modified
BCK 7.6	Thorium-228	0.03	pCi/l	0.06	0.06	0.13	04/03/23 11:21	4/12/2023	EPA 907.0 Modified
BCK 7.6	Thorium-230	0.19	pCi/l	0.13	0.14	0.12	04/03/23 11:21	4/12/2023	EPA 907.0 Modified
BCK 7.6	Thorium-232	0.01	pCi/l	0.04	0.04	0.11	04/03/23 11:21	4/12/2023	EPA 907.0 Modified
BCK 7.6	Uranium-233/234	3.86	pCi/l	0.69	0.74	0.15	04/03/23 11:21	4/12/2023	EPA 908.0 Modified
BCK 7.6	Uranium-235/236	0.31	pCi/l	0.20	0.20	0.18	04/03/23 11:21	4/12/2023	EPA 908.0 Modified
BCK 7.6	Uranium-238	8.92	pCi/l	1.19	1.35	0.15	04/03/23 11:21	4/12/2023	EPA 908.0 Modified
BCK 8.63	Cobalt-60	1.67	pCi/l	3.33	3.33	5.78	04/03/23 12:37	4/12/2023	EPA 901.1 Modified
BCK 8.63	Cesium-137	-0.36	pCi/l	3.48	3.48	4.82	04/03/23 12:37	4/12/2023	EPA 901.1 Modified
BCK 8.63	Europium-154	0.87	pCi/l	8.39	8.39	5.89	04/03/23 12:37	4/12/2023	EPA 901.1 Modified
BCK 8.63	Americium-241	0.11	pCi/l	0.14	0.14	0.20	04/03/23 12:37	4/14/2023	EML Am-01 Modified
BCK 8.63	Carbon-14	-2.77	pCi/l	2.25	2.28	3.94	04/03/23 12:37	4/21/2023	ENIC Modified
BCK 8.63	Chlorine-36	1.55	pCi/l	1.01	1.06	1.61	04/03/23 12:37	4/14/2023	4500-Cl-B
BCK 8.63	Tritium	193.24	pCi/l	219.13	219.39	367.97	04/03/23 12:37	4/15/2023	EPA 906.0 Modified
BCK 8.63	Iodine-129	1.09	pCi/l	0.70	0.70	1.15	04/03/23 12:37	4/27/2023	EPA 902.0 Modified
BCK 8.63	Neptunium-237	0.02	pCi/l	0.06	0.06	0.12	04/03/23 12:37	4/14/2023	EIChroM ACW08 Mod
BCK 8.63	Plutonium-238	0.06	pCi/l	0.10	0.10	0.14	04/03/23 12:37	4/13/2023	EML Pu-02 Modified
BCK 8.63	Plutonium-239/240	0.16	pCi/l	0.15	0.15	0.16	04/03/23 12:37	4/13/2023	EML Pu-02 Modified

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
BCK 8.63	Radium-226	0.18	pCi/l	0.18	0.18	0.23	04/03/23 12:37	4/12/2023	EPA 903.0 Modified
BCK 8.63	Radium-228	0.93	pCi/l	0.63	0.66	1.24	04/03/23 12:37	4/13/2023	EPA 904.0
BCK 8.63	Strontium-90	0.48	pCi/l	0.35	0.36	0.70	04/03/23 12:37	4/26/2023	EIChroM SRW01 Modified
BCK 8.63	Technetium-99	8.08	pCi/l	1.84	2.01	2.89	04/03/23 12:37	4/13/2023	EIChroM TCW01 Modified
BCK 8.63	Thorium-228	0.06	pCi/l	0.09	0.09	0.16	04/03/23 12:37	4/12/2023	EPA 907.0 Modified
BCK 8.63	Thorium-230	0.12	pCi/l	0.12	0.12	0.13	04/03/23 12:37	4/12/2023	EPA 907.0 Modified
BCK 8.63	Thorium-232	0.05	pCi/l	0.07	0.07	0.11	04/03/23 12:37	4/12/2023	EPA 907.0 Modified
BCK 8.63	Uranium-233/234	4.83	pCi/l	1.04	1.10	0.21	04/03/23 12:37	4/12/2023	EPA 908.0 Modified
BCK 8.63	Uranium-235/236	0.41	pCi/l	0.32	0.32	0.29	04/03/23 12:37	4/12/2023	EPA 908.0 Modified
BCK 8.63	Uranium-238	10.54	pCi/l	1.67	1.84	0.21	04/03/23 12:37	4/12/2023	EPA 908.0 Modified
NT10US	Cobalt-60	0.99	pCi/l	3.05	3.05	4.30	04/10/23 11:10	4/26/2023	EPA 901.1 Modified
NT10US	Cesium-137	0.92	pCi/l	3.23	3.23	5.12	04/10/23 11:10	4/26/2023	EPA 901.1 Modified
NT10US	Europium-154	0.60	pCi/l	1.46	1.46	6.54	04/10/23 11:10	4/26/2023	EPA 901.1 Modified
NT10US	Americium-241	0.05	pCi/l	0.06	0.06	0.08	04/10/23 11:10	5/3/2023	EML Am-01 Modified
NT10US	Carbon-14	-1.73	pCi/l	2.67	2.68	4.63	04/10/23 11:10	4/25/2023	ENIC Modified
NT10US	Chlorine-36	0.20	pCi/l	0.97	0.97	1.72	04/10/23 11:10	4/19/2023	4500-Cl-B
NT10US	Tritium	-131.49	pCi/l	228.44	228.56	398.38	04/10/23 11:10	4/20/2023	EPA 906.0 Modified
NT10US	Iodine-129	0.73	pCi/l	0.74	0.74	1.21	04/10/23 11:10	5/1/2023	EPA 902.0 Modified
NT10US	Neptunium-237	-0.03	pCi/l	0.08	0.08	0.22	04/10/23 11:10	5/3/2023	EIChroM ACW08 Mod
NT10US	Plutonium-238	0.00	pCi/l	0.13	0.13	0.33	04/10/23 11:10	5/3/2023	EML Pu-02 Modified
NT10US	Plutonium-239/240	-0.02	pCi/l	0.09	0.09	0.29	04/10/23 11:10	5/3/2023	EML Pu-02 Modified
NT10US	Radium-226	-0.02	pCi/l	0.07	0.07	0.24	04/10/23 11:10	4/25/2023	EPA 903.0 Modified
NT10US	Radium-228	0.55	pCi/l	0.35	0.38	0.69	04/10/23 11:10	4/27/2023	EPA 904.0
NT10US	Strontium-90	0.49	pCi/l	0.34	0.34	0.66	04/10/23 11:10	4/26/2023	EIChroM SRW01 Modified
NT10US	Technetium-99	-2.54	pCi/l	1.82	1.84	3.20	04/10/23 11:10	4/19/2023	EIChroM TCW01 Modified
NT10US	Thorium-228	0.19	pCi/l	0.18	0.18	0.24	04/10/23 11:10	4/25/2023	EPA 907.0 Modified
NT10US	Thorium-230	0.07	pCi/l	0.13	0.13	0.23	04/10/23 11:10	4/25/2023	EPA 907.0 Modified
NT10US	Thorium-232	0.01	pCi/l	0.06	0.06	0.17	04/10/23 11:10	4/25/2023	EPA 907.0 Modified
NT10US	Uranium-234	0.20	pCi/l	0.14	0.14	0.13	04/10/23 11:10	4/25/2023	EPA 908.0 Modified
NT10US	Uranium-235	0.06	pCi/l	0.10	0.10	0.18	04/10/23 11:10	4/25/2023	EPA 908.0 Modified
NT10US	Uranium-238	0.21	pCi/l	0.14	0.14	0.10	04/10/23 11:10	4/25/2023	EPA 908.0 Modified

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
SF-1	Cobalt-60	2.31	pCi/l	3.54	3.54	5.61	04/03/23 13:16	4/12/2023	EPA 901.1 Modified
SF-1	Cesium-137	0.11	pCi/l	3.75	3.75	5.62	04/03/23 13:16	4/12/2023	EPA 901.1 Modified
SF-1	Europium-154	0.20	pCi/l	4.10	4.10	6.03	04/03/23 13:16	4/12/2023	EPA 901.1 Modified
SF-1	Americium-241	0.25	pCi/l	0.18	0.18	0.13	04/03/23 13:16	4/14/2023	EML Am-01 Modified
SF-1	Carbon-14	-1.21	pCi/l	2.36	2.37	4.08	04/03/23 13:16	4/21/2023	ENIC Modified
SF-1	Chlorine-36	0.15	pCi/l	0.90	0.90	1.61	04/03/23 13:16	4/14/2023	4500-Cl-B
SF-1	Tritium	157.60	pCi/l	217.52	217.70	366.78	04/03/23 13:16	4/15/2023	EPA 906.0 Modified
SF-1	Iodine-129	0.85	pCi/l	0.80	0.80	1.48	04/03/23 13:16	4/27/2023	EPA 902.0 Modified
SF-1	Neptunium-237	0.02	pCi/l	0.08	0.08	0.21	04/03/23 13:16	4/14/2023	EIChroM ACW08 Mod
SF-1	Plutonium-238	0.04	pCi/l	0.11	0.11	0.25	04/03/23 13:16	4/13/2023	EML Pu-02 Modified
SF-1	Plutonium-239/240	-0.02	pCi/l	0.08	0.08	0.21	04/03/23 13:16	4/13/2023	EML Pu-02 Modified
SF-1	Radium-226	0.15	pCi/l	0.14	0.14	0.15	04/03/23 13:16	4/11/2023	EPA 903.0 Modified
SF-1	Radium-228	0.44	pCi/l	0.56	0.57	1.16	04/03/23 13:16	4/13/2023	EPA 904.0
SF-1	Strontium-90	-0.06	pCi/l	0.31	0.31	0.68	04/03/23 13:16	4/26/2023	EIChroM SRW01 Modified
SF-1	Technetium-99	0.94	pCi/l	1.75	1.75	2.96	04/03/23 13:16	4/13/2023	EIChroM TCW01 Modified
SF-1	Thorium-228	0.04	pCi/l	0.08	0.08	0.16	04/03/23 13:16	4/12/2023	EPA 907.0 Modified
SF-1	Thorium-230	0.12	pCi/l	0.13	0.13	0.17	04/03/23 13:16	4/12/2023	EPA 907.0 Modified
SF-1	Thorium-232	0.06	pCi/l	0.10	0.10	0.17	04/03/23 13:16	4/12/2023	EPA 907.0 Modified
SF-1	Uranium-233/234	0.05	pCi/l	0.25	0.25	0.53	04/03/23 13:16	4/12/2023	EPA 908.0 Modified
SF-1	Uranium-235/236	0.09	pCi/l	0.23	0.23	0.49	04/03/23 13:16	4/12/2023	EPA 908.0 Modified
SF-1	Uranium-238	0.01	pCi/l	0.20	0.20	0.47	04/03/23 13:16	4/12/2023	EPA 908.0 Modified
SF-3	Cobalt-60	-2.45	pCi/l	3.88	3.88	4.23	04/03/23 13:58	4/11/2023	EPA 901.1 Modified
SF-3	Cesium-137	3.43	pCi/l	2.69	2.70	5.02	04/03/23 13:58	4/11/2023	EPA 901.1 Modified
SF-3	Europium-154	0.49	pCi/l	6.12	6.12	3.98	04/03/23 13:58	4/11/2023	EPA 901.1 Modified
SF-3	Americium-241	0.07	pCi/l	0.11	0.11	0.19	04/03/23 13:58	4/14/2023	EML Am-01 Modified
SF-3	Carbon-14	-2.95	pCi/l	2.27	2.31	3.99	04/03/23 13:58	4/21/2023	ENIC Modified
SF-3	Chlorine-36	3.35	pCi/l	1.25	1.41	1.85	04/03/23 13:58	4/14/2023	4500-Cl-B
SF-3	Tritium	88.01	pCi/l	216.84	216.89	368.70	04/03/23 13:58	4/15/2023	EPA 906.0 Modified
SF-3	Iodine-129	1.36	pCi/l	0.81	0.81	1.61	04/03/23 13:58	4/27/2023	EPA 902.0 Modified
SF-3	Neptunium-237	0.01	pCi/l	0.06	0.06	0.16	04/03/23 13:58	4/14/2023	EIChroM ACW08 Mod
SF-3	Plutonium-238	0.07	pCi/l	0.13	0.13	0.22	04/03/23 13:58	4/13/2023	EML Pu-02 Modified
SF-3	Plutonium-239/240	0.03	pCi/l	0.07	0.07	0.15	04/03/23 13:58	4/13/2023	EML Pu-02 Modified
SF-3	Radium-226	0.09	pCi/l	0.12	0.12	0.18	04/03/23 13:58	4/11/2023	EPA 903.0 Modified
SF-3	Radium-228	0.09	pCi/l	0.57	0.57	1.20	04/03/23 13:58	4/13/2023	EPA 904.0

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
SF-3	Strontium-90	0.29	pCi/l	0.35	0.35	0.72	04/03/23 13:58	4/26/2023	EIChroM SRW01 Modified
SF-3	Technetium-99	0.00	pCi/l	2.13	2.13	3.63	04/03/23 13:58	4/13/2023	EIChroM TCW01 Modified
SF-3	Thorium-228	0.03	pCi/l	0.07	0.07	0.15	04/03/23 13:58	4/12/2023	EPA 907.0 Modified
SF-3	Thorium-230	0.17	pCi/l	0.14	0.14	0.12	04/03/23 13:58	4/12/2023	EPA 907.0 Modified
SF-3	Thorium-232	0.02	pCi/l	0.05	0.05	0.11	04/03/23 13:58	4/12/2023	EPA 907.0 Modified
SF-3	Uranium-233/234	0.05	pCi/l	0.07	0.07	0.10	04/03/23 13:58	4/12/2023	EPA 908.0 Modified
SF-3	Uranium-235/236	0.02	pCi/l	0.06	0.06	0.16	04/03/23 13:58	4/12/2023	EPA 908.0 Modified
SF-3	Uranium-238	0.09	pCi/l	0.10	0.10	0.12	04/03/23 13:58	4/12/2023	EPA 908.0 Modified
SF-6	Cobalt-60	3.19	pCi/l	2.67	2.67	5.45	04/10/23 09:03	4/26/2023	EPA 901.1 Modified
SF-6	Cesium-137	-0.25	pCi/l	3.95	3.95	5.52	04/10/23 09:03	4/26/2023	EPA 901.1 Modified
SF-6	Europium-154	-1.55	pCi/l	8.35	8.35	5.77	04/10/23 09:03	4/26/2023	EPA 901.1 Modified
SF-6	Americium-241	0.03	pCi/l	0.05	0.05	0.09	04/10/23 09:03	5/3/2023	EML Am-01 Modified
SF-6	Carbon-14	-1.56	pCi/l	2.68	2.69	4.64	04/10/23 09:03	4/25/2023	ENIC Modified
SF-6	Chlorine-36	-0.15	pCi/l	0.98	0.98	1.78	04/10/23 09:03	4/19/2023	4500-Cl-B
SF-6	Tritium	0.00	pCi/l	232.40	232.40	399.27	04/10/23 09:03	4/20/2023	EPA 906.0 Modified
SF-6	Iodine-129	0.94	pCi/l	0.74	0.74	1.43	04/10/23 09:03	4/30/2023	EPA 902.0 Modified
SF-6	Neptunium-237	0.35	pCi/l	0.24	0.24	0.21	04/10/23 09:03	5/3/2023	EIChroM ACW08 Mod
SF-6	Plutonium-238	0.04	pCi/l	0.12	0.12	0.27	04/10/23 09:03	5/3/2023	EML Pu-02 Modified
SF-6	Plutonium-239/240	-0.01	pCi/l	0.09	0.09	0.20	04/10/23 09:03	5/3/2023	EML Pu-02 Modified
SF-6	Radium-226	0.00	pCi/l	0.12	0.12	0.31	04/10/23 09:03	4/25/2023	EPA 903.0 Modified
SF-6	Radium-228	0.18	pCi/l	0.35	0.35	0.73	04/10/23 09:03	4/27/2023	EPA 904.0
SF-6	Strontium-90	0.51	pCi/l	0.37	0.37	0.72	04/10/23 09:03	4/26/2023	EIChroM SRW01 Modified
SF-6	Technetium-99	-2.53	pCi/l	1.81	1.83	3.18	04/10/23 09:03	4/19/2023	EIChroM TCW01 Modified
SF-6	Thorium-228	0.17	pCi/l	0.17	0.17	0.20	04/10/23 09:03	4/25/2023	EPA 907.0 Modified
SF-6	Thorium-230	0.28	pCi/l	0.20	0.21	0.18	04/10/23 09:03	4/25/2023	EPA 907.0 Modified
SF-6	Thorium-232	0.06	pCi/l	0.09	0.09	0.14	04/10/23 09:03	4/25/2023	EPA 907.0 Modified
SF-6	Uranium-234	0.07	pCi/l	0.10	0.10	0.17	04/10/23 09:03	4/25/2023	EPA 908.0 Modified
SF-6	Uranium-235	0.07	pCi/l	0.12	0.12	0.22	04/10/23 09:03	4/25/2023	EPA 908.0 Modified
SF-6	Uranium-238	0.04	pCi/l	0.08	0.08	0.15	04/10/23 09:03	4/25/2023	EPA 908.0 Modified
SPRING D10W	Cobalt-60	2.36	pCi/l	2.66	2.66	4.71	04/10/23 10:05	4/26/2023	EPA 901.1 Modified
SPRING D10W	Cesium-137	0.06	pCi/l	2.74	2.74	4.29	04/10/23 10:05	4/26/2023	EPA 901.1 Modified
SPRING D10W	Europium-154	1.05	pCi/l	8.69	8.69	4.21	04/10/23 10:05	4/26/2023	EPA 901.1 Modified

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
SPRING D10W	Americium-241	0.10	pCi/l	0.10	0.10	0.13	04/10/23 10:05	5/3/2023	EML Am-01 Modified
SPRING D10W	Carbon-14	-2.25	pCi/l	2.66	2.68	4.63	04/10/23 10:05	4/25/2023	ENIC Modified
SPRING D10W	Chlorine-36	0.96	pCi/l	0.94	0.96	1.55	04/10/23 10:05	4/19/2023	4500-Cl-B
SPRING D10W	Tritium	131.29	pCi/l	234.90	235.02	397.77	04/10/23 10:05	4/20/2023	EPA 906.0 Modified
SPRING D10W	Iodine-129	1.00	pCi/l	0.69	0.69	1.38	04/10/23 10:05	4/30/2023	EPA 902.0 Modified
SPRING D10W	Neptunium-237	0.05	pCi/l	0.08	0.08	0.12	04/10/23 10:05	5/3/2023	EIChroM ACW08 Mod
SPRING D10W	Plutonium-238	0.02	pCi/l	0.08	0.08	0.18	04/10/23 10:05	5/3/2023	EML Pu-02 Modified
SPRING D10W	Plutonium-239/240	0.05	pCi/l	0.11	0.11	0.21	04/10/23 10:05	5/3/2023	EML Pu-02 Modified
SPRING D10W	Radium-226	-0.15	pCi/l	0.13	0.13	0.40	04/10/23 10:05	4/25/2023	EPA 903.0 Modified
SPRING D10W	Radium-228	1.10	pCi/l	0.47	0.53	0.89	04/10/23 10:05	4/27/2023	EPA 904.0
SPRING D10W	Strontium-90	0.77	pCi/l	0.37	0.38	0.70	04/10/23 10:05	4/26/2023	EIChroM SRW01 Modified
SPRING D10W	Technetium-99	-0.64	pCi/l	1.78	1.78	3.06	04/10/23 10:05	4/19/2023	EIChroM TCW01 Modified
SPRING D10W	Thorium-228	0.06	pCi/l	0.12	0.12	0.22	04/10/23 10:05	4/25/2023	EPA 907.0 Modified
SPRING D10W	Thorium-230	0.05	pCi/l	0.08	0.08	0.14	04/10/23 10:05	4/25/2023	EPA 907.0 Modified
SPRING D10W	Thorium-232	0.09	pCi/l	0.11	0.11	0.17	04/10/23 10:05	4/25/2023	EPA 907.0 Modified
SPRING D10W	Uranium-234	0.14	pCi/l	0.13	0.13	0.17	04/10/23 10:05	4/25/2023	EPA 908.0 Modified
SPRING D10W	Uranium-235	0.14	pCi/l	0.15	0.15	0.21	04/10/23 10:05	4/25/2023	EPA 908.0 Modified
SPRING D10W	Uranium-238	0.11	pCi/l	0.12	0.12	0.17	04/10/23 10:05	4/25/2023	EPA 908.0 Modified

CU - Combined Uncertainty: Total uncertainty in the measurement, including all error sources.
CSU - Combined Standard Uncertainty: Uncertainty from the radioactive decay counting process (i.e. statistical standard deviation of an individual radiological result).
MDA - Minimum Detectable Activity: Smallest activity level reliably distinguishable from background noise.

Table D.4: *Dioxin Furan Results for EMDF Baseline Sampling April 2023. Bold indicates result > Method Detection Limit (MDL).*

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
BCK 7.6	1,2,3,4,6,7,8-HPCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,4,6,7,8-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,4,7,8,9-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,4,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	**1,2,3,4,7,8-HXCDF**	**0.93**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	1,2,3,6,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,7,8,9-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,7,8,9-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	**1,2,3,7,8-PECDD**	**1.7**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**1,2,3,7,8-PECDF**	**0.86**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	2,3,4,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	2,3,4,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	2,3,7,8-TCDD	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	2,3,7,8-TCDF	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	HPCDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	HPCDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	HXCDD, TOTAL	ND	pg/L	U	0	375	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	**HXCDF, TOTAL**	**0.93**	**pg/L**	**J**	**0**	**500**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**OCDD**	**11**	**pg/L**	**J**	**0**	**100**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	OCDF	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	**PCDD, TOTAL**	**12.7**	**pg/L**	**J**	**0**	**925**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**PCDD/PCDF, TOTAL**	**14.5**	**pg/L**	**J**	**0**	**2225**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**PCDF, TOTAL**	**1.8**	**pg/L**	**J**	**0**	**1300**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**PECDD, TOTAL**	**1.7**	**pg/L**	**J**	**0**	**125**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**PECDF, TOTAL**	**0.86**	**pg/L**	**J**	**0**	**250**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	TCDD, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	TCDF, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
BCK 8.63	1,2,3,4,6,7,8-HPCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,4,6,7,8-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,4,7,8,9-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,4,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,4,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,6,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**1,2,3,6,7,8-HXCDF**	**2.4**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	1,2,3,7,8,9-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**1,2,3,7,8,9-HXCDF**	**4.5**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	1,2,3,7,8-PECDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	2,3,4,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	2,3,4,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	2,3,7,8-TCDD	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**2,3,7,8-TCDF**	**1.2**	**pg/L**	**J**	**0**	**10**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	HPCDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**HPCDF, TOTAL**	**7.8**	**pg/L**	**J**	**0**	**250**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	**HXCDD, TOTAL**	**6.9**	**pg/L**	**J**	**0**	**375**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	HXCDF, TOTAL	ND	pg/L	U	0	500	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	OCDD	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	OCDF	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	PCDD, TOTAL	ND	pg/L	U	0	925	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**PCDD/PCDF, TOTAL**	**8.1**	**pg/L**	**J**	**0**	**2225**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	**PCDF, TOTAL**	**8.1**	**pg/L**	**J**	**0**	**1300**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	PECDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	PECDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	TCDD, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**TCDF, TOTAL**	**1.2**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
NT10US	1,2,3,4,6,7,8-HPCDD	<5.2	pg/L	U	5.2	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,4,6,7,8-HPCDF	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,4,7,8,9-HPCDF	<1.4	pg/L	U	1.4	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,4,7,8-HXCDD	<3.0	pg/L	U	3	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,4,7,8-HXCDF	<1.5	pg/L	U	1.5	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,6,7,8-HXCDD	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,6,7,8-HXCDF	<0.61	pg/L	U	0.61	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,7,8,9-HXCDD	<0.52	pg/L	U	0.52	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,7,8,9-HXCDF	<1.5	pg/L	U	1.5	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,7,8-PECDD	<1.8	pg/L	U	1.8	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	**1,2,3,7,8-PECDF**	**0.77**	**pg/L**	**J**	**0.77**	**50**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	2,3,4,6,7,8-HXCDF	<0.65	pg/L	U	0.65	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	2,3,4,7,8-PECDF	<0.85	pg/L	U	0.85	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	2,3,7,8-TCDD	<1.8	pg/L	U	1.8	10	1	4/10/2023	4/21/2023	EPA 1613
NT10US	2,3,7,8-TCDF	<0.74	pg/L	U	0.74	10	1	4/10/2023	4/21/2023	EPA 1613
NT10US	HPCDD, TOTAL	<5.2	pg/L	U	5.2	125	1	4/10/2023	4/21/2023	EPA 1613
NT10US	HPCDF, TOTAL	<2.6	pg/L	U	2.6	250	1	4/10/2023	4/21/2023	EPA 1613
NT10US	HXCDD, TOTAL	<4.7	pg/L	U	4.7	375	1	4/10/2023	4/21/2023	EPA 1613
NT10US	HXCDF, TOTAL	<4.3	pg/L	U	4.3	500	1	4/10/2023	4/21/2023	EPA 1613
NT10US	**OCDD**	**25**	**pg/L**	**J**	**25**	**100**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	OCDF	<3.0	pg/L	U	3	100	1	4/10/2023	4/21/2023	EPA 1613
NT10US	**PCDD, TOTAL**	**25**	**pg/L**	**J**	**25**	**925**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	**PCDD/PCDF, TOTAL**	**26**	**pg/L**	**J**	**26**	**2225**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	PCDF, TOTAL	<37.0	pg/L	U	37	1300	1	4/10/2023	4/21/2023	EPA 1613
NT10US	PECDD, TOTAL	<1.8	pg/L	U	1.8	125	1	4/10/2023	4/21/2023	EPA 1613
NT10US	**PECDF, TOTAL**	**0.77**	**pg/L**	**J**	**0.77**	**250**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	TCDD, TOTAL	<1.8	pg/L	U	1.8	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	TCDF, TOTAL	<0.74	pg/L	U	0.74	50	1	4/10/2023	4/21/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SF-1	1,2,3,4,6,7,8-HPCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,4,6,7,8-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**1,2,3,4,7,8,9-HPCDF**	**1.9**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	1,2,3,4,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,4,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,6,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,7,8,9-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,7,8,9-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,7,8-PECDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	2,3,4,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	2,3,4,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	2,3,7,8-TCDD	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**2,3,7,8-TCDF**	**0.81**	**pg/L**	**J**	**0**	**10**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	HPCDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**HPCDF, TOTAL**	**1.9**	**pg/L**	**J**	**0**	**250**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	HXCDD, TOTAL	ND	pg/L	U	0	375	1	4/3/2023	5/3/2023	EPA 1613
SF-1	HXCDF, TOTAL	ND	pg/L	U	0	500	1	4/3/2023	5/3/2023	EPA 1613
SF-1	OCDD	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
SF-1	OCDF	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
SF-1	PCDD, TOTAL	ND	pg/L	U	0	925	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**PCDD/PCDF, TOTAL**	**2.71**	**pg/L**	**J**	**0**	**2225**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	**PCDF, TOTAL**	**2.71**	**pg/L**	**J**	**0**	**1300**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	PECDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
SF-1	PECDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
SF-1	TCDD, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**TCDF, TOTAL**	**0.81**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-3	1,2,3,4,6,7,8-HPCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SF-3	1,2,3,4,6,7,8-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,4,7,8,9-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,4,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,4,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,6,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,7,8,9-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,7,8,9-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,7,8-PECDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	2,3,4,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	2,3,4,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	2,3,7,8-TCDD	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
SF-3	2,3,7,8-TCDF	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
SF-3	HPCDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
SF-3	HPCDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
SF-3	HXCDD, TOTAL	ND	pg/L	U	0	375	1	4/3/2023	5/3/2023	EPA 1613
SF-3	HXCDF, TOTAL	ND	pg/L	U	0	500	1	4/3/2023	5/3/2023	EPA 1613
SF-3	OCDD	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
SF-3	OCDF	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PCDD, TOTAL	ND	pg/L	U	0	925	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PCDD/PCDF, TOTAL	ND	pg/L	U	0	2225	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PCDF, TOTAL	ND	pg/L	U	0	1300	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PECDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PECDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
SF-3	TCDD, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	TCDF, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-6	**1,2,3,4,6,7,8-HPCDD**	**2.5**	**pg/L**	**J**	**2.5**	**50**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
SF-6	1,2,3,4,6,7,8-HPCDF	<2.0	pg/L	U	2	50	1	4/10/2023	4/21/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SF-6	1,2,3,4,7,8,9-HPCDF	<1.5	pg/L	U	1.5	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,4,7,8-HXCDD	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,4,7,8-HXCDF	<1.0	pg/L	U	1	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,6,7,8-HXCDD	<1.5	pg/L	U	1.5	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,6,7,8-HXCDF	<0.41	pg/L	U	0.41	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,7,8,9-HXCDD	<3.3	pg/L	U	3.3	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,7,8,9-HXCDF	<1.1	pg/L	U	1.1	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,7,8-PECDD	<1.6	pg/L	U	1.6	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,7,8-PECDF	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	2,3,4,6,7,8-HXCDF	<0.63	pg/L	U	0.63	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	2,3,4,7,8-PECDF	<1.1	pg/L	U	1.1	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	2,3,7,8-TCDD	<1.1	pg/L	U	1.1	10	1	4/10/2023	4/21/2023	EPA 1613
SF-6	2,3,7,8-TCDF	<0.57	pg/L	U	0.57	10	1	4/10/2023	4/21/2023	EPA 1613
SF-6	**HPCDD, TOTAL**	**2.5**	**pg/L**	**J**	**2.5**	**125**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
SF-6	HPCDF, TOTAL	<3.5	pg/L	U	3.5	250	1	4/10/2023	4/21/2023	EPA 1613
SF-6	HXCDD, TOTAL	<6.0	pg/L	U	6	375	1	4/10/2023	4/21/2023	EPA 1613
SF-6	HXCDF, TOTAL	<3.1	pg/L	U	3.1	500	1	4/10/2023	4/21/2023	EPA 1613
SF-6	OCDD	<12.0	pg/L	U	12	100	1	4/10/2023	4/21/2023	EPA 1613
SF-6	OCDF	<1.8	pg/L	U	1.8	100	1	4/10/2023	4/21/2023	EPA 1613
SF-6	**PCDD, TOTAL**	**2.5**	**pg/L**	**J**	**2.5**	**925**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
SF-6	**PCDD/PCDF, TOTAL**	**2.5**	**pg/L**	**J**	**2.5**	**2225**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
SF-6	PCDF, TOTAL	<11.0	pg/L	U	11	1300	1	4/10/2023	4/21/2023	EPA 1613
SF-6	PECDD, TOTAL	<1.6	pg/L	U	1.6	125	1	4/10/2023	4/21/2023	EPA 1613
SF-6	PECDF, TOTAL	<2.3	pg/L	U	2.3	250	1	4/10/2023	4/21/2023	EPA 1613
SF-6	TCDD, TOTAL	<1.1	pg/L	U	1.1	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	TCDF, TOTAL	<0.57	pg/L	U	0.57	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,4,6,7,8-HPCDD	<3.2	pg/L	U	3.2	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	**1,2,3,4,6,7,8-HPCDF**	**3.8**	**pg/L**	**J**	**3.8**	**50**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	1,2,3,4,7,8,9-HPCDF	<3.6	pg/L	U	3.6	50	1	4/10/2023	4/21/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
Spring D10W	1,2,3,4,7,8-HXCDD	<2.2	pg/L	U	2.2	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,4,7,8-HXCDF	<0.93	pg/L	U	0.93	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,6,7,8-HXCDD	<2.3	pg/L	U	2.3	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,6,7,8-HXCDF	<3.6	pg/L	U	3.6	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	**1,2,3,7,8,9-HXCDD**	**3.2**	**pg/L**	**J**	**3.2**	**50**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	1,2,3,7,8,9-HXCDF	<3.0	pg/L	U	3	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,7,8-PECDD	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,7,8-PECDF	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	2,3,4,6,7,8-HXCDF	<1.4	pg/L	U	1.4	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	2,3,4,7,8-PECDF	<2.4	pg/L	U	2.4	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	2,3,7,8-TCDD	<1.7	pg/L	U	1.7	10	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	2,3,7,8-TCDF	<0.67	pg/L	U	0.67	10	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	HPCDD, TOTAL	<3.2	pg/L	U	3.2	125	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	HPCDF, TOTAL	<7.4	pg/L	U	7.4	250	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	**HXCDD, TOTAL**	**3.2**	**pg/L**	**J**	**3.2**	**375**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	HXCDF, TOTAL	<8.9	pg/L	U	8.9	500	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	OCDD	<25.0	pg/L	U	25	100	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	OCDF	<6.6	pg/L	U	6.6	100	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	**PCDD, TOTAL**	**3.2**	**pg/L**	**J**	**3.2**	**925**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	**PCDD/PCDF, TOTAL**	**7**	**pg/L**	**J**	**7**	**2225**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	**PCDF, TOTAL**	**3.8**	**pg/L**	**J**	**3.8**	**1300**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	PECDD, TOTAL	<1.2	pg/L	U	1.2	125	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	PECDF, TOTAL	<3.6	pg/L	U	3.6	250	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	TCDD, TOTAL	<1.7	pg/L	U	1.7	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	TCDF, TOTAL	<0.67	pg/L	U	0.67	50	1	4/10/2023	4/21/2023	EPA 1613

MDL - Method Detection Limit: The minimum concentration detectable by the method but not precisely quantifiable below this threshold.
RL - Reporting Limit: Concentrations above this level exceed a pre-determined acceptable range for reliable quantification.
U: Analyte not detected above MDL **J:** Analyte detected above MDL but below reporting limit **DF:** Dilution Factor
***If MDL = 0, ND = Not Detected**

Table D.3**: Wet Chemistry Results for EMDF Baseline Sampling April 2023.* ***Bold indicates result > Method Detection Limit (MDL).

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	**Alkalinity (as CaCO3)**	**123**	**mg/L**		**1**	**1**	**4/3/2023 11:21**	**4/10/2023 9:48**	**SM-2320 B**
BCK 7.6	**Bicarbonate**	**123**	**mg/L**		**1**	**1**	**4/3/2023 11:21**	**4/10/2023 9:48**	**SM-2320 B**
BCK 7.6	Carbonate	<2	mg/L	U	2	1	4/3/2023 11:21	4/10/2023 9:48	SM-2320 B
BCK 7.6	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 11:21	4/5/2023 15:00	SM-4500-NH3D
BCK 7.6	**Chloride**	**9.36**	**mg/L**		**0.245**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**EPA-300.0**
BCK 7.6	Cyanide Total	<0.005	mg/L	U	0.005	1	4/3/2023 11:21	4/5/2023 9:30	SM-4500CNE
BCK 7.6	**Nitrate (NO3-N)**	**1.6**	**mg/L**		**0.075**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**EPA-300.0**
BCK 7.6	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/3/2023 11:21	4/4/2023 12:30	EPA-300.0
BCK 7.6	**Nitrate+Nitrite-N**	**1.6**	**mg/L**		**0.046**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**EPA-300.0**
BCK 7.6	**Total Dissolved Solids**	**190**	**mg/L**		**51**	**1**	**4/3/2023 11:21**	**4/10/2023 18:24**	**SM-2540C**
BCK 7.6	**Total Suspended Solids**	**4**	**mg/L**		**3**	**1**	**4/3/2023 11:21**	**4/10/2023 10:05**	**SM-2540D**
BCK 7.6	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/3/2023 11:21	4/7/2023 13:33	SM-4500-N-ORG
BCK 7.6	**Total Nitrogen**	**1.6**	**mg/L**		**0.1**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**CALCULATION**
BCK 7.6	Phosphorus	<0.500	mg/L	U	0.5	1	4/3/2023 11:21	4/7/2023 13:33	EPA-365.4
BCK 7.6	**TOC**	**1.47**	**mg/L**		**1**	**1**	**4/3/2023 11:21**	**4/14/2023 2:48**	**SM-5310C**
BCK 7.6	**Sulfate**	**10.7**	**mg/L**		**0.328**	**1**	**4/3/2023 11:21**	**4/4/2023 12:30**	**EPA-300.0**
BCK 7.6	Arsenic	<0.297	µg/L	U	0.297	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	**Barium**	**62.2**	**µg/L**		**0.453**	**1**	**4/3/2023 11:21**	**4/5/2023 23:40**	**SW-6020B**
BCK 7.6	Cadmium	<0.350	µg/L	U	0.35	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	**Calcium**	**46.4**	**mg/L**		**0.5**	**1**	**4/3/2023 11:21**	**4/7/2023 0:25**	**SW-6010D**
BCK 7.6	**Chromium**	**0.667**	**µg/L**	**J**	**0.346**	**1**	**4/3/2023 11:21**	**4/6/2023 19:13**	**SW-6020B**
BCK 7.6	**Copper**	**0.65**	**µg/L**	**J**	**0.489**	**1**	**4/3/2023 11:21**	**4/6/2023 19:13**	**SW-6020B**
BCK 7.6	**Hardness as CaCO3(SM-2340B)**	**161**	**mg/L**		**0.1**	**1**	**4/3/2023 11:21**	**4/7/2023 0:25**	**SW-6010D**
BCK 7.6	Lead	<0.264	µg/L	U	0.264	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	**Magnesium**	**10.9**	**mg/L**		**0.1**	**1**	**4/3/2023 11:21**	**4/7/2023 0:25**	**SW-6010D**
BCK 7.6	**Nickel**	**0.702**	**µg/L**	**J**	**0.182**	**1**	**4/3/2023 11:21**	**4/6/2023 19:13**	**SW-6020B**
BCK 7.6	**Potassium**	**1330**	**µg/L**		**32.1**	**1**	**4/3/2023 11:21**	**4/5/2023 23:40**	**SW-6020B**
BCK 7.6	Selenium	<0.703	µg/L	U	0.703	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	Silver	<0.0570	µg/L	U	0.057	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B
BCK 7.6	**Sodium**	**5810**	**µg/L**		**60.4**	**1**	**4/3/2023 11:21**	**4/6/2023 19:13**	**SW-6020B**
BCK 7.6	Thallium	<0.0610	µg/L	U	0.061	1	4/3/2023 11:21	4/5/2023 23:40	SW-6020B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	Acenaphthene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Acenaphthylene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Acetone	<20.0	µg/L	U	20	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Aldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Anthracene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/3/2023 11:21	4/11/2023 16:33	SW-8082A
BCK 7.6	Benzene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzoic Acid	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Benzyl alcohol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	beta-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Bromodichloromethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Bromoform	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Bromomethane	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Carbazole	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Carbon Disulfide	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chlordane	<0.200	µg/L	U	0.2	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	4-Chloroaniline	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Chlorobenzene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chloroform	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chloromethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	2-Chlorophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Chrysene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	44-DDD	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	44-DDE	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	44-DDT	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Dibenzofuran	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	11-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	12-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	11-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	12-Dichloropropane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Dieldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Diethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Ethylbenzene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Fluorene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/3/2023 11:21	4/11/2023 3:28	SW-8081B
BCK 7.6	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Hexachloroethane	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	2-Hexanone	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Isophorone	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Methylene Chloride	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	2-Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	mp-Xylene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	2-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	3-Nitroaniline	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	4-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	2-Nitrophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	4-Nitrophenol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	o-Xylene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Pentachlorophenol	<10.0	µg/L	U	10	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Phenanthrene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Phenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Pyrene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Styrene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Tetrachloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Toluene	<2.00	µg/L	U	2	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	111-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	112-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Trichloroethene	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 11:21	4/11/2023 1:19	SW-8270D
BCK 7.6	Vinyl Chloride	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Xylene (Total)	<1.00	µg/L	U	1	1	4/3/2023 11:21	4/8/2023 12:26	SW-8260B
BCK 7.6	Chromium Hexavalent	<10	µg/L	U	10	1	4/3/2023 11:21	4/4/2023 11:00	SM-3500CrB (LOW)
BCK 7.6	**Mercury**	**3.08**	**ng/L**		**0.5**	**1**	**4/3/2023 11:21**	**4/6/2023 16:51**	**EPA-1631E**
BCK 7.6	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Anthracene	<0.00550	µg/L	U	0.0055	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Chrysene	<0.00820	µg/L	U	0.0082	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 7.6	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Fluorene	<0.0101	µg/L	U	0.0101	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 7.6	Pyrene	<0.00960	µg/L	U	0.0096	1	4/13/2023 14:33	4/19/2023 18:10	SW-8270D (SIM LVI)
BCK 8.63	**Alkalinity (as CaCO3)**	**133**	**mg/L**		**1**	**1**	**4/3/2023 12:37**	**4/10/2023 9:48**	**SM-2320 B**
BCK 8.63	**Bicarbonate**	**133**	**mg/L**		**1**	**1**	**4/3/2023 12:37**	**4/10/2023 9:48**	**SM-2320 B**
BCK 8.63	Carbonate	<2	mg/L	U	2	1	4/3/2023 12:37	4/10/2023 9:48	SM-2320 B
BCK 8.63	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 12:37	4/5/2023 15:00	SM-4500-NH3D
BCK 8.63	**Chloride**	**10**	**mg/L**		**0.245**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**EPA-300.0**
BCK 8.63	Cyanide Total	<0.005	mg/L	U	0.005	1	4/3/2023 12:37	4/5/2023 9:30	SM-4500CNE
BCK 8.63	**Nitrate (NO3-N)**	**1.78**	**mg/L**		**0.075**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**EPA-300.0**
BCK 8.63	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/3/2023 12:37	4/4/2023 12:56	EPA-300.0
BCK 8.63	**Nitrate+Nitrite-N**	**1.78**	**mg/L**		**0.046**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**EPA-300.0**
BCK 8.63	**Total Dissolved Solids**	**194**	**mg/L**		**51**	**1**	**4/3/2023 12:37**	**4/10/2023 18:24**	**SM-2540C**
BCK 8.63	**Total Suspended Solids**	**4**	**mg/L**		**3**	**1**	**4/3/2023 12:37**	**4/10/2023 10:05**	**SM-2540D**
BCK 8.63	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/3/2023 12:37	4/7/2023 13:27	SM-4500-N-ORG
BCK 8.63	**Total Nitrogen**	**1.78**	**mg/L**		**0.1**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**CALCULATION**
BCK 8.63	Phosphorus	<0.500	mg/L	U	0.5	1	4/3/2023 12:37	4/7/2023 13:27	EPA-365.4
BCK 8.63	**TOC**	**1.31**	**mg/L**		**1**	**1**	**4/3/2023 12:37**	**4/14/2023 4:04**	**SM-5310C**
BCK 8.63	**Sulfate**	**11.1**	**mg/L**		**0.328**	**1**	**4/3/2023 12:37**	**4/4/2023 12:56**	**EPA-300.0**
BCK 8.63	Arsenic	<0.297	µg/L	U	0.297	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	**Barium**	**64.4**	**µg/L**		**0.453**	**1**	**4/3/2023 12:37**	**4/5/2023 23:44**	**SW-6020B**
BCK 8.63	Cadmium	<0.350	µg/L	U	0.35	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	**Calcium**	**51.3**	**mg/L**		**0.5**	**1**	**4/3/2023 12:37**	**4/7/2023 0:30**	**SW-6010D**
BCK 8.63	**Chromium**	**0.555**	**µg/L**	**J**	**0.346**	**1**	**4/3/2023 12:37**	**4/6/2023 19:16**	**SW-6020B**
BCK 8.63	Copper	<0.489	µg/L	U	0.489	1	4/3/2023 12:37	4/6/2023 19:16	SW-6020B
BCK 8.63	**Hardness as CaCO3(SM-2340B)**	**179**	**mg/L**		**0.1**	**1**	**4/3/2023 12:37**	**4/7/2023 0:30**	**SW-6010D**
BCK 8.63	Lead	<0.264	µg/L	U	0.264	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B

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BCK 8.63	**Magnesium**	**12.3**	**mg/L**		**0.1**	**1**	**4/3/2023 12:37**	**4/7/2023 0:30**	**SW-6010D**
BCK 8.63	**Nickel**	**0.702**	**µg/L**	**J**	**0.182**	**1**	**4/3/2023 12:37**	**4/6/2023 19:16**	**SW-6020B**
BCK 8.63	**Potassium**	**1340**	**µg/L**		**32.1**	**1**	**4/3/2023 12:37**	**4/5/2023 23:44**	**SW-6020B**
BCK 8.63	Selenium	<0.703	µg/L	U	0.703	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	Silver	<0.0570	µg/L	U	0.057	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	**Sodium**	**6120**	**µg/L**		**60.4**	**1**	**4/3/2023 12:37**	**4/6/2023 19:16**	**SW-6020B**
BCK 8.63	Thallium	<0.0610	µg/L	U	0.061	1	4/3/2023 12:37	4/5/2023 23:44	SW-6020B
BCK 8.63	Acenaphthene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Acenaphthylene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Acetone	<20.0	µg/L	U	20	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Aldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Anthracene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/3/2023 12:37	4/11/2023 16:53	SW-8082A
BCK 8.63	Benzene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzoic Acid	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Benzyl alcohol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	beta-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 8.63	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Bromodichloromethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Bromoform	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Bromomethane	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Carbazole	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Carbon Disulfide	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chlordane	<0.200	µg/L	U	0.2	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Chloroaniline	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Chlorobenzene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chloroform	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chloromethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	2-Chlorophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Chrysene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	44-DDD	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	44-DDE	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	44-DDT	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Dibenzofuran	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	11-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 8.63	12-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	11-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	**cis-12-Dichloroethene**	**1.77**	**µg/L**		**1**	**1**	**4/3/2023 12:37**	**4/8/2023 12:47**	**SW-8260B**
BCK 8.63	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	12-Dichloropropane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Dieldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Diethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Ethylbenzene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Fluorene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/3/2023 12:37	4/11/2023 3:55	SW-8081B
BCK 8.63	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Hexachloroethane	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	2-Hexanone	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Isophorone	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 8.63	Methylene Chloride	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	2-Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	mp-Xylene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	2-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	3-Nitroaniline	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	2-Nitrophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	4-Nitrophenol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	o-Xylene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Pentachlorophenol	<10.0	µg/L	U	10	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Phenanthrene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Phenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Pyrene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Styrene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Tetrachloroethene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Toluene	<2.00	µg/L	U	2	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	111-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	112-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Trichloroethene	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 12:37	4/11/2023 1:42	SW-8270D
BCK 8.63	Vinyl Chloride	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Xylene (Total)	<1.00	µg/L	U	1	1	4/3/2023 12:37	4/8/2023 12:47	SW-8260B
BCK 8.63	Chromium Hexavalent	<10	µg/L	U	10	1	4/3/2023 12:37	4/4/2023 11:00	SM-3500CrB (LOW)
BCK 8.63	**Mercury**	**2.96**	**ng/L**		**0.5**	**1**	**4/3/2023 12:37**	**4/6/2023 17:45**	**EPA-1631E**
BCK 8.63	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
BCK 8.63	Anthracene	<0.00550	µg/L	U	0.0055	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Chrysene	<0.00820	µg/L	U	0.0082	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Fluorene	<0.0101	µg/L	U	0.0101	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
BCK 8.63	Pyrene	<0.00960	µg/L	U	0.0096	1	4/13/2023 11:35	4/19/2023 18:31	SW-8270D (SIM LVI)
NT10US	**Alkalinity (as CaCO3)**	**12**	**mg/L**		**1**	**1**	**4/10/2023 11:10**	**4/18/2023 10:30**	**SM-2320 B**
NT10US	**Bicarbonate**	**12**	**mg/L**		**1**	**1**	**4/10/2023 11:10**	**4/18/2023 10:30**	**SM-2320 B**
NT10US	Carbonate	<2	mg/L	U	2	1	4/10/2023 11:10	4/18/2023 10:30	SM-2320 B
NT10US	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 11:10	4/13/2023 12:16	SM-4500-NH3D
NT10US	**Chloride**	**0.767**	**mg/L**		**0.245**	**1**	**4/10/2023 11:10**	**4/11/2023 23:12**	**EPA-300.0**
NT10US	Cyanide Total	<0.005	mg/L	U	0.005	1	4/10/2023 11:10	4/13/2023 9:00	SM-4500CNE
NT10US	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/10/2023 11:10	4/11/2023 23:12	EPA-300.0
NT10US	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/10/2023 11:10	4/11/2023 23:12	EPA-300.0
NT10US	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/10/2023 11:10	4/11/2023 23:12	EPA-300.0
NT10US	**Total Dissolved Solids**	**36.9**	**mg/L**		**12.8**	**1**	**4/10/2023 11:10**	**4/17/2023 16:52**	**SM-2540C**
NT10US	**Total Suspended Solids**	**14**	**mg/L**		**2**	**1**	**4/10/2023 11:10**	**4/14/2023 18:04**	**SM-2540D**
NT10US	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/10/2023 11:10	4/17/2023 13:59	SM-4500-N-ORG
NT10US	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 11:10	4/11/2023 23:12	CALCULATION
NT10US	Phosphorus	<0.500	mg/L	U	0.5	1	4/10/2023 11:10	4/17/2023 15:02	EPA-365.4
NT10US	**TOC**	**1.2**	**mg/L**		**1**	**1**	**4/10/2023 11:10**	**4/19/2023 1:04**	**SM-5310C**
NT10US	**Sulfate**	**5.07**	**mg/L**		**0.328**	**1**	**4/10/2023 11:10**	**4/11/2023 23:12**	**EPA-300.0**
NT10US	Arsenic	<0.297	µg/L	U	0.297	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	Barium	36.4	µg/L		0.453	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Cadmium	<0.350	µg/L	U	0.35	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Calcium	3.93	mg/L		0.5	1	4/10/2023 11:10	4/14/2023 1:35	SW-6010D
NT10US	Chromium	0.926	µg/L	J	0.346	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Copper	0.767	µg/L	J	0.489	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Hardness as CaCO3(SM-2340B)	18.4	mg/L		0.1	1	4/10/2023 11:10	4/14/2023 1:35	SW-6010D
NT10US	Lead	0.456	µg/L	J	0.264	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Magnesium	2.08	mg/L		0.1	1	4/10/2023 11:10	4/14/2023 1:35	SW-6010D
NT10US	Nickel	1.56	µg/L		0.182	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Potassium	1340	µg/L		32.1	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Selenium	<0.703	µg/L	U	0.703	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Silver	<0.0570	µg/L	U	0.057	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Sodium	1860	µg/L		60.4	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Thallium	<0.0610	µg/L	U	0.061	1	4/10/2023 11:10	4/12/2023 22:38	SW-6020B
NT10US	Acenaphthene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Acenaphthylene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Acetone	<20.0	µg/L	U	20	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Aldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Anthracene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/10/2023 11:10	4/18/2023 2:40	SW-8082A
NT10US	Benzene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzoic Acid	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Benzyl alcohol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	beta-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Bromodichloromethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Bromoform	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Bromomethane	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Carbazole	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Carbon Disulfide	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chlordane	<0.200	µg/L	U	0.2	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Chloroaniline	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Chlorobenzene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chloroform	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chloromethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	2-Chlorophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Chrysene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	44-DDD	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	44-DDE	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	44-DDT	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Dibenzofuran	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	11-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	12-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	11-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	12-Dichloropropane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Dieldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Diethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Ethylbenzene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Fluorene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/10/2023 11:10	4/17/2023 23:00	SW-8081B
NT10US	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Hexachloroethane	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	2-Hexanone	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Isophorone	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Methylene Chloride	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	2-Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	mp-Xylene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	2-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	3-Nitroaniline	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	2-Nitrophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	4-Nitrophenol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	o-Xylene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Pentachlorophenol	<10.0	µg/L	U	10	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Phenanthrene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Phenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Pyrene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Styrene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Tetrachloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Toluene	<2.00	µg/L	U	2	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	111-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	112-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Trichloroethene	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
NT10US	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 11:10	4/17/2023 3:48	SW-8270D
NT10US	Vinyl Chloride	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Xylene (Total)	<1.00	µg/L	U	1	1	4/10/2023 11:10	4/17/2023 22:20	SW-8260B
NT10US	Chromium Hexavalent	<10	µg/L	U	10	1	4/10/2023 11:10	4/11/2023 10:01	SM-3500CrB (LOW)
NT10US	**Mercury**	**9.57**	**ng/L**		**0.5**	**1**	**4/10/2023 11:10**	**4/14/2023 18:48**	**EPA-1631E**
NT10US	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Anthracene	<0.00550	µg/L	U	0.0055	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Chrysene	<0.00820	µg/L	U	0.0082	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Fluorene	<0.0101	µg/L	U	0.0101	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
NT10US	Pyrene	<0.00960	µg/L	U	0.0096	1	4/10/2023 11:10	4/17/2023 23:29	SW-8270D (SIM LVI)
SF-1	**Alkalinity (as CaCO3)**	**37**	**mg/L**		**1**	**1**	**4/3/2023 13:16**	**4/10/2023 9:48**	**SM-2320 B**
SF-1	**Bicarbonate**	**37**	**mg/L**		**1**	**1**	**4/3/2023 13:16**	**4/10/2023 9:48**	**SM-2320 B**
SF-1	Carbonate	<2	mg/L	U	2	1	4/3/2023 13:16	4/10/2023 9:48	SM-2320 B
SF-1	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 13:16	4/5/2023 15:00	SM-4500-NH3D
SF-1	**Chloride**	**0.873**	**mg/L**		**0.245**	**1**	**4/3/2023 13:16**	**4/4/2023 11:39**	**EPA-300.0**
SF-1	Cyanide Total	<0.005	mg/L	U	0.005	1	4/3/2023 13:16	4/5/2023 9:30	SM-4500CNE
SF-1	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/3/2023 13:16	4/4/2023 11:39	EPA-300.0
SF-1	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/3/2023 13:16	4/4/2023 11:39	EPA-300.0
SF-1	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/3/2023 13:16	4/4/2023 11:39	EPA-300.0
SF-1	Total Dissolved Solids	<50.0	mg/L	U	50	1	4/3/2023 13:16	4/10/2023 18:24	SM-2540C

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-1	**Total Suspended Solids**	**9**	**mg/L**		**2**	**1**	**4/3/2023 13:16**	**4/10/2023 10:05**	**SM-2540D**
SF-1	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/3/2023 13:16	4/7/2023 13:30	SM-4500-N-ORG
SF-1	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 13:16	4/4/2023 11:39	CALCULATION
SF-1	Phosphorus	<0.500	mg/L	U	0.5	1	4/3/2023 13:16	4/7/2023 13:31	EPA-365.4
SF-1	**TOC**	**1.32**	**mg/L**		**1**	**1**	**4/3/2023 13:16**	**4/14/2023 1:32**	**SM-5310C**
SF-1	**Sulfate**	**7.97**	**mg/L**		**0.328**	**1**	**4/3/2023 13:16**	**4/4/2023 11:39**	**EPA-300.0**
SF-1	**Arsenic**	**0.496**	**µg/L**	**J**	**0.297**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	**Barium**	**74.4**	**µg/L**		**0.453**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	Cadmium	<0.350	µg/L	U	0.35	1	4/3/2023 13:16	4/5/2023 23:26	SW-6020B
SF-1	**Calcium**	**18.2**	**mg/L**		**0.5**	**1**	**4/3/2023 13:16**	**4/7/2023 0:15**	**SW-6010D**
SF-1	**Chromium**	**4.52**	**µg/L**		**0.346**	**1**	**4/3/2023 13:16**	**4/6/2023 18:58**	**SW-6020B**
SF-1	**Copper**	**2.02**	**µg/L**		**0.489**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	**Hardness as CaCO3(SM-2340B)**	**63.2**	**mg/L**		**0.1**	**1**	**4/3/2023 13:16**	**4/7/2023 0:15**	**SW-6010D**
SF-1	**Lead**	**1.85**	**µg/L**		**0.264**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	**Magnesium**	**4.3**	**mg/L**		**0.1**	**1**	**4/3/2023 13:16**	**4/7/2023 0:15**	**SW-6010D**
SF-1	**Nickel**	**3.63**	**µg/L**		**0.182**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	**Potassium**	**2050**	**µg/L**		**32.1**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	Selenium	<0.703	µg/L	U	0.703	1	4/3/2023 13:16	4/5/2023 23:26	SW-6020B
SF-1	Silver	<0.0570	µg/L	U	0.057	1	4/3/2023 13:16	4/5/2023 23:26	SW-6020B
SF-1	**Sodium**	**2430**	**µg/L**		**60.4**	**1**	**4/3/2023 13:16**	**4/6/2023 18:58**	**SW-6020B**
SF-1	**Thallium**	**0.107**	**µg/L**	**J**	**0.061**	**1**	**4/3/2023 13:16**	**4/5/2023 23:26**	**SW-6020B**
SF-1	Acenaphthene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Acenaphthylene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Acetone	<20.0	µg/L	U	20	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Aldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A

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SF-1	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/3/2023 13:16	4/11/2023 15:51	SW-8082A
SF-1	Benzene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzoic Acid	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Benzyl alcohol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	beta-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Bromodichloromethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Bromoform	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Bromomethane	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Carbazole	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Carbon Disulfide	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chlordane	<0.200	µg/L	U	0.2	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Chloroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Chlorobenzene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chloroform	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chloromethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B

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SF-1	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	2-Chlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Chrysene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	44-DDD	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	44-DDE	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	44-DDT	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Dibenzofuran	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	11-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	12-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	11-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	12-Dichloropropane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Dieldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Diethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-1	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Ethylbenzene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Fluorene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/3/2023 13:16	4/11/2023 2:33	SW-8081B
SF-1	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Hexachloroethane	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	2-Hexanone	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Isophorone	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Methylene Chloride	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	2-Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	mp-Xylene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	2-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	3-Nitroaniline	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	2-Nitrophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	4-Nitrophenol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	o-Xylene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Pentachlorophenol	<10.0	µg/L	U	10	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Phenanthrene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Phenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Styrene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-1	Tetrachloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Toluene	<2.00	µg/L	U	2	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	111-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	112-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Trichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:16	4/10/2023 23:48	SW-8270D
SF-1	Vinyl Chloride	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Xylene (Total)	<1.00	µg/L	U	1	1	4/3/2023 13:16	4/8/2023 11:44	SW-8260B
SF-1	Chromium Hexavalent	<10	µg/L	U	10	1	4/3/2023 13:16	4/4/2023 11:00	SM-3500CrB (LOW)
SF-1	**Mercury**	**3.44**	**ng/L**		**0.5**	**1**	**4/3/2023 13:16**	**4/6/2023 16:28**	**EPA-1631E**
SF-1	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Anthracene	<0.00550	µg/L	U	0.0055	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Chrysene	<0.00820	µg/L	U	0.0082	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Fluorene	<0.0101	µg/L	U	0.0101	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-1	Pyrene	<0.00960	µg/L	U	0.0096	1	4/13/2023 11:48	4/19/2023 18:51	SW-8270D (SIM LVI)
SF-3	**Alkalinity (as CaCO3)**	**4**	**mg/L**		**1**	**1**	**4/3/2023 13:58**	**4/10/2023 9:48**	**SM-2320 B**
SF-3	**Bicarbonate**	**4**	**mg/L**		**1**	**1**	**4/3/2023 13:58**	**4/10/2023 9:48**	**SM-2320 B**
SF-3	Carbonate	<2	mg/L	U	2	1	4/3/2023 13:58	4/10/2023 9:48	SM-2320 B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 13:58	4/5/2023 15:00	SM-4500-NH3D
SF-3	**Chloride**	**0.764**	**mg/L**		**0.245**	**1**	**4/3/2023 13:58**	**4/4/2023 12:04**	**EPA-300.0**
SF-3	Cyanide Total	<0.005	mg/L	U	0.005	1	4/3/2023 13:58	4/5/2023 9:30	SM-4500CNE
SF-3	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/3/2023 13:58	4/4/2023 12:04	EPA-300.0
SF-3	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/3/2023 13:58	4/4/2023 12:04	EPA-300.0
SF-3	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/3/2023 13:58	4/4/2023 12:04	EPA-300.0
SF-3	**Total Dissolved Solids**	**41.9**	**mg/L**		**12.6**	**1**	**4/3/2023 13:58**	**4/10/2023 18:24**	**SM-2540C**
SF-3	**Total Suspended Solids**	**28**	**mg/L**		**3**	**1**	**4/3/2023 13:58**	**4/10/2023 10:05**	**SM-2540D**
SF-3	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/3/2023 13:58	4/7/2023 13:31	SM-4500-N-ORG
SF-3	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/3/2023 13:58	4/4/2023 12:04	CALCULATION
SF-3	Phosphorus	<0.500	mg/L	U	0.5	1	4/3/2023 13:58	4/7/2023 13:32	EPA-365.4
SF-3	**TOC**	**1.02**	**mg/L**		**1**	**1**	**4/3/2023 13:58**	**4/14/2023 2:10**	**SM-5310C**
SF-3	**Sulfate**	**5.13**	**mg/L**		**0.328**	**1**	**4/3/2023 13:58**	**4/4/2023 12:04**	**EPA-300.0**
SF-3	Arsenic	<0.297	µg/L	U	0.297	1	4/3/2023 13:58	4/5/2023 23:36	SW-6020B
SF-3	**Barium**	**38.1**	**µg/L**		**0.453**	**1**	**4/3/2023 13:58**	**4/5/2023 23:36**	**SW-6020B**
SF-3	Cadmium	<0.350	µg/L	U	0.35	1	4/3/2023 13:58	4/5/2023 23:36	SW-6020B
SF-3	**Calcium**	**3.25**	**mg/L**		**0.5**	**1**	**4/3/2023 13:58**	**4/7/2023 0:20**	**SW-6010D**
SF-3	**Chromium**	**1.26**	**µg/L**		**0.346**	**1**	**4/3/2023 13:58**	**4/6/2023 19:09**	**SW-6020B**
SF-3	**Copper**	**0.76**	**µg/L**	**J**	**0.489**	**1**	**4/3/2023 13:58**	**4/6/2023 19:09**	**SW-6020B**
SF-3	**Hardness as CaCO3(SM-2340B)**	**14.3**	**mg/L**		**0.1**	**1**	**4/3/2023 13:58**	**4/7/2023 0:20**	**SW-6010D**
SF-3	**Lead**	**0.411**	**µg/L**	**J**	**0.264**	**1**	**4/3/2023 13:58**	**4/5/2023 23:36**	**SW-6020B**
SF-3	**Magnesium**	**1.49**	**mg/L**		**0.1**	**1**	**4/3/2023 13:58**	**4/7/2023 0:20**	**SW-6010D**
SF-3	**Nickel**	**1.28**	**µg/L**		**0.182**	**1**	**4/3/2023 13:58**	**4/6/2023 19:09**	**SW-6020B**
SF-3	**Potassium**	**1340**	**µg/L**		**32.1**	**1**	**4/3/2023 13:58**	**4/5/2023 23:36**	**SW-6020B**
SF-3	Selenium	<0.703	µg/L	U	0.703	1	4/3/2023 13:58	4/5/2023 23:36	SW-6020B
SF-3	Silver	<0.0570	µg/L	U	0.057	1	4/3/2023 13:58	4/5/2023 23:36	SW-6020B
SF-3	**Sodium**	**1610**	**µg/L**		**60.4**	**1**	**4/3/2023 13:58**	**4/6/2023 19:09**	**SW-6020B**
SF-3	**Thallium**	**0.066**	**µg/L**	**J**	**0.061**	**1**	**4/3/2023 13:58**	**4/5/2023 23:36**	**SW-6020B**
SF-3	Acenaphthene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Acenaphthylene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Acetone	<20.0	µg/L	U	20	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Aldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/3/2023 13:58	4/11/2023 16:12	SW-8082A
SF-3	Benzene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzoic Acid	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Benzyl alcohol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	beta-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Bromodichloromethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Bromoform	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Bromomethane	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Carbazole	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Carbon Disulfide	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chlordane	<0.200	µg/L	U	0.2	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Chloroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Chlorobenzene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chloroform	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chloromethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	2-Chlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Chrysene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	44-DDD	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	44-DDE	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	44-DDT	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Dibenzofuran	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	11-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	12-Dichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	11-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	12-Dichloropropane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Dieldrin	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Diethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Ethylbenzene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Fluoranthene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Fluorene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/3/2023 13:58	4/11/2023 3:00	SW-8081B
SF-3	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Hexachloroethane	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	2-Hexanone	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Isophorone	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Methylene Chloride	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	2-Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	mp-Xylene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	2-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	3-Nitroaniline	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Nitroaniline	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	2-Nitrophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	4-Nitrophenol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	o-Xylene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Pentachlorophenol	<10.0	µg/L	U	10	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Phenanthrene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Phenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Pyrene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Styrene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Tetrachloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Toluene	<2.00	µg/L	U	2	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	111-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	112-Trichloroethane	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Trichloroethene	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/3/2023 13:58	4/11/2023 0:57	SW-8270D
SF-3	Vinyl Chloride	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Xylene (Total)	<1.00	µg/L	U	1	1	4/3/2023 13:58	4/8/2023 12:05	SW-8260B
SF-3	Chromium Hexavalent	<10	µg/L	U	10	1	4/3/2023 13:58	4/4/2023 11:00	SM-3500CrB (LOW)
SF-3	**Mercury**	**4.52**	**ng/L**		**0.5**	**1**	**4/3/2023 13:58**	**4/6/2023 17:37**	**EPA-1631E**
SF-3	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Anthracene	<0.00550	µg/L	U	0.0055	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Chrysene	<0.00820	µg/L	U	0.0082	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Fluorene	<0.0101	µg/L	U	0.0101	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-3	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-3	Pyrene	<0.00960	µg/L	U	0.0096	1	4/13/2023 12:05	4/19/2023 19:12	SW-8270D (SIM LVI)
SF-6	**Alkalinity (as CaCO3)**	**33**	**mg/L**		**1**	**1**	**4/10/2023 9:03**	**4/18/2023 10:30**	**SM-2320 B**
SF-6	**Bicarbonate**	**33**	**mg/L**		**1**	**1**	**4/10/2023 9:03**	**4/18/2023 10:30**	**SM-2320 B**
SF-6	Carbonate	<2	mg/L	U	2	1	4/10/2023 9:03	4/18/2023 10:30	SM-2320 B
SF-6	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 9:03	4/13/2023 12:16	SM-4500-NH3D
SF-6	**Chloride**	**0.692**	**mg/L**		**0.245**	**1**	**4/10/2023 9:03**	**4/11/2023 21:55**	**EPA-300.0**
SF-6	Cyanide Total	<0.005	mg/L	U	0.005	1	4/10/2023 9:03	4/13/2023 9:00	SM-4500CNE
SF-6	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/10/2023 9:03	4/11/2023 21:55	EPA-300.0
SF-6	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/10/2023 9:03	4/11/2023 21:55	EPA-300.0
SF-6	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/10/2023 9:03	4/11/2023 21:55	EPA-300.0
SF-6	**Total Dissolved Solids**	**52.1**	**mg/L**		**36.2**	**1**	**4/10/2023 9:03**	**4/17/2023 16:52**	**SM-2540C**
SF-6	**Total Suspended Solids**	**11**	**mg/L**		**2**	**1**	**4/10/2023 9:03**	**4/14/2023 18:04**	**SM-2540D**
SF-6	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/10/2023 9:03	4/17/2023 13:58	SM-4500-N-ORG
SF-6	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 9:03	4/11/2023 21:55	CALCULATION
SF-6	Phosphorus	<0.500	mg/L	U	0.5	1	4/10/2023 9:03	4/17/2023 15:16	EPA-365.4
SF-6	**TOC**	**1.54**	**mg/L**		**1**	**1**	**4/10/2023 9:03**	**4/18/2023 22:32**	**SM-5310C**
SF-6	**Sulfate**	**5.48**	**mg/L**		**0.328**	**1**	**4/10/2023 9:03**	**4/11/2023 21:55**	**EPA-300.0**
SF-6	**Arsenic**	**0.316**	**µg/L**	**J**	**0.297**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Barium**	**42.7**	**µg/L**		**0.453**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	Cadmium	<0.350	µg/L	U	0.35	1	4/10/2023 9:03	4/12/2023 22:23	SW-6020B
SF-6	**Calcium**	**10.7**	**mg/L**		**0.5**	**1**	**4/10/2023 9:03**	**4/14/2023 1:45**	**SW-6010D**
SF-6	**Chromium**	**1.31**	**µg/L**		**0.346**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Copper**	**0.734**	**µg/L**	**J**	**0.489**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Hardness as CaCO3(SM-2340B)**	**38.1**	**mg/L**		**0.1**	**1**	**4/10/2023 9:03**	**4/14/2023 1:45**	**SW-6010D**
SF-6	**Lead**	**0.459**	**µg/L**	**J**	**0.264**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Magnesium**	**2.77**	**mg/L**		**0.1**	**1**	**4/10/2023 9:03**	**4/14/2023 1:45**	**SW-6010D**
SF-6	**Nickel**	**1.32**	**µg/L**		**0.182**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Potassium**	**1280**	**µg/L**		**32.1**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	Selenium	<0.703	µg/L	U	0.703	1	4/10/2023 9:03	4/12/2023 22:23	SW-6020B
SF-6	Silver	<0.0570	µg/L	U	0.057	1	4/10/2023 9:03	4/12/2023 22:23	SW-6020B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	**Sodium**	**2590**	**µg/L**		**60.4**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	**Thallium**	**0.0683**	**µg/L**	**J**	**0.061**	**1**	**4/10/2023 9:03**	**4/12/2023 22:23**	**SW-6020B**
SF-6	Acenaphthene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Acenaphthylene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Acetone	<20.0	µg/L	U	20	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Aldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Anthracene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/10/2023 9:03	4/18/2023 1:56	SW-8082A
SF-6	Benzene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzoic Acid	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Benzyl alcohol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	beta-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Bromodichloromethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Bromoform	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Bromomethane	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Carbazole	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Carbon Disulfide	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chlordane	<0.200	µg/L	U	0.2	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Chloroaniline	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Chlorobenzene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chloroform	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Chloromethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	2-Chlorophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Chrysene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	44-DDD	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	44-DDE	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	44-DDT	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Dibenzofuran	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	11-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	12-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	11-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	12-Dichloropropane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Dieldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Diethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Ethylbenzene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Fluorene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/10/2023 9:03	4/17/2023 22:05	SW-8081B
SF-6	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Hexachloroethane	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	2-Hexanone	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Isophorone	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Methylene Chloride	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	2-Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	mp-Xylene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	2-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	3-Nitroaniline	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	2-Nitrophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	4-Nitrophenol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	o-Xylene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Pentachlorophenol	<10.0	µg/L	U	10	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Phenanthrene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Phenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Pyrene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Styrene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Tetrachloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Toluene	<2.00	µg/L	U	2	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	111-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	112-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Trichloroethene	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 9:03	4/17/2023 2:17	SW-8270D
SF-6	Vinyl Chloride	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	Xylene (Total)	<1.00	µg/L	U	1	1	4/10/2023 9:03	4/17/2023 21:38	SW-8260B
SF-6	**Mercury**	**4.08**	**ng/L**		**0.5**	**1**	**4/10/2023 9:03**	**4/14/2023 16:54**	**EPA-1631E**
SF-6	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Anthracene	<0.00550	µg/L	U	0.0055	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
SF-6	Chrysene	<0.00820	µg/L	U	0.0082	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Fluorene	<0.0101	µg/L	U	0.0101	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Pyrene	<0.00960	µg/L	U	0.0096	1	4/10/2023 9:03	4/14/2023 16:35	SW-8270D (SIM LVI)
SF-6	Chromium Hexavalent	<0.002	mg/L	U	0.002	1	4/13/2023 12:13	4/14/2023 8:07	SM-3500CrB
Spring D10W	**Alkalinity (as CaCO3)**	**14**	**mg/L**		**1**	**1**	**4/10/2023 10:05**	**4/18/2023 10:30**	**SM-2320 B**
Spring D10W	**Bicarbonate**	**14**	**mg/L**		**1**	**1**	**4/10/2023 10:05**	**4/18/2023 10:30**	**SM-2320 B**
Spring D10W	Carbonate	<2	mg/L	U	2	1	4/10/2023 10:05	4/18/2023 10:30	SM-2320 B
Spring D10W	Ammonia Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 10:05	4/13/2023 12:16	SM-4500-NH3D
Spring D10W	**Chloride**	**1.03**	**mg/L**		**0.245**	**1**	**4/10/2023 10:05**	**4/11/2023 22:46**	**EPA-300.0**
Spring D10W	Cyanide Total	<0.005	mg/L	U	0.005	1	4/10/2023 10:05	4/13/2023 9:00	SM-4500CNE
Spring D10W	Nitrate (NO3-N)	<0.075	mg/L	U	0.075	1	4/10/2023 10:05	4/11/2023 22:46	EPA-300.0
Spring D10W	Nitrite (NO2-N)	<0.046	mg/L	U	0.046	1	4/10/2023 10:05	4/11/2023 22:46	EPA-300.0
Spring D10W	Nitrate+Nitrite-N	<0.046	mg/L	U	0.046	1	4/10/2023 10:05	4/11/2023 22:46	EPA-300.0
Spring D10W	**Total Dissolved Solids**	**46.7**	**mg/L**		**12.6**	**1**	**4/10/2023 10:05**	**4/17/2023 16:52**	**SM-2540C**
Spring D10W	**Total Suspended Solids**	**6**	**mg/L**		**2**	**1**	**4/10/2023 10:05**	**4/14/2023 18:04**	**SM-2540D**
Spring D10W	Total Kjeldahl Nitrogen	<0.500	mg/L	U	0.5	1	4/10/2023 10:05	4/17/2023 13:55	SM-4500-N-ORG
Spring D10W	Total Nitrogen	<0.100	mg/L	U	0.1	1	4/10/2023 10:05	4/11/2023 22:46	CALCULATION
Spring D10W	Phosphorus	<0.500	mg/L	U	0.5	1	4/10/2023 10:05	4/17/2023 14:57	EPA-365.4
Spring D10W	TOC	<1.00	mg/L	U	1	1	4/10/2023 10:05	4/18/2023 23:48	SM-5310C
Spring D10W	**Sulfate**	**6.68**	**mg/L**		**0.328**	**1**	**4/10/2023 10:05**	**4/11/2023 22:46**	**EPA-300.0**
Spring D10W	Arsenic	<0.297	µg/L	U	0.297	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	**Barium**	**42.3**	**µg/L**		**0.453**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	Cadmium	<0.350	µg/L	U	0.35	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	**Calcium**	**3.77**	**mg/L**		**0.5**	**1**	**4/10/2023 10:05**	**4/14/2023 1:40**	**SW-6010D**
Spring D10W	**Chromium**	**0.815**	**µg/L**	**J**	**0.346**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	Copper	<0.489	µg/L	U	0.489	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	**Hardness as CaCO3(SM-2340B)**	**19.5**	**mg/L**		**0.1**	**1**	**4/10/2023 10:05**	**4/14/2023 1:40**	**SW-6010D**
Spring D10W	Lead	<0.264	µg/L	U	0.264	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	**Magnesium**	**2.46**	**mg/L**		**0.1**	**1**	**4/10/2023 10:05**	**4/14/2023 1:40**	**SW-6010D**
Spring D10W	**Nickel**	**0.757**	**µg/L**	**J**	**0.182**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	**Potassium**	**2080**	**µg/L**		**32.1**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	Selenium	<0.703	µg/L	U	0.703	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	Silver	<0.0570	µg/L	U	0.057	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	**Sodium**	**2100**	**µg/L**		**60.4**	**1**	**4/10/2023 10:05**	**4/12/2023 22:34**	**SW-6020B**
Spring D10W	Thallium	<0.0610	µg/L	U	0.061	1	4/10/2023 10:05	4/12/2023 22:34	SW-6020B
Spring D10W	Acenaphthene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Acenaphthylene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Acetone	<20.0	µg/L	U	20	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Aldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Anthracene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Aroclor 1016	<0.130	µg/L	U	0.13	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1221	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1232	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1242	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1262	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1248	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1254	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1260	<0.169	µg/L	U	0.169	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Aroclor 1268	<0.0670	µg/L	U	0.067	1	4/10/2023 10:05	4/18/2023 2:17	SW-8082A
Spring D10W	Benzene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Benzo(a)anthracene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzo(a)pyrene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzo(b)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzo(ghi)perylene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzo(k)fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzoic Acid	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Benzyl alcohol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	alpha-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	beta-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	Bis(2-Chloroethoxy)methane	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Bis(2-Chloroethyl)ether	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Bis(2-Chloroisopropyl)ether	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Bis(2-ethylhexyl)phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Bromodichloromethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Bromoform	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Bromomethane	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	4-Bromophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Methyl Ethyl Ketone (MEK)	<20.0	µg/L	U	20	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Butyl benzyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Carbazole	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Carbon Disulfide	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Carbon Tetrachloride	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chlordane	<0.200	µg/L	U	0.2	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	4-Chloro-3-methylphenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Chloroaniline	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Chlorobenzene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chlorodibromomethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chloroform	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chloromethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	2-Chloronaphthalene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	2-Chlorophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Chlorophenyl phenyl ether	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Chrysene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	44-DDD	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	44-DDE	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	44-DDT	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Dibenz(ah)anthracene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Dibenzofuran	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	12-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	13-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	14-Dichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	33-Dichlorobenzidine	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	11-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	12-Dichloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	11-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	cis-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	trans-12-Dichloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	24-Dichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	12-Dichloropropane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	cis-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	trans-13-Dichloropropene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Dieldrin	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Diethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Dimethyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	24-Dimethylphenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Di-n-butyl phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	46-Dinitro-2-methylphenol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	24-Dinitrophenol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	24-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	26-Dinitrotoluene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Di-n-Octyl Phthalate	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Endosulfan II	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Endrin Aldehyde	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Ethylbenzene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Fluoranthene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Fluorene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	gamma-BHC	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Heptachlor Epoxide	<0.0400	µg/L	U	0.04	10	4/10/2023 10:05	4/17/2023 22:32	SW-8081B
Spring D10W	Hexachlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Hexachlorobutadiene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Hexachlorocyclopentadiene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Hexachloroethane	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	2-Hexanone	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Indeno(123-cd)pyrene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	Isophorone	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Methyl-2-Pentanone	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Methylene Chloride	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	2-Methylnaphthalene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	2-Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	3&4 Methylphenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	mp-Xylene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	2-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	3-Nitroaniline	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Nitroaniline	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	2-Nitrophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	4-Nitrophenol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	N-Nitrosodiphenylamine	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	N-Nitroso-di-n-propylamine	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	o-Xylene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Pentachlorophenol	<10.0	µg/L	U	10	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Phenanthrene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Phenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Pyrene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Styrene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	1122-Tetrachloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Tetrachloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Toluene	<2.00	µg/L	U	2	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	124-Trichlorobenzene	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	111-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	112-Trichloroethane	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Trichloroethene	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	245-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	246-Trichlorophenol	<5.00	µg/L	U	5	1	4/10/2023 10:05	4/17/2023 3:25	SW-8270D
Spring D10W	Vinyl Chloride	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Xylene (Total)	<1.00	µg/L	U	1	1	4/10/2023 10:05	4/17/2023 21:59	SW-8260B
Spring D10W	Chromium Hexavalent	<10	µg/L	U	10	1	4/10/2023 10:05	4/11/2023 10:01	SM-3500CrB (LOW)
Spring D10W	**Mercury**	**1.24**	**ng/L**		**0.5**	**1**	**4/10/2023 10:05**	**4/14/2023 18:41**	**EPA-1631E**

Station ID	Analyte	Result	Units	Qualifier	PQL	DF	Collection Date	Analysis Date	Method
Spring D10W	Acenaphthene	<0.0180	µg/L	U	0.018	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Acenaphthylene	<0.0144	µg/L	U	0.0144	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Anthracene	<0.00550	µg/L	U	0.0055	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(a)anthracene	<0.0113	µg/L	U	0.0113	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(a)pyrene	<0.0124	µg/L	U	0.0124	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(b)fluoranthene	<0.00830	µg/L	U	0.0083	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(ghi)perylene	<0.00730	µg/L	U	0.0073	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Benzo(k)fluoranthene	<0.0165	µg/L	U	0.0165	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Chrysene	<0.00820	µg/L	U	0.0082	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Dibenz(ah)anthracene	<0.00660	µg/L	U	0.0066	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Fluoranthene	<0.00570	µg/L	U	0.0057	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Fluorene	<0.0101	µg/L	U	0.0101	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Indeno(123-cd)pyrene	<0.0144	µg/L	U	0.0144	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	1-Methylnaphthalene	<0.00760	µg/L	U	0.0076	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	2-Methylnaphthalene	<0.0185	µg/L	U	0.0185	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Naphthalene	<0.0196	µg/L	U	0.0196	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Phenanthrene	<0.00820	µg/L	U	0.0082	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)
Spring D10W	Pyrene	<0.00960	µg/L	U	0.0096	1	4/10/2023 10:05	4/14/2023 16:57	SW-8270D (SIM LVI)

MDL - Method Detection Limit: The minimum concentration detectable by the method but not precisely quantifiable below this threshold.
PQL - Practical Quantitation Limit: The lowest concentration that can be reliably measured with acceptable precision and accuracy under routine lab conditions.
U: Analyte not detected above MDL
J: Analyte detected above MDL but below reporting limit
DF: Dilution Factor

Table D.2: *Uranium metal Results for EMDF Baseline Sampling April 2023.* ***Bold indicates result > Method Detection Limit (MDL).***

Station ID	Analyte	Result	Units	Qualifier	MDL	PQL	DF	Collection Date	Analysis Date	Method
SF-1	**Uranium**	**0.146**	**ug/L**	**J**	**0.067**	**0.2**	**1**	**04/03/23 13:16**	**04/07/23 00:37**	**EPA 200.2**
SF-3	Uranium	<0.067	ug/L	U	0.067	0.2	1	04/03/23 13:58	04/07/23 01:00	EPA 200.2
BCK 7.6	**Uranium**	**27**	**ug/L**		**0.067**	**0.2**	**1**	**04/03/23 11:21**	**04/07/23 01:03**	**EPA 200.2**
BCK 8.63	**Uranium**	**29.7**	**ug/L**		**0.067**	**0.2**	**1**	**04/03/23 12:37**	**04/07/23 01:07**	**EPA 200.2**
SF-6	**Uranium**	**0.1**	**ug/L**	**J**	**0.067**	**0.2**	**1**	**04/10/23 09:03**	**04/16/23 09:11**	**EPA 200.2**
Spring D10W	Uranium	<0.067	ug/L	U	0.067	0.2	1	04/10/23 10:05	04/16/23 09:18	EPA 200.2
NT10US	Uranium	<0.067	ug/L	U	0.067	0.2	1	04/10/23 11:10	04/16/23 09:20	EPA 200.2

MDL - Method Detection Limit: The minimum concentration detectable by the method but not precisely quantifiable below this threshold.
PQL - Practical Quantitation Limit: The lowest concentration that can be reliably measured with acceptable precision and accuracy under routine lab conditions.
U: Analyte not detected above MDL
J: Analyte detected above MDL but below reporting limit
DF: Dilution Factor

Table D.3: *Radionuclide Results for EMDF Baseline Sampling April 2023.*

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
BCK 7.6	Cobalt-60	-1.30	pCi/l	3.44	3.44	5.92	04/03/23 11:21	4/11/2023	EPA 901.1 Modified
BCK 7.6	Cesium-137	0.24	pCi/l	4.80	4.80	7.84	04/03/23 11:21	4/11/2023	EPA 901.1 Modified
BCK 7.6	Europium-154	-11.27	pCi/l	14.26	14.27	5.96	04/03/23 11:21	4/11/2023	EPA 901.1 Modified
BCK 7.6	Americium-241	0.15	pCi/l	0.17	0.17	0.24	04/03/23 11:21	4/14/2023	EML Am-01 Modified
BCK 7.6	Carbon-14	-2.36	pCi/l	2.28	2.30	3.98	04/03/23 11:21	4/21/2023	ENIC Modified
BCK 7.6	Chlorine-36	1.36	pCi/l	0.87	0.91	1.37	04/03/23 11:21	4/14/2023	4500-Cl-B
BCK 7.6	Tritium	139.13	pCi/l	215.58	215.72	364.27	04/03/23 11:21	4/15/2023	EPA 906.0 Modified
BCK 7.6	Iodine-129	1.17	pCi/l	0.79	0.79	1.20	04/03/23 11:21	4/27/2023	EPA 902.0 Modified
BCK 7.6	Neptunium-237	0.05	pCi/l	0.10	0.10	0.18	04/03/23 11:21	4/14/2023	EIChroM ACW08 Mod
BCK 7.6	Plutonium-238	0.01	pCi/l	0.07	0.07	0.21	04/03/23 11:21	4/13/2023	EML Pu-02 Modified
BCK 7.6	Plutonium-239/240	-0.01	pCi/l	0.07	0.07	0.14	04/03/23 11:21	4/13/2023	EML Pu-02 Modified
BCK 7.6	Radium-226	-0.04	pCi/l	0.15	0.15	0.35	04/03/23 11:21	4/12/2023	EPA 903.0 Modified
BCK 7.6	Radium-228	0.23	pCi/l	0.50	0.50	1.03	04/03/23 11:21	4/13/2023	EPA 904.0
BCK 7.6	Strontium-90	0.47	pCi/l	0.34	0.34	0.67	04/03/23 11:21	4/26/2023	EIChroM SRW01 Modified
BCK 7.6	Technetium-99	8.14	pCi/l	1.86	2.03	2.91	04/03/23 11:21	4/13/2023	EIChroM TCW01 Modified
BCK 7.6	Thorium-228	0.03	pCi/l	0.06	0.06	0.13	04/03/23 11:21	4/12/2023	EPA 907.0 Modified
BCK 7.6	Thorium-230	0.19	pCi/l	0.13	0.14	0.12	04/03/23 11:21	4/12/2023	EPA 907.0 Modified
BCK 7.6	Thorium-232	0.01	pCi/l	0.04	0.04	0.11	04/03/23 11:21	4/12/2023	EPA 907.0 Modified
BCK 7.6	Uranium-233/234	3.86	pCi/l	0.69	0.74	0.15	04/03/23 11:21	4/12/2023	EPA 908.0 Modified
BCK 7.6	Uranium-235/236	0.31	pCi/l	0.20	0.20	0.18	04/03/23 11:21	4/12/2023	EPA 908.0 Modified
BCK 7.6	Uranium-238	8.92	pCi/l	1.19	1.35	0.15	04/03/23 11:21	4/12/2023	EPA 908.0 Modified
BCK 8.63	Cobalt-60	1.67	pCi/l	3.33	3.33	5.78	04/03/23 12:37	4/12/2023	EPA 901.1 Modified
BCK 8.63	Cesium-137	-0.36	pCi/l	3.48	3.48	4.82	04/03/23 12:37	4/12/2023	EPA 901.1 Modified
BCK 8.63	Europium-154	0.87	pCi/l	8.39	8.39	5.89	04/03/23 12:37	4/12/2023	EPA 901.1 Modified
BCK 8.63	Americium-241	0.11	pCi/l	0.14	0.14	0.20	04/03/23 12:37	4/14/2023	EML Am-01 Modified
BCK 8.63	Carbon-14	-2.77	pCi/l	2.25	2.28	3.94	04/03/23 12:37	4/21/2023	ENIC Modified
BCK 8.63	Chlorine-36	1.55	pCi/l	1.01	1.06	1.61	04/03/23 12:37	4/14/2023	4500-Cl-B
BCK 8.63	Tritium	193.24	pCi/l	219.13	219.39	367.97	04/03/23 12:37	4/15/2023	EPA 906.0 Modified
BCK 8.63	Iodine-129	1.09	pCi/l	0.70	0.70	1.15	04/03/23 12:37	4/27/2023	EPA 902.0 Modified
BCK 8.63	Neptunium-237	0.02	pCi/l	0.06	0.06	0.12	04/03/23 12:37	4/14/2023	EIChroM ACW08 Mod
BCK 8.63	Plutonium-238	0.06	pCi/l	0.10	0.10	0.14	04/03/23 12:37	4/13/2023	EML Pu-02 Modified
BCK 8.63	Plutonium-239/240	0.16	pCi/l	0.15	0.15	0.16	04/03/23 12:37	4/13/2023	EML Pu-02 Modified

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
BCK 8.63	Radium-226	0.18	pCi/l	0.18	0.18	0.23	04/03/23 12:37	4/12/2023	EPA 903.0 Modified
BCK 8.63	Radium-228	0.93	pCi/l	0.63	0.66	1.24	04/03/23 12:37	4/13/2023	EPA 904.0
BCK 8.63	Strontium-90	0.48	pCi/l	0.35	0.36	0.70	04/03/23 12:37	4/26/2023	EIChroM SRW01 Modified
BCK 8.63	Technetium-99	8.08	pCi/l	1.84	2.01	2.89	04/03/23 12:37	4/13/2023	EIChroM TCW01 Modified
BCK 8.63	Thorium-228	0.06	pCi/l	0.09	0.09	0.16	04/03/23 12:37	4/12/2023	EPA 907.0 Modified
BCK 8.63	Thorium-230	0.12	pCi/l	0.12	0.12	0.13	04/03/23 12:37	4/12/2023	EPA 907.0 Modified
BCK 8.63	Thorium-232	0.05	pCi/l	0.07	0.07	0.11	04/03/23 12:37	4/12/2023	EPA 907.0 Modified
BCK 8.63	Uranium-233/234	4.83	pCi/l	1.04	1.10	0.21	04/03/23 12:37	4/12/2023	EPA 908.0 Modified
BCK 8.63	Uranium-235/236	0.41	pCi/l	0.32	0.32	0.29	04/03/23 12:37	4/12/2023	EPA 908.0 Modified
BCK 8.63	Uranium-238	10.54	pCi/l	1.67	1.84	0.21	04/03/23 12:37	4/12/2023	EPA 908.0 Modified
NT10US	Cobalt-60	0.99	pCi/l	3.05	3.05	4.30	04/10/23 11:10	4/26/2023	EPA 901.1 Modified
NT10US	Cesium-137	0.92	pCi/l	3.23	3.23	5.12	04/10/23 11:10	4/26/2023	EPA 901.1 Modified
NT10US	Europium-154	0.60	pCi/l	1.46	1.46	6.54	04/10/23 11:10	4/26/2023	EPA 901.1 Modified
NT10US	Americium-241	0.05	pCi/l	0.06	0.06	0.08	04/10/23 11:10	5/3/2023	EML Am-01 Modified
NT10US	Carbon-14	-1.73	pCi/l	2.67	2.68	4.63	04/10/23 11:10	4/25/2023	ENIC Modified
NT10US	Chlorine-36	0.20	pCi/l	0.97	0.97	1.72	04/10/23 11:10	4/19/2023	4500-Cl-B
NT10US	Tritium	-131.49	pCi/l	228.44	228.56	398.38	04/10/23 11:10	4/20/2023	EPA 906.0 Modified
NT10US	Iodine-129	0.73	pCi/l	0.74	0.74	1.21	04/10/23 11:10	5/1/2023	EPA 902.0 Modified
NT10US	Neptunium-237	-0.03	pCi/l	0.08	0.08	0.22	04/10/23 11:10	5/3/2023	EIChroM ACW08 Mod
NT10US	Plutonium-238	0.00	pCi/l	0.13	0.13	0.33	04/10/23 11:10	5/3/2023	EML Pu-02 Modified
NT10US	Plutonium-239/240	-0.02	pCi/l	0.09	0.09	0.29	04/10/23 11:10	5/3/2023	EML Pu-02 Modified
NT10US	Radium-226	-0.02	pCi/l	0.07	0.07	0.24	04/10/23 11:10	4/25/2023	EPA 903.0 Modified
NT10US	Radium-228	0.55	pCi/l	0.35	0.38	0.69	04/10/23 11:10	4/27/2023	EPA 904.0
NT10US	Strontium-90	0.49	pCi/l	0.34	0.34	0.66	04/10/23 11:10	4/26/2023	EIChroM SRW01 Modified
NT10US	Technetium-99	-2.54	pCi/l	1.82	1.84	3.20	04/10/23 11:10	4/19/2023	EIChroM TCW01 Modified
NT10US	Thorium-228	0.19	pCi/l	0.18	0.18	0.24	04/10/23 11:10	4/25/2023	EPA 907.0 Modified
NT10US	Thorium-230	0.07	pCi/l	0.13	0.13	0.23	04/10/23 11:10	4/25/2023	EPA 907.0 Modified
NT10US	Thorium-232	0.01	pCi/l	0.06	0.06	0.17	04/10/23 11:10	4/25/2023	EPA 907.0 Modified
NT10US	Uranium-234	0.20	pCi/l	0.14	0.14	0.13	04/10/23 11:10	4/25/2023	EPA 908.0 Modified
NT10US	Uranium-235	0.06	pCi/l	0.10	0.10	0.18	04/10/23 11:10	4/25/2023	EPA 908.0 Modified
NT10US	Uranium-238	0.21	pCi/l	0.14	0.14	0.10	04/10/23 11:10	4/25/2023	EPA 908.0 Modified

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
SF-1	Cobalt-60	2.31	pCi/l	3.54	3.54	5.61	04/03/23 13:16	4/12/2023	EPA 901.1 Modified
SF-1	Cesium-137	0.11	pCi/l	3.75	3.75	5.62	04/03/23 13:16	4/12/2023	EPA 901.1 Modified
SF-1	Europium-154	0.20	pCi/l	4.10	4.10	6.03	04/03/23 13:16	4/12/2023	EPA 901.1 Modified
SF-1	Americium-241	0.25	pCi/l	0.18	0.18	0.13	04/03/23 13:16	4/14/2023	EML Am-01 Modified
SF-1	Carbon-14	-1.21	pCi/l	2.36	2.37	4.08	04/03/23 13:16	4/21/2023	ENIC Modified
SF-1	Chlorine-36	0.15	pCi/l	0.90	0.90	1.61	04/03/23 13:16	4/14/2023	4500-Cl-B
SF-1	Tritium	157.60	pCi/l	217.52	217.70	366.78	04/03/23 13:16	4/15/2023	EPA 906.0 Modified
SF-1	Iodine-129	0.85	pCi/l	0.80	0.80	1.48	04/03/23 13:16	4/27/2023	EPA 902.0 Modified
SF-1	Neptunium-237	0.02	pCi/l	0.08	0.08	0.21	04/03/23 13:16	4/14/2023	EIChroM ACW08 Mod
SF-1	Plutonium-238	0.04	pCi/l	0.11	0.11	0.25	04/03/23 13:16	4/13/2023	EML Pu-02 Modified
SF-1	Plutonium-239/240	-0.02	pCi/l	0.08	0.08	0.21	04/03/23 13:16	4/13/2023	EML Pu-02 Modified
SF-1	Radium-226	0.15	pCi/l	0.14	0.14	0.15	04/03/23 13:16	4/11/2023	EPA 903.0 Modified
SF-1	Radium-228	0.44	pCi/l	0.56	0.57	1.16	04/03/23 13:16	4/13/2023	EPA 904.0
SF-1	Strontium-90	-0.06	pCi/l	0.31	0.31	0.68	04/03/23 13:16	4/26/2023	EIChroM SRW01 Modified
SF-1	Technetium-99	0.94	pCi/l	1.75	1.75	2.96	04/03/23 13:16	4/13/2023	EIChroM TCW01 Modified
SF-1	Thorium-228	0.04	pCi/l	0.08	0.08	0.16	04/03/23 13:16	4/12/2023	EPA 907.0 Modified
SF-1	Thorium-230	0.12	pCi/l	0.13	0.13	0.17	04/03/23 13:16	4/12/2023	EPA 907.0 Modified
SF-1	Thorium-232	0.06	pCi/l	0.10	0.10	0.17	04/03/23 13:16	4/12/2023	EPA 907.0 Modified
SF-1	Uranium-233/234	0.05	pCi/l	0.25	0.25	0.53	04/03/23 13:16	4/12/2023	EPA 908.0 Modified
SF-1	Uranium-235/236	0.09	pCi/l	0.23	0.23	0.49	04/03/23 13:16	4/12/2023	EPA 908.0 Modified
SF-1	Uranium-238	0.01	pCi/l	0.20	0.20	0.47	04/03/23 13:16	4/12/2023	EPA 908.0 Modified
SF-3	Cobalt-60	-2.45	pCi/l	3.88	3.88	4.23	04/03/23 13:58	4/11/2023	EPA 901.1 Modified
SF-3	Cesium-137	3.43	pCi/l	2.69	2.70	5.02	04/03/23 13:58	4/11/2023	EPA 901.1 Modified
SF-3	Europium-154	0.49	pCi/l	6.12	6.12	3.98	04/03/23 13:58	4/11/2023	EPA 901.1 Modified
SF-3	Americium-241	0.07	pCi/l	0.11	0.11	0.19	04/03/23 13:58	4/14/2023	EML Am-01 Modified
SF-3	Carbon-14	-2.95	pCi/l	2.27	2.31	3.99	04/03/23 13:58	4/21/2023	ENIC Modified
SF-3	Chlorine-36	3.35	pCi/l	1.25	1.41	1.85	04/03/23 13:58	4/14/2023	4500-Cl-B
SF-3	Tritium	88.01	pCi/l	216.84	216.89	368.70	04/03/23 13:58	4/15/2023	EPA 906.0 Modified
SF-3	Iodine-129	1.36	pCi/l	0.81	0.81	1.61	04/03/23 13:58	4/27/2023	EPA 902.0 Modified
SF-3	Neptunium-237	0.01	pCi/l	0.06	0.06	0.16	04/03/23 13:58	4/14/2023	EIChroM ACW08 Mod
SF-3	Plutonium-238	0.07	pCi/l	0.13	0.13	0.22	04/03/23 13:58	4/13/2023	EML Pu-02 Modified
SF-3	Plutonium-239/240	0.03	pCi/l	0.07	0.07	0.15	04/03/23 13:58	4/13/2023	EML Pu-02 Modified
SF-3	Radium-226	0.09	pCi/l	0.12	0.12	0.18	04/03/23 13:58	4/11/2023	EPA 903.0 Modified
SF-3	Radium-228	0.09	pCi/l	0.57	0.57	1.20	04/03/23 13:58	4/13/2023	EPA 904.0

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
SF-3	Strontium-90	0.29	pCi/l	0.35	0.35	0.72	04/03/23 13:58	4/26/2023	EIChroM SRW01 Modified
SF-3	Technetium-99	0.00	pCi/l	2.13	2.13	3.63	04/03/23 13:58	4/13/2023	EIChroM TCW01 Modified
SF-3	Thorium-228	0.03	pCi/l	0.07	0.07	0.15	04/03/23 13:58	4/12/2023	EPA 907.0 Modified
SF-3	Thorium-230	0.17	pCi/l	0.14	0.14	0.12	04/03/23 13:58	4/12/2023	EPA 907.0 Modified
SF-3	Thorium-232	0.02	pCi/l	0.05	0.05	0.11	04/03/23 13:58	4/12/2023	EPA 907.0 Modified
SF-3	Uranium-233/234	0.05	pCi/l	0.07	0.07	0.10	04/03/23 13:58	4/12/2023	EPA 908.0 Modified
SF-3	Uranium-235/236	0.02	pCi/l	0.06	0.06	0.16	04/03/23 13:58	4/12/2023	EPA 908.0 Modified
SF-3	Uranium-238	0.09	pCi/l	0.10	0.10	0.12	04/03/23 13:58	4/12/2023	EPA 908.0 Modified
SF-6	Cobalt-60	3.19	pCi/l	2.67	2.67	5.45	04/10/23 09:03	4/26/2023	EPA 901.1 Modified
SF-6	Cesium-137	-0.25	pCi/l	3.95	3.95	5.52	04/10/23 09:03	4/26/2023	EPA 901.1 Modified
SF-6	Europium-154	-1.55	pCi/l	8.35	8.35	5.77	04/10/23 09:03	4/26/2023	EPA 901.1 Modified
SF-6	Americium-241	0.03	pCi/l	0.05	0.05	0.09	04/10/23 09:03	5/3/2023	EML Am-01 Modified
SF-6	Carbon-14	-1.56	pCi/l	2.68	2.69	4.64	04/10/23 09:03	4/25/2023	ENIC Modified
SF-6	Chlorine-36	-0.15	pCi/l	0.98	0.98	1.78	04/10/23 09:03	4/19/2023	4500-Cl-B
SF-6	Tritium	0.00	pCi/l	232.40	232.40	399.27	04/10/23 09:03	4/20/2023	EPA 906.0 Modified
SF-6	Iodine-129	0.94	pCi/l	0.74	0.74	1.43	04/10/23 09:03	4/30/2023	EPA 902.0 Modified
SF-6	Neptunium-237	0.35	pCi/l	0.24	0.24	0.21	04/10/23 09:03	5/3/2023	EIChroM ACW08 Mod
SF-6	Plutonium-238	0.04	pCi/l	0.12	0.12	0.27	04/10/23 09:03	5/3/2023	EML Pu-02 Modified
SF-6	Plutonium-239/240	-0.01	pCi/l	0.09	0.09	0.20	04/10/23 09:03	5/3/2023	EML Pu-02 Modified
SF-6	Radium-226	0.00	pCi/l	0.12	0.12	0.31	04/10/23 09:03	4/25/2023	EPA 903.0 Modified
SF-6	Radium-228	0.18	pCi/l	0.35	0.35	0.73	04/10/23 09:03	4/27/2023	EPA 904.0
SF-6	Strontium-90	0.51	pCi/l	0.37	0.37	0.72	04/10/23 09:03	4/26/2023	EIChroM SRW01 Modified
SF-6	Technetium-99	-2.53	pCi/l	1.81	1.83	3.18	04/10/23 09:03	4/19/2023	EIChroM TCW01 Modified
SF-6	Thorium-228	0.17	pCi/l	0.17	0.17	0.20	04/10/23 09:03	4/25/2023	EPA 907.0 Modified
SF-6	Thorium-230	0.28	pCi/l	0.20	0.21	0.18	04/10/23 09:03	4/25/2023	EPA 907.0 Modified
SF-6	Thorium-232	0.06	pCi/l	0.09	0.09	0.14	04/10/23 09:03	4/25/2023	EPA 907.0 Modified
SF-6	Uranium-234	0.07	pCi/l	0.10	0.10	0.17	04/10/23 09:03	4/25/2023	EPA 908.0 Modified
SF-6	Uranium-235	0.07	pCi/l	0.12	0.12	0.22	04/10/23 09:03	4/25/2023	EPA 908.0 Modified
SF-6	Uranium-238	0.04	pCi/l	0.08	0.08	0.15	04/10/23 09:03	4/25/2023	EPA 908.0 Modified
SPRING D10W	Cobalt-60	2.36	pCi/l	2.66	2.66	4.71	04/10/23 10:05	4/26/2023	EPA 901.1 Modified
SPRING D10W	Cesium-137	0.06	pCi/l	2.74	2.74	4.29	04/10/23 10:05	4/26/2023	EPA 901.1 Modified
SPRING D10W	Europium-154	1.05	pCi/l	8.69	8.69	4.21	04/10/23 10:05	4/26/2023	EPA 901.1 Modified

Station ID	Analyte	Result	Units	CU	CSU	MDA	Collection Date	Analysis Date	Method
SPRING D10W	Americium-241	0.10	pCi/l	0.10	0.10	0.13	04/10/23 10:05	5/3/2023	EML Am-01 Modified
SPRING D10W	Carbon-14	-2.25	pCi/l	2.66	2.68	4.63	04/10/23 10:05	4/25/2023	ENIC Modified
SPRING D10W	Chlorine-36	0.96	pCi/l	0.94	0.96	1.55	04/10/23 10:05	4/19/2023	4500-Cl-B
SPRING D10W	Tritium	131.29	pCi/l	234.90	235.02	397.77	04/10/23 10:05	4/20/2023	EPA 906.0 Modified
SPRING D10W	Iodine-129	1.00	pCi/l	0.69	0.69	1.38	04/10/23 10:05	4/30/2023	EPA 902.0 Modified
SPRING D10W	Neptunium-237	0.05	pCi/l	0.08	0.08	0.12	04/10/23 10:05	5/3/2023	EIChroM ACW08 Mod
SPRING D10W	Plutonium-238	0.02	pCi/l	0.08	0.08	0.18	04/10/23 10:05	5/3/2023	EML Pu-02 Modified
SPRING D10W	Plutonium-239/240	0.05	pCi/l	0.11	0.11	0.21	04/10/23 10:05	5/3/2023	EML Pu-02 Modified
SPRING D10W	Radium-226	-0.15	pCi/l	0.13	0.13	0.40	04/10/23 10:05	4/25/2023	EPA 903.0 Modified
SPRING D10W	Radium-228	1.10	pCi/l	0.47	0.53	0.89	04/10/23 10:05	4/27/2023	EPA 904.0
SPRING D10W	Strontium-90	0.77	pCi/l	0.37	0.38	0.70	04/10/23 10:05	4/26/2023	EIChroM SRW01 Modified
SPRING D10W	Technetium-99	-0.64	pCi/l	1.78	1.78	3.06	04/10/23 10:05	4/19/2023	EIChroM TCW01 Modified
SPRING D10W	Thorium-228	0.06	pCi/l	0.12	0.12	0.22	04/10/23 10:05	4/25/2023	EPA 907.0 Modified
SPRING D10W	Thorium-230	0.05	pCi/l	0.08	0.08	0.14	04/10/23 10:05	4/25/2023	EPA 907.0 Modified
SPRING D10W	Thorium-232	0.09	pCi/l	0.11	0.11	0.17	04/10/23 10:05	4/25/2023	EPA 907.0 Modified
SPRING D10W	Uranium-234	0.14	pCi/l	0.13	0.13	0.17	04/10/23 10:05	4/25/2023	EPA 908.0 Modified
SPRING D10W	Uranium-235	0.14	pCi/l	0.15	0.15	0.21	04/10/23 10:05	4/25/2023	EPA 908.0 Modified
SPRING D10W	Uranium-238	0.11	pCi/l	0.12	0.12	0.17	04/10/23 10:05	4/25/2023	EPA 908.0 Modified

CU - Combined Uncertainty: Total uncertainty in the measurement, including all error sources.
CSU - Combined Standard Uncertainty: Uncertainty from the radioactive decay counting process (i.e. statistical standard deviation of an individual radiological result).
MDA - Minimum Detectable Activity: Smallest activity level reliably distinguishable from background noise.

Table D.4: *Dioxin Furan Results for EMDF Baseline Sampling April 2023. Bold indicates result > Method Detection Limit (MDL).*

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
BCK 7.6	1,2,3,4,6,7,8-HPCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,4,6,7,8-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,4,7,8,9-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,4,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	**1,2,3,4,7,8-HXCDF**	**0.93**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	1,2,3,6,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,7,8,9-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	1,2,3,7,8,9-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	**1,2,3,7,8-PECDD**	**1.7**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**1,2,3,7,8-PECDF**	**0.86**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	2,3,4,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	2,3,4,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	2,3,7,8-TCDD	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	2,3,7,8-TCDF	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	HPCDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	HPCDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	HXCDD, TOTAL	ND	pg/L	U	0	375	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	**HXCDF, TOTAL**	**0.93**	**pg/L**	**J**	**0**	**500**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**OCDD**	**11**	**pg/L**	**J**	**0**	**100**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	OCDF	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	**PCDD, TOTAL**	**12.7**	**pg/L**	**J**	**0**	**925**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**PCDD/PCDF, TOTAL**	**14.5**	**pg/L**	**J**	**0**	**2225**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**PCDF, TOTAL**	**1.8**	**pg/L**	**J**	**0**	**1300**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**PECDD, TOTAL**	**1.7**	**pg/L**	**J**	**0**	**125**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	**PECDF, TOTAL**	**0.86**	**pg/L**	**J**	**0**	**250**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 7.6	TCDD, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 7.6	TCDF, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
BCK 8.63	1,2,3,4,6,7,8-HPCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,4,6,7,8-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,4,7,8,9-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,4,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,4,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,6,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**1,2,3,6,7,8-HXCDF**	**2.4**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	1,2,3,7,8,9-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**1,2,3,7,8,9-HXCDF**	**4.5**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	1,2,3,7,8-PECDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	1,2,3,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	2,3,4,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	2,3,4,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	2,3,7,8-TCDD	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**2,3,7,8-TCDF**	**1.2**	**pg/L**	**J**	**0**	**10**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	HPCDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**HPCDF, TOTAL**	**7.8**	**pg/L**	**J**	**0**	**250**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	**HXCDD, TOTAL**	**6.9**	**pg/L**	**J**	**0**	**375**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	HXCDF, TOTAL	ND	pg/L	U	0	500	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	OCDD	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	OCDF	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	PCDD, TOTAL	ND	pg/L	U	0	925	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**PCDD/PCDF, TOTAL**	**8.1**	**pg/L**	**J**	**0**	**2225**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	**PCDF, TOTAL**	**8.1**	**pg/L**	**J**	**0**	**1300**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
BCK 8.63	PECDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	PECDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	TCDD, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
BCK 8.63	**TCDF, TOTAL**	**1.2**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
NT10US	1,2,3,4,6,7,8-HPCDD	<5.2	pg/L	U	5.2	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,4,6,7,8-HPCDF	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,4,7,8,9-HPCDF	<1.4	pg/L	U	1.4	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,4,7,8-HXCDD	<3.0	pg/L	U	3	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,4,7,8-HXCDF	<1.5	pg/L	U	1.5	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,6,7,8-HXCDD	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,6,7,8-HXCDF	<0.61	pg/L	U	0.61	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,7,8,9-HXCDD	<0.52	pg/L	U	0.52	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,7,8,9-HXCDF	<1.5	pg/L	U	1.5	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	1,2,3,7,8-PECDD	<1.8	pg/L	U	1.8	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	**1,2,3,7,8-PECDF**	**0.77**	**pg/L**	**J**	**0.77**	**50**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	2,3,4,6,7,8-HXCDF	<0.65	pg/L	U	0.65	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	2,3,4,7,8-PECDF	<0.85	pg/L	U	0.85	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	2,3,7,8-TCDD	<1.8	pg/L	U	1.8	10	1	4/10/2023	4/21/2023	EPA 1613
NT10US	2,3,7,8-TCDF	<0.74	pg/L	U	0.74	10	1	4/10/2023	4/21/2023	EPA 1613
NT10US	HPCDD, TOTAL	<5.2	pg/L	U	5.2	125	1	4/10/2023	4/21/2023	EPA 1613
NT10US	HPCDF, TOTAL	<2.6	pg/L	U	2.6	250	1	4/10/2023	4/21/2023	EPA 1613
NT10US	HXCDD, TOTAL	<4.7	pg/L	U	4.7	375	1	4/10/2023	4/21/2023	EPA 1613
NT10US	HXCDF, TOTAL	<4.3	pg/L	U	4.3	500	1	4/10/2023	4/21/2023	EPA 1613
NT10US	**OCDD**	**25**	**pg/L**	**J**	**25**	**100**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	OCDF	<3.0	pg/L	U	3	100	1	4/10/2023	4/21/2023	EPA 1613
NT10US	**PCDD, TOTAL**	**25**	**pg/L**	**J**	**25**	**925**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	**PCDD/PCDF, TOTAL**	**26**	**pg/L**	**J**	**26**	**2225**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	PCDF, TOTAL	<37.0	pg/L	U	37	1300	1	4/10/2023	4/21/2023	EPA 1613
NT10US	PECDD, TOTAL	<1.8	pg/L	U	1.8	125	1	4/10/2023	4/21/2023	EPA 1613
NT10US	**PECDF, TOTAL**	**0.77**	**pg/L**	**J**	**0.77**	**250**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
NT10US	TCDD, TOTAL	<1.8	pg/L	U	1.8	50	1	4/10/2023	4/21/2023	EPA 1613
NT10US	TCDF, TOTAL	<0.74	pg/L	U	0.74	50	1	4/10/2023	4/21/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SF-1	1,2,3,4,6,7,8-HPCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,4,6,7,8-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**1,2,3,4,7,8,9-HPCDF**	**1.9**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	1,2,3,4,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,4,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,6,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,7,8,9-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,7,8,9-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,7,8-PECDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	1,2,3,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	2,3,4,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	2,3,4,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	2,3,7,8-TCDD	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**2,3,7,8-TCDF**	**0.81**	**pg/L**	**J**	**0**	**10**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	HPCDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**HPCDF, TOTAL**	**1.9**	**pg/L**	**J**	**0**	**250**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	HXCDD, TOTAL	ND	pg/L	U	0	375	1	4/3/2023	5/3/2023	EPA 1613
SF-1	HXCDF, TOTAL	ND	pg/L	U	0	500	1	4/3/2023	5/3/2023	EPA 1613
SF-1	OCDD	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
SF-1	OCDF	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
SF-1	PCDD, TOTAL	ND	pg/L	U	0	925	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**PCDD/PCDF, TOTAL**	**2.71**	**pg/L**	**J**	**0**	**2225**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	**PCDF, TOTAL**	**2.71**	**pg/L**	**J**	**0**	**1300**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-1	PECDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
SF-1	PECDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
SF-1	TCDD, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-1	**TCDF, TOTAL**	**0.81**	**pg/L**	**J**	**0**	**50**	**1**	**4/3/2023**	**5/3/2023**	**EPA 1613**
SF-3	1,2,3,4,6,7,8-HPCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SF-3	1,2,3,4,6,7,8-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,4,7,8,9-HPCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,4,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,4,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,6,7,8-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,7,8,9-HXCDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,7,8,9-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,7,8-PECDD	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	1,2,3,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	2,3,4,6,7,8-HXCDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	2,3,4,7,8-PECDF	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	2,3,7,8-TCDD	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
SF-3	2,3,7,8-TCDF	ND	pg/L	U	0	10	1	4/3/2023	5/3/2023	EPA 1613
SF-3	HPCDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
SF-3	HPCDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
SF-3	HXCDD, TOTAL	ND	pg/L	U	0	375	1	4/3/2023	5/3/2023	EPA 1613
SF-3	HXCDF, TOTAL	ND	pg/L	U	0	500	1	4/3/2023	5/3/2023	EPA 1613
SF-3	OCDD	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
SF-3	OCDF	ND	pg/L	U	0	100	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PCDD, TOTAL	ND	pg/L	U	0	925	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PCDD/PCDF, TOTAL	ND	pg/L	U	0	2225	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PCDF, TOTAL	ND	pg/L	U	0	1300	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PECDD, TOTAL	ND	pg/L	U	0	125	1	4/3/2023	5/3/2023	EPA 1613
SF-3	PECDF, TOTAL	ND	pg/L	U	0	250	1	4/3/2023	5/3/2023	EPA 1613
SF-3	TCDD, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-3	TCDF, TOTAL	ND	pg/L	U	0	50	1	4/3/2023	5/3/2023	EPA 1613
SF-6	**1,2,3,4,6,7,8-HPCDD**	**2.5**	**pg/L**	**J**	**2.5**	**50**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
SF-6	1,2,3,4,6,7,8-HPCDF	<2.0	pg/L	U	2	50	1	4/10/2023	4/21/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SF-6	1,2,3,4,7,8,9-HPCDF	<1.5	pg/L	U	1.5	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,4,7,8-HXCDD	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,4,7,8-HXCDF	<1.0	pg/L	U	1	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,6,7,8-HXCDD	<1.5	pg/L	U	1.5	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,6,7,8-HXCDF	<0.41	pg/L	U	0.41	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,7,8,9-HXCDD	<3.3	pg/L	U	3.3	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,7,8,9-HXCDF	<1.1	pg/L	U	1.1	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,7,8-PECDD	<1.6	pg/L	U	1.6	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	1,2,3,7,8-PECDF	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	2,3,4,6,7,8-HXCDF	<0.63	pg/L	U	0.63	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	2,3,4,7,8-PECDF	<1.1	pg/L	U	1.1	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	2,3,7,8-TCDD	<1.1	pg/L	U	1.1	10	1	4/10/2023	4/21/2023	EPA 1613
SF-6	2,3,7,8-TCDF	<0.57	pg/L	U	0.57	10	1	4/10/2023	4/21/2023	EPA 1613
SF-6	**HPCDD, TOTAL**	**2.5**	**pg/L**	**J**	**2.5**	**125**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
SF-6	HPCDF, TOTAL	<3.5	pg/L	U	3.5	250	1	4/10/2023	4/21/2023	EPA 1613
SF-6	HXCDD, TOTAL	<6.0	pg/L	U	6	375	1	4/10/2023	4/21/2023	EPA 1613
SF-6	HXCDF, TOTAL	<3.1	pg/L	U	3.1	500	1	4/10/2023	4/21/2023	EPA 1613
SF-6	OCDD	<12.0	pg/L	U	12	100	1	4/10/2023	4/21/2023	EPA 1613
SF-6	OCDF	<1.8	pg/L	U	1.8	100	1	4/10/2023	4/21/2023	EPA 1613
SF-6	**PCDD, TOTAL**	**2.5**	**pg/L**	**J**	**2.5**	**925**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
SF-6	**PCDD/PCDF, TOTAL**	**2.5**	**pg/L**	**J**	**2.5**	**2225**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
SF-6	PCDF, TOTAL	<11.0	pg/L	U	11	1300	1	4/10/2023	4/21/2023	EPA 1613
SF-6	PECDD, TOTAL	<1.6	pg/L	U	1.6	125	1	4/10/2023	4/21/2023	EPA 1613
SF-6	PECDF, TOTAL	<2.3	pg/L	U	2.3	250	1	4/10/2023	4/21/2023	EPA 1613
SF-6	TCDD, TOTAL	<1.1	pg/L	U	1.1	50	1	4/10/2023	4/21/2023	EPA 1613
SF-6	TCDF, TOTAL	<0.57	pg/L	U	0.57	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,4,6,7,8-HPCDD	<3.2	pg/L	U	3.2	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	**1,2,3,4,6,7,8-HPCDF**	**3.8**	**pg/L**	**J**	**3.8**	**50**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	1,2,3,4,7,8,9-HPCDF	<3.6	pg/L	U	3.6	50	1	4/10/2023	4/21/2023	EPA 1613

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
Spring D10W	1,2,3,4,7,8-HXCDD	<2.2	pg/L	U	2.2	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,4,7,8-HXCDF	<0.93	pg/L	U	0.93	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,6,7,8-HXCDD	<2.3	pg/L	U	2.3	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,6,7,8-HXCDF	<3.6	pg/L	U	3.6	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	**1,2,3,7,8,9-HXCDD**	**3.2**	**pg/L**	**J**	**3.2**	**50**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	1,2,3,7,8,9-HXCDF	<3.0	pg/L	U	3	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,7,8-PECDD	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	1,2,3,7,8-PECDF	<1.2	pg/L	U	1.2	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	2,3,4,6,7,8-HXCDF	<1.4	pg/L	U	1.4	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	2,3,4,7,8-PECDF	<2.4	pg/L	U	2.4	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	2,3,7,8-TCDD	<1.7	pg/L	U	1.7	10	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	2,3,7,8-TCDF	<0.67	pg/L	U	0.67	10	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	HPCDD, TOTAL	<3.2	pg/L	U	3.2	125	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	HPCDF, TOTAL	<7.4	pg/L	U	7.4	250	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	**HXCDD, TOTAL**	**3.2**	**pg/L**	**J**	**3.2**	**375**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	HXCDF, TOTAL	<8.9	pg/L	U	8.9	500	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	OCDD	<25.0	pg/L	U	25	100	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	OCDF	<6.6	pg/L	U	6.6	100	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	**PCDD, TOTAL**	**3.2**	**pg/L**	**J**	**3.2**	**925**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	**PCDD/PCDF, TOTAL**	**7**	**pg/L**	**J**	**7**	**2225**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	**PCDF, TOTAL**	**3.8**	**pg/L**	**J**	**3.8**	**1300**	**1**	**4/10/2023**	**4/21/2023**	**EPA 1613**
Spring D10W	PECDD, TOTAL	<1.2	pg/L	U	1.2	125	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	PECDF, TOTAL	<3.6	pg/L	U	3.6	250	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	TCDD, TOTAL	<1.7	pg/L	U	1.7	50	1	4/10/2023	4/21/2023	EPA 1613
Spring D10W	TCDF, TOTAL	<0.67	pg/L	U	0.67	50	1	4/10/2023	4/21/2023	EPA 1613

MDL - Method Detection Limit: The minimum concentration detectable by the method but not precisely quantifiable below this threshold.
RL - Reporting Limit: Concentrations above this level exceed a pre-determined acceptable range for reliable quantification.
U: Analyte not detected above MDL **J:** Analyte detected above MDL but below reporting limit **DF:** Dilution Factor
***If MDL = 0, ND = Not Detected**

Table D.5**: PFAS Results for EMDF Baseline Sampling April 2023.* ***Bold indicates result > Method Detection Limit (MDL).

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
BCK 7.6	11Cl-PF3OUDS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	4:2FTS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	**6:2FTS**	**0.26**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	8:2FTS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	9Cl-PF3ONS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	ADONA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	HFPO-DA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	NFDHA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	**PFBA**	**420**	**ng/L**		**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	**PFBS**	**1.7**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	PFDA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	PFDoA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	PFEESA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	**PFHpA**	**4**	**ng/L**		**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	PFHpS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	**PFHxA**	**4.4**	**ng/L**		**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	**PFHxS**	**3.2**	**ng/L**		**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	PFMBA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	**PFMPA**	**0.23**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	**PFNA**	**0.48**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	**PFOA**	**3.1**	**ng/L**		**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	**PFOS**	**3.3**	**ng/L**		**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	**PFPeA**	**6.1**	**ng/L**		**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	**PFPeS**	**0.57**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 8:58**	**4/13/2023 20:01**	**EPA 533**
BCK 7.6	PFUnA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 8:58	4/13/2023 20:01	EPA 533
BCK 7.6	NEtFOSAA	<0.4	ng/L	U	0.4	2	1	4/3/2023 8:58	5/2/2023 18:56	EPA 537.1
BCK 7.6	NMeFOSAA	<0.38	ng/L	U	0.38	2	1	4/3/2023 8:58	5/2/2023 18:56	EPA 537.1
BCK 7.6	PFTeDA	<0.16	ng/L	U	0.16	2	1	4/3/2023 8:58	5/2/2023 18:56	EPA 537.1
BCK 7.6	PFTrDA	<0.24	ng/L	U	0.24	2	1	4/3/2023 8:58	5/2/2023 18:56	EPA 537.1
BCK 8.63	11Cl-PF3OUDS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	4:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
BCK 8.63	**6:2FTS**	**0.55**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	8:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	9Cl-PF3ONS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	ADONA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	HFPO-DA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	NFDHA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	**PFBA**	**440**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	**PFBS**	**1.8**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	PFDA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	PFDoA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	PFEESA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	**PFHpA**	**4.4**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	PFHpS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	**PFHxA**	**4.6**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	**PFHxS**	**3.1**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	PFMBA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	**PFMPA**	**0.3**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	**PFNA**	**0.54**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	**PFOA**	**3.6**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	**PFOS**	**3.3**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	**PFPeA**	**6.2**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	**PFPeS**	**0.57**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 9:24**	**4/13/2023 20:09**	**EPA 533**
BCK 8.63	PFUnA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:24	4/13/2023 20:09	EPA 533
BCK 8.63	NEtFOSAA	<0.39	ng/L	U	0.39	2	1	4/3/2023 9:24	5/2/2023 19:09	EPA 537.1
BCK 8.63	NMeFOSAA	<0.36	ng/L	U	0.36	2	1	4/3/2023 9:24	5/2/2023 19:09	EPA 537.1
BCK 8.63	PFTeDA	<0.16	ng/L	U	0.16	2	1	4/3/2023 9:24	5/2/2023 19:09	EPA 537.1
BCK 8.63	PFTrDA	<0.23	ng/L	U	0.23	2	1	4/3/2023 9:24	5/2/2023 19:09	EPA 537.1
NT1OUS	11Cl-PF3OUDS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	4:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	6:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	8:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	9Cl-PF3ONS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	ADONA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
NT1OUS	HFPO-DA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	NFDHA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	**PFBA**	**4.9**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 10:36**	**4/13/2023 20:18**	**EPA 533**
NT1OUS	**PFBS**	**0.95**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 10:36**	**4/13/2023 20:18**	**EPA 533**
NT1OUS	PFDA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFDoA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFEESA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFHpA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFHpS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFHxA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFHxS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFMBA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFMPA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFNA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	PFOA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	**PFOS**	**0.45**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 10:36**	**4/13/2023 20:18**	**EPA 533**
NT1OUS	PFPeA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	**PFPeS**	**0.35**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 10:36**	**4/13/2023 20:18**	**EPA 533**
NT1OUS	PFUnA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:36	4/13/2023 20:18	EPA 533
NT1OUS	NEtFOSAA	<0.38	ng/L	U	0.38	2	1	4/3/2023 10:36	5/2/2023 19:34	EPA 537.1
NT1OUS	NMeFOSAA	<0.36	ng/L	U	0.36	2	1	4/3/2023 10:36	5/2/2023 19:34	EPA 537.1
NT1OUS	PFTeDA	<0.16	ng/L	U	0.16	2	1	4/3/2023 10:36	5/2/2023 19:34	EPA 537.1
NT1OUS	PFTrDA	<0.23	ng/L	U	0.23	2	1	4/3/2023 10:36	5/2/2023 19:34	EPA 537.1
SF-1	11Cl-PF3OUDS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	4:2FTS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	6:2FTS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	8:2FTS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	9Cl-PF3ONS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	ADONA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	HFPO-DA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	NFDHA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	**PFBA**	**13**	**ng/L**		**0.18**	**1.8**	**1**	**4/3/2023 9:36**	**4/13/2023 19:09**	**EPA 533**
SF-1	**PFBS**	**0.96**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 9:36**	**4/13/2023 19:09**	**EPA 533**

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SF-1	PFDA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFDoA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFEESA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFHpA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFHpS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFHxA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFHxS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFMBA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFMPA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFNA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	PFOA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	**PFOS**	**0.35**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 9:36**	**4/13/2023 19:09**	**EPA 533**
SF-1	PFPeA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	**PFPeS**	**0.98**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 9:36**	**4/13/2023 19:09**	**EPA 533**
SF-1	PFUnA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 9:36	4/13/2023 19:09	EPA 533
SF-1	NEtFOSAA	<0.4	ng/L	U	0.4	2	1	4/3/2023 9:36	5/2/2023 17:54	EPA 537.1
SF-1	NMeFOSAA	<0.37	ng/L	U	0.37	2	1	4/3/2023 9:36	5/2/2023 17:54	EPA 537.1
SF-1	PFTeDA	<0.16	ng/L	U	0.16	2	1	4/3/2023 9:36	5/2/2023 17:54	EPA 537.1
SF-1	PFTrDA	<0.24	ng/L	U	0.24	2	1	4/3/2023 9:36	5/2/2023 17:54	EPA 537.1
SF-3	11Cl-PF3OUDS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	4:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	6:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	8:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	9Cl-PF3ONS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	ADONA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	HFPO-DA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	NFDHA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	**PFBA**	**7.1**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 9:53**	**4/13/2023 19:18**	**EPA 533**
SF-3	**PFBS**	**0.88**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 9:53**	**4/13/2023 19:18**	**EPA 533**
SF-3	PFDA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	PFDoA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	PFEESA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	PFHpA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SF-3	PFHpS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	PFHxA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	PFHxS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	PFMBA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	PFMPA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	PFNA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	PFOA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	**PFOS**	**0.27**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 9:53**	**4/13/2023 19:18**	**EPA 533**
SF-3	PFPeA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	**PFPeS**	**0.58**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 9:53**	**4/13/2023 19:18**	**EPA 533**
SF-3	PFUnA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 9:53	4/13/2023 19:18	EPA 533
SF-3	NEtFOSAA	<0.39	ng/L	U	0.39	2	1	4/3/2023 9:53	5/2/2023 18:06	EPA 537.1
SF-3	NMeFOSAA	<0.37	ng/L	U	0.37	2	1	4/3/2023 9:53	5/2/2023 18:06	EPA 537.1
SF-3	PFTeDA	<0.16	ng/L	U	0.16	2	1	4/3/2023 9:53	5/2/2023 18:06	EPA 537.1
SF-3	PFTrDA	<0.23	ng/L	U	0.23	2	1	4/3/2023 9:53	5/2/2023 18:06	EPA 537.1
SF-6	11Cl-PF3OUDS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	4:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	**6:2FTS**	**3.8**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 10:07**	**4/13/2023 19:26**	**EPA 533**
SF-6	8:2FTS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	9Cl-PF3ONS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	ADONA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	HFPO-DA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	NFDHA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	**PFBA**	**5.2**	**ng/L**		**0.17**	**1.7**	**1**	**4/3/2023 10:07**	**4/13/2023 19:26**	**EPA 533**
SF-6	**PFBS**	**0.91**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 10:07**	**4/13/2023 19:26**	**EPA 533**
SF-6	PFDA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	PFDoA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	PFEESA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	PFHpA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	PFHpS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	PFHxA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	PFHxS	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	PFMBA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	PFMPA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SF-6	PFNA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	PFOA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	**PFOS**	**0.39**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 10:07**	**4/13/2023 19:26**	**EPA 533**
SF-6	PFPeA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	**PFPeS**	**0.9**	**ng/L**	**J**	**0.17**	**1.7**	**1**	**4/3/2023 10:07**	**4/13/2023 19:26**	**EPA 533**
SF-6	PFUnA	<0.17	ng/L	U	0.17	1.7	1	4/3/2023 10:07	4/13/2023 19:26	EPA 533
SF-6	NEtFOSAA	<0.39	ng/L	U	0.39	2	1	4/3/2023 10:07	5/2/2023 18:19	EPA 537.1
SF-6	NMeFOSAA	<0.37	ng/L	U	0.37	2	1	4/3/2023 10:07	5/2/2023 18:19	EPA 537.1
SF-6	PFTeDA	<0.16	ng/L	U	0.16	2	1	4/3/2023 10:07	5/2/2023 18:19	EPA 537.1
SF-6	PFTrDA	<0.24	ng/L	U	0.24	2	1	4/3/2023 10:07	5/2/2023 18:19	EPA 537.1
SpringD10W	11Cl-PF3OUDS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	4:2FTS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	6:2FTS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	8:2FTS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	9Cl-PF3ONS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	ADONA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	HFPO-DA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	NFDHA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	**PFBA**	**28**	**ng/L**		**0.18**	**1.8**	**1**	**4/3/2023 10:25**	**4/13/2023 19:52**	**EPA 533**
SpringD10W	**PFBS**	**0.9**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 10:25**	**4/13/2023 19:52**	**EPA 533**
SpringD10W	PFDA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFDoA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFEESA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFHpA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFHpS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFHxA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFHxS	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFMBA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFMPA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFNA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	PFOA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	**PFOS**	**0.28**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 10:25**	**4/13/2023 19:52**	**EPA 533**
SpringD10W	PFPeA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533

Station ID	Analyte	Result	Units	Qualifier	MDL	RL	DF	Collection Date	Analysis Date	Method
SpringD10W	**PFPeS**	**0.34**	**ng/L**	**J**	**0.18**	**1.8**	**1**	**4/3/2023 10:25**	**4/13/2023 19:52**	**EPA 533**
SpringD10W	PFUnA	<0.18	ng/L	U	0.18	1.8	1	4/3/2023 10:25	4/13/2023 19:52	EPA 533
SpringD10W	NEtFOSAA	<0.42	ng/L	U	0.42	2	1	4/3/2023 10:25	5/2/2023 18:44	EPA 537.1
SpringD10W	NMeFOSAA	<0.39	ng/L	U	0.39	2	1	4/3/2023 10:25	5/2/2023 18:44	EPA 537.1
SpringD10W	PFTeDA	<0.17	ng/L	U	0.17	2	1	4/3/2023 10:25	5/2/2023 18:44	EPA 537.1
SpringD10W	PFTrDA	<0.25	ng/L	U	0.25	2	1	4/3/2023 10:25	5/2/2023 18:44	EPA 537.1

MDL - Method Detection Limit: The minimum concentration detectable by the method but not precisely quantifiable below this threshold.
RL - Reporting Limit: Concentrations above this level exceed a pre-determined acceptable range for reliable quantification.
U: Analyte not detected above MDL
J: Analyte detected above MDL but below reporting limit
DF: Dilution Factor

Table D.6**: Wet Chemistry Results for EMDF Baseline Sampling April 2023.* ***Bold indicates results with IC25 value < 100%

Station ID	Analyte	Result	Units	CV %	Collection Date	Analysis Date	Method
BCK 7.6	Ceriodaphnia dubia IC25 (Survival)	> 100%	%	27.9	4/4/2023	4/12/2023	EPA 1002.0
BCK 7.6	Ceriodaphnia dubia IC25 (Reproduction)	> 100%	%	27.9	4/4/2023	4/12/2023	EPA 1002.0
BCK 7.6	Pimephales promelas IC25 (Survival)	> 100%	%	4.1	4/4/2023	4/11/2023	EPA 1000.0
BCK 7.6	Pimephales promelas IC25 (Growth)	> 100%	%	4.1	4/4/2023	4/11/2023	EPA 1000.0
BCK 8.63	Ceriodaphnia dubia IC25 (Survival)	> 100%	%	22.1	4/4/2023	4/10/2023	EPA 1002.0
BCK 8.63	Ceriodaphnia dubia IC25 (Reproduction)	> 100%	%	22.1	4/4/2023	4/10/2023	EPA 1002.0
BCK 8.63	**Pimephales promelas IC25 (Survival)**	**22.3**	**%**	**9.3**	**4/4/2023**	**4/11/2023**	**EPA 1000.0**
BCK 8.63	**Pimephales promelas IC25 (Growth)**	**23.8**	**%**	**9.3**	**4/4/2023**	**4/11/2023**	**EPA 1000.0**
NT10US	Ceriodaphnia dubia IC25 (Survival)	> 100%	%	6.9	4/11/2023	4/17/2023	EPA 1002.0
NT10US	Ceriodaphnia dubia IC25 (Reproduction)	> 100%	%	6.9	4/11/2023	4/17/2023	EPA 1002.0
NT10US	Pimephales promelas IC25 (Survival)	> 100%	%	9	4/11/2023	4/18/2023	EPA 1000.0
NT10US	Pimephales promelas IC25 (Growth)	> 100%	%	9	4/11/2023	4/18/2023	EPA 1000.0
SF-1	Ceriodaphnia dubia IC25 (Survival)	> 100%	%	24.7	4/4/2023	4/11/2023	EPA 1002.0
SF-1	Ceriodaphnia dubia IC25 (Reproduction)	> 100%	%	24.7	4/4/2023	4/11/2023	EPA 1002.0
SF-1	Pimephales promelas IC25 (Survival)	> 100%	%	11.6	4/4/2023	4/11/2023	EPA 1000.0
SF-1	Pimephales promelas IC25 (Growth)	> 100%	%	11.6	4/4/2023	4/11/2023	EPA 1000.0
SF-3	Ceriodaphnia dubia IC25 (Survival)	> 100%	%	9.6	4/4/2023	4/10/2023	EPA 1002.0
SF-3	Ceriodaphnia dubia IC25 (Reproduction)	> 100%	%	9.6	4/4/2023	4/10/2023	EPA 1002.0
SF-3	Pimephales promelas IC25 (Survival)	> 100%	%	11.6	4/4/2023	4/11/2023	EPA 1000.0
SF-3	Pimephales promelas IC25 (Growth)	> 100%	%	11.6	4/4/2023	4/11/2023	EPA 1000.0
SF-6	Ceriodaphnia dubia IC25 (Survival)	> 100%	%	34	4/11/2023	4/17/2023	EPA 1002.0
SF-6	Ceriodaphnia dubia IC25 (Reproduction)	> 100%	%	34	4/11/2023	4/17/2023	EPA 1002.0
SF-6	**Pimephales promelas IC25 (Survival)**	**62.5**	**%**	**18.4**	**4/11/2023**	**4/18/2023**	**EPA 1000.0**
SF-6	Pimephales promelas IC25 (Growth)	> 100%	%	18.4	4/11/2023	4/18/2023	EPA 1000.0

IC25 - Inhibition Concentration 25%: Concentration of a sample that causes a 25% reduction in a specific biological measurement, like growth or reproduction, in a test organism population.
CV - Coefficient of Variance: A measure of relative variability, expressed as a percentage, calculated as the ratio of the standard deviation to the mean.

E. Bear Creek Valley VOCs

E.1 Background

The Bear Creek Burial Grounds (BCBG, indicated in yellow on the map below) have been used since the 1950s for waste disposal from the Y-12 Plant. Historical records are incomplete, raising concerns about potential contamination. Baseline sampling detected cis-1,2-DCE and PCE, prompting further investigation. The VOC sampling focused on identifying and delineating potential contaminant sources in Bear Creek and distinguishing sources near the EMDF area from other areas.

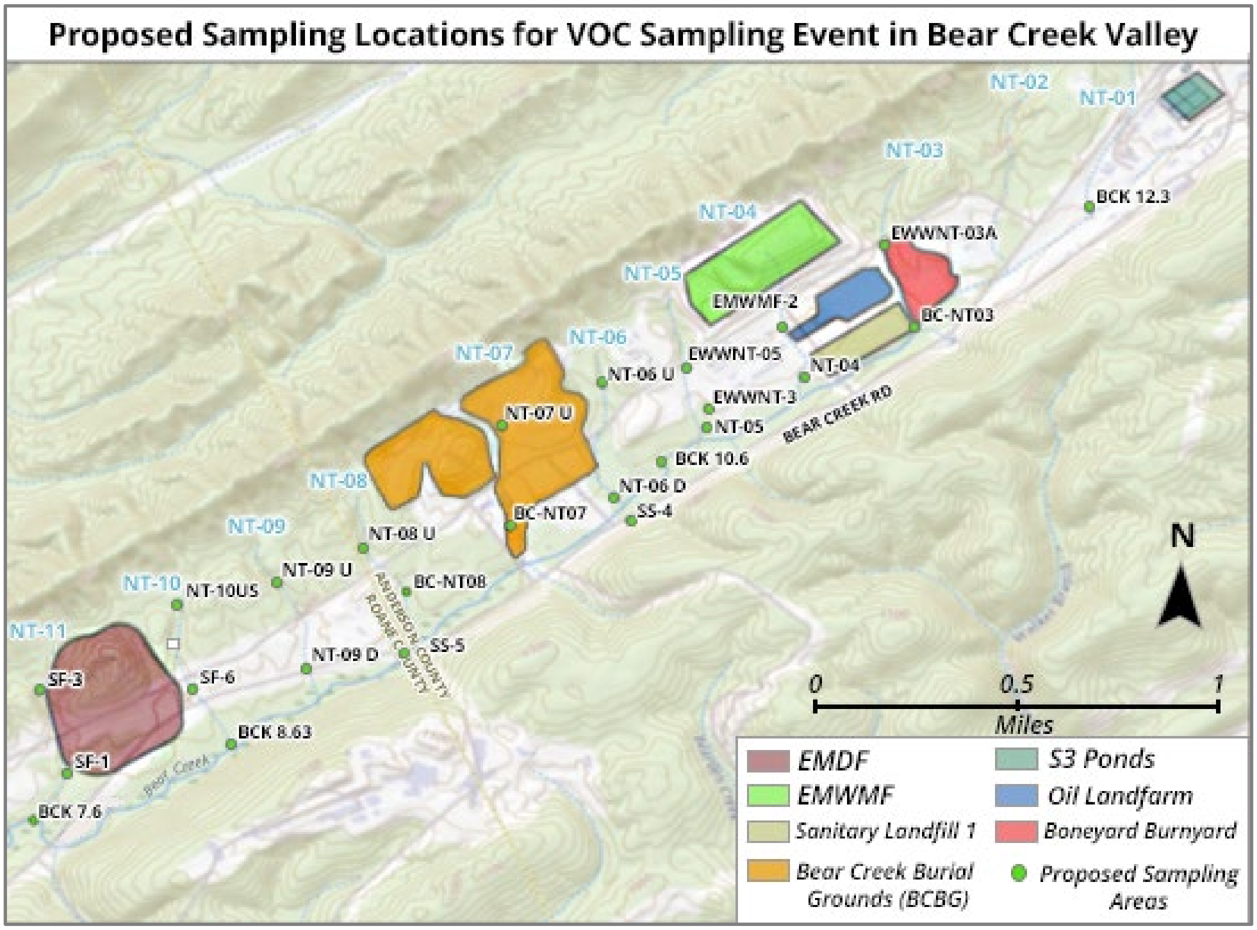

Figure E.1.1: Bear Creek Valley's Proposed Sampling Sites.

E.2 Scope

A total of 27 locations (green dots on the map above) were sampled along Bear Creek Valley, including sites downstream, at the headwaters of Bear Creek, and upstream and downstream locations on most tributaries, as well as several springs.

E.3 Sampling Summary

Tributaries near the BCBG (NT-07, NT-08) had the highest number and concentrations of VOCs. Downstream locations on these tributaries and in Bear Creek had more detections and higher concentrations than their upstream counterparts (NT-07U and NT-08UW/UE). Several springs also contained notable VOC concentrations. Samples were tested by Eurofins using EPA method 8260B.

E.4 Results

Results indicate contaminant migration from the burial grounds into tributaries and across Bear Creek Valley, providing a more comprehensive assessment of the area and delineating baseline conditions for the EMDF, which lies downstream to the east of the BCBG. Sampling results are reported in the following tables.

Table E.4: *Detected VOC Levels Above MDL in Bear Creek Valley Across Sampling Stations. All units in µg/L.*

Analyte	BC-NT07	BC-NT08	BCK 12.3	BCK 8.63	EMWMF-3	NT-06DE	NT-07U	NT-08UW	NT-O8UE	SF-3	SS-4	SS-5
1,1,1-Trichloroethane	0.37	0.41	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	-	0.24	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	9	3.9	-	-	-	0.64	-	-	-	-	-	-
1,1-Dichloroethene	2.7	1.5	-	-	-	0.44	-	-	-	-	0.63	-
1,2-Dichloroethane	0.35	0.37	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	-	-	-	-	-	-	-	-	-	4.1	-	-
Acetone	-	-	-	-	8.9	-	-	-	-	9.9	-	-
Benzene	4.5	0.33	-	-	-	-	-	-	-	-	-	-
Chloroform	1.7	0.45	-	-	-	-	-	-	-	-	1.9	-
Tetrachloroethene	20	15	1.3	-	-	-	-	0.34	1.7	-	-	-
Toluene	-	-	-	-	-	-	-	-		0.44	-	-
Trichloroethene	20	12	-	-	-	0.26	-	-	0.39	-	2.2	-
Vinyl chloride	6.8	1.6	-	-	-	-	1.4	-	-	-	-	-
cis-1,2-Dichloroethene	75	64	-	0.56	-	3.9	4.6	-	0.89	-	4.2	0.28

Table E.5**: VOC Results for Bear Creek Valley: All Analytes & Sampling Stations.* ***Bold indicates result > Method Detection Limit (MDL).

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
BCK 12.3	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/18/2024 15:46	8260B
BCK 12.3	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/18/2024 15:46	8260B
BCK 12.3	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/18/2024 15:46	8260B
BCK 12.3	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 15:46	8260B
BCK 12.3	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/18/2024 15:46	8260B
BCK 12.3	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/18/2024 15:46	8260B
BCK 12.3	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 15:46	8260B
BCK 12.3	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/18/2024 15:46	8260B
BCK 12.3	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/18/2024 15:46	8260B
BCK 12.3	2-Hexanone	<2.0	ug/L	2	5	1	06/18/2024 15:46	8260B
BCK 12.3	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/18/2024 15:46	8260B
BCK 12.3	Acetone	<3.3	ug/L	3.3	10	1	06/18/2024 15:46	8260B
BCK 12.3	Benzene	<0.19	ug/L	0.19	1	1	06/18/2024 15:46	8260B
BCK 12.3	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/18/2024 15:46	8260B
BCK 12.3	Bromoform	<0.27	ug/L	0.27	1	1	06/18/2024 15:46	8260B
BCK 12.3	Bromomethane	<1.2	ug/L	1.2	2	1	06/18/2024 15:46	8260B
BCK 12.3	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/18/2024 15:46	8260B
BCK 12.3	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/18/2024 15:46	8260B
BCK 12.3	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/18/2024 15:46	8260B
BCK 12.3	Chloroethane	<0.75	ug/L	0.75	2	1	06/18/2024 15:46	8260B
BCK 12.3	Chloroform	<0.24	ug/L	0.24	1	1	06/18/2024 15:46	8260B
BCK 12.3	Chloromethane	<0.73	ug/L	0.73	2	1	06/18/2024 15:46	8260B
BCK 12.3	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/18/2024 15:46	8260B
BCK 12.3	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/18/2024 15:46	8260B
BCK 12.3	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/18/2024 15:46	8260B
BCK 12.3	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/18/2024 15:46	8260B
BCK 12.3	Methylene Chloride	<2.0	ug/L	2	2	1	06/18/2024 15:46	8260B
BCK 12.3	Styrene	<0.25	ug/L	0.25	1	1	06/18/2024 15:46	8260B
BCK 12.3	**Tetrachloroethene**	**1.3**	**ug/L**	**0.24**	**1**	**1**	**06/18/2024 15:46**	**8260B**
BCK 12.3	Toluene	<0.41	ug/L	0.41	1	1	06/18/2024 15:46	8260B
BCK 12.3	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/18/2024 15:46	8260B
BCK 12.3	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/18/2024 15:46	8260B
BCK 12.3	Trichloroethene	<0.22	ug/L	0.22	1	1	06/18/2024 15:46	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
BCK 12.3	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/18/2024 15:46	8260B
BCK 12.3	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/18/2024 15:46	8260B
BCK 7.6	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 16:12	8260B
BCK 7.6	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 16:12	8260B
BCK 7.6	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 16:12	8260B
BCK 7.6	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 16:12	8260B
BCK 7.6	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 16:12	8260B
BCK 7.6	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 16:12	8260B
BCK 7.6	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 16:12	8260B
BCK 7.6	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 16:12	8260B
BCK 7.6	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 16:12	8260B
BCK 7.6	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 16:12	8260B
BCK 7.6	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 16:12	8260B
BCK 7.6	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 16:12	8260B
BCK 7.6	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 16:12	8260B
BCK 7.6	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 16:12	8260B
BCK 7.6	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 16:12	8260B
BCK 7.6	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 16:12	8260B
BCK 7.6	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 16:12	8260B
BCK 7.6	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 16:12	8260B
BCK 7.6	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 16:12	8260B
BCK 7.6	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 16:12	8260B
BCK 7.6	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 16:12	8260B
BCK 7.6	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 16:12	8260B
BCK 7.6	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 16:12	8260B
BCK 7.6	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 16:12	8260B
BCK 7.6	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 16:12	8260B
BCK 7.6	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 16:12	8260B
BCK 7.6	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 16:12	8260B
BCK 7.6	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 16:12	8260B
BCK 7.6	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 16:12	8260B
BCK 7.6	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 16:12	8260B
BCK 7.6	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 16:12	8260B
BCK 7.6	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 16:12	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
BCK 7.6	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 16:12	8260B
BCK 7.6	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 16:12	8260B
BCK 7.6	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 16:12	8260B
BCK 8.63	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 17:26	8260B
BCK 8.63	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 17:26	8260B
BCK 8.63	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 17:26	8260B
BCK 8.63	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 17:26	8260B
BCK 8.63	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 17:26	8260B
BCK 8.63	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 17:26	8260B
BCK 8.63	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 17:26	8260B
BCK 8.63	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 17:26	8260B
BCK 8.63	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 17:26	8260B
BCK 8.63	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 17:26	8260B
BCK 8.63	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 17:26	8260B
BCK 8.63	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 17:26	8260B
BCK 8.63	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 17:26	8260B
BCK 8.63	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 17:26	8260B
BCK 8.63	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 17:26	8260B
BCK 8.63	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 17:26	8260B
BCK 8.63	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 17:26	8260B
BCK 8.63	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 17:26	8260B
BCK 8.63	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 17:26	8260B
BCK 8.63	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 17:26	8260B
BCK 8.63	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 17:26	8260B
BCK 8.63	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 17:26	8260B
BCK 8.63	**cis-1,2-Dichloroethene**	**0.56**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 17:26**	**8260B**
BCK 8.63	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 17:26	8260B
BCK 8.63	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 17:26	8260B
BCK 8.63	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 17:26	8260B
BCK 8.63	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 17:26	8260B
BCK 8.63	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 17:26	8260B
BCK 8.63	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 17:26	8260B
BCK 8.63	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 17:26	8260B
BCK 8.63	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 17:26	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
BCK 8.63	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 17:26	8260B
BCK 8.63	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 17:26	8260B
BCK 8.63	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 17:26	8260B
BCK 8.63	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 17:26	8260B
BCK-10.6	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 23:34	8260B
BCK-10.6	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 23:34	8260B
BCK-10.6	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 23:34	8260B
BCK-10.6	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 23:34	8260B
BCK-10.6	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 23:34	8260B
BCK-10.6	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 23:34	8260B
BCK-10.6	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 23:34	8260B
BCK-10.6	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 23:34	8260B
BCK-10.6	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 23:34	8260B
BCK-10.6	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 23:34	8260B
BCK-10.6	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 23:34	8260B
BCK-10.6	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 23:34	8260B
BCK-10.6	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 23:34	8260B
BCK-10.6	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 23:34	8260B
BCK-10.6	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 23:34	8260B
BCK-10.6	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 23:34	8260B
BCK-10.6	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 23:34	8260B
BCK-10.6	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 23:34	8260B
BCK-10.6	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 23:34	8260B
BCK-10.6	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 23:34	8260B
BCK-10.6	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 23:34	8260B
BCK-10.6	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 23:34	8260B
BCK-10.6	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 23:34	8260B
BCK-10.6	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 23:34	8260B
BCK-10.6	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 23:34	8260B
BCK-10.6	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 23:34	8260B
BCK-10.6	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 23:34	8260B
BCK-10.6	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 23:34	8260B
BCK-10.6	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 23:34	8260B
BCK-10.6	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 23:34	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
BCK-10.6	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 23:34	8260B
BCK-10.6	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 23:34	8260B
BCK-10.6	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 23:34	8260B
BCK-10.6	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 23:34	8260B
BCK-10.6	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 23:34	8260B
BC-NT03	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/18/2024 14:32	8260B
BC-NT03	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/18/2024 14:32	8260B
BC-NT03	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/18/2024 14:32	8260B
BC-NT03	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 14:32	8260B
BC-NT03	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/18/2024 14:32	8260B
BC-NT03	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/18/2024 14:32	8260B
BC-NT03	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 14:32	8260B
BC-NT03	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/18/2024 14:32	8260B
BC-NT03	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/18/2024 14:32	8260B
BC-NT03	2-Hexanone	<2.0	ug/L	2	5	1	06/18/2024 14:32	8260B
BC-NT03	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/18/2024 14:32	8260B
BC-NT03	Acetone	<3.3	ug/L	3.3	10	1	06/18/2024 14:32	8260B
BC-NT03	Benzene	<0.19	ug/L	0.19	1	1	06/18/2024 14:32	8260B
BC-NT03	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/18/2024 14:32	8260B
BC-NT03	Bromoform	<0.27	ug/L	0.27	1	1	06/18/2024 14:32	8260B
BC-NT03	Bromomethane	<1.2	ug/L	1.2	2	1	06/18/2024 14:32	8260B
BC-NT03	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/18/2024 14:32	8260B
BC-NT03	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/18/2024 14:32	8260B
BC-NT03	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/18/2024 14:32	8260B
BC-NT03	Chloroethane	<0.75	ug/L	0.75	2	1	06/18/2024 14:32	8260B
BC-NT03	Chloroform	<0.24	ug/L	0.24	1	1	06/18/2024 14:32	8260B
BC-NT03	Chloromethane	<0.73	ug/L	0.73	2	1	06/18/2024 14:32	8260B
BC-NT03	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/18/2024 14:32	8260B
BC-NT03	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/18/2024 14:32	8260B
BC-NT03	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/18/2024 14:32	8260B
BC-NT03	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/18/2024 14:32	8260B
BC-NT03	Methylene Chloride	<2.0	ug/L	2	2	1	06/18/2024 14:32	8260B
BC-NT03	Styrene	<0.25	ug/L	0.25	1	1	06/18/2024 14:32	8260B
BC-NT03	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/18/2024 14:32	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
BC-NT03	Toluene	<0.41	ug/L	0.41	1	1	06/18/2024 14:32	8260B
BC-NT03	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/18/2024 14:32	8260B
BC-NT03	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/18/2024 14:32	8260B
BC-NT03	Trichloroethene	<0.22	ug/L	0.22	1	1	06/18/2024 14:32	8260B
BC-NT03	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/18/2024 14:32	8260B
BC-NT03	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/18/2024 14:32	8260B
BC-NT07	**1,1,1-Trichloroethane**	**0.37**	**ug/L**	**0.3**	**1**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 21:31	8260B
BC-NT07	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 21:31	8260B
BC-NT07	**1,1-Dichloroethane**	**9**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	**1,1-Dichloroethene**	**2.7**	**ug/L**	**0.27**	**1**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 21:31	8260B
BC-NT07	**1,2-Dichloroethane**	**0.35**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 21:31	8260B
BC-NT07	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 21:31	8260B
BC-NT07	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 21:31	8260B
BC-NT07	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 21:31	8260B
BC-NT07	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 21:31	8260B
BC-NT07	**Benzene**	**4.5**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 21:31	8260B
BC-NT07	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 21:31	8260B
BC-NT07	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 21:31	8260B
BC-NT07	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 21:31	8260B
BC-NT07	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 21:31	8260B
BC-NT07	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 21:31	8260B
BC-NT07	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 21:31	8260B
BC-NT07	**Chloroform**	**1.7**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 21:31	8260B
BC-NT07	**cis-1,2-Dichloroethene**	**75**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 21:31	8260B
BC-NT07	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 21:31	8260B
BC-NT07	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 21:31	8260B
BC-NT07	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 21:31	8260B
BC-NT07	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 21:31	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
BC-NT07	**Tetrachloroethene**	**20**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 21:31	8260B
BC-NT07	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 21:31	8260B
BC-NT07	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 21:31	8260B
BC-NT07	**Trichloroethene**	**20**	**ug/L**	**0.22**	**1**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	**Vinyl chloride**	**6.8**	**ug/L**	**0.58**	**2**	**1**	**06/17/2024 21:31**	**8260B**
BC-NT07	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 21:31	8260B
BC-NT08	**1,1,1-Trichloroethane**	**0.41**	**ug/L**	**0.3**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 19:29	8260B
BC-NT08	**1,1,2-Trichloroethane**	**0.24**	**ug/L**	**0.22**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	**1,1-Dichloroethane**	**3.9**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	**1,1-Dichloroethene**	**1.5**	**ug/L**	**0.27**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 19:29	8260B
BC-NT08	**1,2-Dichloroethane**	**0.37**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 19:29	8260B
BC-NT08	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 19:29	8260B
BC-NT08	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 19:29	8260B
BC-NT08	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 19:29	8260B
BC-NT08	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 19:29	8260B
BC-NT08	**Benzene**	**0.33**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 19:29	8260B
BC-NT08	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 19:29	8260B
BC-NT08	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 19:29	8260B
BC-NT08	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 19:29	8260B
BC-NT08	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 19:29	8260B
BC-NT08	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 19:29	8260B
BC-NT08	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 19:29	8260B
BC-NT08	**Chloroform**	**0.45**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 19:29	8260B
BC-NT08	**cis-1,2-Dichloroethene**	**64**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 19:29	8260B
BC-NT08	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 19:29	8260B
BC-NT08	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 19:29	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
BC-NT08	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 19:29	8260B
BC-NT08	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 19:29	8260B
BC-NT08	**Tetrachloroethene**	**15**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 19:29	8260B
BC-NT08	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 19:29	8260B
BC-NT08	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 19:29	8260B
BC-NT08	**Trichloroethene**	**12**	**ug/L**	**0.22**	**1**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	**Vinyl chloride**	**1.6**	**ug/L**	**0.58**	**2**	**1**	**06/17/2024 19:29**	**8260B**
BC-NT08	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 19:29	8260B
EMWMF-2	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/18/2024 14:08	8260B
EMWMF-2	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/18/2024 14:08	8260B
EMWMF-2	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/18/2024 14:08	8260B
EMWMF-2	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 14:08	8260B
EMWMF-2	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/18/2024 14:08	8260B
EMWMF-2	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/18/2024 14:08	8260B
EMWMF-2	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 14:08	8260B
EMWMF-2	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/18/2024 14:08	8260B
EMWMF-2	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/18/2024 14:08	8260B
EMWMF-2	2-Hexanone	<2.0	ug/L	2	5	1	06/18/2024 14:08	8260B
EMWMF-2	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/18/2024 14:08	8260B
EMWMF-2	Acetone	<3.3	ug/L	3.3	10	1	06/18/2024 14:08	8260B
EMWMF-2	Benzene	<0.19	ug/L	0.19	1	1	06/18/2024 14:08	8260B
EMWMF-2	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/18/2024 14:08	8260B
EMWMF-2	Bromoform	<0.27	ug/L	0.27	1	1	06/18/2024 14:08	8260B
EMWMF-2	Bromomethane	<1.2	ug/L	1.2	2	1	06/18/2024 14:08	8260B
EMWMF-2	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/18/2024 14:08	8260B
EMWMF-2	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/18/2024 14:08	8260B
EMWMF-2	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/18/2024 14:08	8260B
EMWMF-2	Chloroethane	<0.75	ug/L	0.75	2	1	06/18/2024 14:08	8260B
EMWMF-2	Chloroform	<0.24	ug/L	0.24	1	1	06/18/2024 14:08	8260B
EMWMF-2	Chloromethane	<0.73	ug/L	0.73	2	1	06/18/2024 14:08	8260B
EMWMF-2	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/18/2024 14:08	8260B
EMWMF-2	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/18/2024 14:08	8260B
EMWMF-2	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/18/2024 14:08	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
EMWMF-2	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/18/2024 14:08	8260B
EMWMF-2	Methylene Chloride	<2.0	ug/L	2	2	1	06/18/2024 14:08	8260B
EMWMF-2	Styrene	<0.25	ug/L	0.25	1	1	06/18/2024 14:08	8260B
EMWMF-2	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/18/2024 14:08	8260B
EMWMF-2	Toluene	<0.41	ug/L	0.41	1	1	06/18/2024 14:08	8260B
EMWMF-2	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/18/2024 14:08	8260B
EMWMF-2	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/18/2024 14:08	8260B
EMWMF-2	Trichloroethene	<0.22	ug/L	0.22	1	1	06/18/2024 14:08	8260B
EMWMF-2	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/18/2024 14:08	8260B
EMWMF-2	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/18/2024 14:08	8260B
EMWMF-3	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/18/2024 12:54	8260B
EMWMF-3	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/18/2024 12:54	8260B
EMWMF-3	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/18/2024 12:54	8260B
EMWMF-3	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 12:54	8260B
EMWMF-3	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/18/2024 12:54	8260B
EMWMF-3	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/18/2024 12:54	8260B
EMWMF-3	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 12:54	8260B
EMWMF-3	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/18/2024 12:54	8260B
EMWMF-3	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/18/2024 12:54	8260B
EMWMF-3	2-Hexanone	<2.0	ug/L	2	5	1	06/18/2024 12:54	8260B
EMWMF-3	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/18/2024 12:54	8260B
EMWMF-3	**Acetone**	**8.9**	**ug/L**	**3.3**	**10**	**1**	**06/18/2024 12:54**	**8260B**
EMWMF-3	Benzene	<0.19	ug/L	0.19	1	1	06/18/2024 12:54	8260B
EMWMF-3	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/18/2024 12:54	8260B
EMWMF-3	Bromoform	<0.27	ug/L	0.27	1	1	06/18/2024 12:54	8260B
EMWMF-3	Bromomethane	<1.2	ug/L	1.2	2	1	06/18/2024 12:54	8260B
EMWMF-3	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/18/2024 12:54	8260B
EMWMF-3	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/18/2024 12:54	8260B
EMWMF-3	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/18/2024 12:54	8260B
EMWMF-3	Chloroethane	<0.75	ug/L	0.75	2	1	06/18/2024 12:54	8260B
EMWMF-3	Chloroform	<0.24	ug/L	0.24	1	1	06/18/2024 12:54	8260B
EMWMF-3	Chloromethane	<0.73	ug/L	0.73	2	1	06/18/2024 12:54	8260B
EMWMF-3	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/18/2024 12:54	8260B
EMWMF-3	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/18/2024 12:54	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
EMWMF-3	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/18/2024 12:54	8260B
EMWMF-3	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/18/2024 12:54	8260B
EMWMF-3	Methylene Chloride	<2.0	ug/L	2	2	1	06/18/2024 12:54	8260B
EMWMF-3	Styrene	<0.25	ug/L	0.25	1	1	06/18/2024 12:54	8260B
EMWMF-3	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/18/2024 12:54	8260B
EMWMF-3	Toluene	<0.41	ug/L	0.41	1	1	06/18/2024 12:54	8260B
EMWMF-3	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/18/2024 12:54	8260B
EMWMF-3	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/18/2024 12:54	8260B
EMWMF-3	Trichloroethene	<0.22	ug/L	0.22	1	1	06/18/2024 12:54	8260B
EMWMF-3	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/18/2024 12:54	8260B
EMWMF-3	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/18/2024 12:54	8260B
EMWNT-03B	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/18/2024 15:21	8260B
EMWNT-03B	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/18/2024 15:21	8260B
EMWNT-03B	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/18/2024 15:21	8260B
EMWNT-03B	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 15:21	8260B
EMWNT-03B	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/18/2024 15:21	8260B
EMWNT-03B	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/18/2024 15:21	8260B
EMWNT-03B	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 15:21	8260B
EMWNT-03B	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/18/2024 15:21	8260B
EMWNT-03B	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/18/2024 15:21	8260B
EMWNT-03B	2-Hexanone	<2.0	ug/L	2	5	1	06/18/2024 15:21	8260B
EMWNT-03B	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/18/2024 15:21	8260B
EMWNT-03B	Acetone	<3.3	ug/L	3.3	10	1	06/18/2024 15:21	8260B
EMWNT-03B	Benzene	<0.19	ug/L	0.19	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Bromoform	<0.27	ug/L	0.27	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Bromomethane	<1.2	ug/L	1.2	2	1	06/18/2024 15:21	8260B
EMWNT-03B	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Chloroethane	<0.75	ug/L	0.75	2	1	06/18/2024 15:21	8260B
EMWNT-03B	Chloroform	<0.24	ug/L	0.24	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Chloromethane	<0.73	ug/L	0.73	2	1	06/18/2024 15:21	8260B
EMWNT-03B	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/18/2024 15:21	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
EMWNT-03B	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Methylene Chloride	<2.0	ug/L	2	2	1	06/18/2024 15:21	8260B
EMWNT-03B	Styrene	<0.25	ug/L	0.25	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Toluene	<0.41	ug/L	0.41	1	1	06/18/2024 15:21	8260B
EMWNT-03B	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/18/2024 15:21	8260B
EMWNT-03B	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Trichloroethene	<0.22	ug/L	0.22	1	1	06/18/2024 15:21	8260B
EMWNT-03B	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/18/2024 15:21	8260B
EMWNT-03B	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/18/2024 15:21	8260B
EMWNT-05	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/18/2024 13:19	8260B
EMWNT-05	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/18/2024 13:19	8260B
EMWNT-05	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/18/2024 13:19	8260B
EMWNT-05	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 13:19	8260B
EMWNT-05	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/18/2024 13:19	8260B
EMWNT-05	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/18/2024 13:19	8260B
EMWNT-05	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 13:19	8260B
EMWNT-05	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/18/2024 13:19	8260B
EMWNT-05	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/18/2024 13:19	8260B
EMWNT-05	2-Hexanone	<2.0	ug/L	2	5	1	06/18/2024 13:19	8260B
EMWNT-05	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/18/2024 13:19	8260B
EMWNT-05	Acetone	<3.3	ug/L	3.3	10	1	06/18/2024 13:19	8260B
EMWNT-05	Benzene	<0.19	ug/L	0.19	1	1	06/18/2024 13:19	8260B
EMWNT-05	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/18/2024 13:19	8260B
EMWNT-05	Bromoform	<0.27	ug/L	0.27	1	1	06/18/2024 13:19	8260B
EMWNT-05	Bromomethane	<1.2	ug/L	1.2	2	1	06/18/2024 13:19	8260B
EMWNT-05	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/18/2024 13:19	8260B
EMWNT-05	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/18/2024 13:19	8260B
EMWNT-05	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/18/2024 13:19	8260B
EMWNT-05	Chloroethane	<0.75	ug/L	0.75	2	1	06/18/2024 13:19	8260B
EMWNT-05	Chloroform	<0.24	ug/L	0.24	1	1	06/18/2024 13:19	8260B
EMWNT-05	Chloromethane	<0.73	ug/L	0.73	2	1	06/18/2024 13:19	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
EMWNT-05	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/18/2024 13:19	8260B
EMWNT-05	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/18/2024 13:19	8260B
EMWNT-05	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/18/2024 13:19	8260B
EMWNT-05	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/18/2024 13:19	8260B
EMWNT-05	Methylene Chloride	<2.0	ug/L	2	2	1	06/18/2024 13:19	8260B
EMWNT-05	Styrene	<0.25	ug/L	0.25	1	1	06/18/2024 13:19	8260B
EMWNT-05	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/18/2024 13:19	8260B
EMWNT-05	Toluene	<0.41	ug/L	0.41	1	1	06/18/2024 13:19	8260B
EMWNT-05	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/18/2024 13:19	8260B
EMWNT-05	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/18/2024 13:19	8260B
EMWNT-05	Trichloroethene	<0.22	ug/L	0.22	1	1	06/18/2024 13:19	8260B
EMWNT-05	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/18/2024 13:19	8260B
EMWNT-05	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/18/2024 13:19	8260B
NT-04	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/18/2024 13:44	8260B
NT-04	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/18/2024 13:44	8260B
NT-04	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/18/2024 13:44	8260B
NT-04	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 13:44	8260B
NT-04	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/18/2024 13:44	8260B
NT-04	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/18/2024 13:44	8260B
NT-04	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 13:44	8260B
NT-04	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/18/2024 13:44	8260B
NT-04	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/18/2024 13:44	8260B
NT-04	2-Hexanone	<2.0	ug/L	2	5	1	06/18/2024 13:44	8260B
NT-04	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/18/2024 13:44	8260B
NT-04	Acetone	<3.3	ug/L	3.3	10	1	06/18/2024 13:44	8260B
NT-04	Benzene	<0.19	ug/L	0.19	1	1	06/18/2024 13:44	8260B
NT-04	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/18/2024 13:44	8260B
NT-04	Bromoform	<0.27	ug/L	0.27	1	1	06/18/2024 13:44	8260B
NT-04	Bromomethane	<1.2	ug/L	1.2	2	1	06/18/2024 13:44	8260B
NT-04	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/18/2024 13:44	8260B
NT-04	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/18/2024 13:44	8260B
NT-04	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/18/2024 13:44	8260B
NT-04	Chloroethane	<0.75	ug/L	0.75	2	1	06/18/2024 13:44	8260B
NT-04	Chloroform	<0.24	ug/L	0.24	1	1	06/18/2024 13:44	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-04	Chloromethane	<0.73	ug/L	0.73	2	1	06/18/2024 13:44	8260B
NT-04	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/18/2024 13:44	8260B
NT-04	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/18/2024 13:44	8260B
NT-04	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/18/2024 13:44	8260B
NT-04	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/18/2024 13:44	8260B
NT-04	Methylene Chloride	<2.0	ug/L	2	2	1	06/18/2024 13:44	8260B
NT-04	Styrene	<0.25	ug/L	0.25	1	1	06/18/2024 13:44	8260B
NT-04	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/18/2024 13:44	8260B
NT-04	Toluene	<0.41	ug/L	0.41	1	1	06/18/2024 13:44	8260B
NT-04	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/18/2024 13:44	8260B
NT-04	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/18/2024 13:44	8260B
NT-04	Trichloroethene	<0.22	ug/L	0.22	1	1	06/18/2024 13:44	8260B
NT-04	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/18/2024 13:44	8260B
NT-04	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/18/2024 13:44	8260B
NT-05	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/18/2024 12:30	8260B
NT-05	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/18/2024 12:30	8260B
NT-05	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/18/2024 12:30	8260B
NT-05	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 12:30	8260B
NT-05	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/18/2024 12:30	8260B
NT-05	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/18/2024 12:30	8260B
NT-05	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/18/2024 12:30	8260B
NT-05	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/18/2024 12:30	8260B
NT-05	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/18/2024 12:30	8260B
NT-05	2-Hexanone	<2.0	ug/L	2	5	1	06/18/2024 12:30	8260B
NT-05	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/18/2024 12:30	8260B
NT-05	Acetone	<3.3	ug/L	3.3	10	1	06/18/2024 12:30	8260B
NT-05	Benzene	<0.19	ug/L	0.19	1	1	06/18/2024 12:30	8260B
NT-05	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/18/2024 12:30	8260B
NT-05	Bromoform	<0.27	ug/L	0.27	1	1	06/18/2024 12:30	8260B
NT-05	Bromomethane	<1.2	ug/L	1.2	2	1	06/18/2024 12:30	8260B
NT-05	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/18/2024 12:30	8260B
NT-05	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/18/2024 12:30	8260B
NT-05	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/18/2024 12:30	8260B
NT-05	Chloroethane	<0.75	ug/L	0.75	2	1	06/18/2024 12:30	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-05	Chloroform	<0.24	ug/L	0.24	1	1	06/18/2024 12:30	8260B
NT-05	Chloromethane	<0.73	ug/L	0.73	2	1	06/18/2024 12:30	8260B
NT-05	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/18/2024 12:30	8260B
NT-05	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/18/2024 12:30	8260B
NT-05	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/18/2024 12:30	8260B
NT-05	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/18/2024 12:30	8260B
NT-05	Methylene Chloride	<2.0	ug/L	2	2	1	06/18/2024 12:30	8260B
NT-05	Styrene	<0.25	ug/L	0.25	1	1	06/18/2024 12:30	8260B
NT-05	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/18/2024 12:30	8260B
NT-05	Toluene	<0.41	ug/L	0.41	1	1	06/18/2024 12:30	8260B
NT-05	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/18/2024 12:30	8260B
NT-05	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/18/2024 12:30	8260B
NT-05	Trichloroethene	<0.22	ug/L	0.22	1	1	06/18/2024 12:30	8260B
NT-05	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/18/2024 12:30	8260B
NT-05	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/18/2024 12:30	8260B
NT-06DE	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 22:20	8260B
NT-06DE	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 22:20	8260B
NT-06DE	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 22:20	8260B
NT-06DE	**1,1-Dichloroethane**	**0.64**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 22:20**	**8260B**
NT-06DE	**1,1-Dichloroethene**	**0.44**	**ug/L**	**0.27**	**1**	**1**	**06/17/2024 22:20**	**8260B**
NT-06DE	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 22:20	8260B
NT-06DE	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 22:20	8260B
NT-06DE	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 22:20	8260B
NT-06DE	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 22:20	8260B
NT-06DE	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 22:20	8260B
NT-06DE	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 22:20	8260B
NT-06DE	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 22:20	8260B
NT-06DE	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 22:20	8260B
NT-06DE	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 22:20	8260B
NT-06DE	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 22:20	8260B
NT-06DE	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 22:20	8260B
NT-06DE	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 22:20	8260B
NT-06DE	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 22:20	8260B
NT-06DE	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 22:20	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-06DE	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 22:20	8260B
NT-06DE	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 22:20	8260B
NT-06DE	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 22:20	8260B
NT-06DE	**cis-1,2-Dichloroethene**	**3.9**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 22:20**	**8260B**
NT-06DE	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 22:20	8260B
NT-06DE	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 22:20	8260B
NT-06DE	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 22:20	8260B
NT-06DE	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 22:20	8260B
NT-06DE	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 22:20	8260B
NT-06DE	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 22:20	8260B
NT-06DE	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 22:20	8260B
NT-06DE	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 22:20	8260B
NT-06DE	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 22:20	8260B
NT-06DE	**Trichloroethene**	**0.26**	**ug/L**	**0.22**	**1**	**1**	**06/17/2024 22:20**	**8260B**
NT-06DE	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 22:20	8260B
NT-06DE	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 22:20	8260B
NT-06DW	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 22:44	8260B
NT-06DW	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 22:44	8260B
NT-06DW	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 22:44	8260B
NT-06DW	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 22:44	8260B
NT-06DW	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 22:44	8260B
NT-06DW	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 22:44	8260B
NT-06DW	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 22:44	8260B
NT-06DW	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 22:44	8260B
NT-06DW	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 22:44	8260B
NT-06DW	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 22:44	8260B
NT-06DW	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 22:44	8260B
NT-06DW	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 22:44	8260B
NT-06DW	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 22:44	8260B
NT-06DW	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 22:44	8260B
NT-06DW	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 22:44	8260B
NT-06DW	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 22:44	8260B
NT-06DW	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 22:44	8260B
NT-06DW	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 22:44	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-06DW	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 22:44	8260B
NT-06DW	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 22:44	8260B
NT-06DW	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 22:44	8260B
NT-06DW	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 22:44	8260B
NT-06DW	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 22:44	8260B
NT-06DW	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 22:44	8260B
NT-06DW	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 22:44	8260B
NT-06DW	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 22:44	8260B
NT-06DW	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 22:44	8260B
NT-06DW	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 22:44	8260B
NT-06DW	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 22:44	8260B
NT-06DW	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 22:44	8260B
NT-06DW	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 22:44	8260B
NT-06DW	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 22:44	8260B
NT-06DW	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 22:44	8260B
NT-06DW	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 22:44	8260B
NT-06DW	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 22:44	8260B
NT-06U	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 23:09	8260B
NT-06U	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 23:09	8260B
NT-06U	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 23:09	8260B
NT-06U	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 23:09	8260B
NT-06U	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 23:09	8260B
NT-06U	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 23:09	8260B
NT-06U	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 23:09	8260B
NT-06U	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 23:09	8260B
NT-06U	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 23:09	8260B
NT-06U	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 23:09	8260B
NT-06U	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 23:09	8260B
NT-06U	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 23:09	8260B
NT-06U	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 23:09	8260B
NT-06U	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 23:09	8260B
NT-06U	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 23:09	8260B
NT-06U	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 23:09	8260B
NT-06U	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 23:09	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-06U	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 23:09	8260B
NT-06U	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 23:09	8260B
NT-06U	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 23:09	8260B
NT-06U	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 23:09	8260B
NT-06U	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 23:09	8260B
NT-06U	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 23:09	8260B
NT-06U	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 23:09	8260B
NT-06U	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 23:09	8260B
NT-06U	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 23:09	8260B
NT-06U	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 23:09	8260B
NT-06U	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 23:09	8260B
NT-06U	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 23:09	8260B
NT-06U	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 23:09	8260B
NT-06U	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 23:09	8260B
NT-06U	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 23:09	8260B
NT-06U	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 23:09	8260B
NT-06U	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 23:09	8260B
NT-06U	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 23:09	8260B
NT-07U	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 21:06	8260B
NT-07U	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 21:06	8260B
NT-07U	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 21:06	8260B
NT-07U	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 21:06	8260B
NT-07U	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 21:06	8260B
NT-07U	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 21:06	8260B
NT-07U	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 21:06	8260B
NT-07U	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 21:06	8260B
NT-07U	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 21:06	8260B
NT-07U	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 21:06	8260B
NT-07U	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 21:06	8260B
NT-07U	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 21:06	8260B
NT-07U	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 21:06	8260B
NT-07U	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 21:06	8260B
NT-07U	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 21:06	8260B
NT-07U	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 21:06	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-07U	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 21:06	8260B
NT-07U	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 21:06	8260B
NT-07U	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 21:06	8260B
NT-07U	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 21:06	8260B
NT-07U	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 21:06	8260B
NT-07U	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 21:06	8260B
NT-07U	**cis-1,2-Dichloroethene**	**4.6**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 21:06**	**8260B**
NT-07U	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 21:06	8260B
NT-07U	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 21:06	8260B
NT-07U	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 21:06	8260B
NT-07U	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 21:06	8260B
NT-07U	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 21:06	8260B
NT-07U	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 21:06	8260B
NT-07U	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 21:06	8260B
NT-07U	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 21:06	8260B
NT-07U	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 21:06	8260B
NT-07U	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 21:06	8260B
NT-07U	**Vinyl chloride**	**1.4**	**ug/L**	**0.58**	**2**	**1**	**06/17/2024 21:06**	**8260B**
NT-07U	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 21:06	8260B
NT-08UW	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 20:42	8260B
NT-08UW	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 20:42	8260B
NT-08UW	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 20:42	8260B
NT-08UW	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 20:42	8260B
NT-08UW	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 20:42	8260B
NT-08UW	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 20:42	8260B
NT-08UW	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 20:42	8260B
NT-08UW	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 20:42	8260B
NT-08UW	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 20:42	8260B
NT-08UW	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 20:42	8260B
NT-08UW	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 20:42	8260B
NT-08UW	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 20:42	8260B
NT-08UW	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 20:42	8260B
NT-08UW	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 20:42	8260B
NT-08UW	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 20:42	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-08UW	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 20:42	8260B
NT-08UW	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 20:42	8260B
NT-08UW	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 20:42	8260B
NT-08UW	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 20:42	8260B
NT-08UW	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 20:42	8260B
NT-08UW	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 20:42	8260B
NT-08UW	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 20:42	8260B
NT-08UW	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 20:42	8260B
NT-08UW	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 20:42	8260B
NT-08UW	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 20:42	8260B
NT-08UW	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 20:42	8260B
NT-08UW	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 20:42	8260B
NT-08UW	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 20:42	8260B
NT-08UW	**Tetrachloroethene**	**0.34**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 20:42**	**8260B**
NT-08UW	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 20:42	8260B
NT-08UW	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 20:42	8260B
NT-08UW	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 20:42	8260B
NT-08UW	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 20:42	8260B
NT-08UW	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 20:42	8260B
NT-08UW	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 20:42	8260B
NT-09D	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 19:04	8260B
NT-09D	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 19:04	8260B
NT-09D	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 19:04	8260B
NT-09D	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 19:04	8260B
NT-09D	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 19:04	8260B
NT-09D	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 19:04	8260B
NT-09D	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 19:04	8260B
NT-09D	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 19:04	8260B
NT-09D	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 19:04	8260B
NT-09D	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 19:04	8260B
NT-09D	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 19:04	8260B
NT-09D	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 19:04	8260B
NT-09D	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 19:04	8260B
NT-09D	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 19:04	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-09D	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 19:04	8260B
NT-09D	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 19:04	8260B
NT-09D	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 19:04	8260B
NT-09D	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 19:04	8260B
NT-09D	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 19:04	8260B
NT-09D	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 19:04	8260B
NT-09D	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 19:04	8260B
NT-09D	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 19:04	8260B
NT-09D	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 19:04	8260B
NT-09D	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 19:04	8260B
NT-09D	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 19:04	8260B
NT-09D	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 19:04	8260B
NT-09D	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 19:04	8260B
NT-09D	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 19:04	8260B
NT-09D	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 19:04	8260B
NT-09D	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 19:04	8260B
NT-09D	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 19:04	8260B
NT-09D	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 19:04	8260B
NT-09D	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 19:04	8260B
NT-09D	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 19:04	8260B
NT-09D	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 19:04	8260B
NT-09U	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 18:39	8260B
NT-09U	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 18:39	8260B
NT-09U	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 18:39	8260B
NT-09U	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 18:39	8260B
NT-09U	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 18:39	8260B
NT-09U	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 18:39	8260B
NT-09U	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 18:39	8260B
NT-09U	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 18:39	8260B
NT-09U	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 18:39	8260B
NT-09U	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 18:39	8260B
NT-09U	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 18:39	8260B
NT-09U	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 18:39	8260B
NT-09U	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 18:39	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-09U	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 18:39	8260B
NT-09U	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 18:39	8260B
NT-09U	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 18:39	8260B
NT-09U	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 18:39	8260B
NT-09U	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 18:39	8260B
NT-09U	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 18:39	8260B
NT-09U	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 18:39	8260B
NT-09U	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 18:39	8260B
NT-09U	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 18:39	8260B
NT-09U	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 18:39	8260B
NT-09U	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 18:39	8260B
NT-09U	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 18:39	8260B
NT-09U	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 18:39	8260B
NT-09U	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 18:39	8260B
NT-09U	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 18:39	8260B
NT-09U	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 18:39	8260B
NT-09U	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 18:39	8260B
NT-09U	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 18:39	8260B
NT-09U	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 18:39	8260B
NT-09U	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 18:39	8260B
NT-09U	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 18:39	8260B
NT-09U	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 18:39	8260B
NT-10US	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 18:15	8260B
NT-10US	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 18:15	8260B
NT-10US	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 18:15	8260B
NT-10US	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 18:15	8260B
NT-10US	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 18:15	8260B
NT-10US	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 18:15	8260B
NT-10US	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 18:15	8260B
NT-10US	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 18:15	8260B
NT-10US	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 18:15	8260B
NT-10US	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 18:15	8260B
NT-10US	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 18:15	8260B
NT-10US	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 18:15	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-10US	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 18:15	8260B
NT-10US	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 18:15	8260B
NT-10US	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 18:15	8260B
NT-10US	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 18:15	8260B
NT-10US	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 18:15	8260B
NT-10US	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 18:15	8260B
NT-10US	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 18:15	8260B
NT-10US	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 18:15	8260B
NT-10US	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 18:15	8260B
NT-10US	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 18:15	8260B
NT-10US	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 18:15	8260B
NT-10US	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 18:15	8260B
NT-10US	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 18:15	8260B
NT-10US	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 18:15	8260B
NT-10US	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 18:15	8260B
NT-10US	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 18:15	8260B
NT-10US	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 18:15	8260B
NT-10US	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 18:15	8260B
NT-10US	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 18:15	8260B
NT-10US	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 18:15	8260B
NT-10US	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 18:15	8260B
NT-10US	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 18:15	8260B
NT-10US	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 18:15	8260B
NT-O8UE	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 20:17	8260B
NT-O8UE	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 20:17	8260B
NT-O8UE	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 20:17	8260B
NT-O8UE	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 20:17	8260B
NT-O8UE	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 20:17	8260B
NT-O8UE	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 20:17	8260B
NT-O8UE	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 20:17	8260B
NT-O8UE	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 20:17	8260B
NT-O8UE	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 20:17	8260B
NT-O8UE	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 20:17	8260B
NT-O8UE	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 20:17	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
NT-O8UE	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 20:17	8260B
NT-O8UE	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 20:17	8260B
NT-O8UE	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 20:17	8260B
NT-O8UE	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 20:17	8260B
NT-O8UE	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 20:17	8260B
NT-O8UE	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 20:17	8260B
NT-O8UE	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 20:17	8260B
NT-O8UE	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 20:17	8260B
NT-O8UE	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 20:17	8260B
NT-O8UE	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 20:17	8260B
NT-O8UE	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 20:17	8260B
NT-O8UE	**cis-1,2-Dichloroethene**	**0.89**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 20:17**	**8260B**
NT-O8UE	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 20:17	8260B
NT-O8UE	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 20:17	8260B
NT-O8UE	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 20:17	8260B
NT-O8UE	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 20:17	8260B
NT-O8UE	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 20:17	8260B
NT-O8UE	**Tetrachloroethene**	**1.7**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 20:17**	**8260B**
NT-O8UE	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 20:17	8260B
NT-O8UE	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 20:17	8260B
NT-O8UE	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 20:17	8260B
NT-O8UE	**Trichloroethene**	**0.39**	**ug/L**	**0.22**	**1**	**1**	**06/17/2024 20:17**	**8260B**
NT-O8UE	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 20:17	8260B
NT-O8UE	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 20:17	8260B
SF-1	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 16:36	8260B
SF-1	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 16:36	8260B
SF-1	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 16:36	8260B
SF-1	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 16:36	8260B
SF-1	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 16:36	8260B
SF-1	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 16:36	8260B
SF-1	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 16:36	8260B
SF-1	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 16:36	8260B
SF-1	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 16:36	8260B
SF-1	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 16:36	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
SF-1	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 16:36	8260B
SF-1	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 16:36	8260B
SF-1	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 16:36	8260B
SF-1	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 16:36	8260B
SF-1	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 16:36	8260B
SF-1	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 16:36	8260B
SF-1	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 16:36	8260B
SF-1	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 16:36	8260B
SF-1	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 16:36	8260B
SF-1	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 16:36	8260B
SF-1	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 16:36	8260B
SF-1	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 16:36	8260B
SF-1	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 16:36	8260B
SF-1	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 16:36	8260B
SF-1	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 16:36	8260B
SF-1	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 16:36	8260B
SF-1	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 16:36	8260B
SF-1	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 16:36	8260B
SF-1	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 16:36	8260B
SF-1	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 16:36	8260B
SF-1	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 16:36	8260B
SF-1	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 16:36	8260B
SF-1	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 16:36	8260B
SF-1	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 16:36	8260B
SF-1	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 16:36	8260B
SF-3	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 17:01	8260B
SF-3	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 17:01	8260B
SF-3	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 17:01	8260B
SF-3	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 17:01	8260B
SF-3	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 17:01	8260B
SF-3	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 17:01	8260B
SF-3	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 17:01	8260B
SF-3	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 17:01	8260B
SF-3	**2-Butanone (MEK)**	**4.1**	**ug/L**	**2**	**5**	**1**	**06/17/2024 17:01**	**8260B**

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
SF-3	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 17:01	8260B
SF-3	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 17:01	8260B
SF-3	**Acetone**	**9.9**	**ug/L**	**3.3**	**10**	**1**	**06/17/2024 17:01**	**8260B**
SF-3	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 17:01	8260B
SF-3	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 17:01	8260B
SF-3	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 17:01	8260B
SF-3	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 17:01	8260B
SF-3	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 17:01	8260B
SF-3	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 17:01	8260B
SF-3	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 17:01	8260B
SF-3	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 17:01	8260B
SF-3	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 17:01	8260B
SF-3	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 17:01	8260B
SF-3	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 17:01	8260B
SF-3	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 17:01	8260B
SF-3	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 17:01	8260B
SF-3	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 17:01	8260B
SF-3	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 17:01	8260B
SF-3	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 17:01	8260B
SF-3	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 17:01	8260B
SF-3	**Toluene**	**0.44**	**ug/L**	**0.41**	**1**	**1**	**06/17/2024 17:01**	**8260B**
SF-3	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 17:01	8260B
SF-3	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 17:01	8260B
SF-3	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 17:01	8260B
SF-3	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 17:01	8260B
SF-3	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 17:01	8260B
SF-6	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 17:50	8260B
SF-6	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 17:50	8260B
SF-6	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 17:50	8260B
SF-6	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 17:50	8260B
SF-6	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 17:50	8260B
SF-6	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 17:50	8260B
SF-6	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 17:50	8260B
SF-6	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 17:50	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
SF-6	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 17:50	8260B
SF-6	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 17:50	8260B
SF-6	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 17:50	8260B
SF-6	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 17:50	8260B
SF-6	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 17:50	8260B
SF-6	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 17:50	8260B
SF-6	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 17:50	8260B
SF-6	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 17:50	8260B
SF-6	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 17:50	8260B
SF-6	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 17:50	8260B
SF-6	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 17:50	8260B
SF-6	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 17:50	8260B
SF-6	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 17:50	8260B
SF-6	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 17:50	8260B
SF-6	cis-1,2-Dichloroethene	<0.19	ug/L	0.19	1	1	06/17/2024 17:50	8260B
SF-6	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 17:50	8260B
SF-6	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 17:50	8260B
SF-6	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 17:50	8260B
SF-6	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 17:50	8260B
SF-6	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 17:50	8260B
SF-6	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 17:50	8260B
SF-6	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 17:50	8260B
SF-6	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 17:50	8260B
SF-6	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 17:50	8260B
SF-6	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 17:50	8260B
SF-6	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 17:50	8260B
SF-6	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 17:50	8260B
SS-4	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 21:55	8260B
SS-4	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 21:55	8260B
SS-4	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 21:55	8260B
SS-4	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 21:55	8260B
SS-4	**1,1-Dichloroethene**	**0.63**	**ug/L**	**0.27**	**1**	**1**	**06/17/2024 21:55**	**8260B**
SS-4	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 21:55	8260B
SS-4	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 21:55	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
SS-4	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 21:55	8260B
SS-4	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 21:55	8260B
SS-4	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 21:55	8260B
SS-4	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 21:55	8260B
SS-4	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 21:55	8260B
SS-4	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 21:55	8260B
SS-4	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 21:55	8260B
SS-4	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 21:55	8260B
SS-4	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 21:55	8260B
SS-4	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 21:55	8260B
SS-4	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 21:55	8260B
SS-4	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 21:55	8260B
SS-4	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 21:55	8260B
SS-4	**Chloroform**	**1.9**	**ug/L**	**0.24**	**1**	**1**	**06/17/2024 21:55**	**8260B**
SS-4	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 21:55	8260B
SS-4	**cis-1,2-Dichloroethene**	**4.2**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 21:55**	**8260B**
SS-4	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 21:55	8260B
SS-4	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 21:55	8260B
SS-4	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 21:55	8260B
SS-4	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 21:55	8260B
SS-4	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 21:55	8260B
SS-4	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 21:55	8260B
SS-4	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 21:55	8260B
SS-4	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 21:55	8260B
SS-4	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 21:55	8260B
SS-4	**Trichloroethene**	**2.2**	**ug/L**	**0.22**	**1**	**1**	**06/17/2024 21:55**	**8260B**
SS-4	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 21:55	8260B
SS-4	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 21:55	8260B
SS-5	1,1,1-Trichloroethane	<0.3	ug/L	0.3	1	1	06/17/2024 19:53	8260B
SS-5	1,1,2,2-Tetrachloroethane	<0.18	ug/L	0.18	1	1	06/17/2024 19:53	8260B
SS-5	1,1,2-Trichloroethane	<0.22	ug/L	0.22	1	1	06/17/2024 19:53	8260B
SS-5	1,1-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 19:53	8260B
SS-5	1,1-Dichloroethene	<0.27	ug/L	0.27	1	1	06/17/2024 19:53	8260B
SS-5	1,2-Dibromoethane (EDB)	<0.26	ug/L	0.26	1	1	06/17/2024 19:53	8260B

Station ID	Analyte	Result	Units	MDL	RL	Dilution Factor	Date Analyzed	Method
SS-5	1,2-Dichloroethane	<0.24	ug/L	0.24	1	1	06/17/2024 19:53	8260B
SS-5	1,2-Dichloropropane	<0.21	ug/L	0.21	1	1	06/17/2024 19:53	8260B
SS-5	2-Butanone (MEK)	<2.0	ug/L	2	5	1	06/17/2024 19:53	8260B
SS-5	2-Hexanone	<2.0	ug/L	2	5	1	06/17/2024 19:53	8260B
SS-5	4-Methyl-2-pentanone (MIBK)	<0.71	ug/L	0.71	5	1	06/17/2024 19:53	8260B
SS-5	Acetone	<3.3	ug/L	3.3	10	1	06/17/2024 19:53	8260B
SS-5	Benzene	<0.19	ug/L	0.19	1	1	06/17/2024 19:53	8260B
SS-5	Bromodichloromethane	<0.24	ug/L	0.24	1	1	06/17/2024 19:53	8260B
SS-5	Bromoform	<0.27	ug/L	0.27	1	1	06/17/2024 19:53	8260B
SS-5	Bromomethane	<1.2	ug/L	1.2	2	1	06/17/2024 19:53	8260B
SS-5	Carbon disulfide	<0.28	ug/L	0.28	1	1	06/17/2024 19:53	8260B
SS-5	Carbon tetrachloride	<0.25	ug/L	0.25	1	1	06/17/2024 19:53	8260B
SS-5	Chlorobenzene	<0.14	ug/L	0.14	1	1	06/17/2024 19:53	8260B
SS-5	Chloroethane	<0.75	ug/L	0.75	2	1	06/17/2024 19:53	8260B
SS-5	Chloroform	<0.24	ug/L	0.24	1	1	06/17/2024 19:53	8260B
SS-5	Chloromethane	<0.73	ug/L	0.73	2	1	06/17/2024 19:53	8260B
SS-5	**cis-1,2-Dichloroethene**	**0.28**	**ug/L**	**0.19**	**1**	**1**	**06/17/2024 19:53**	**8260B**
SS-5	cis-1,3-Dichloropropene	<0.16	ug/L	0.16	1	1	06/17/2024 19:53	8260B
SS-5	Dibromochloromethane	<0.16	ug/L	0.16	1	1	06/17/2024 19:53	8260B
SS-5	Ethylbenzene	<0.21	ug/L	0.21	1	1	06/17/2024 19:53	8260B
SS-5	Methylene Chloride	<2.0	ug/L	2	2	1	06/17/2024 19:53	8260B
SS-5	Styrene	<0.25	ug/L	0.25	1	1	06/17/2024 19:53	8260B
SS-5	Tetrachloroethene	<0.24	ug/L	0.24	1	1	06/17/2024 19:53	8260B
SS-5	Toluene	<0.41	ug/L	0.41	1	1	06/17/2024 19:53	8260B
SS-5	trans-1,2-Dichloroethene	<0.18	ug/L	0.18	1	1	06/17/2024 19:53	8260B
SS-5	trans-1,3-Dichloropropene	<0.13	ug/L	0.13	1	1	06/17/2024 19:53	8260B
SS-5	Trichloroethene	<0.22	ug/L	0.22	1	1	06/17/2024 19:53	8260B
SS-5	Vinyl chloride	<0.58	ug/L	0.58	2	1	06/17/2024 19:53	8260B
SS-5	Xylenes, Total	<0.21	ug/L	0.21	3	1	06/17/2024 19:53	8260B

MDL (Method Detection Limit): The minimum concentration detectable by the method but not precisely quantifiable below this threshold.
RL (Reporting Limit): Concentrations above this level exceed a pre-determined acceptable range for reliable quantification.

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