FOURTH FIVE-YEAR REVIEW REPORT FOR WEYERHAEUSER CO. PLYMOUTH WOOD TREATING PLANT SUPERFUND ALTERNATIVE APPROACH SITE MARTIN COUNTY, NORTH CAROLINA

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LIST OF ABBREVIATIONS AND ACRONYMS

AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
CZR	CZR, Inc.
eMNR™	Enhanced Monitored Natural Recovery
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
HQ	Hazard Quotient
IRIS	Integrated Risk Information System
I-TEQ	International Toxicity Equivalency Concentration
LRR	Lower Roanoke River
MCL	Maximum Contaminant Level
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
NC DENR	North Carolina Department of Environment and Natural Resources
NCDEQ	North Carolina Department of Environmental Quality
NC DHHS	North Carolina Department of Health and Human Services
NCP	National Contingency Plan
ng/kg	Nanograms per kilogram
ng/L	Nanograms per liter
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OCDD	Octachlorodibenzo-p-dioxin
OCDF	Octachlorodibenzofuran
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
ppb	Parts per billion
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI	Remedial Investigation
RfD	Oral Reference Dose
RSL	Regional Screening Level
ROD	Record of Decision
RPM	Remedial Project Manager
SWAC	Surface Weighted Area Concentration
TEQ	Toxicity Equivalent Concentration
TOC	Total Organic Carbon

TRC	TRC Environmental Corporation
WHO	World Health Organization
UU/UE	Unlimited Use and Unrestricted Exposure
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency is preparing this FYR pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations Section 300.430(f)(4)(ii)) and considering EPA's policy.

This is the fourth FYR for the Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Alternative Approach site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of four operable units (OUs). This FYR addresses all site OUs. OU-1 addresses the Former Landfill No. 1 Area. OU-2 addresses the Lower Roanoke River (LRR). OU-3 addresses the Former Chlorine Plant Area. OU-4 addresses Welch Creek.

The EPA's remedial project manager (RPM) Evan Adams led the FYR. Other participants included the EPA's hydrogeologist James Ferreira, community involvement coordinator (CIC) Angela Miller, risk assessor Kevin Koporec, ecological risk assessor Sharon Thoms, and attorney John Sheesley. North Carolina Department of Environmental Quality (NCDEQ) site manager Beth Hartzell, and Melissa Oakley and Peri Bowser with EPA support contractor Skeo were also in attendance. The potentially responsible party (PRP), Domtar Corporation, was notified of the initiation of the FYR. The review began on 11/4/2024.

Site Background

The Site comprises about 2,400 acres in Martin County, North Carolina. The Site is in a low-lying area near the confluence of Welch Creek and the LRR about 1.5 miles west of the city limits of Plymouth, North Carolina (Figure 1). Pulp and paper manufacturing operations have occurred near the Site since 1937 and continue today. Previous wood-treating operations using chromium copper arsenate also impacted the Site. Between 1937 and 1956, Weyerhaeuser discharged wastewater associated with bleached pulp directly to the LRR. Beginning in 1957, facility wastewater was discharged to Welch Creek. Since 1968, all wastewater is treated in a series of on-site wastewater treatment ponds. The state issued a permit in 1969 that regulated discharges to Welch Creek. A National Pollutant Discharge Elimination System (NPDES) permit was obtained in 1975. Wastewater discharges, surface water runoff and waste disposal in an unlined landfill on-site contaminated groundwater, sediment, soil, surface water and fish tissue with dioxins and heavy metals. Domtar Paper Company, LLC acquired the pulp and paper operations at Plymouth Mill from Weyerhaeuser in March 2007 and assumed all site-related environmental cleanup obligations. Domtar was acquired by Paper Excellence in 2021, and the company has rebranded as Domtar Corporation. The Domtar facility is located outside of the Site's boundaries (Figure 1). The physical characteristics of each OU are discussed below.

OU-1 (Former Landfill No. 1 Area): The Former Landfill No. 1 covers 97 acres west of the Domtar paper manufacturing facility. The unlined landfill operated from the mid-1950s until the early 1980s. Materials disposed of at the landfill included bark, sawdust, lime grits and wastepaper. In 1981, site operators closed the landfill after receiving permission from the state to use wastewater treatment solids from the facility's on-site settling ponds as the cover material. The wastewater treatment solids contained dioxins and heavy metals. In 1994, the former property owner covered the northern part of OU-1 with gravel. Contractors use the gravel-covered part of OU-1 for equipment staging and storage. The grass-covered part of the OU-1 landfill cap is vacant. Wooded swamps border the landfill on the northwest, southwest and southeast. Groundwater beneath the landfill generally flows toward the northwest.

OU-2 (LRR): OU-2 includes surface water and sediment within a 14.3-mile stretch of the LRR from a point upstream of the Domtar facility to the Albemarle Sound. The river is surrounded by extensive coastal wetlands.

OU-3 (Former Chlorine Plant Area): The Former Chlorine Plant Area occupies about three acres within the larger paper manufacturing facility property. The area is primarily covered with asphalt and concrete pavement. Between 1952 and 1968, paper plant activities included the operation of a chlorine plant. Chlorine plant operations, surface water runoff and/or other discharges from the former plant contaminated soil and river sediment with mercury. The direction of OU-3 groundwater flow varies depending on the groundwater table elevation. Ultimately, groundwater beneath the former Chlorine Plant Area discharges to the LRR, to the north.

OU-4 (Welch Creek): OU-4 includes surface water and sediment within a 4.5-mile stretch of Welch Creek, extending from the Highway 64 bridge to its confluence with the Roanoke River (Figure 1). The eastern side of the creek within the OU contains wooded wetlands and on the west side there are non-production paper mill facilities.

Groundwater and Surface Water Information

A surficial aquifer, less than 50 feet thick, underlies the Site. Site-related groundwater contamination at OU-1 and OU-3 is present within the surficial aquifer, primarily within the shallow (0 feet to 10 feet below ground surface (bgs)) and intermediate depths (about 25 feet bgs). A layer of confining clay (50 feet to 100 feet thick) separates the surficial aquifer from the Castle Hayne Aquifer, the top of which is about 130 feet bgs near the Site. The Castle Hayne Aquifer is the most productive aquifer in North Carolina. Surficial aquifer groundwater near the Site is not currently used or expected to be used in the future as a potable water source. The nearest private well is about 2 miles south of OU-1; this well is screened in the Castle Hayne aquifer. Neither Welch Creek nor the LRR are used as drinking water sources. However, both water bodies support some recreational fishing, subject to fish consumption advisories for bottom-dwelling fish.

Appendix A lists the materials referenced during this FYR. Appendix B provides the Site's current status. Appendix C provides a chronology of major site events.

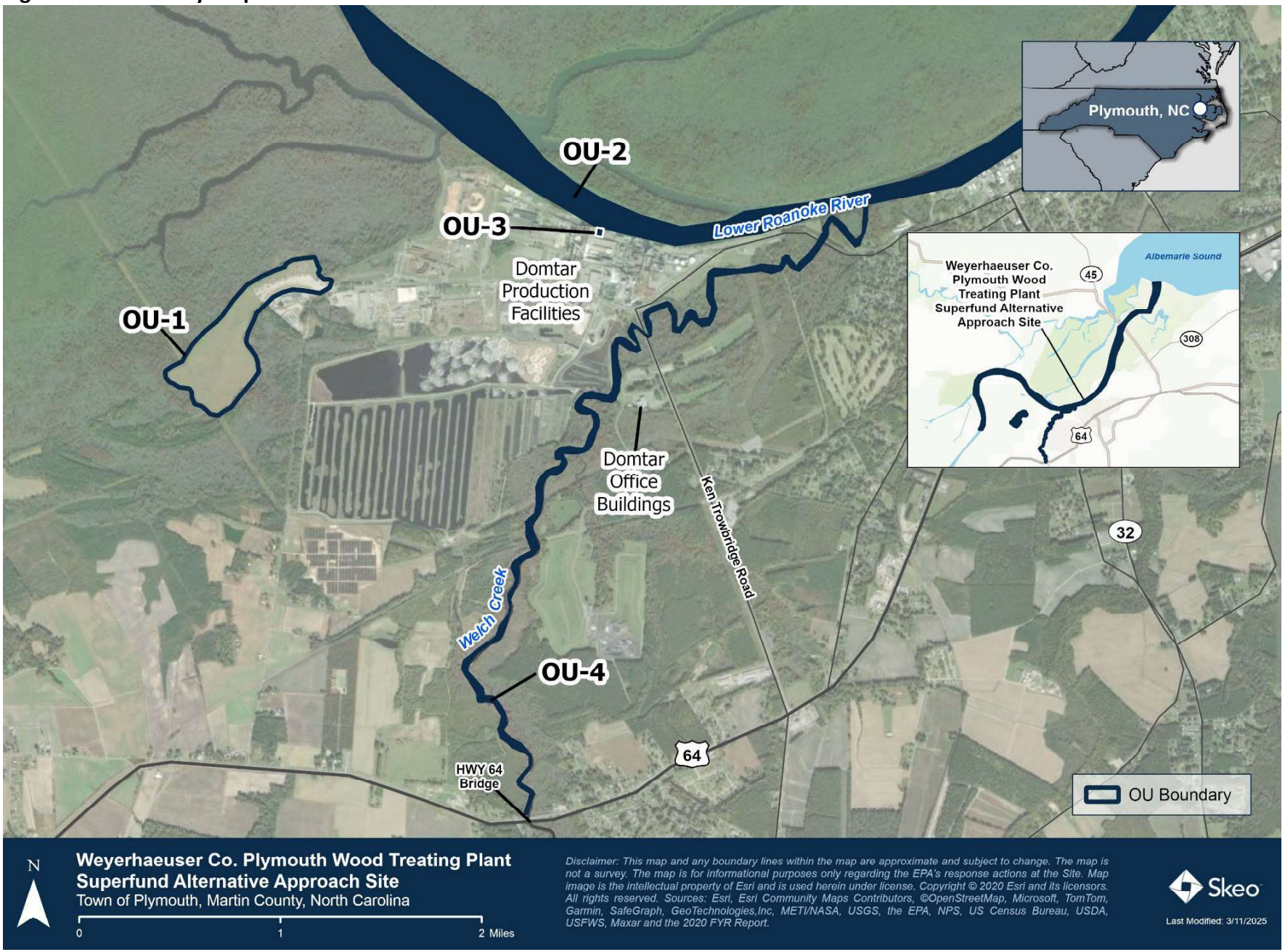
FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Weyerhaeuser Co. Plymouth Wood Treating Plant		
EPA ID: NCD991278540		
Region: 4	**State:** North Carolina	**City/County:** Plymouth/Martin

SITE STATUS	
NPL Status: Non-NPL	
Multiple OUs? Yes	**Has the Site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name: Evan Adams
Author affiliation: EPA Region 4 with support provided by Skeo
Review period: 11/4/2024 – 7/16/2025
Date of site inspection: 12/4/2024
Type of review: Statutory
Review number: 4
Triggering action date: 7/16/2020
Due date *(five years after triggering action date)*: 7/16/2025

Figure 1: Site Vicinity Map



II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The baseline ecological risk assessment for OU-1 determined that dioxins and metals in the wastewater treatment solids, cover soil on the landfill and wetland soil adjacent to the landfill presented unacceptable risk to environmental receptors. The baseline human health risk assessment determined that dioxin in groundwater would present an unacceptable risk to future residents if they installed drinking water wells in the contaminated aquifer. It also identified risk to current workers, primarily attributed to incidental exposure to dioxin in cover soil.

The baseline risk assessment for OU-2 determined that human consumption of whole fish from the LRR results in a potential risk slightly above the 1×10^{-4} risk level due to dioxin toxicity equivalent concentration (TEQ). In contrast, for human health consumption of fish fillets, the calculated potential incremental lifetime cancer risk fell within the EPA's target risk range for Superfund sites. The OU-2 risk assessment also identified potential risks to some ecological receptors, such as birds or mammals that ingest LRR fish, sediment or wetland soil.

The human health risk assessment for OU-3 calculated a current low risk (a calculated noncarcinogenic hazard < 1) associated with mercury in soil and groundwater. However, the assessment determined that there was a possibility that a future release of large quantities of mercury contained in sub-surface soil in OU-3 could occur and that this release could result in an unacceptable risk (a noncarcinogenic hazard > 1) to human health and the environment.

According to the OU-4 baseline risk assessment, dioxin concentrations in Welch Creek sediment do not present an unacceptable risk to human health but do present a potentially unacceptable risk to environmental receptors. The exposure assessment incorporated a number of access control measures including an existing fish consumption advisory. The fish consumption advisory issued by the North Carolina Department of Health and Human Services (NC DHHS) remains in effect for Welch Creek and the LRR, which indicates the potential for unacceptable risk to people. The fish consumption advisory is based on low-level dioxin concentrations in bottom-dwelling fish, such as catfish and carp.[1] Mercury was eliminated from consideration as a driver for sediment remediation based on the observation that mercury levels in higher trophic level fish were consistent with reported local, regional, and national levels.

Table 1 lists the primary contaminants of concern (COCs) initially identified by the RODs, by media.

[1] The OU-2 and OU-4 RODs referenced the 3 parts per trillion fish consumption advisory in place at the time. The current concentration for dioxin consumption advisories in North Carolina is 4 nanograms per kilogram (ng/kg) TEQ, according to the NCDEQ Standard Operating Procedures for Fish Tissue Assessments (December 2013).

Table 1: Site COCs, by Media

COC	Media
Dioxin	Surface soil (OU-1) Groundwater (OU-1)[2] Fish (OU-2 and OU-4) Sediment (OU-4)
Chromium	Surface soil (OU-1) Wetland soil (OU-1)
Lead	Surface soil (OU-1)
Mercury	Surface soil (OU-1 and OU-3) Wetland soil (OU-1) Groundwater (OU-3) Surface water (OU-3) Fish (OU-4)
Selenium	Surface soil (OU-1)
Vanadium	Surface soil (OU-1)

The EPA did not list the Site on the Superfund program's National Priorities List (NPL) but considers it an NPL-caliber site. The Site is being addressed under a Superfund Alternative Approach agreement with Domtar Paper Company, LLC (Domtar)[3] (formerly Weyerhaeuser Company), which uses the same process and standards used for the investigation and cleanup of NPL sites.

Response Actions

Weyerhaeuser conducted voluntary cleanup at the Former Chlorine Plant Area (OU-3) between 1986 and 1992. Those actions included building demolition and the excavation and off-site disposal of mercury-contaminated soil down to the water table, about 4 feet bgs. The excavation was backfilled with soil and concrete and paved with asphalt.

The EPA selected remedies to address site contamination in four Records of Decision (RODs) between 2002 and 2008. Information about the selected remedies is presented below, by OU.

OU-1 – Former Landfill No. 1 Area

The EPA issued the OU-1 ROD in June 2002. The OU-1 ROD identified the following remedial action objectives (RAOs):

- Eliminate potential risk to site-specific human receptors associated with exposure to dioxin TEQ in landfill cover soil.
- Eliminate potential risk to site-specific ecological receptors associated with exposure to dioxin TEQ, chromium, lead, mercury, selenium and vanadium in landfill cover soil.

[2] While the dioxin congener 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) was not detected in any groundwater samples during the RI, the RI found unacceptable risk associated with dioxin in OU-1 groundwater, expressed as International Toxicity Equivalency Concentrations (I-TEQs).

[3] Domtar took ownership of the pulp and paper operations at the Plymouth Mill and assumed related environmental obligations from Weyerhaeuser Company on March 7, 2007. Required reports under the AOC prior to March 2007 were submitted by Weyerhaeuser.

- Eliminate potential risk to site-specific ecological receptors associated with exposure to chromium and mercury in the wetland soil adjacent to Former Landfill No. 1.
- Eliminate potential risk to hypothetical future residential receptors associated with exposure to dioxin TEQ in groundwater near the Former Landfill No. 1 area.

The major components of the selected remedy for OU-1 include:

- A cover system consisting of a geotextile barrier and soil and gravel over the entire surface of Former Landfill No. 1.
- Natural recovery for the adjacent wetland soil.
- Annual wetland soil monitoring for site COCs to assess the natural recovery process until the cleanup standards are met.
- Institutional controls for routine maintenance of the cap (barrier system), to limit land use to industrial and to prohibit potable groundwater use Monitoring to assess the effectiveness of this remedial alternative for the protection of groundwater quality and routine maintenance of the landfill cap.

The OU-1 ROD identified COCs for surface soil and wetland soil (Table 2). The EPA did not establish any OU-1 groundwater COCs or cleanup goals. Except for iron and manganese, none of the inorganic constituents identified in groundwater during the RI exceeded North Carolina groundwater standards. Iron and manganese exceeded North Carolina standards upgradient and downgradient of the landfill. However, elevated naturally occurring iron and manganese are common in the region's groundwater and were not considered site-related. It can also be noted that the North Carolina groundwater standards for iron and manganese are based on aesthetics rather than health effects. As the dioxin congener 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) was not detected in any groundwater samples during the RI and the North Carolina groundwater standard for dioxin, expressed as an international toxicity equivalency concentration (I-TEQ), was only a proposed standard, the OU-1 ROD did not establish dioxin as a groundwater COC.

Table 2: OU-1 Soil and Wetland Cleanup Goals

Surface Soil COCs	**ROD Cleanup Goal[a]**
Dioxin TEQ[b*]	370 ng/kg
Dioxin TEQ[c*]	770 ng/kg
Chromium	110 mg/kg
Lead	70 mg/kg
Mercury	0.4 mg/kg
Selenium	4.0 mg/kg
Vanadium	140 mg/kg
Wetland Soil COCs	**ROD Cleanup Goal[d]**
Mercury	0.4 mg/kg
Chromium	110 mg/kg
Notes:	

Surface Soil COCs	ROD Cleanup Goal[a]

a. Surface soil COCs and cleanup goals as presented in Table M-2 in the June 2002 OU-1 ROD. Baseline ecological risk assessment results formed the basis for the numerical cleanup goals presented in the ROD.
b. Based on World Health Organization's (WHO's) mammalian method (WHO, 1989).
c. Based on the WHO's avian method (WHO, 1989).
d. Wetland soil COCs and cleanup goals as presented in Table M-3 in the June 2002 OU-1 ROD. Baseline ecological risk assessment results formed the basis for the numerical cleanup goals presented in the ROD.

* Both methods of calculation must be performed and applied to verify the cleanup standard is achieved.
ng/kg = nanograms per kilogram
mg/kg = milligrams per kilogram

OU-2 – LRR

The EPA issued the OU-2 ROD in September 2008. The OU-2 ROD identified the following human health RAOs for OU-2:

- Maintain acceptable levels of potential risk to site-specific human receptors associated with exposure to dioxin in fish.
- Maintain concentrations of surface water contaminants at or below surface water standards, to the extent practicable.
- Continue progress toward removal of remaining fish consumption advisories in the LRR.

The OU-2 ROD identified the following ecological RAOs for OU-2:

- Protect the habitat of the LRR to maintain the health of local populations and communities of biota.
- Reduce the dioxin concentrations in whole fish tissues over time to the extent practicable.
- Minimize the adverse effects of remediation activities on the existing aquatic environment and/or wetland habitat to the extent practicable.
- Protect the striped bass fishery and habitat.

The selected remedy for OU-2 consists of monitored natural recovery (MNR) for the LRR, institutional controls in the form of maintaining the NC DHHS fish consumption advisories, and long-term monitoring to document improving conditions in the area. The OU-2 ROD also requires that the NC DHHS fish consumption advisories remain in place until state standards have been met. A goal of the remedy is to continue progress towards, and ultimately lift or modify, the existing fish consumption advisory based on dioxin. The OU-2 ROD identified the North Carolina 2B standard for dioxin of 3 nanograms per kilogram (ng/kg) as the surface water target level to ensure the protection of surface water quality.

OU-3 – Former Chlorine Plant Area

The EPA issued the OU-3 ROD in September 2003. The OU-3 ROD identified the following RAOs for OU-3:

- Maintain acceptable levels of potential risk to site-specific human receptors associated with exposure to mercury in soil and groundwater at the Former Chlorine Plant Area.
- Reduce groundwater levels of mercury to the point of compliance with the North Carolina maximum acceptable concentration of 1.1 micrograms per liter (µg/L).
- Prevent a potential future release of the large quantities of mercury in subsurface soil to groundwater that may contaminate the Roanoke River.

Components of the selected remedy for OU-3 include:

- A barrier wall containment system for contaminated soil largely within the footprint of the Former Chlorine Plant building.
- Shallow target area excavations of contaminated soil.
- A surface cap containment system.
- Groundwater monitoring.
- Institutional controls for land and groundwater use to limit exposure to soil and groundwater and maintain the integrity of the remedy.

Table 3 lists the cleanup levels selected for the contaminated media at the Former Chlorine Plant Area.

Table 3: OU-3 Mercury Cleanup Goals

Media	ROD Cleanup Goal[a]
Soil	20 mg/kg[b]
Groundwater	1.1 µg/L[c]
Surface water	0.012 µg/L[d]

Notes:
a. Mercury cleanup goals for OU-3 media as presented in Table M-2 of the September 2003 OU-3 ROD.
b. EPA selected a soil cleanup goal that would be protective of groundwater.
c. Cleanup goal based on North Carolina maximum allowable concentration (North Carolina 2L groundwater standard) (published in the September 2003 OU-3 ROD).
d. Cleanup goal based on North Carolina Fresh Surface Water Quality Standards for Class C Waters.
mg/kg = milligrams per kilogram
µg/L = micrograms per liter

OU-4 – Welch Creek

The EPA issued the OU-4 ROD in September 2007. The OU-4 ROD identified the following human health RAOs for OU-4:

- Maintain acceptable levels of potential risk to site-specific human receptors associated with exposure to contaminated fish and sediment.
- Continue progress toward removal of the remaining fish consumption advisory in Welch Creek.

The OU-4 ROD identified the following ecological RAOs for OU-4:

- Protect the health of local populations and communities of biota.
- Reduce the dioxin concentrations in whole fish tissues over time to the extent practicable.
- Achieve concentrations of surface water contaminants at or below surface water standards, to the extent practicable.
- Limit biological uptake of COCs from the sediment in areas with excess potential risk to the extent practicable.
- Minimize the adverse effects of remediation activities on the existing aquatic environment and/or wetland habitat to the extent practicable.

The OU-4 ROD also identified a RAO for the management of migration potential:

- Minimize significant migration of COC-containing sediment in delineated areas of concern, to the extent practicable.

The components of the selected remedy for OU-4 include:

- Enhanced monitored natural recovery (eMNR^{TM}) for sediment with dioxin above the 1 microgram per kilogram (µg/kg) cleanup goal for the Upper Reach of Welch Creek through placement of a thin layer sand cap.
- Mobility monitoring for the Midstream Reach of Welch Creek.
- Long-term monitoring and maintenance of the sand cap.
- Long-term testing and monitoring of sediment, surface water and biota to document the performance of the remedy and compliance with cleanup goals.
- Institutional controls to limit the consumption of fish from Welch Creek, maintain the integrity of the sand cap, maintain the existing fencing, which limits access to Welch Creek, maintain signs in Welch Creek noting fish advisories and the presence of the sand cap, and place deed restrictions to limit land development on the Domtar property that could affect the remedy.

Table 4 lists the cleanup levels selected for the contaminated media at Welch Creek.

Table 4: OU-4 COC Cleanup Goals

Sediment COC	**ROD Cleanup Goal[a]**
Dioxin TEQ[b]	1 µg/kg
Surface Water COC	**ROD Cleanup Goal[a]**
Dioxin (2,3,7,8-TCDD)	1.4×10^{-5} ng/L[c]

Notes:

a. Dioxin cleanup goals for OU-4 sediment and surface water as presented in Table M-2 of the September 2007 OU-4 ROD.
b. EPA International TEQ Factors (EPA 1989).
c. Cleanup goal based on 2007 North Carolina 2B surface water standard.

µg/kg = micrograms per kilogram
ng/L = nanograms per liter

Status of Implementation

The Site's PRP has completed remedy construction for all four OUs. Remedy implementation activities for each OU are discussed below.

OU-1 – Former Landfill No. 1 Area

Pursuant to a 2003 Consent Decree between Weyerhaeuser and the EPA, Weyerhaeuser performed remedy construction between April and November 2005. Remedial activities included the installation of a geotextile material over the Landfill No. 1 Area surface, placement of 12 inches of cover soil over the geotextile material and establishment of vegetation on the soil cover. Remedy construction also included placement of 6 - 12 inches of gravel aggregate on the northern end of OU-1 and ongoing performance monitoring to include landfill cover inspections, wetland monitoring and groundwater monitoring. Signs installed around OU-1 notify contractors that penetration of the landfill cap is prohibited. The EPA and the North Carolina Department of Environment and Natural Resources (now the NCDEQ) conducted the final construction inspection in December 2005. The EPA approved the Remedial Action Report for OU-1 in June 2006. The OU-1 ROD required the implementation of groundwater and land use restrictions. The Institutional Control Review section below provides more information.

OU-2 – LRR

Pursuant to a 2011 Consent Decree between Domtar and the EPA, Domtar initiated remedial action in September 2011. Domtar initiated natural recovery monitoring in 2012, as outlined in the approved 2011 *Remedial Design/Remedial Action Work Plan for the Lower Roanoke River*. Ongoing monitoring activities include collection and analysis of fine-layer sediment, surface water and fish tissues. Domtar documents monitoring activities in annual natural recovery monitoring reports for OU-2. The most recent report (for 2023 [Year 12]) was submitted in February 2024. Ongoing remedy-related activities performed by Domtar also include annual inspection of the NC DHHS fish consumption advisory sign, maintenance of fish consumption advisories until state standards have been met, and the review of reports on local habitat conditions that could adversely affect biota habitats. The Institutional Control Review section below provides more information. The EPA considers the construction of the OU-2 remedy complete. Due to the nature of the selected remedy (consisting primarily of monitoring requirements), the EPA does not intend to issue a Remedial Action Report for OU-2.

OU-3 – Former Chlorine Plant Area

Pursuant to a 2004 Consent Decree between Weyerhaeuser and the EPA, Weyerhaeuser conducted remedy construction between March and August 2006. Remedial activities included limited excavation of mercury-contaminated soil in four separate target areas totaling approximately 800 cubic yards of excavated soils (with disposal in an active permitted on-site landfill) and installation of a coated steel sheet pile wall around the remaining mercury-contaminated subsurface soil in the Former Chlorine Plant Area. The sheets were driven down to a final depth of 47 feet bgs (with the top of the wall being 2 feet below grade). The system has sealable joints specifically designed for the containment of groundwater. Additional remedial activities included the installation of an asphalt cap over the barrier wall footprint. As required by the OU-3 ROD, the PRP has also conducted groundwater monitoring, cap inspections and implementation of land and groundwater use restrictions. The Institutional Control Review section below provides more information. The EPA and North Carolina Department of Environment and Natural Resources (NC DENR) conducted a pre-final construction inspection in August 2006. The EPA approved the Remedial Action Report for OU-3 in September 2006.

OU-4 – Welch Creek

Pursuant to a 2009 Consent Decree between Domtar and the EPA, Domtar performed remedy construction between November 2011 and February 2012. Remedial activities included spreading 2 inches to 4 inches of sand over a 1-mile stretch of Welch Creek to cover dioxin-contaminated sediment. Additional remedial activities included installing signage along the creek notifying boaters of the sand cap and prohibiting the use of equipment that could damage the cap, such as anchors, trotlines or traps. Additional signage notifies the public of the fish consumption advisory. As required by the OU-4 ROD, the PRP performs long-term monitoring and maintenance of the sand cap, mobility monitoring and long-term monitoring of sediment, surface water and biota. The OU-4 ROD also requires institutional controls. The Institutional Control Review section below provides more information. The NC DENR performed a final inspection of remedy construction in May 2012. The EPA approved the revised Remedial Action Report for OU-4 in July 2012.

Institutional Control Review

Each ROD requires institutional controls for each respective OU. The requirements for each OU are as follows:

- The OU-1 ROD requires institutional controls for routine maintenance of the cap (barrier system), to limit land use to industrial and to prohibit potable groundwater use.
- The OU-2 ROD requires institutional controls to prevent or limit the consumption of contaminated fish in the LRR through the continuation of the existing fish consumption advisory and maintenance of signs (until state standards are met).
- The OU-3 ROD requires institutional controls to prohibit residential land use and installation of potable water wells.
- The OU-4 ROD requires institutional controls to limit consumption of contaminated fish from Welch Creek through the continuation of the existing fish consumption advisory, maintain the integrity of the sand cap, maintain fencing and signs, and prohibit development that could impact the remedy.

All institutional control requirements for the Site have been met. On September 23, 2016, Domtar filed a Declaration of Perpetual Land Use Restrictions with the Martin County Register of Deeds. The 2016 Declaration of Perpetual Land Use Restrictions meets all institutional control requirements for OU-1 and OU-3 and some requirements for OU-4; those controls run with the land. The OU-4 institutional control requirements not met by the 2016 Declaration of Perpetual Land Use Restrictions, including maintenance of fencing and signage and inspections of the sand cap, are met by the implementation of the Site's 2011 Performance Standards Verification Plan/Operations and Maintenance Plan for Welch Creek and the NC DHHS fish consumption advisories. The NC DHHS fish consumption advisories fulfill the OU-2 institutional control requirements.

While the OU-1 ROD does not require institutional controls that ensure the long-term integrity of the landfill cap, it requires routine maintenance of the cap (barrier system), limits land use to industrial and prohibits potable groundwater use. Cap maintenance includes routine inspections and maintenance of signs posted at the OU-1 entrance that specifically prohibit activities that could potentially disturb the cap. In addition, the 2016 Declaration of Perpetual Land Use Restrictions specifically prohibits activities that could impact the integrity of the OU-1 remedy. Table 5 below summarizes all institutional control

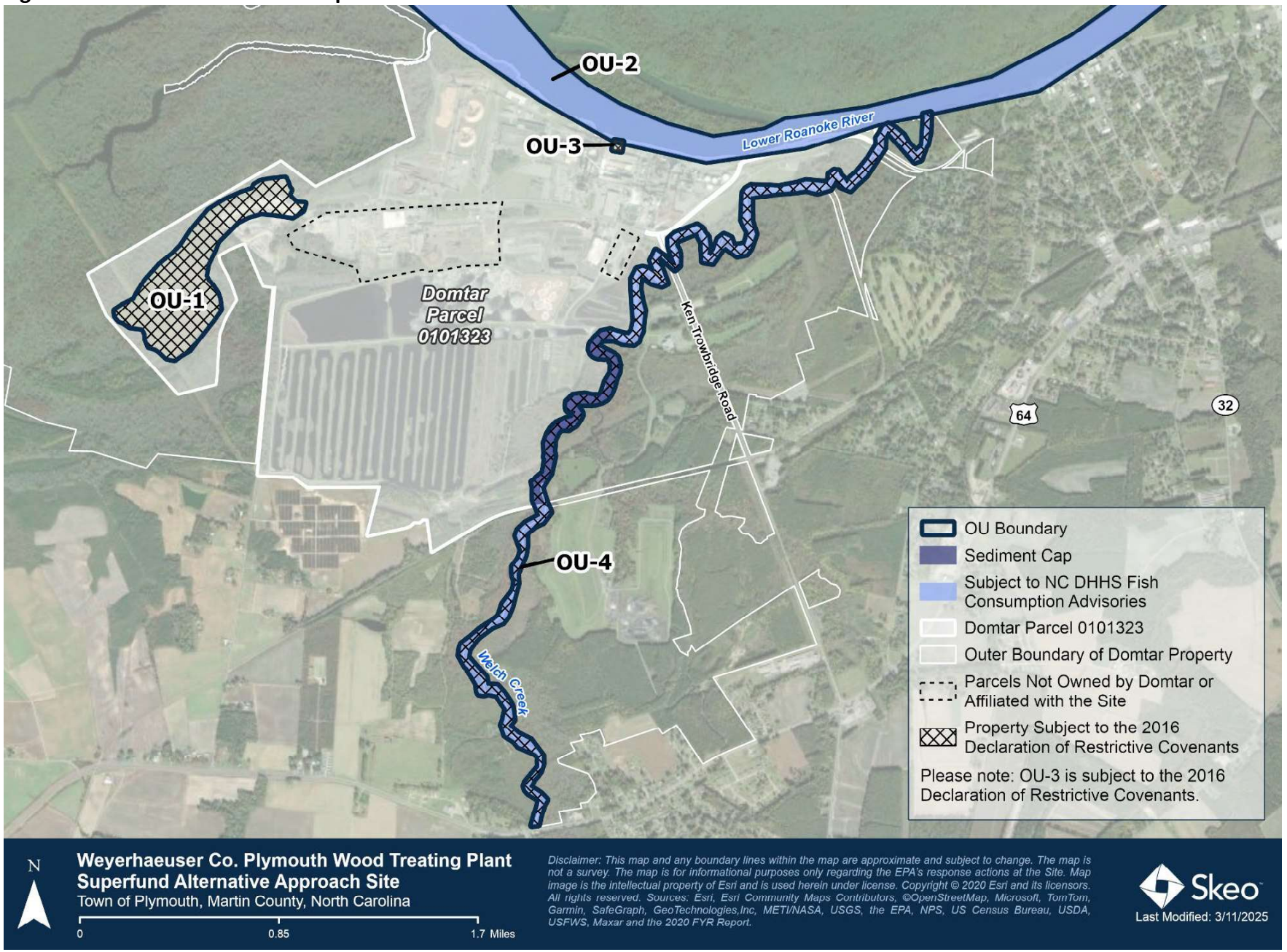
requirements and how each requirement has been met for each respective OU. Figure 2 shows the site areas subject to institutional controls. Appendix D includes a copy of the 2016 Declaration of Perpetual Land Use Restrictions.

Table 5: Summary of Institutional Controls (ICs)

Media, Engineered Controls and Areas That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)/ Areas	IC Objective	Title of IC Instrument Implemented and Date	Institutional Control Details
OU-1 (Former Landfill No. 1 Area) Groundwater	Yes	Yes	Part of parcel: 0101323	Prohibit the installation of drinking water wells.	September 2016 Declaration of Perpetual Land Use Restrictions	Requires routine maintenance of the cap (barrier system) and prohibits groundwater use for any purpose and prohibits installation of new groundwater wells.
OU-1 (Former Landfill No. 1 Area) Soil	Yes	Yes	Part of parcel 0101323	Limit land uses to industrial uses.	September 2016 Declaration of Perpetual Land Use Restrictions	Requires routine maintenance of the cap (barrier system), limits land uses to commercial and industrial uses only, prohibits activities that could impact the integrity of the OU-1 remedy, and prohibits any new aboveground or underground construction or improvements without the NCDEQ's approval.
OU-2 (LRR) Fish	Yes	Yes	LRR	Prevent or reduce potential human consumption of contaminated fish in the LRR.	NC DHHS fish consumption advisories	The NC DHHS fish consumption advisories will remain in place until state standards have been met. The fish consumption advisory sign posted at OU-2 is routinely inspected.
OU-3 (Former Chlorine Plant Area) Groundwater	Yes	Yes	Part of parcel 0101323	Prohibit the potable use of groundwater from the shallow aquifer under the Former Chlorine Plant Area and mercury plume areas.	September 2016 Declaration of Perpetual Land Use Restrictions	Prohibits groundwater use for any purpose and prohibits installation of new groundwater wells.

Media, Engineered Controls and Areas That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)/ Areas	IC Objective	Title of IC Instrument Implemented and Date	Institutional Control Details
OU-3 (Former Chlorine Plant Area) Soil	Yes	Yes	Part of parcel 0101323	Maintain the integrity of the OU-3 remedy and prevent exposure to contaminated soil.	September 2016 Declaration of Perpetual Land Use Restrictions	Limits land uses to commercial and industrial uses only, prohibits activities that could impact the integrity of the OU-3 remedy, prohibits any new aboveground or underground construction or improvements without the NCDEQ's approval.
OU-4 (Welch Creek) Fish	Yes	Yes	Part of parcel 0101323 and Welch Creek	Limit fish consumption from Welch Creek and maintain fish advisory signage along Welch Creek.	NC DHHS fish consumption advisories	The NC DHHS fish consumption advisories will remain in place until state standards have been met. The fish consumption advisory signs are routinely inspected.
OU-4 (Welch Creek) Sand Cap	Yes	Yes	Part of parcel 0101323	Limit land development on the Domtar property that could impact the sand cap.	September 2016 Declaration of Perpetual Land Use Restrictions	Prohibits any activities in the uplands area adjacent to the upstream reaches of Welch Creek that could impact the integrity of the sand cap (including, but not limited to, a boat launch, ramp or pier), without prior NCDEQ approval.

Figure 2: Institutional Controls Map



Systems Operations/Operation and Maintenance (O&M)

OU-1 – Former Landfill No. 1 Area

Domtar has contracted TRC Environmental Corporation (TRC) to perform site O&M activities. TRC performs OU-1 O&M activities in accordance with the Site's 2004 *Performance Standards Verification Plan* and with the EPA's approved modifications to that plan. Performance monitoring, which began in November 2005 includes landfill cover inspections, wetland soil monitoring and groundwater monitoring. Domtar submits annual monitoring reports for OU-1, prepared by TRC, to the EPA for review, with the most recent report (for 2024 O&M activities) submitted in December 2024.

Domtar personnel inspect the landfill cover quarterly. TRC performs annual cap inspections and cap maintenance as necessary. Landfill inspections performed since the 2020 FYR have not identified any major issues. Domtar contractor, General Maintenance Inc., routinely mows the landfill cap. TRC samples OU-1 groundwater once every five years and previously sampled wetland soil every two years. Wetland soil monitoring is now discontinued since cleanup goals were met for three consecutive events as of 2023.

OU-2 – LRR

Domtar submits annual monitored natural recovery reports for OU-2, prepared by TRC, to the EPA for review. TRC performs OU-2 O&M activities in accordance with the 2011 *Remedial Design/Remedial Action Work Plan for the Lower Roanoke River*. O&M activities include collection and analysis of fish tissue samples, surface water and sediment from the LRR once every five years. Additional activities include inspection of fish advisory signs and annual reviews of reports on local habitat conditions that could adversely affect biota habitats. Domtar/TRC have not identified any significant O&M issues at OU-2 since the 2020 FYR.

OU-3 – Former Chlorine Plant Area

TRC performs OU-3 O&M activities in accordance with the 2005 *Performance Standards Verification Plan for the Former Chlorine Plant Area* and according to recommendations of the Site's 2010, 2015 and 2020 FYR Reports. O&M activities for OU-3 include monitoring and maintenance of the surface cap and groundwater monitoring once every five years. The surface cap containment system, which includes concrete, asphalt and stormwater system components, reduces infiltration of surface water at the Former Chlorine Plant Area. TRC inspects the surface cap containment system annually for surface cracks, holes, depressions or other signs of surface integrity degradation. Domtar/TRC has not identified cap degradation or the need for more cap maintenance since the 2020 FYR. Domtar initiated groundwater sampling in November 2006.

OU-4 – Welch Creek

Domtar submits annual eMNR^{TM} performance monitoring reports for OU-4, prepared by TRC, to the EPA for review. TRC performs OU-4 O&M activities in accordance with the 2011 *Performance Standards Verification Plan/Operations and Maintenance Plan for the Welch Creek Area* and according to recommendations of the Site's 2010, 2015 and 2020 FYR Reports. TRC performs monitoring of sediment cap thickness, sediment profile and surface water, and specialty contractors sample creek biota and fish once every five years. TRC also maintains the fencing that restricts access to Welch Creek and inspects signage along the creek. TRC's inspection in 2023 verified the signs were in place and in

good condition; however, during the FYR site inspection, one sign was observed to be missing at the pipe bridge.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR Report as well as the recommendation from the previous FYR Report and the status of that recommendation.

Table 6: Protectiveness Determinations/Statements from the 2020 FYR Report

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The selected remedy for OU-1 protects human health and the environment because exposure pathways that could result in unacceptable risks have been addressed. Fencing and manned security gates restrict landfill access and the landfill cap prevents potential human and environmental receptor exposure to contaminated soil below. Shallow groundwater is not used in the vicinity of the landfill and landfill inspection and maintenance activities ensure the continued integrity of the landfill cap. Institutional controls limit land use to industrial land use only and prohibit groundwater use, installation of drinking water wells and any activities that could impact the integrity of the OU-1 remedy.
2	Short-term Protective	The selected remedy for OU-2 is currently protective of human health and the environment. Exposure pathways that could result in unacceptable risks have been addressed through NC DHHS fish consumption advisories, which prevent or reduce potential human consumption of contaminated fish. However, in order for the remedy to be protective over the long term, it would be ideal if the method used to analyze surface water samples for 2,3,7,8-TCDD was able to achieve even lower detection limits and ultimately match the North Carolina surface water cleanup target level of 5×10^{-6} ng/L.
3	Protective	The selected remedy for OU-3 protects human health and the environment because exposure pathways that could result in unacceptable risks have been addressed. Groundwater is not used in the vicinity of the Former Chlorine Plant Area. The subsurface barrier wall and the limited excavation of mercury impacted soil have reduced the potential for a future release of mercury to the LRR. The asphalt cap over the Former Chlorine Plant Area reduces infiltration of surface water and prevents potential human exposures to contaminated soil below. Institutional controls limit land use to industrial land use only and prohibit groundwater use, installation of drinking water wells and any activities that could impact the integrity of the OU-3 remedy.

OU #	Protectiveness Determination	Protectiveness Statement
4	Short-term Protective	The selected remedy for OU-4 currently protects human health and the environment because exposure pathways that could result in unacceptable risks have been addressed. The sand cap serves as an exposure control barrier to underlying sediments and limits re-suspension of impacted underlying sediment. Institutional controls help limit the consumption of fish from Welch Creek, help maintain the integrity of the sand cap, inform the public of fish advisories and the presence of the sand cap, and prohibit any activities in the uplands area adjacent to the upstream reaches of Welch Creek that could impact the integrity of the sand cap. However, in order for the remedy to be protective over the long term, it would be ideal if the method used to analyze surface water samples for 2,3,7,8-TCDD was able to achieve even lower detection limits and ultimately match the North Carolina surface water cleanup target level of 5 x 10^{-6} ng/L.

Table 7: Status of Recommendation from the 2020 FYR Report

OU #	Issue	Recommendation	Current Status	Current Implementation Status Description	Completion Date (if applicable)
2 and 4	The analytical method used to analyze surface water samples for 2,3,7,8- TCDD cannot detect 2,3,7,8-TCDD concentrations as low as the North Carolina surface water cleanup target level of 5 x 10^{-6} ng/L.	Continue to periodically review the method used to analyze surface water samples for 2,3,7,8-TCDD for further improvements to achieve even lower detection limits and ultimately match the North Carolina surface water cleanup target level of 5 x 10^{-6} ng/L.	Ongoing	During this FYR period, the detection limit for 2,3,7,8-TCDD in surface water (0.0047 ng/L) was still higher than the North Carolina surface water cleanup target level of 5 x 10^{-6} ng/L. Therefore, it is still not clear if 2,3,7,8-TCDD is present in surface water at concentrations higher than the state cleanup level, but lower than the analytical detection limits.	Not applicable

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available by online posting on 10/30/2024 (Appendix E).[4] It stated that the FYR was underway and invited the public to submit any comments to the EPA. The results of the review and the completed FYR Report will be made available on the EPA's site profile page

[4] EPA's 2024 Public Notice Press Release: https://www.epa.gov/newsreleases/epa-review-cleanups-47-southeast-superfund-sites-year#

(https://www.epa.gov/superfund/weyerhaeuser-company-plymouth), which can also be accessed online from the Site's information repository, Washington County Public Library, located at 201 East Third Street in Plymouth, North Carolina.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. The interviews are summarized below and included in Appendix F.

Beth Hartzell, the NCDEQ site manager, expressed that the Site is well-maintained by the PRP and its contractor and that the remedy has been effective. Ms. Hartzell is not aware of any complaints or inquiries regarding the Site in the last five years and indicated that the PRP is diligent about keeping the land use restrictions up to date.

Kari Cahoon, a PRP representative, indicated her belief that the remedial activities were well done and that she feels well-informed about site-related activities. Ms. Cahoon did not have any recommendations regarding management or operation of the Site's remedy and believes the remedy has been successful.

Michelle Hays, the PRP's O&M contractor representative, expressed that monitoring has demonstrated the success of the remedy through reduced COC concentrations across all monitored environmental media. Ms. Hays indicated that the quarterly inspections of the landfill cap and annual inspection of the cap at OU-3 will continue but recommended reducing the sampling schedule for several of the media to once a year and discontinuing sampling of the landfill soil (OU-1), benthic tissue (OU-4) and sediment fine-layer coring (OU-2).

Data Review

This FYR examined monitoring data for all site-related media to assess remedy performance and identify trends in contaminant concentrations. Data review findings are discussed by OU and media below. Appendix I provides detailed findings and supporting figures and data.

On November 4, 2019, Domtar submitted a Memorandum prepared by TRC including sampling recommendations for the next five-year period (2020 to 2024). TRC, Domtar and the EPA discussed the sampling frequency in multiple correspondences and meetings. Two letters capture the monitoring changes that are implemented in this FYR period. The EPA is reviewing the letters.

The monitoring changes for this FYR period included:

- OU-1: Groundwater was sampled once in 2023 (Year 19) rather than annually.
- OU-2: Surface water was sampled once in 2023 (Year 12) rather than every two years. Sediment was sampled once in 2023 rather than twice during the FYR period. Fish tissue was sampled once rather than three times during the FYR period.
- OU-4: Sediment was sampled once in 2023 (Year 12) rather than annually. Surface water was sampled once rather than annually. Benthic sampling was conducted once rather than three times during the FYR period. Fish tissue sampling was conducted once rather than annually.

OU-1

OU-1 – Groundwater

As required by the OU-1 ROD, TRC performs OU-1 groundwater monitoring to assess the effectiveness of the OU-1 remedy for the protection of groundwater quality. With the EPA's approval, TRC now collects OU-1 groundwater samples once every five years from several locations (Figure I-1, Appendix I) and analyzes them for dioxin/furans. Samples are collected from six shallow wells and six intermediate-depth wells. Since the previous FYR, OU-1 groundwater was sampled once, in 2023. This groundwater data review includes an analysis and summary of all OU-1 groundwater data collected since the completion of the OU-1 remedy in November 2005. Table I-1 in Appendix I includes all OU-1 groundwater monitoring results from 2005 to 2023.

In 2001, the state of North Carolina proposed a modification of its groundwater standard for dioxin, by referring to the application of the standard to dioxin expressed as I-TEQ rather than 2,3,7,8-TCDD. Since OU-1 groundwater monitoring began in 2005, dioxin I-TEQ values have been calculated for each monitoring well and compared to the proposed North Carolina 2L groundwater standard of 2×10^{-10} milligrams per liter. In 2023, three locations exceeded the I-TEQ groundwater standard (Table I-1, Appendix I). The concentrations in shallow groundwater sampled ranged from 2.5×10^{-10} mg/L to 1.2×10^{-8} mg/L. In the deeper groundwater, concentrations ranged from 2.2×10^{-10} mg/L to 1.2×10^{-9} mg/L. The 2,3,7,8-TCDD congener was not detected in the groundwater samples collected during the September 2023 sampling event and groundwater concentrations of dioxins (I-TEQ) remain consistent with historical observations. These data indicate that the landfill cap is effective at limiting groundwater migration. The 2023 OU-1 monitoring report states that detectable concentrations of dioxin/furan congeners are potentially associated with solids entrained in the groundwater samples.

OU-1 – Wetland Soil

The purpose of OU-1 wetland soil monitoring is to assess the effectiveness of the natural recovery remedy. Every two years, TRC collects wetland soil samples from three locations (FLWS-01, FLWS-04 and FLWS-06) for chromium and mercury analysis; results are compared to the ecological cleanup goals established by the OU-1 ROD (Figure I-1, Appendix I). Since the previous FYR, wetland soil samples were collected and analyzed in November 2021 and September 2023.

During the 2021 sampling event, chromium concentrations in wetland soil samples ranged from 4.5 milligrams per kilogram to 7.9 mg/kg. During the 2023 wetland soil sampling event, chromium concentrations in wetland soil samples ranged from 5.57 mg/kg to 9.80 mg/kg. All concentrations were an order of magnitude below the ROD cleanup level of 110 mg/kg. Mercury analysis resulted in a maximum detected concentration of 0.030 mg/kg in 2021 and a maximum detection of 0.037 mg/kg in 2023. All concentrations were below the ecological cleanup level for mercury of 0.4 mg/kg. Table I-2 in Appendix I provides sampling results since 2005.

Pursuant to the EPA's comments provided in a letter dated August 6, 2020, and TRC's response to those comments in a letter dated September 30, 2020, it was agreed that wetland soil sampling would discontinue once chromium and mercury concentrations were below their respective cleanup goals for three consecutive sampling events. This was achieved as of the 2023 sampling event, demonstrating that natural recovery was effective in reducing contaminant levels below the ROD cleanup goals.

OU-2

In 2023, sediment, surface water and fish tissue samples were collected from the LRR for dioxin analysis.

OU-2 – Sediment

The purpose of OU-2 sediment sampling is to document that natural recovery is taking place within the LRR. In accordance with the Site's 2011 Remedial Design/Remedial Action Work Plan for the LRR, TRC collected sediment samples from five locations in the LRR for dioxin in 2023 (Figure I-2, Appendix I). Fine-layer coring samples confirmed the dioxin concentrations within the top 6 inches (15 centimeters) are below the target level of 1 µg/kg in the fine-layer core sediment. The average dioxin I-TEQ concentration observed downstream in 2023 (0.031 µg/kg) has decreased since the 2012 sampling (average downstream concentration of 0.039 µg/kg) but is higher than the value detected in 2015. While average dioxin concentrations fluctuated, they remain below the target level of 1 µg/kg. Table I-3 in Appendix I summarizes historical dioxin observations in shallow sediment in OU-2.

OU-2 – Surface Water

The purpose of OU-2 surface water monitoring is to document that natural recovery is taking place within the LRR. TRC collects surface water samples from three locations in the LRR for 2,3,7,8-TCDD analysis (Figure I-3, Appendix I). Samples were collected annually prior to the 2015 FYR, then every two years, and now once per FYR period (every five years). Surface water samples were last collected and analyzed in September 2023. Table I-4 in Appendix I includes all OU-2 surface water monitoring results from 2012 to 2023.

One of the OU-2 RAOs is to maintain surface water concentrations at or below surface water standards, to the extent practicable. North Carolina has updated their surface water criteria for 2,3,7,8-TCDD in surface water to 5×10^{-6} nanograms per liter (ng/L), which is more stringent than the OU-2 ROD standard. Between 2012 and 2023, 2,3,7,8-TCDD has not been detected in any OU-2 surface water samples. However, the analytical method used cannot detect 2,3,7,8-TCDD at the current surface water cleanup level. During this FYR period, the detection limit for 2,3,7,8-TCDD was 0.0047 ng/L, which is about three orders of magnitude greater than the cleanup level. Therefore, it is not clear if 2,3,7,8-TCDD is present in surface water at concentrations higher than the state cleanup level, but lower than the analytical detection limits.

OU-2 – Fish Tissue

The purpose of OU-2 fish tissue sampling is to monitor progress toward the removal of remaining fish consumption advisories in the LRR, monitor dioxin concentrations in whole fish tissues, and assess dioxin and mercury concentration trends. From 2013 to 2019, TRC subcontractor, CZR, Inc. (CZR) collected and analyzed fish tissue samples every two years. The previous FYR Report noted that modifications to monitoring schedules be made as appropriate based on previous sampling results. This FYR data review summarizes fish tissue sampling results from the single 2023 sampling event (Table I-5, Appendix I). Per the EPA's approval, mercury monitoring in fish tissues was discontinued for this FYR sampling period. Mercury analysis for OU-2 fish tissue last occurred in 2017 and was required by the ROD to confirm that mercury in fish tissue is not site-related. According to the existing statewide fish advisory that was issued in 2008, mercury levels dictate recommended consumption levels from

freshwater sources. Bottom feeders, small forage and large forage fish species were collected from three locations in the LRR (Figure I-4, Appendix I).

The NC DHHS issues a fish consumption advisory when the dioxin TEQ concentration in edible fish tissue, typically the fillet tissue, is greater than 4 ng/kg. None of the fillet composites collected from OU-2 during the 2023 sampling exhibited a dioxin I-TEQ concentration greater than the North Carolina fish consumption advisory level. According to the previous FYR, none of the fillet composites collected from OU-2 during 2015, 2017 or 2019 exhibited a dioxin I-TEQ concentration greater than the North Carolina fish consumption advisory level. One of the ecological RAOs for OU-2 includes reducing dioxin concentrations in whole fish tissues over time; therefore, CZR also analyzes whole fish for dioxin. As demonstrated in Figure I-7 in Appendix I, whole fish dioxin I-TEQ concentrations in the LRR are significantly lower than they were when sampling for the RI took place but have remained steady in some species since implementing the sand cap in OU-4 in 2012. The EPA recommends that fish sampling continue once every five years to evaluate whether fish tissue dioxin levels are declining in accordance with the RAO.

OU-3

OU-3 – Groundwater

The objective of the OU-3 groundwater monitoring program is to assess the effectiveness of the remedy to protect groundwater quality by reducing the migration of mercury from the Former Chlorine Plant Area. Groundwater sampling events began in November 2006, after the completion of OU-3 remedy construction. With the EPA's approval, TRC samples OU-3 shallow groundwater once every two years from four wells, and samples the remaining ten shallow/intermediate wells once every five years. Results are compared to the current North Carolina 2L Groundwater Standard for mercury of 1 µg/L, which is slightly lower than the 1.1 µg/L mercury groundwater cleanup goal established by the OU-3 ROD. Table I-6 in Appendix I includes all OU-3 groundwater monitoring results from 2006 to 2023. Figure I-8 in Appendix I shows the locations of the OU-3 groundwater monitoring wells.

Between 2006 and 2023, the highest mercury concentrations have been observed at CP-06-1, located within the barrier wall. Mercury concentrations above the 2L Standard have historically been observed in monitoring wells CP-01-2, CP-04-1, CP-05-1, and CP-06-1. In November 2021, mercury concentrations above the North Carolina 2L Groundwater Standard were detected in three of the four wells sampled: CP-06-1 (within the barrier wall) and CP-04-1 and CP-05-1 (outside of the barrier wall). During the September 2023 sampling event, mercury concentrations above the North Carolina 2L groundwater standard were only detected in CP-06-1 out of the 14 wells sampled. Mercury concentrations at wells CP-01-2, CP-04-1 and CP-05-1 fluctuate over time and routinely exceed the North Carolina 2L Groundwater Standard but remain within historical limits. Between 2016 and 2018, mercury concentrations at CP-06-1 increased slightly from 64 µg/L to an estimated concentration of 120 µg/L but the concentration decreased two orders of magnitude to 1.2 µg/L in September 2023 sampling. Elevated mercury concentrations are expected at well CP-06-1, as it is in the middle of the former source area. Since OU-3 groundwater monitoring began in 2006, mercury concentrations in the deepest wells (screened in the marine sand layer) exceeded the North Carolina 2L Groundwater Standard only twice. The two exceedances took place in 2007, with results ranging from 2.1 to 2.3 µg/L. These results indicate that mercury is likely not migrating deeper into the marine sand layer (see Table I-6, Appendix I).

A review of all groundwater monitoring between 2006 and 2023 reveals no significant trends in mercury concentrations. Historically, mercury results have been below the method detection limit or cleanup goal for most of the OU-3 groundwater samples collected outside the barrier wall, confirming the overall effectiveness of the barrier wall in protecting groundwater quality by reducing the migration of mercury from the Former Chlorine Plant Area.

OU-4

OU-4 – Sediment

To assess cap integrity, TRC collects and analyzes sediment cores collected from random locations throughout the cap in the Upper Reach of Welch Creek. Figure I-9 in Appendix I shows sediment sampling locations for the 2023 monitoring event. In the 10 randomly selected cores retrieved in 2023, the cap thickness met the design thickness range for the given area compared to the baseline thicknesses. Natural sedimentation was noted in the 10 performance monitoring cores, consisting of a black silty mud overlaying the thin-layer cap. This sedimentation is due to deposition of upstream or wetland sediment and it has been observed more frequently in the cores over time. Leaf litter and twig debris were observed on the surface of five of the cores and did not appear to damage the cap integrity. However, bioturbation from burrowing was noted in three of the cores. While bioturbation indicates recolonization of benthic organisms, it can pose a threat to the cap if it extends into the thin-layer cap.

TRC also evaluates dioxin I-TEQ concentrations in the top five centimeters of the cap, inclusive of redeposited sediment. The analysis is performed to confirm that the thin-layer cap continues to serve as an exposure control barrier to underlying sediment and continues to limit re-suspension of impacted underlying sediment. The individual I-TEQ values from each of the 10 core samples collected during the 2023 sampling event were below the performance target level of 1 µg/kg, with values ranging from 0.00085 µg/kg to 0.097 µg/kg (Figure I-10, Appendix I).

The I-TEQ surface weighted area concentration (SWAC) from Years 1-12 have been substantially below the I-TEQ target level of 0.41 µg/kg for SWAC (Figure I-10, Appendix I). Post-remedy results are higher than the SWAC calculated immediately following the cap installation because the initial value was calculated from newly spread, clean sand. While post-remedy I-TEQ SWAC has fluctuated over time, it remains below 0.41 µg/kg and when the first datapoint is removed the overall trend is down. Given the absence of noticeable cap disturbance, any observed dioxin concentrations do not appear to be related to the interaction of the thin-layer cap with underlying sediments. As noted in the Site's Year 12 eMNR^{TM} Performance Monitoring Report, observed dioxin concentrations may be attributable to background sources, but will require further sampling to confirm.

As requested in the EPA's Review Comment letter dated February 4, 2022, total organic carbon analyses were included as part of the 2023 sampling effort of the sediment core samples. TOC concentrations ranged from 533 mg/kg to 14,900 mg/kg. The EPA requested that TOC be analyzed to evaluate the bioaccumulation of dioxins in the benthic invertebrates that are the diet of bottom feeder fish. TOC values are shown in Table I-8, Appendix I.

The OU-4 remedy initially required mobility monitoring for the less contaminated sediment in the Midstream Reach of Welch Creek. With the EPA's approval, following a previous FYR, sediment from the Midstream Reach of Welch Creek is now sampled only following a 25-year storm event (defined as a severe storm event with a peak intensity of about nine inches of rainfall per hour). Although tropical storm Ophelia impacted eastern North Carolina in September 2023, the 25-year storm conditions were not met according to the rainfall data collected from the National Weather Service. Therefore, the Year 12 performance monitoring study did not include Midstream Reach sediment sampling.

OU-4 – Surface Water

Surface water monitoring in Welch Creek is performed to document the performance of the remedy and compliance with cleanup goals. The OU-4 surface water cleanup level for Welch Creek was based on the 2003 North Carolina 2B Surface Water Standard for 2,3,7,8-TCDD of 1.4×10^{-5} ng/L, which North Carolina has since updated to 5×10^{-6} ng/L. Surface water sampling data are compared to the current North Carolina 2B Surface Water Standard. Three surface water grab samples were collected from the Upper Reach in 2023 (Figure I-11, Appendix I). The 2,3,7,8-TCDD congener was not detected at the lowest estimated instrument detection limits in the surface water samples. Octachlorodibenzo-p-dioxin (OCDD) and octachlorodibenzofuran (OCDF) were the predominant detected congeners in the 2023 surface water sampling event, with 1,2,3,4,6,7,8-heptachlorinated dibenzo-p-dioxins and 1,2,3,4,6,7,8-heptachlorodibenzofuran detected at lesser concentrations. Congener profiles in 2019 and 2023 demonstrated higher concentrations of the detected congeners as compared to previous years. In 2016 there were no detected congeners for surface water, and in 2017 and 2018 there was only one congener detected. While the 2023 surface water quality, metals and dioxin analyses are similar to concentrations observed in previous years, dioxin sampling in 2019 and 2023 shows more congeners detected at higher concentrations than the previous three sampling events. The EPA recommends the continuation of dioxin TEQ monitoring in the surface water of OU-4 in order to track the trend and ensure that a declining trend is being achieved in accordance with the RAO.

Dioxin fingerprinting established during the RI found that high relative concentrations of 2,3,7,8-TCDF distinguish paper mill influences, while high relative concentrations of OCDD distinguish non-mill-related influences. The predominant congener in OU-4 surface water has consistently been OCDD, which represents background sources.

Since the initiation of annual OU-4 surface water monitoring in 2012 (Year 1), 2,3,7,8-TCDD has not been detected in any of the Welch Creek surface water samples (Table I-9, Appendix I). However, the analytical method used to analyze surface water samples cannot detect 2,3,7,8-TCDD concentrations as low as the current surface water cleanup target level of 5×10^{-6} ng/L for North Carolina. During this FYR period, the detection limit for 2,3,7,8-TCDD was about three orders of magnitude greater than the cleanup level. Therefore, it is not clear if 2,3,7,8-TCDD is present in surface water at concentrations higher than the state cleanup level, but lower than the analytical detection limits.

OU-4 – Benthic Organisms

The OU-4 remedial action and work plan required sampling and analysis of the benthic community in 2013 through 2016 (Years 2 through 5) following remedy implementation to evaluate benthic recolonization after the application of the sediment cap to determine the impact, if any, of the benthic community on the sediment cap, and determine whether dioxin is present in the organisms. It was agreed that another round of benthic tissue sampling would be performed to better evaluate trends.

Benthic assessment and sampling occurred at four locations in 2023: one upstream station, GT-4, as a reference point, and three locations in the Upper Reach, near transects MT-3, MT-4 and MT-6. The benthic community survey occurred in April 2023. Benthic tissue sampling occurred in May 2023.

According to the 2023 monitoring report, there is a diverse and abundant benthic macroinvertebrate community in the capped area of Welch Creek and the total number of taxa from the reference location as well as the downstream side-slope locations have recovered to numbers close to total taxa observed during pre-remedy implementation. Due to the depth of the sand cap, none of the burrowing benthic organisms would be expected to negatively impact the effectiveness of the cap. Dioxin I-TEQ values in benthic tissue samples have decreased significantly since the baseline survey conducted in 1999. For example, the average downstream I-TEQ concentration in benthic tissue in 1999 was 15.6 ng/kg wet weight; the 2023 downstream average was 4.30 ng/kg wet weight. It should be noted that the downstream average has increased in the last three sampling events, from 1.12 ng/kg in 2014 to 3.78 ng/kg in 2016 and 4.30 ng/kg in 2023. More routine sampling and dioxin analysis for benthic organisms may be needed. Dioxin concentrations in benthic invertebrate tissues were similar to previous sampling events post-remedy implementation and well below concentrations observed pre-remedy. Table I-12 in Appendix I shows the comparison of benthic tissue dioxin TEQ concentrations from 1999 to those collected in 2013, 2014, 2016 and 2023.

OU-4 – Fish Tissue

TRC subcontractor CZR performs OU-4 fish tissue sampling activities to assess the effectiveness of the remedy, to monitor progress toward removal of the remaining fish consumption advisory in Welch Creek and to monitor dioxin concentrations in whole fish tissues. It involves the collection of three fish species at four locations: an upstream reference point, an Upper Reach location, a Midstream Reach location and a downstream location. A secondary goal of Welch Creek fish tissue sampling has been to collect two more species of bottom feeders and forage fish from the two middle locations. As stated in the TRC's 2022 Responses to Review Comments, additional effort was made in 2023 to collect secondary composites in these locations for small forage, large forage and bottom feeder species. Per the updated sampling recommendations, mercury monitoring in fish tissues was discontinued.

Even though a variety of collection methods were used during the 2023 fish sampling event, the sampling event generated a low capture rate of bottom feeders in one location (MT-8 to MT-19). Due to the low capture rate, a two-fish composite was submitted for analysis for this location when the desired minimum number of composites is three. Reduced capture success has been observed in the bottom feeder species in prior Welch Creek sampling events, which has been attributed to naturally low dissolved oxygen.

In 2023, each fillet composite sample collected from Welch Creek exhibited a dioxin I-TEQ concentration below the current North Carolina fish consumption advisory level (4 ng/kg). The 2023 dioxin I-TEQ concentrations in the edible fish tissue are generally consistent with historical monitoring results, except for the 2012 results, which are considered unreliable. The 2023 dioxin I-TEQ in the edible fish tissue shows a downward trend from the concentrations observed during the 1999 RI. Since performance monitoring began in OU-4, fillet samples from both bottom feeders and large and small

forage fish have been below the North Carolina consumption advisory threshold with few exceptions. Table I-13 in Appendix I includes OU-4 fish tissue sampling results.

One of the ecological RAOs for OU-4 is to reduce dioxin concentrations in whole fish tissues over time; therefore, CZR also analyzes whole fish from Welch Creek for dioxin. Whole fish I-TEQ concentrations in Welch Creek have decreased substantially since the RI and 2023 samples are comparable with concentrations collected post-remedy, apart from those in 2012. The majority of whole fish concentrations, which are not considered edible for humans, have been below the fish tissue consumption advisory threshold concentration since performance monitoring began. Figure I-13 shows dioxin I-TEQ concentrations of whole fish in Welch Creek over time.

Site Inspection

The site inspection took place on 12/4/2024. Participants included the EPA RPMs Evan Adams and Randy Bryant, Beth Hartzell with the NC DEQ, Kari Cahoon and JT Lilley with Domtar, Michelle Hays with Domtar's O&M contractor TRC, and Melissa Oakley and Peri Bowser with the EPA FYR support contractor Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. The site inspection checklist is included in Appendix G. Site inspection photographs are included in Appendix H.

The inspection began at the Domtar facility with a site and safety briefing, followed by a tour of the Former Landfill No. 1 Area. Participants observed equipment storage on the gravel portion of the cap. The gravel portion of the cap also serves as overflow parking for logging trucks. The vegetated part of the cap is surrounded by a locked fence. Cap vegetation appeared well-maintained and healthy. No evidence of erosion or burrowing was observed. The vegetated cap is not in use. Groundwater monitoring wells around the landfill cap were clearly labeled, secured with locks and appeared to be in good condition. Participants also observed warning signs posted at the gravel portion of the landfill cap and on the fence surrounding the vegetated landfill cap. Activities that could potentially disturb the cap are restricted. Access to the Domtar facility, and therefore the Former Landfill No. 1 Area and Former Chlorine Plant Area, is restricted by manned security gates at facility entry points. Guards ensure that only facility employees and registered visitors enter the facility. Participants then toured the Former Chlorine Plant Area. The asphalt cap that covers the Former Chlorine Plant Area footprint and subsurface barrier wall appeared to be in good condition. All monitoring wells were flush with the ground surface and secured with bolts.

Participants toured the mile-long sand cap along Welch Creek by boat. The perimeter property fence and dense wetland vegetation on the creek banks limit access to the capped area. No trespassing signs were observed along the creek's banks. Warning signs were observed at one end of the cap, clearly identifying the area as the EPA sediment remediation area and restricting any activities that could disturb the sand cap. However, the warning sign that is typically posted on the pipe bridge at the other end of the sediment cap was missing. The PRP contractor made a note to replace it. The inspection team observed several "no trespassing" signs on the banks of Welch Creek, along the length of the sand cap. Participants also observed a fish consumption advisory sign at the Water Street Landing Boat Access Area, located along the LRR. Nothing observed during the site inspection impacts the protectiveness of the remedy.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:
Yes, the remedy is functioning as intended by the Site's decision documents.

At OU-1, fencing and manned security gates restrict landfill access, and the landfill cap prevents potential human and environmental receptor exposure to contaminated soil below. Landfill inspection and maintenance activities ensure the continued integrity of the landfill cap. Groundwater is not used near the landfill. In general, OU-1 groundwater data collected since implementation of the OU-1 remedy indicate improving groundwater quality in shallow and intermediate wells downgradient of the landfill, confirming the OU-1 remedy is effectively protecting groundwater quality. During the 2021 and 2023 wetland soil sampling event, there were no exceedances of the mercury or chromium cleanup levels. As of the 2023 sampling event, chromium and mercury concentrations in OU-1 wetland soil were below their respective cleanup goals for three consecutive sampling events. Therefore, sampling has been discontinued. The 2016 Declaration of Perpetual Land Use Restrictions prevents groundwater use and installation of new groundwater wells, limits land use to industrial purposes and prevents activities that could impact the integrity of the remedy.

At OU-2, monitored natural recovery is underway, and dioxin concentrations within the top 15 centimeters of sediment were below the target cleanup level of 1 µg/kg according to the Year 12 monitoring report, which is generally consistent with historical concentrations. None of the fillet composites collected from OU-2 during the 2015, 2017, 2019 or 2023 sampling exhibited a dioxin I-TEQ concentration greater than the current North Carolina fish consumption advisory level. Whole fish dioxin I-TEQ concentrations in the LRR have significantly decreased since the RI, indicating progress toward meeting the ecological RAO of reducing dioxin concentrations in whole fish tissues over time.

While groundwater at some OU-3 sampling locations contains mercury concentrations above the cleanup goal, groundwater is not used near the Former Chlorine Plant Area. The installation of the subsurface barrier wall and the limited excavation of mercury-impacted soil have reduced the potential for a future release of mercury to the LRR. The asphalt cap over the Former Chlorine Plant Area reduces infiltration of surface water and prevents potential human exposure to contaminated soil below. Historically, mercury results have been below the method detection limit or cleanup goal for most of the OU-3 groundwater samples collected outside the barrier wall, confirming the overall effectiveness of the barrier wall to protect groundwater quality by reducing the migration of mercury from the Former Chlorine Plant Area. The 2016 Declaration of Perpetual Land Use Restrictions prevents groundwater use and installation of new groundwater wells, limits land use to industrial purposes and prevents activities that could impact the integrity of the remedy.

At OU-4, the sand cap that was placed reduces exposures of local populations and biota to dioxin in sediment. The 2016 Declaration of Perpetual Land Use Restrictions and the 2011 Performance Standards Verification Plan/Operations and Maintenance Plan for the Welch Creek Area help limit the consumption of fish from Welch Creek, maintain the integrity of the sand cap and inform the public of fish advisories and the presence of the sand cap. The cap is located entirely within the Domtar property boundary. Access to the creek is limited by security fencing and by a large expanse of dense

vegetated wetlands on both sides of the creek. According to OU-4 Enhanced Monitored Natural Recovery Performance Monitoring Reports for Year 12, a diverse and abundant benthic macroinvertebrate community has re-colonized the capped area of Welch Creek. Bioturbation, visible through burrowing, was observed in three of the samples, indicating benthic recolonization. Dioxin I-TEQ values in benthic tissue samples have decreased significantly since the baseline survey conducted in 1999. However, due to the average downstream I-TEQ increasing between 2014 and 2023 from 1.12 ng/kg to 4.30 ng/kg for three consecutive sampling events, additional routine sampling and dioxin analysis for benthic organisms may be needed. Dioxin concentrations in benthic invertebrate tissues were similar to previous sampling events post-remedy implementation and well below concentrations observed pre-remedy. The 2023 I-TEQ concentrations in edible fish tissue were consistent with previous performance monitoring results and show a general downward trend from concentrations observed during the 1999 RI. None of the fillet composites collected from Welch Creek in 2023 exhibited a dioxin I-TEQ concentration greater than the North Carolina fish consumption advisory level. Since performance monitoring began in OU-4, fillet samples from both bottom feeders and large and small forage fish have been below the North Carolina consumption advisory threshold (4 ng/kg) with few exceptions. Whole fish I-TEQ concentrations in Welch Creek have decreased substantially from those concentrations reported during the RI, indicating progress toward meeting the ecological RAO of reducing dioxin concentrations in whole fish tissues over time.

The OU-2 and OU-4 RODs established the RAO of achieving concentrations of surface water contaminants at or below surface water standards, to the extent practicable. Analytical results indicate that 2,3,7,8-TCDD has not been detected in any of the OU-2 or OU-4 surface water samples since the initiation of surface water monitoring in 2012. However, the analytical method used to analyze surface water samples for 2,3,7,8-TCDD cannot detect concentrations as low as the current surface water cleanup target level of 5×10^{-6} ng/L. During this FYR period, the detection limit for 2,3,7,8-TCDD was about three orders of magnitude greater than the surface water cleanup level. Therefore, it is not clear if 2,3,7,8-TCDD is present in surface water at concentrations higher than the state cleanup level, but lower than the analytical detection limits.

O&M at all OUs has been adequate and no significant O&M issues were identified in this FYR period. Based on sampling results, the PRP contractor has suggested several modifications to the current sampling schedules that could potentially result in O&M-related cost savings.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Question B Summary:

The exposure assumptions, cleanup levels and RAOs used at the time of the remedy selection remain protective of human health and the environment. There are no complete exposure pathways at the Site. Capping of contaminated soil and sediment prevents direct contact with those wastes. While some groundwater constituents are present at concentrations above North Carolina groundwater standards, no one is using the groundwater. Institutional controls also prevent future exposure to site-related groundwater and capped wastes, as well as prevent consumption of contaminated fish.

The groundwater cleanup goals for OU-1 and OU-3 remain valid. The OU-1 and OU-3 RODs established North Carolina Groundwater Standards for mercury and dioxin as Applicable or Relevant and

Appropriate Requirements (ARARs) for groundwater. The cleanup standard for 2,3,7,8-TCDD has not changed. While the current groundwater standard for mercury has changed slightly since the time of the ROD, the change is not significant and does not affect the protectiveness of the remedy because no one drinks the groundwater. Table J-1 in Appendix J provides more information.

Any changes in toxicity for OU-1 soil COCs that may have occurred since the OU-1 ROD do not affect the protectiveness of the remedy. The OU-1 RI identified unacceptable risks to human and ecological receptors associated with direct contact with the cover soil that previously covered the OU-1 landfill. The landfill cap prevents direct contact with contaminated material below the cap; therefore, there are no complete exposure pathways, regardless of changes in default exposure assumptions or changes in toxicity values. The cleanup levels for dioxin in soil were established before there was an oral noncancer toxicity value, or reference dose (RfD) available. In 2012 the EPA published an oral RfD on the EPA's Integrated Risk Information System (IRIS), recommending a noncancer RfD for 2,3,7,8-TCDD of 7×10^{-10} mg/kg per day. To evaluate whether the OU-1 soil cleanup levels remain protective in light of the toxicity value update, this FYR compared the OU-1 soil cleanup levels to the EPA's industrial regional screening levels (RSLs) (Appendix K). The dioxin cleanup levels are associated with cancer risk levels that are within the EPA's risk management range of 1×10^{-4} to 1×10^{-6} and at, or below the EPA's target noncancer hazard quotient (HQ) of 1 (see Table K-1 in Appendix K). Therefore, the dioxin cleanup levels for OU-1 soil remain protective. The OU-1 remedy also aimed to eliminate potential risk to site-specific ecological receptors associated with exposure to chromium and mercury in the wetland soil adjacent to the OU-1 landfill. The OU-1 remedy for wetland soil involves monitoring of the natural recovery process until the cleanup standards are met. In 2021 and 2023, all wetland soil sample results were below the wetland soil cleanup goals for chromium and mercury, which makes three consecutive sampling events below cleanup goals. Since 2005, there have been only sporadic exceedances of chromium and mercury cleanup goals in wetland soil samples.

The OU-3 soil cleanup goal was established to be protective of groundwater and continues to be protective. Mercury-contaminated soil is contained within the subsurface barrier wall and capped with concrete so there is no complete exposure pathway for direct human contact. The groundwater monitoring data collected from outside the barrier wall shows that the wall is functioning as designed and that mercury in soil is not migrating into groundwater outside the wall.

The OU-3 and OU-4 RODs established the North Carolina 2B surface water standards as ARARs for the Site. The North Carolina 2B surface water standard for mercury, selected as the OU-3 surface water standard, has not changed. The OU-4 surface water cleanup level for Welch Creek was based on the 2003 North Carolina 2B surface water standard for 2,3,7,8-TCDD of 1.4×10^{-5} ng/L, which is now 5×10^{-6} ng/L. Table J-2 in Appendix J provides more information. According to the OU-2 and OU-4 monitoring reports, surface water sampling data are compared to the current, lower North Carolina 2B surface water standard for 2,3,7,8-TCDD of 5×10^{-6} ng/L. However, this standard is not recorded in a decision document as a cleanup goal. While 2,3,7,8-TCDD has not been detected in any of the OU-2 or OU-4 surface water samples since the start of surface water monitoring in 2012, the current North Carolina surface water standard for 2,3,7,8-TCDD is significantly lower than the laboratory method detection limit. Welch Creek is not a source of drinking water and the site's human health risk assessment did not identify unacceptable risk associated with exposure to surface water. While the surface water standard also considers the protection of human health based on the consumption of fish, the fish consumption advisories in place for Welch Creek and the LRR, based on fish tissue

concentrations, further prevent human exposure to site contaminants in surface water/biota that would result in unacceptable health risks. Therefore, the change of the surface water standard for 2,3,7,8-TCDD does not affect the protectiveness of the remedy.

For the OU-4 Welch Creek, the range of calculated remediation goals protective of ecological receptors for sediment varied from 0.41 µg/kg to 4.1 µg/kg. The EPA selected a surficial sediment cleanup goal of 1 µg/kg dioxin TEQ (1,000 ng/kg) as a not-to-exceed value from within the range of remedial goal options. The intention of the sediment cleanup goal is to be protective of surface water and fish consumption.

Fish consumption advisories are in place at the LRR and Welch Creek and will remain in effect until tissue concentrations have met the state guidelines. At the time the RODs were issued, the advisories were based on a 3 ng/kg dioxin concentration and, as of December 2013, are based on a 4 ng/kg TEQ. The EPA recommends that monitoring of fish tissue levels should continue until a declining trend is met, in accordance with the RAOs.

No new toxicological studies have come to light since the last FYR that would question the protectiveness of the remedy from the standpoint of ecological risk.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

Hurricane Helene impacted North Carolina in late September 2024. The EPA evaluated the Site after Hurricane Helene and determined that no storm-related impacts or releases occurred. No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
OU-1 and OU-3

Issues and Recommendations Identified in the FYR:

OU(s): OU-2, OU-4	**Issue Category: Monitoring**
	Issue: The analytical method used to analyze surface water samples for 2,3,7,8-TCDD cannot detect 2,3,7,8-TCDD concentrations as low as the current North Carolina surface water criteria of 5×10^{-6} ng/L. Currently, this standard is lower than the capacity to reliably quantify it using routinely available analytical services.
	Recommendation: Continue to periodically review the method used to analyze surface water samples for 2,3,7,8-TCDD for further improvements to achieve

	even lower detection limits and ultimately match the current North Carolina surface water criteria of 5 x 10^{-6} ng/L.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	6/30/2027

OTHER FINDINGS

Additional recommendations were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

General Recommendations

- Based on sampling results, the PRP has requested several modifications to the current sampling schedules for all OUs. Consider updating monitoring plans for all OUs with approved, updated monitoring requirements and schedules. Key O&M changes being requested by the PRP include:
    - OU-1 – Former Landfill No.1 Area: Discontinuation of the wetland soil sampling was recommended in Year 19 because the criteria have been met.
    - OU-2 – LRR: Discontinuation of the fine-layer coring was recommended in Year 12 because the criteria have been met. Fish tissue and surface water monitoring are still recommended once in the next five-year period, which was a PRP recommendation during the previous FYR that has not yet been formally approved. A request to reduce the annual reporting requirements of the ecological conditions was made in Year 12 (2023).
    - OU-3 – Former Chlorine Plant Area: It was recommended in Year 19 to reduce the number of monitoring points due to decreased concentrations and reduce the sampling from biennial to once in the next five years.
    - OU-4 – Welch Creek: A formal agreement was not reached with the EPA regarding the sampling frequency of sediment, surface water or fish tissue during the previous FYR. Sampling this media was again recommended once in the next five-year period in the Year 12 monitoring report. Discontinuing benthic tissue sampling was also recommended in the Year 12 report because the criteria have been met.

Recommendation for OU-2:

- In the future, it may be appropriate to update the surface water cleanup goal for 2,3,7,8-TCDD in a decision document, particularly if analytical method detection limits improve and can achieve the updated surface water standard.
- To ensure the RAO of a reduction in dioxin concentrations in whole fish tissues over time is met, continue sampling until that trend can be established.
- Upstream surface water sampling and supplemental fingerprinting analysis indicate dioxin contributions from other upstream or natural factors. Continued sampling will need to occur at upstream locations to ensure this increase is not site related.

Recommendation for OU-4:

- In the future, it may be appropriate to update the surface water cleanup goal for 2,3,7,8-TCDD in a decision document, particularly if analytical method detection limits improve and can achieve the updated surface water standard.
- Dioxin concentrations in benthic invertebrate tissues were similar to previous sampling events post-remedy implementation and well below concentrations observed pre-remedy. However, due to the average downstream I-TEQ increasing between 2014 and 2023 from 1.12 ng/kg to 4.30 ng/kg in benthic tissue for three consecutive sampling events, more routine sampling and dioxin analysis for benthic organisms may be needed.
- Ensure the missing warning sign on the pipe bridge in Welch Creek is replaced.
- To ensure the RAO of a reduction in dioxin concentrations in whole fish tissues over time is met, continue sampling until that trend can be established.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement	
Operable Unit: OU-1	*Protectiveness Determination:* Protective
Protectiveness Statement: The selected remedy for OU-1 protects human health and the environment because exposure pathways that could result in unacceptable risks have been addressed. Fencing and manned security gates restrict landfill access and the landfill cap prevents potential human and environmental receptor exposure to contaminated soil below. Shallow groundwater is not used in the vicinity of the landfill and landfill inspection and maintenance activities ensure the continued integrity of the landfill cap. Institutional controls limit land use to industrial land use only and prohibit groundwater use, installation of drinking water wells and any activities that could impact the integrity of the OU-1 remedy.	

Protectiveness Statement	
Operable Unit: OU-2	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The selected remedy for OU-2 is currently protective of human health and the environment. Monitored natural recovery is underway, and exposure pathways that could result in unacceptable risks have been addressed through NC DHHS fish consumption advisories, which prevent or reduce potential human consumption of contaminated fish. However, for the remedy to be protective over the long term, continue to periodically review the method used to analyze surface water samples for 2,3,7,8-TCDD for further improvements to achieve even lower detection limits and ultimately match the current North Carolina surface water criteria of 5×10^{-6} ng/L. Currently, this standard is lower than the capacity to reliably quantify it using routinely available analytical services.	

Protectiveness Statement

Operable Unit:	*Protectiveness Determination:*
OU-3	Protective

Protectiveness Statement:
The selected remedy for OU-3 protects human health and the environment because exposure pathways that could result in unacceptable risks have been addressed. Groundwater is not used in the vicinity of the Former Chlorine Plant Area. The subsurface barrier wall and the limited excavation of mercury-impacted soil have reduced the potential for a future release of mercury to the LRR. The asphalt cap over the Former Chlorine Plant Area reduces infiltration of surface water and prevents potential human exposures to contaminated soil below. Institutional controls limit land use to industrial land use only and prohibit groundwater use, installation of drinking water wells and any activities that could impact the integrity of the OU-3 remedy.

Protectiveness Statement

Operable Unit:	*Protectiveness Determination:*
OU-4	Short-term Protective

Protectiveness Statement:
The selected remedy for OU-4 currently protects human health and the environment because exposure pathways that could result in unacceptable risks have been addressed. The sand cap serves as an exposure control barrier to underlying sediment and limits re-suspension of impacted underlying sediment. Institutional controls help limit the consumption of fish from Welch Creek, help maintain the integrity of the sand cap, inform the public of fish advisories and the presence of the sand cap, and prohibit any activities in the uplands area adjacent to the upstream reaches of Welch Creek that could impact the integrity of the sand cap. However, for the remedy to be protective over the long term, continue to periodically review the method used to analyze surface water samples for 2,3,7,8-TCDD for further improvements to achieve even lower detection limits and ultimately match the current North Carolina surface water criteria of 5×10^{-6} ng/L. Currently, this standard is lower than the capacity to reliably quantify it using routinely available analytical services.

Sitewide Protectiveness Statement

Operable Unit:	*Protectiveness Determination:*
Sitewide	Short-term Protective

Protectiveness Statement:
The selected remedy for the Site currently protects human health and the environment because exposure pathways that could result in an unacceptable risk have been addressed. Fencing and manned security gates for OU-1 restrict landfill access and the landfill cap prevent potential human and environmental receptor exposure to contaminated soil below. Shallow groundwater is not used in the vicinity of the landfill and landfill inspection and maintenance activities ensure the continued integrity of the landfill cap. For OU-2, monitored natural recovery is underway, and exposure pathways that could result in unacceptable risks have been addressed through NC DHHS fish consumption advisories, which prevent or reduce potential human consumption of contaminated fish. For OU-3, groundwater is not used in the vicinity of the Former Chlorine Plant Area. The subsurface barrier wall and the limited excavation of mercury-impacted soil have reduced the potential for a future release of mercury to the LRR. The asphalt cap over the Former Chlorine Plant Area reduces infiltration of surface water and prevents potential human exposures to contaminated soil below. For OU-4, the sand cap serves as an exposure control barrier to underlying sediment and

limits re-suspension of impacted underlying sediment. Institutional controls limit land use to industrial land use only and prohibit groundwater use, installation of drinking water wells and any activities that could impact the integrity of the OU-1 and OU-3 remedies. NC DHHS fish consumption advisories apply to OU-2 and OU-4, which prevent or reduce potential human consumption of contaminated fish. In addition, for OU-4, institutional controls help maintain the integrity of the sand cap and prohibit any activities in the uplands area adjacent to the upstream reaches of Welch Creek that could impact the integrity of the sand cap. However, for the remedy to be protective over the long term, the following actions need to be taken:

- Continue to periodically review the method used to analyze surface water samples for 2,3,7,8-TCDD for further improvements to achieve even lower detection limits and ultimately match the current North Carolina surface water criteria of 5×10^{-6} ng/L. Currently, this standard is lower than the capacity to reliably quantify it using routinely available analytical services.

VIII. NEXT REVIEW

The next FYR Report for the Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Alternative Approach site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2020 (Year 16) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Landfill No. 1 Area – Operable Unit 1. Prepared by TRC for Domtar Paper Company. February 2021.

2020 (Year 16) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Chlorine Plant Area– Operable Unit 3. Prepared by TRC for Domtar Paper Company. February 2021.

2021 (Year 17) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Landfill No. 1 Area – Operable Unit 1. Prepared by TRC for Domtar Paper Company. January 2022.

2021 (Year 17) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Chlorine Plant Area– Operable Unit 3. Prepared by TRC for Domtar Paper Company. January 2022.

2022 (Year 18) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Landfill No. 1 Area – Operable Unit 1. Prepared by TRC for Domtar Paper Company. December 2022.

2022 (Year 18) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Chlorine Plant Area– Operable Unit 3. Prepared by TRC for Domtar Paper Company. December 2022.

2023 (Year 19) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Landfill No. 1 Area – Operable Unit 1. Prepared by TRC for Domtar Paper Company. December 2023.

2023 (Year 19) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Chlorine Plant Area– Operable Unit 3. Prepared by TRC for Domtar Paper Company. December 2023.

2024 (Year 20) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Landfill No. 1 Area – Operable Unit 1. Prepared by TRC for Domtar Paper Company. December 2024.

2024 (Year 20) Annual Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Chlorine Plant Area– Operable Unit 3. Prepared by TRC for Domtar Paper Company. December 2024.

Declaration of Perpetual Land Use Restrictions for the Property Owned by Domtar Paper Company, LLC. Prepared by Kilpatrick, Townsend & Stockton LLP for Domtar Paper Company, LLC. September 2016.

First Five-Year Review for the Weyerhaeuser Company Superfund Site, Plymouth, Martin County, North Carolina. United States Environmental Protection Agency Region 4. May 5, 2010.

Record of Decision, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Chlorine Plant Area– Operable Unit 3, Plymouth, Martin County, North Carolina.
United States Environmental Protection Agency Region 4. September 29, 2003.

Record of Decision, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Landfill No. 1 Area – Operable Unit 1, Plymouth, Martin County, North Carolina.
United States Environmental Protection Agency Region 4. June 19, 2002.

Record of Decision, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Lower Roanoke River Area – Operable Unit 2, Plymouth, Martin County, North Carolina.
United States Environmental Protection Agency Region 4. September 24, 2008.

Record of Decision, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Welch Creek Area – Operable Unit 4, Plymouth, Martin County, North Carolina.
United States Environmental Protection Agency Region 4. September 26, 2007.

Remedial Action Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Chlorine Plant Area– Operable Unit 3, Weyerhaeuser Company, Plymouth, North Carolina.
United States Environmental Protection Agency Region 4. September 2006.

Remedial Action Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Landfill No. 1 Area – Operable Unit 1, Plymouth, Martin County, North Carolina.
United States Environmental Protection Agency Region 4. February 2006, Revised June 2006.

Remedial Action Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Lower Roanoke River– Operable Unit 2, Plymouth, Martin County, North Carolina.
United States Environmental Protection Agency Region 4. September 2008.

Remedial Action Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Welch Creek Area – Operable Unit 4, Plymouth, Martin County, North Carolina. Prepared by TRC for
United States Environmental Protection Agency Region 4. April 2012, Revised July 2012.

Remedial Investigation Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Chlorine Plant Area– Operable Unit 3, Plymouth, North Carolina.
United States Environmental Protection Agency Region 4. June 2000.

Remedial Investigation Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Former Landfill No. 1 Area – Operable Unit 1, Plymouth, North Carolina. Prepared by RMT, Inc. for
United States Environmental Protection Agency Region 4. June 2001, Revised October 2001.

Remedial Investigation Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Lower Roanoke River– Operable Unit 2, Plymouth, North Carolina. Prepared by CDM Federal Programs Corporation for United States Environmental Protection Agency Region 4. June 2003, Revised March 2004

Responses to United States Environmental Protection Agency (EPA) Review Comments on the Third Five-Year Review (5YR) Sampling Frequency. Prepared by TRC. September 2020.

Responses to United States Environmental Protection Agency (EPA) Review Comments on the OU-2 and OU-4 Sampling. Prepared by TRC. September 2022.

Second Five-Year Review for the Weyerhaeuser Company Superfund Site, Plymouth, Martin County, North Carolina. United States Environmental Protection Agency Region 4. June 2, 2015.

Third Five-Year Review for the Weyerhaeuser Company Superfund Alternative Approach Site, Plymouth, Martin County, North Carolina. United States Environmental Protection Agency Region 4. July 16, 2020.

Year 9 Monitored Natural Recovery Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Lower Roanoke River– Operable Unit 2. Prepared by TRC for Domtar Paper Company. March 2021.

Year 10 Monitored Natural Recovery Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Lower Roanoke River– Operable Unit 2. Prepared by TRC for Domtar Paper Company. January 2022.

Year 11 Monitored Natural Recovery Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Lower Roanoke River– Operable Unit 2. Prepared by TRC for Domtar Paper Company. December 2022.

Year 12 Enhanced Monitored Natural Recovery Performance Monitoring Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Welch Creek Area – Operable Unit 4. Prepared by TRC for Domtar Paper Company. February 2024.

Year 12 Monitored Natural Recovery Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Lower Roanoke River– Operable Unit 2. Prepared by TRC for Domtar Paper Company. February 2024.

Year 13 Monitored Natural Recovery Report, Weyerhaeuser Co. Plymouth Wood Treating Plant Superfund Site, Lower Roanoke River– Operable Unit 2. Prepared by TRC for Domtar Paper Company. December 2024.

APPENDIX B – CURRENT SITE STATUS

Environmental Indicators
- Current human exposures at the Site are under control. *- Current groundwater migration is under control.*

Are Necessary Institutional Controls in Place?
☒ All ☐ Some ☐ None

Has EPA Designated the Site as Sitewide Ready for Anticipated Use?
☒ Yes ☐ No

Has the Site Been Put into Reuse?
☒ Yes ☐ No

APPENDIX C – SITE CHRONOLOGY

Table C-1: Site Chronology

Event	Date
Pulp and paper production began at the Site	1937
Operators discharged facility wastewater directly to nearby surface water bodies	1937-1956
Weyerhaeuser acquired the site facility from the Kieckhefer-Eddy Company and implemented in-plant waste control improvements	1957
The state of North Carolina issued a permit to Weyerhaeuser to discharge wastewater to Welch Creek	1969
Wastewater discharges became subject to National Pollutant Discharge Elimination System regulations	1975
Weyerhaeuser closed the landfill (OU-1)	1981
The state of North Carolina conducted a preliminary site assessment	March 1, 1985
Weyerhaeuser conducted voluntary cleanup at the Former Chlorine Plant Area (OU-3)	1986 to 1992
EPA and Weyerhaeuser entered into an AOC and Weyerhaeuser initiated RIs and FSs for OUs 1, 3 and 4	March 24, 1998
EPA initiated the OU-2 RI/FS	August 13, 1999
Weyerhaeuser completed the OU-1 RI/FS and EPA issued a ROD for OU-1	June 19, 2002
Weyerhaeuser began the remedial design of the OU-1 remedy	May 3, 2003
EPA issued a Consent Decree to Weyerhaeuser for OU-1	August 18, 2003
Weyerhaeuser completed the OU-3 RI/FS and EPA issued a ROD for OU-3	September 29, 2003
Weyerhaeuser began the remedial design of the OU-3 remedy	April 23, 2004
EPA issued a Consent Decree to Weyerhaeuser for OU-3	July 27, 2004
Weyerhaeuser completed the remedial design of the OU-1 remedy	November 8, 2004
Weyerhaeuser began the remedial action for OU-1	April 18, 2005
Weyerhaeuser completed the remedial design of the OU-3 remedy and began remedial action at OU-3	June 27, 2005
Weyerhaeuser completed the OU-1 remedial action	November 9, 2005
Weyerhaeuser completed the OU-3 remedial action	September 28, 2006
Domtar acquired the Site from Weyerhaeuser and assumed all site-related environmental cleanup obligations	March 7, 2007
Weyerhaeuser completed the OU-4 RI/FS and EPA issued a ROD for OU-4	September 26, 2007
Domtar completed the OU-2 RI/FS and EPA issued a ROD for OU-2	September 24, 2008
EPA issued a Consent Decree to Domtar for OU-4	January 7, 2009
Domtar began the OU-4 remedial design	June 2009
EPA completed the Site's first FYR Report	May 5, 2010
Domtar completed the OU-4 remedial design	September 22, 2010
Domtar began the OU-2 remedial design	September 30, 2010
EPA issued a Consent Decree to Domtar for OU-2	April 5, 2011
Domtar completed the OU-2 remedial design and initiated the OU-2 remedial action	September 20, 2011

Event	Date
Domtar began the OU-4 remedial action	November 7, 2011
Domtar completed the remedial action at OU-4	February 1, 2012
Domtar began long-term monitoring/completed remedial action at OU-2	June 2012
EPA completed the Site's second FYR Report	June 2, 2015
Domtar filed a Declaration of Perpetual Land Use Restrictions with the Martin County Register of Deeds	September 23, 2016
The Site achieved the Sitewide Ready for Anticipated Use performance measure	September 28, 2017
EPA completed the Site's third FYR Report	July 16, 2020

APPENDIX D – INSTITUTIONAL CONTROLS

Figure D-1: Excerpt from the 2016 Declaration of Perpetual Land Use Restrictions

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0045

FILED
MARTIN COUNTY NC
KIMBERLY J. GRIFFIN
REGISTER OF DEEDS

FILED	Sep 23, 2016
TIME	01:17 pm
BOOK	0N-26
START PAGE	0045
END PAGE	0051
INSTRUMENT #	01767
RECORDING	$26.00
EXCISE TAX LCB	(None)

BK:0N-26 PG:0045

Lois C. Beck, Assistant

Prepared by and Return to:

INDEXED
✓ GRANTOR ✓ GRANTEE

Kilpatrick Townsend & Stockton LLP (JCL)
4208 Six Forks Road, Suite 1400
Raleigh, NC 27609

DECLARATION OF PERPETUAL LAND USE RESTRICTIONS

For Property Owned By: Domtar Paper Company, LLC

Domtar Paper Company, LLC (formerly Weyerhaeuser Company), Martin County and Washington County, North Carolina

In reference to Consent Decrees number No. 4: 03-CV-90-H(3), No. 4: 04-CV-77-FL(1) and No. 4: 08-CV-179-D, the real property which is the subject of this Declaration of Perpetual Land Use Restrictions ("Declaration") is contaminated with hazardous substances, and is an INACTIVE HAZARDOUS SUBSTANCE OR WASTE DISPOSAL SITE as defined by North Carolina's Inactive Hazardous Sites Response Act of 1987, which consists of Section 130A-310 through Section 130A-310.19 of the North Carolina General Statutes ("N.C.G.S.") and the Comprehensive Environmental Response Compensation and Liability Act, 42 U.S.C. § 9601 *et seq.* The real property which is the subject of this Declaration shall hereinafter referred to as the "Site." This Declaration is part of a Corrective Action for the Site that has been approved by the United States Environmental Protection Agency ("EPA") and the Secretary of the North Carolina Department of Environmental Quality (or its successor in function), or his/her delegate, as authorized by N.C.G.S. Section 130A-310. The North Carolina Department of Environmental Quality shall hereinafter be referred to as "DEQ."

Domtar Paper Company, LLC, Fort Mill, South Carolina, is the owner in fee simple of the Site, which is located on NC Highway 149 North the Counties of Martin and Washington, Jamesville Township, State of North Carolina, and is a portion of the real property legally

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described in Deed Book A-22 Page 96 in the Office of the Register of Deeds for Martin County and in Deed Book 443, Page 601 in the Office of the Register of Deeds for Washington County. The Site is composed of three areas:

1. That portion of this tract or parcel of land, which is the former location of a landfill (also known as Landfill No. 1) at the Site and is referred to as "Operable Unit 1" or "OU 1" in the Consent Decree entered on August 18, 2003 in the matter of *United States of America v. Weyerhaeuser*, Civil Action No. 4: 03-CV-90-H(3), U.S. District Court, Eastern District of North Carolina ("Area OU1");

2. That portion of this tract or parcel of land, which is the former location of a Chloride Plant at the Site and is referred to as "Operable Unit 3" or "OU 3" in the Consent Decree entered on July 27, 2004 in the matter of *United States of America v. Weyerhaeuser*, Civil Action No. 4: 04-CV-77-FL(1), U.S. District Court, Eastern District of North Carolina ("Area OU3"); and

3. That portion of this tract or parcel of land located immediately adjacent to Welch Creek included in the 4.5 mile portion of the lower creek extending upstream from the Highway 64 bridge to its confluence with the Roanoke River referred to as "Operable Unit 4" or "OU4" in the Consent Decree entered on January 7, 2009 in the matter of *United States of America v. Weyerhaeuser*, Civil Action No. 4: 08-CV-179-D, U.S. District Court, Eastern District of North Carolina. ("Area OU4").

The Site is also shown on Attachment A, which is a survey plat that is concurrently being recorded with the Declaration at Map Book C Page 194 & 195 in the Office of Register of Deeds for Martin County and Map Book ____ Page ____ in the Office of Register of Deeds for Washington County.

For the purpose of protecting public health and the environment, Domtar Paper Company, LLC, hereby declares that all of the Site shall be held, sold and conveyed subject to the following perpetual land use restrictions, which shall run with the land; shall be binding on all parties having any right, title or interest in the Site or any part thereof, their heirs, successors and assigns; and shall, as provided in N.C.G.S. Section 130A-310.3(f), be enforceable without regard to lack of privity of estate or contract, lack of benefit to particular land, or lack of any property interest in particular land. These restrictions shall continue in perpetuity and cannot be amended or canceled unless and until the Martin County Register of Deeds receives and records the written concurrence of the EPA and the Secretary of DEQ (or its successor in function), or his/her delegate. If any provision of this Declaration is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

PERPETUAL LAND USE RESTRICTIONS

1. Areas OU1 and OU3 of the Site shall be used exclusively for commercial and industrial purposes and shall not be used for child care centers, school, parks, recreational areas, or athletic fields except for uses that have prior approval of DEQ or its successors in function.

2. No alteration, disturbance or removal of the existing soil, concrete, landscape and contours shall occur at Areas OU1 and Area OU3 of the Site without prior approval by DEQ or its successor in function, other than repair work for minor disturbances due to normal wear and tear for industrial activities and natural erosion or remedial action to existing underground pipe and plumbing installation or other remedial activities. The Site shall not be used for any new above- or below-ground construction or improvements (including, but not limited to, utilities, roads, and sidewalks) without prior approval by DEQ or its successor in function.

3. Dominion Power owns an easement for a high power transmission line, which traverses Area OU1 and which may result in disturbance of Area OU1. Dominion Power is required to repair any disturbances to Area OU1.

4. Groundwater beneath the Site shall not be used as a source of potable or irrigation water. The installation of groundwater wells or other devices for access to groundwater for any purpose other than monitoring groundwater quality is prohibited without prior approval by DEQ, or its successor in function.

5. Activities necessary to maintain the security of the Site, prevent human exposure to contaminated materials, and to prevent erosion of the contaminated soil at the Site are permitted, if approved in advance by DEQ or its successor in function.

6. With regard to Area OU4 of the Site only:

a. each person who owns any portion of Area OU4, shall notify all future owners or tenants of that portion of the presence of wastewater contaminated solids along the bottom of Welch Creek and the presence of a sand cap over contaminated wastewater solids in the upstream reach of Welch Creek.

b. no activities shall be conducted in the uplands areas adjacent to the upstream reaches of Welch Creek (as depicted on Attachment A) that could impact the integrity of the sand cap over contaminated wastewater solids (including, but not limited to, a boat launch, ramp or pier) without prior approval by DEQ or its successor in function.

c. each person who owns any portion of the Site shall consult with EPA and DEQ or its successor in function prior to undertaking any construction activities or improvements in Area OU4.

7. Each person who owns any portion of the Site shall submit a letter report, containing the notarized signature of the owner, in January of each year on or before January 31st, to the EPA Region 4 Superfund Division and the Superfund Section of the Division of Waste Management of DEQ, or its successor in function, confirming that this Declaration is still recorded in the Office of the Martin County Register of Deeds and in the Office of Washington County Register of Deeds and that activities and conditions at the Site remain in compliance with the land use restrictions herein.

8. No person conducting environmental assessment or remediation at the Site, or involved in determining compliance with applicable land use restrictions, at the direction of, or pursuant to a permit or order issued by, EPA and DEQ or its successor in function may be denied access to the Site for the purpose of conducting such activities.

9. Each person who owns any portion of the Site shall cause the instrument of any sale, lease, grant, or other transfer of any interest in the Site to include a provision expressly requiring the lessee, grantee, or transferee to comply with this Declaration. The failure to include such provision shall not affect the validity or applicability of any land use restriction in this Declaration.

REPRESENTATIONS AND WARRANTIES

The owner of the Site hereby represents and warrants to the other signatories hereto:

that the owner of the Site is the sole owner of the Site and that the owner of the Site holds fee simple title to the Site free, clear and unencumbered; **or** that the owner of the Site has provided to DEQ the names of all other persons that own an interest in or hold an encumbrance to the Site and have notified such persons of the owner of the Site's intention to enter into this Declaration;;

that the owner of the Site has the power and authority to enter into this Declaration, to grant the rights and interests herein provided and to carry out all obligations hereunder; and

that this Declaration will not materially violate or contravene or constitute a material default under any other agreement, document or instrument to which the owner of the Site is a party or by which the owner of the Site may be bound or affected.

ENFORCEMENT

The above land use restrictions are an integral part of the remedy for the contamination at the Site. Adherence to the restrictions is necessary to protect public health and the environment. These land use restrictions shall be enforced by any owner, operator, or other party responsible for any part of the Site. The above land use restrictions may also be enforced by EPA or DEQ through the remedies provided in N.C.G.S. Chapter 130A, Article 1, Part 2 or by means of a civil action, and may also be enforced by any unit of local government having jurisdiction over any part of the Site. Any attempt to cancel this Declaration without the approval of EPA or its successor in function shall constitute noncompliance with the corrective action measures approved by EPA for the Site, and shall be subject to enforcement by EPA to the full extent of the law. Failure by any party required or authorized to enforce any of the above restrictions shall in no event be deemed a waiver of the right to do so thereafter as to the same violation or as to one occurring prior or subsequent thereto.

FUTURE SALES, LEASES, CONVEYANCES AND TRANSFERS

When any portion of the Site is sold, leased, conveyed or transferred, pursuant to N.C.G.S. Section 130A-310.8(e) the deed or other instrument of transfer shall contain in the description section, in no smaller type than that used in the body of the deed or instrument, a statement that the real property being sold, leased, conveyed, or transferred has been used as a hazardous substance or waste disposal site and a reference by book and page to the recordation of the Notice of Inactive Hazardous Substance or Waste Disposal Site referenced in this Declaration.

OWNER SIGNATURE

IN WITNESS WHEREOF, I execute these presents on this 1st day of September, 2016.

DOMTAR PAPER COMPANY, LLC

By: _____
Name: Razvan L. Theodoru
Title: Secretary

STATE OF South Carolina
COUNTY OF York

I, Tracie Redmond, a Notary Public, do hereby certify that Razvan L. Theodoru personally appeared before me this day, produced proper identification in the form of a drivers' license, and declared that he is the Secretary of Domtar Paper Company LLC and that by authority duly given, and as the act of Domtar Paper Company LLC, he has signed this Declaration.

WITNESS my hand and official seal this 1st day of September, 2016.

Tracie Redmond
Notary Public

MY COMMISSION EXPIRES:
June 19, 2026

My Commission expires: _____

(SEAL)

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APPROVAL AND CERTIFICATION OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

The foregoing Declaration of Perpetual Land Use Restrictions is hereby approved and certified.

By: _____

Jim Bateson, L G., Chief
Superfund Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources

STATE OF NORTH CAROLINA
COUNTY OF Wake

I, Kathleen Lance, a Notary Public, do hereby certify that Jim Batson L.G. Chief NCDENR personally appeared before me this day, produced proper identification in the form of drivers license, and signed this Declaration.

WITNESS my hand and official seal this 20 day of September, 2016

_____
Notary Public

My Commission expires: January 26, 2019

[SEAL]

KATHLEEN LANCE
NOTARY PUBLIC
WAKE COUNTY, N.C.

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$26.00 rec.

Mail to: Kilpatrick Townsend & Stockton LLP (JCL)
4208 Six Forks Road, Suite 1400
Raleigh, N.C. 27609

APPENDIX E – PRESS NOTICE

EPA to review cleanups at 47 Southeast Superfund Sites this year

Contact: EPA Region 4 Press Office - (404) 562-8400, region4press@epa.gov

ATLANTA (October 30, 2024) – Today, the U.S. Environmental Protection Agency (EPA) announced that comprehensive reviews will be conducted of completed cleanup work at 47 Superfund sites in the Southeast.

The sites, located in Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee, will undergo a legally required Five-Year Review to ensure that previous remediation efforts at the sites continue to protect public health and the environment.

"Five-Year Reviews are an integral part of the site remediation process because they help make sure remedies are still protective," **said Acting Regional Administrator Jeaneanne Gettle**. "The Southeast Region will benefit tremendously from the full restoration of Superfund sites, which can become valuable parts of the community landscape."

The Superfund Sites where EPA will conduct Five-Year Reviews in 2025 are listed below. The web links provide detailed information on site status as well as past assessment and cleanup activity. Once the Five-Year Review is complete, its findings will be posted in a final report at https://www.epa.gov/superfund/search-superfund-five-year-reviews.

Alabama

ANNISTON ARMY DEPOT (SOUTHEAST INDUSTRIAL AREA)

ANNISTON PCB SITE (MONSANTO CO)

TRIANA/TENNESSEE RIVER

Florida

AGRICO CHEMICAL CO.

ARKLA TERRA PROPERTY

BROWN'S DUMP

CHEMFORM, INC.

HIPPS ROAD LANDFILL

HOMESTEAD AIR FORCE BASE

JACKSONVILLE ASH SITE

JJ SEIFERT MACHINE

MADISON COUNTY SANITARY LANDFILL

NORTHWEST 58TH STREET LANDFILL

PEAK OIL CO./BAY DRUM CO.

PETROLEUM PRODUCTS CORP.

PIONEER SAND CO.

SANFORD DRY CLEANERS

SANFORD GASIFICATION PLANT

SHERWOOD MEDICAL INDUSTRIES

STANDARD AUTO BUMPER CORP.

STAUFFER CHEMICAL CO (TAMPA)

STAUFFER CHEMICAL CO. (TARPON SPRINGS)

YELLOW WATER ROAD

Georgia

MONSANTO CORP. (AUGUSTA PLANT)

North Carolina

CHARLES MACON LAGOON AND DRUM STORAGE

CAMP LEJEUNE MILITARY RES. (USNAVY)

CAROLINA TRANSFORMER CO.

DAVIS PARK ROAD TCE

FCX, INC. (WASHINGTON PLANT)

JFD ELECTRONICS/CHANNEL MASTER

SIGMON'S SEPTIC TANK SERVICE

WEYERHAEUSER CO PLYMOUTH WOOD TRTNG PT

South Carolina

AQUA-TECH ENVIRONMENTAL INC (GROCE LABS)

MACALLOY CORPORATION

PARA-CHEM SOUTHERN, INC.

PARRIS ISLAND MARINE CORPS RECRUIT DEPOT

SANGAMO WESTON, INC./TWELVE-MILE CREEK/LAKE HARTWELL PCB CONTAMINATION

SAVANNAH RIVER SITE (USDOE)

SCRDI DIXIANA

TOWNSEND SAW CHAIN CO.

Tennessee

CARRIER AIR CONDITIONING CO.

ICG ISELIN RAILROAD YARD

MALLORY CAPACITOR CO.

MILAN ARMY AMMUNITION PLANT

NORTH HOLLYWOOD DUMP

SIXTY-ONE INDUSTRIAL PARK

WRIGLEY CHARCOAL PLANT

Background

Throughout the process of designing and constructing a cleanup at a hazardous waste site, EPA's primary goal is to make sure the remedy will be protective of public health and the environment. At many sites, where the remedy has been constructed, EPA continues to ensure it remains protective by requiring reviews of cleanups every five years. It is important for EPA to regularly check on these sites to ensure the remedy is working properly. These reviews identify issues (if any) that may affect the protectiveness of the completed remedy and, if necessary, recommend action(s) necessary to address them.

There are many phases of the Superfund cleanup process including considering future use and redevelopment at sites and conducting post cleanup monitoring of sites. EPA must ensure the remedy is protective of public health and the environment and any redevelopment will uphold the protectiveness of the remedy into the future.

The Superfund program, a federal program established by Congress in 1980, investigates and cleans up the most complex, uncontrolled, or abandoned hazardous waste sites in the country and endeavors to facilitate activities to return them to productive use. In total, there are more than 280 Superfund sites across the Southeast.

More information:

EPA's Superfund program: https://www.epa.gov/superfund

APPENDIX F – INTERVIEW FORMS

WEYERHAEUSER CO. PLYMOUTH WOOD TREATING PLANT SUPERFUND ALTERNATIVE APPROACH SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Weyerhaeuser Co. Plymouth Wood Treating Plant	
EPA ID: NCD991278540	
Interviewer name: Melissa Oakley	**Interviewer affiliation: Skeo**
Subject name: Michelle Hays	**Subject affiliation: TRC**
Subject contact information: mhays@trccompanies.com	
Interview date: 1/13/2025	**Interview time:**
Interview location:	
Interview format (circle one): In Person Phone Mail (Email) Other:	
Interview category: O&M Contractor	

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   My overall impression of each OU is positive. All OUs have been in post-remedy performance monitoring for over 12 years with minimal impact to the environment and Mill operations. Cleanup activities have shown success since performance monitoring began.

2. What is your assessment of the current performance of the remedy in place at the Site?

   Data suggests the remedies have been successful in reducing concentrations across the monitored environmental media within each OU with no incremental risk to human health and minimal risk to ecological health.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?

   OU-1- Landfill No.1: Groundwater is monitored for 2,3,7,8-substituted polychlorinated dibenzo-p-dioxin/dibenzofuran (2,3,7,8-PCDD/PCDFs) while wetland soil has been monitored for chromium and mercury. Groundwater concentrations of dioxins (International Toxicity Equivalent Concentration; I-TEQ) remain consistent with historical observations and the 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) congener remains below detection limit in groundwater samples; therefore, it was recommended the groundwater sampling be conducted once in the next five-year period. With respect to chromium and mercury in wetland soil, the concentrations have decreased since 2005, such that each sampling location was below the ecological cleanup criteria for three consecutive events in Year 19 (2023); therefore, discontinuation of wetland soil sampling is recommended. Inspections are also conducted of the landfill cap and will continue on a quarterly basis with annual reporting.

   OU-2 – Lower Roanoke River: Sediment fine-layer coring was conducted in Years 1 (2012), 4 (2015), 12 (2023). Sediment samples were analyzed for 2,3,7,8-PCDD/PCDFs. Sediment data are consistent

with historical observed ranges and each fine-layer core sample throughout the performance monitoring have been well below the remedial goal of 1 part per billion with higher concentrations observed at depth. Therefore, surficial sediments do not pose an ecological risk. Since the criteria of the Remedial Design/Remedial Action Workplan have been satisfied, it is recommended that sediment fine-layer coring is no longer performed within OU-2.
Surface water samples were collected for 2,3,7,8-PCDD/PCDFs comparison to North Carolina water quality standards consistent with USEPA Method 1613B and Region 4 SOPs. USEPA Method 1613B is identified in the North Carolina Surface Water and Wetland Standards (15A NCAC 02B.0103) by reference to 40 CFR Part 136. Dioxin fingerprinting established during the Remedial Investigation found that high relative concentrations of 2,3,7,8-tetrachlorodibenzo-furan (2,3,7,8-TCDF) distinguish Mill influences, while high relative concentrations of octachlorodibenzo-p-dioxin (OCDD) distinguished non-Mill related influences. The predominant congener in OU-2 surface water has consistently been OCDD, which represents natural background sources and not Mill-influenced sources. Since performance monitoring began, no detections of 2,3,7,8-TCDD or 2,3,7,8-TCDF have been detected. Additionally, trend tests were conducted and found no statistically significant trend and no statistically significant difference between upstream and downstream samples. Therefore, it is recommended that surface water be sampled once in the next five-year period.

Fish tissue, which have been separated into fillet and whole fish composite samples, are analyzed for 2,3,7,8-PCDD/PCDFs. Since performance monitoring began in OU-2, fillet (edible portion) composites, with the exception of one 2013 bottom feeder (common carp), have been below the North Carolina fish consumption advisory level of 4 parts per trillion, satisfying the human health risk. Additionally, the whole fish composite concentrations have been below the consumption advisory since performance monitoring began and have shown a decreasing trend since the Remedial Investigation, suggesting the remedy is successful in protecting ecological receptors. It is recommended fish tissue sampling be performed once in the next five-year period. The summary of nearby ecological conditions is performed annually. Going forward, it is recommended this desktop review be completed in conjunction with the surface water and fish tissue sampling proposed once in the next five-year period.

OU-3 - Former Chlorine Plant: Groundwater is monitored for mercury and has shown stable to decreasing trends. It is recommended that monitoring wells above the North Carolina groundwater quality standard (15 NCAC 02L.0202, effective April 1, 2022; the 2L Standard) be monitored once in the next five-year period. Additionally, it is recommended that the surface containment feature continued to be inspected and reported on annually.

OU-4 – Welch Creek: The sediment cap is sampled for 2,3,7,8-PCDD/PCDFs and the I-TEQ is calculated. In Year 12 (2023), TOC was also analyzed at the request of USEPA. Dioxin (I-TEQ) concentrations in sediment have consistently been below the Remedial Goal (1 ppb) for individual samples and the Remedial Goal for the calculated surface weighted area concentration (0.41 ppb). It is recommended that 2,3,7,8-PCDD/PCDFs be sampled once in the next five-year period. Performance monitoring core samples exhibited TOC concentrations with the highest to lowest values within the same segment, in upstream portion of the remedy. Since there are no baseline criteria for comparison, and direct measurement of benthic and fish tissue have been collected post-remedy, it is recommended that the sediment sampling for TOC no longer be performed.

Surface water samples were collected for 2,3,7,8-PCDD/PCDFs comparison to North Carolina water quality standards consistent with USEPA Method 1613B and Region 4 SOPs. USEPA Method 1613B is identified in the North Carolina Surface Water and Wetland Standards (15A NCAC 02B.0103) by reference to 40 CFR Part 136. Surface water samples were also collected for metals, total suspended solids, volatile suspended solids, dissolved organic carbon, and total organic carbon. Dioxin fingerprinting established during the Remedial Investigation found that high relative concentrations of 2,3,7,8-TCDF distinguish Mill influences, while high relative concentrations of OCDD distinguished non-Mill related influences. The predominant congener in OU-4 surface water has consistently been OCDD, which represents natural background sources. Since performance monitoring began, no detections of 2,3,7,8-TCDD or 2,3,7,8-TCDF have been detected. Additionally, trend tests were conducted and found no statistically significant trend and no statistically significant difference between upstream and downstream samples. The metals and general chemistry concentrations have been consistent and in alignment with values from anoxic, coastal, slow-water environments. Therefore, it is recommended that surface water be sampled once in the next five-year period.

Benthic tissue sampling was performed in Years 2 (2013), 3 (2014), 5 (2016), and 12 (2023) of performance monitoring. The total number of taxa observed in the reference location and the downstream thalweg location are approaching the total taxa observed during pre-remedy implementation. Dioxin (I-TEQ) concentrations in benthic invertebrate tissues were similar to previous sampling events post-remedy implementation and well below concentrations observed pre-remedy. Given the recolonization in the benthic macroinvertebrates, and the dioxin concentrations, no further benthic sampling is recommended.

Fish tissue, which have been separated into fillet and whole fish samples, are analyzed for 2,3,7,8-PCDD/PCDFs. Since performance monitoring began in OU-4, fillet samples from both bottom feeders and large and small forage fish have been below the NC consumption advisory threshold (4 ng/kg) with few exceptions. The majority of whole fish concentrations, which are not considered edible for humans, have also been below the fish tissue consumption advisory threshold concentration since performance monitoring began. The fish tissue concentrations in edible fish have consistently been below the human health fish tissue consumption advisory and a downward trend has been observed post remedy in fish from multiple feeding guilds as well as in surface water and sediment, suggesting the remedy is successful in protecting ecological receptors. Therefore, it is recommended that fish tissue sampling be performed once in the next five years Additional summaries and analyses were provided in the 2023 annual reports submitted in early 2024.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.

   Yes, the facility is an active Mill with an environmental department and on-site general contractor. Domtar staff inspect OU-1 on a quarterly basis and the grass-covered portion of the landfill is mowed during the growing season by the on-site contractor. The surface cap at OU-3 is formally inspected annually; however, environmental staff are in the area regularly to perform routine duties. The OU-2 and OU-4 units are not on an inspection or maintenance schedule by Domtar staff

due to the nature of the units, a river and a creek, respectively. These OUs are inspected by TRC staff during site visits once every five years in accordance with the USEPA approved PSVP.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

   There have not been any significant changes in the O&M requirements since remedy implementation.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.

   No, there have not been unexpected O&M difficulties or significant costs in the last five years.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.

   Yes. Given reduction in concentrations in environmental media in each OU, sampling frequencies have been reduced and further reductions have been recommended and submitted to the USEPA for review and approval in this five-year review period.
   OU-1 – Landfill No.1: Discontinuation of the soil sampling was recommended in Year 19 (2023) because the criteria have been met.
   OU-2 - Lower Roanoke River: Discontinuation of the fine layer coring was recommended in Year 12 (2023) because the criteria have been met. Fish tissue and surface water monitoring is still recommended to be sampled once in the next five-year period, which was a recommendation during the last five-year review that has not yet been formally approved by the USEPA. A request to reduce the annual reporting requirements of the ecological conditions was made in Year 12 (2023).
   OU-3 – Former Chlorine Plant: It was recommended in Year 19 (2023) report to reduce the number of monitoring points due to decreased concentrations and reduce the sampling from biennial to once in the next five years.
   OU-4 – Welch Creek: A formal agreement was not reached with the USEPA regarding the sampling frequency of sediment, surface water or fish tissue during the last five-year review. It was again recommended that this media is sampled once in the next five-year period in the Year 12 (2023) report. It was also recommended in the Year 12 (2023) report that benthic tissue sampling be discontinued because the criteria have been met.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?

   None at this time. The next sampling event is proposed for 2027 in each OU, concurrent with the Mill's NPDES fish tissue sampling requirement.

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR report? Yes

WEYERHAEUSER CO. PLYMOUTH WOOD TREATING PLANT SUPERFUND ALTERNATIVE APPROACH SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Weyerhaeuser Co. Plymouth Wood Treating Plant	
EPA ID: NCD991278540	
Interviewer name: Melissa Oakley	**Interviewer affiliation: Skeo**
Subject name: Kari Cahoon	**Subject affiliation: Domtar**
Subject contact information: kari.cahoon@domtar.com	
Interview date: 1/17/25	**Interview time:**
Interview location:	
Interview format (circle one): In Person Phone Mail (Email) Other:	
Interview category: Potentially Responsible Party (PRP)	

1. What is your overall impression of the remedial activities at the Site?

   Well done

2. What have been the effects of this Site on the surrounding community, if any?

   None

3. What is your assessment of the current performance of the remedy in place at the Site?

   Successful

4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

   No

5. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

   Yes

6. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

   No

7. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?

   Yes

WEYERHAEUSER CO. PLYMOUTH WOOD TREATING PLANT SUPERFUND ALTERNATIVE APPROACH SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Weyerhaeuser Co. Plymouth Wood Treating Plant	
EPA ID: NCD991278540	
Interviewer name: Melissa Oakley	**Interviewer affiliation: Skeo**
Subject name: Beth Hartzell	**Subject affiliation: NC DEQ**
Subject contact information:	
Interview date:	**Interview time:**
Interview location:	
Interview format (circle one): In Person Phone Mail (Email) Other:	
Interview category: State Agency	

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   The maintenance at the site is going very well. Domtar and their contractor are vigilant about doing required activities.

2. What is your assessment of the current performance of the remedy in place at the Site?

   The remedy is effective and well maintained.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

   No.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.

   No.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

   No.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

   Yes. Domtar and their contractor are prompt in sending the annual certification of the LURs.

7. Are you aware of any changes in projected land use(s) at the Site?

   No.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

   No.

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?

   Yes.

APPENDIX G – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Weyerhaeuser Co. Plymouth Wood Treating Plant	**Date of Inspection: 12/4/2024**
Location and Region: Plymouth, NC, Region 4	**EPA ID: NCD991278540**
Agency, Office or Company Leading the Five-Year Review: EPA	**Weather/Temperature: Sunny and 40 degrees**

Remedy Includes: (check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☒ Vertical barrier walls
- ☒ Other: The remedy for OU-3 includes an asphalt cap. The remedy for OU-2 included installation of a thin sand cap over contaminated sediment. Monitoring of groundwater, sediment, fish tissue and surface water are performed to assess the effectiveness of remedial components.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** Michelle Hays (Name) TRC (Affiliation) _____ (Date)
   Interviewed ☐ at site ☒ via email ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: FYR interviews are summarized in section IV of this Report. Completed interview forms are included in Appendix F.

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency NC DEQ
   Contact Beth Hartzell (Name) NC DEQ (Affiliation) _____ (Date) _____ (Phone)
   Problems/suggestions ☐ Report attached: FYR interviews are summarized in section IV of this Report. Completed interview forms are included in Appendix F.

4. **Other Interviews** (optional) ☐ Report attached: FYR interviews are summarized in section IV of this Report. Completed interview forms are included in Appendix F.

Kari Cahoon, Domtar

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

	☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
	☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
	☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: All O&M documents are stored electronically.			
2.	**Site-Specific Health and Safety Plan**	☒ Readily available	☒ Up to date	☐ N/A
	☒ Contingency plan/emergency response plan	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: Both Domtar and TRC have their own site-specific health and safety plans, which are available electronically and in hard copy format.			
3.	**O&M and OSHA Training Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: Domtar performs an annual on-site safety training, which covers relevant OSHA topics. Site contractors are certified in OSHA as required by their respective companies.			
4.	**Permits and Service Agreements**			
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
	☒ Effluent discharge	☒ Readily available	☒ Up to date	☐ N/A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
	☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: While not related to the Site's remedy, Domtar's wastewater discharges are regulated by the facility's NPDES permit.			
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: There are no settlement monuments located at the OU-1 landfill. However, Domtar performs visual inspections and aerial surveys of the landfill, which assess the landfill surface. The last aerial survey was performed in 2014.			
7.	**Groundwater Monitoring Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: TRC submits groundwater monitoring data to EPA in OU-specific monitoring reports.			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	☒ N/A
	☒ Water (effluent)	☒ Readily available	☐ Up to date	☐ N/A
	Remarks: While not related to the Site's remedy, Domtar maintains facility effluent discharge records as required by their NPDES permit.			
10.	**Daily Access/Security Logs**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: Access to the Domtar facility is monitored by manned guard houses at facility entrances and exits. Guards ensure every person that enters or exits the facility either has an employee ID badge or a visitor's pass.			
	IV. O&M COSTS			

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☐ PRP in-house ☒ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☒ Domtar has contracted TRC to perform remedy-related monitoring activities, and General Maintenance Incorporated to perform landfill maintenance activities, such as grading and mowing.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: Not applicable.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: All remedy-related fencing appeared to be in good condition. Gates are secured with locks.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs displaying remedy-related information and warnings are posted throughout the Site. Guard gates and fencing also restrict unauthorized access to the Site. One warning sign was observed to be missing at Welch Creek during the FYR site inspection. The PRP made a note to replace it.

C. Institutional Controls

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: Domtar (PRP)

Contact _____ _____ _____ _____

Name Title Date Phone

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: In 2016, Domtar filed a Declaration of Perpetual Land Use Restrictions with the Martin County Register of Deeds office. That document, in conjunction with restrictions and notifications implemented previously, meet the institutional control requirements.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On-Site** ☐ N/A

Remarks: On-site land use has not changed. The gravel portion of the OU-1 landfill cap remains a storage area for contractor equipment. OU-3 is located within the Domtar facility and consists of an area covered with an asphalt cap. Industrial activities occur outside of Site OUs. Domtar was acquired by Paper Excellence since the previous FYR was finalized.

3. **Land Use Changes Off-Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident

Lengths: _____ Widths: _____ Depths: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident

Area extent: _____ Depth: _____

Remarks: _____

5. **Vegetative Cover** ☐ Grass ☒ Cover properly established

☐ No signs of stress ☐ Trees/shrubs (indicate size and locations on a diagram)

Remarks: _____

6. **Alternative Cover** (e.g., armored rock, concrete) ☐ N/A

Remarks: The gravel portion of the landfill cap appeared to be in good condition.

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident

Area extent: _____ Height: _____

Remarks: _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Area extent: _____
☐ Ponding	☐ Location shown on site map	Area extent: _____
☐ Seeps	☐ Location shown on site map	Area extent: _____
☐ Soft subgrade	☐ Location shown on site map	Area extent: _____

Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map

☒ No evidence of slope instability

Area extent: _____

Remarks: _____

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

Remarks: _____

2. **Gas Monitoring Probes**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: No monitoring wells are located within the surface of the OU-1 landfill. Only two monitoring wells (CP-06-1 and CP-06-2) are located within the subsurface barrier wall at OU-3. The wells are flush with the surface of the asphalt cap and appeared to be in good condition.

4. **Extraction Wells Leachate**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

F. Cover Drainage Layer ☒ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☒ Functioning ☐ N/A

Remarks: Stormwater outfalls for the gravel portion of the landfill appeared to be in good condition.

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

H. Retaining Walls ☐ Applicable ☒ N/A

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☒ Applicable ☐ N/A

1. **Settlement** ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: Performance of the OU-3 subsurface barrier wall is assessed by groundwater monitoring.

☐ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☒ N/A

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

C. Treatment System ☐ Applicable ☒ N/A

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☒ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: There is no MNA remedial component for site groundwater. Groundwater is monitored to assess the performance of other remedial components. All groundwater monitoring wells observed were properly secured and appeared to be in good condition. Surface water is monitored to assess the performance of the monitored natural recovery in Welch Creek and the LRR.

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The remedy appears to be effective and functioning as designed. At OU-1, the landfill cover prevents exposure to contaminated soil and continued maintenance ensures that the cap remains effective. The landfill covers are well-maintained and appear to be in good condition. Fish consumption advisory signs posted along the LRR (OU-2) help prevent human exposure to potentially contaminated fish. At OU-3, the barrier wall and asphalt cap prevent exposure to contaminated subsurface soil and prevent the contaminated soil from acting as a source of groundwater and surface water contamination. The asphalt cap appeared to be intact and in good condition. At OU-4, the sand cap limits exposure to contaminated creek sediment from water flow and aquatic biota. Institutional controls are in place to protect the integrity of remedial components and to prevent unacceptable exposures to site-related contamination. The remedy appears to be effective and functioning as designed.

B. Adequacy of O&M

	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. The Site appears to be well-maintained. No major maintenance issues were identified during the site inspection.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. No early indicators of potential remedy problems were identified during the site inspection.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Based on monitoring results, TRC is proposing reductions in the frequency of certain monitoring requirements. EPA is aware of the request and will discuss options with the PRP and TRC following a review of the applicable monitoring data.

APPENDIX H – SITE INSPECTION PHOTOS

Signage at the entrance to the gravel portion of the OU-1 cap

The gravel portion of the OU-1 cap

Signage on the locking gate that restricts access to the grass-covered part of the OU-1 cap

Signage on the locking gate that restricts access to the grass-covered part of the OU-1 cap

Wells FL-10-1 and FL-10-2, outside the northern edge of the OU-1 landfill cap

View of the grass-covered part of the OU-1 cap, looking southwest

View of the grass-covered part of the OU-1 cap, looking northeast

Asphalt cap at the former chlorine plant (OU-3); the seam in the asphalt shows the location of the subsurface barrier wall

Flush-mounted groundwater monitoring well at OU-3

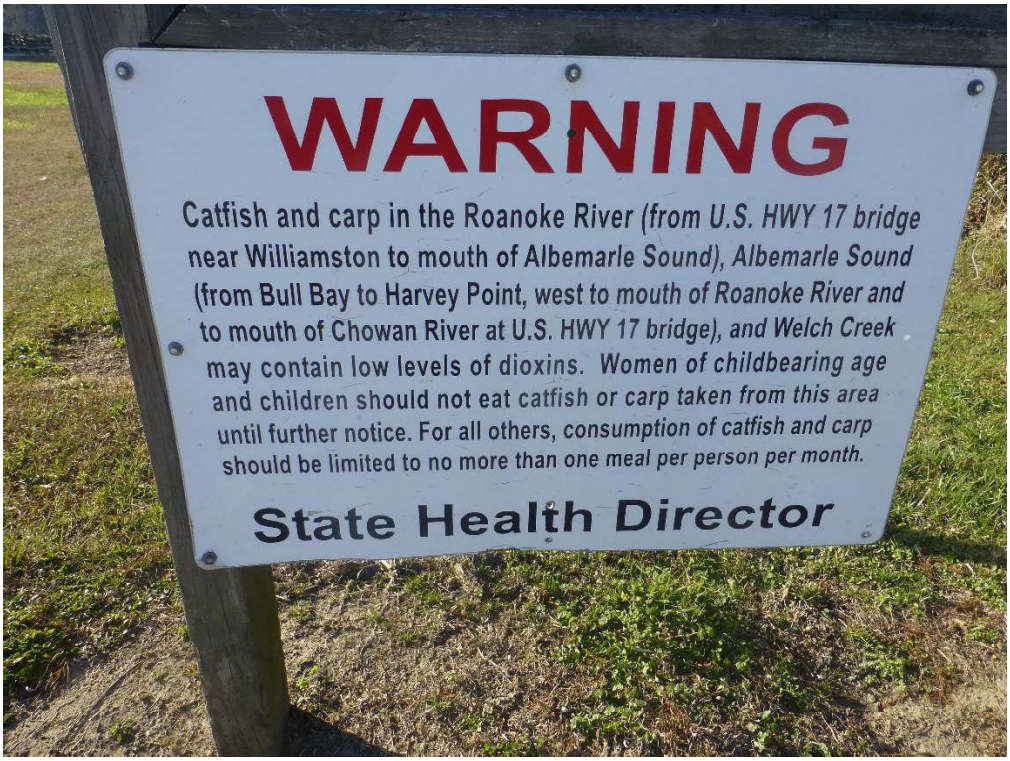
Welch Creek (above the sand cap)

Sign on the Welch Creek railroad trestle notifying anglers of the sediment remediation area

One of the “no trespassing” signs posted along the banks of Welch Creek

Sign on the Welch Creek pipe bridge notifying anglers of the sediment remediation area

Signage at the Water Street Landing Boat Access Area, next to the LRR (OU-2)

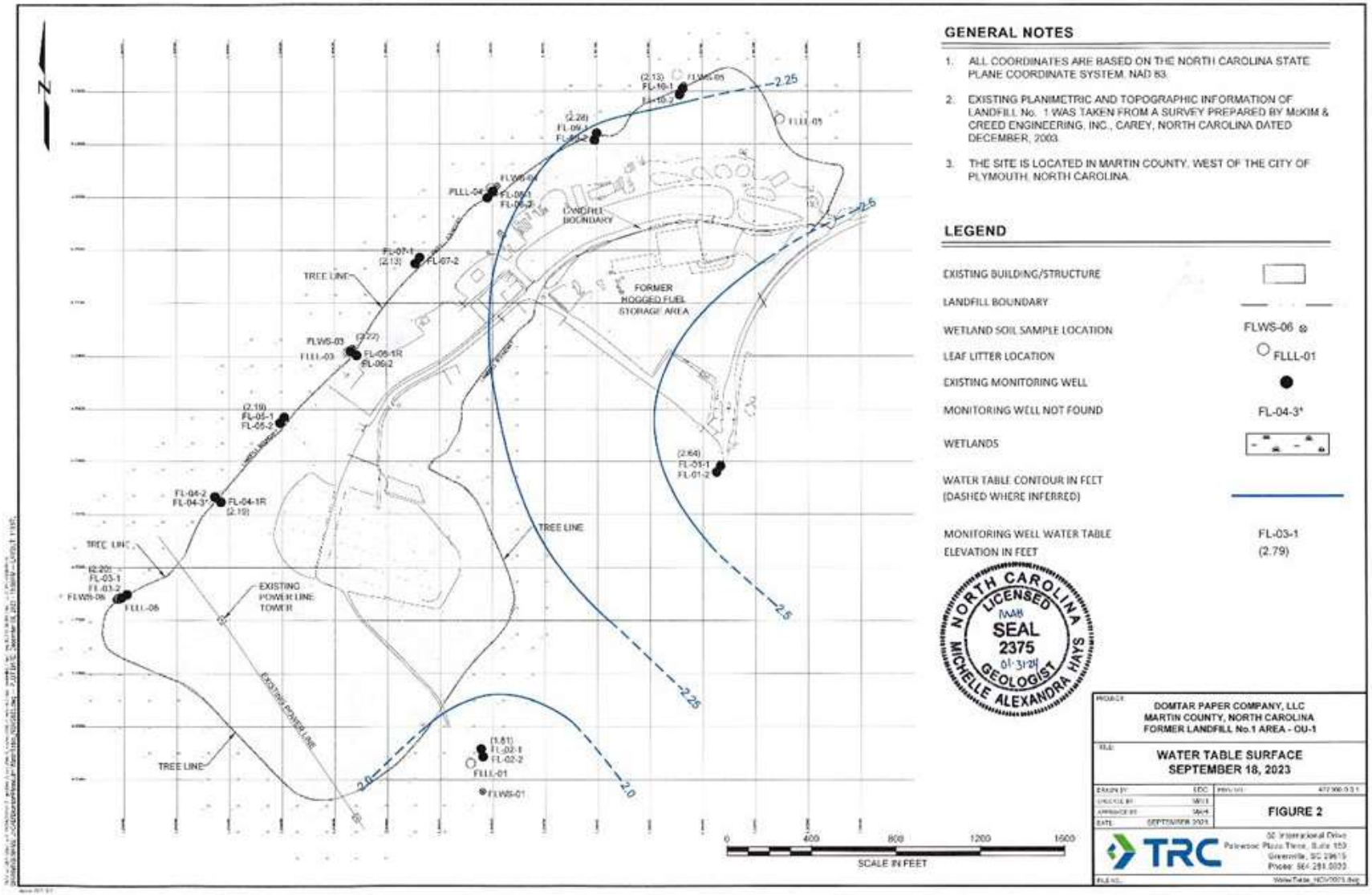


Fish consumption advisory sign posted at the Water Street Landing Boat Access Area


View of the LRR (OU-2) at the Water Street Landing Boat Access Area (the Domtar facility is in the background)

APPENDIX I – DATA REVIEW MATERIALS

Figure I-1: OU-1 Monitoring Locations and 2023 Groundwater Contours



Source: the Site's *OU-1 Year 19 Annual Monitoring Report* (January 2024)

Table I-1: OU-1 Groundwater Monitoring Results, 2005 to 2023

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE						
		FL-01-1 11/15/05	FL-01-1 11/09/07	FL-01-1 12/03/09	FL-01-1 11/11/11	FL-01-1 11/07/13	FL-01-1 11/09/18	FL-01-1 09/18/23
Dioxins								
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000004	<0.0000000098	<0.0000000104	<0.00000000134	<0.00000000114	<0.0000000069
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000002	<0.000000049	<0.0000000521	<0.00000000112	<0.000000000485	<0.0000000238
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000002	<0.000000049	<0.0000000521	<0.000000000999	<0.000000000249	<0.0000000238
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000002	<0.000000049	<0.0000000521	<0.000000000988	<0.00000000029	<0.0000000238
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000006	**0.000000006**	<0.000000049	<0.0000000521	<0.000000000973	<0.000000000283	<0.0000000238
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000014**	**0.000000052**	**0.0000000208 BJ**	<0.0000000379 BJ u	**0.00000000777 J**	**0.00000000445 BJ**	**0.00000000299 JK j**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.00000114**	**0.00000267**	**0.00000211 B**	**0.00000129 B**	**0.00000101**	**0.000000375**	**0.000000104 K j**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000098	<0.0000000104	<0.0000000013	<0.000000000886	<0.00000000558
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000049	<0.0000000521	<0.000000000951	<0.000000000504	<0.0000000238
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000049	<0.0000000521	<0.000000000879	<0.000000000506	<0.0000000238
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.000000049	<0.0000000521	<0.000000000817	<0.000000000202	**0.00000000104 JK j**
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.000000049	<0.0000000521	<0.00000000086	<0.000000000203	**0.000000000794 JK j**
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.000000049	<0.0000000521	<0.00000000112	<0.000000000222	<0.0000000238
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.000000049	<0.0000000521	<0.000000000733	<0.000000000194	<0.0000000238
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.000000049	<0.0000000521	<0.000000000769	<0.000000000371 BJ u	**0.00000000697 JK j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.000000049	<0.0000000521	<0.00000000114	<0.000000000266 BJK u	<0.0000000238
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000005	**0.000000006**	<0.000000098	<0.0000000104	<0.00000000221	<0.00000000923 BJK u	**0.000000905**
2378TCDD TEQ EPA89 (International) [2]	2.0E-10	1.3E-09	3.8E-09	2.3E-09	1.3E-09	1.1E-09	4.2E-10	1.3E-09

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE					
		FL-01-2 11/15/05	FL-01-2 11/09/07	FL-01-2 12/03/09	FL-01-2 11/07/13	FL-01-2 11/09/18	FL-01-2 09/19/23
Dioxins							
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000007	<0.000000003	<0.000000000971	<0.0000000041	<0.00000000217	<0.0000000047
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000005	<0.000000002	<0.0000000485	<0.00000000453 JK u	<0.000000000782	**0.000000000754 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000002	<0.0000000485	<0.00000000587 JK u	<0.000000000804	**0.00000000137 JK j**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000002	<0.0000000485	<0.00000000419 JK u	<0.000000000651	<0.0000000235
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000002	<0.0000000485	<0.00000000598 JK u	<0.000000000612	**0.000000000452 JK j**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	<0.000000007	<0.000000004	<0.0000000485	<0.00000000587 JK u	<0.000000000503 BJK u	**0.000000011 J**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.000000019**	**0.000000027**	<0.0000000344 BJ u	<0.000000032 BJK u	<0.00000000564 BJ u	**0.000000156**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.000000000971	<0.00000000221	<0.00000000131	<0.0000000047
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000485	<0.00000000218	<0.00000000105	<0.0000000235
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000485	<0.00000000423 JK u	<0.0000000011	<0.0000000235
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000485	**0.00000000334 J**	<0.000000000502	<0.0000000235 BJK u
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000485	<0.00000000438 JK u	<0.000000000499	**0.000000000894 JK j**
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000485	<0.0000000047 JK u	<0.000000000575	<0.0000000235
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000485	<0.00000000311 JK u	<0.000000000512	<0.0000000235
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000003	<0.000000003	<0.0000000485	<0.00000000495 JK u	<0.000000000443 BJK u	**0.0000000102 JK j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000003	<0.000000003	<0.0000000485	**0.00000000279 J**	<0.000000000392	**0.000000000286 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000007	<0.000000001	<0.0000000033 BJ u	<0.0000000366 JK u	<0.00000000994 BJ u	**0.000000177**
2378TCDD TEQ EPA89 (International) [2]	2.0E-10	1.9E-11	2.7E-11	0.0	3.6E-10	0.0	1.2E-09

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [1]	LOCATION/SAMPLE DATE						
		FL-02-1 11/15/05	(DU-05401) FL-02-1 11/15/05	FL-02-1 11/09/07	FL-02-1 12/03/09	FL-02-1 11/11/11	FL-02-1 11/08/18	FL-02-1 9/18/2023
Dioxins								
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000005	<0.000000004	<0.000000003	<0.0000000103	<0.0000000102	<0.000000000168	<0.000000000469
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000004	<0.000000003	<0.0000000515	<0.000000051	<0.000000000436	<0.0000000235
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000006	<0.000000005	<0.0000000515	<0.000000051	<0.000000000233	<0.0000000235
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000006	<0.000000005	<0.0000000515	<0.000000051	<0.000000000265 JK u	<0.0000000235
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000006	**0.000000006**	<0.0000000515	<0.000000051	<0.000000000356 JK u	<0.0000000235
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000009**	**0.000000007**	**0.000000089**	<0.0000000515	<0.0000000391 BJ u	<0.00000000611 BJK u	**0.00000000408 JK j**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.000000488**	**0.000000385**	**0.00000501**	**0.0000000431 J**	**0.00000102 B**	**0.000000159**	**0.0000000695**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000003	<0.000000002	<0.0000000103	<0.0000000102	<0.000000000633	<0.000000000767
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000003	<0.000000001	<0.0000000515	<0.000000000331 JK u	<0.000000000432	<0.0000000235
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000003	<0.000000001	<0.0000000515	<0.000000000377 JK u	<0.000000000457	<0.0000000235
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000003	<0.000000001	<0.0000000515	<0.000000051	<0.000000000398 JK u	<0.0000000235
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000003	<0.000000001	<0.0000000515	<0.000000051	<0.000000000414 JK u	<0.0000000235
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.000000003	<0.000000001	<0.0000000515	<0.000000051	<0.000000000443 BJK u	<0.0000000235
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000003	<0.000000001	<0.0000000515	<0.000000051	<0.000000000237	<0.0000000235
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000002	<0.000000004	<0.000000003	<0.0000000515	<0.000000051	<0.000000000131 BJK u	**0.00000000514 J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000002	<0.000000004	<0.000000003	<0.0000000515	<0.000000051	<0.000000000309 BJ u	**0.00000000117 JK j**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000008	<0.00000001	<0.000000006	<0.000000103	<0.0000000403 BJ u	<0.0000000145 BJ u	**0.0000000791**
2378TCDD TEQ EPA89 (International) [2]	2.0E-10	5.8E-10	4.6E-10	6.5E-09	4.3E-10	1.0E-09	1.6E-10	2.5E-10

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [1]	LOCATION/SAMPLE DATE		
		FL-02-2 11/7/2013	FL-02-2 11/7/2018	FL-02-2 9/18/2023
Dioxins				
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.0000000025	<0.000000000195	<0.0000000074
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.00000000125	<0.000000000666	<0.0000000235
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.00000000119	<0.000000000603 JK u	<0.0000000235
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.00000000121	<0.000000000631 JK u	<0.0000000235
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.00000000118	<0.000000000492	<0.0000000235
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	<0.00000000118	<0.00000000117 BJK u	**0.00000000338 J**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	<0.0000000237 JK u	<0.0000000054 BJK u	**0.000000045 JK j**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.00000000173	<0.00000000112	<0.00000000803
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000000924	<0.000000000745	<0.0000000235
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000000823	<0.000000000775	<0.0000000235
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000000816	<0.000000000436	<0.0000000235
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000000679	<0.000000000444	<0.0000000235
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.00000000113	<0.000000000535	<0.0000000235
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000000729	<0.000000000443	<0.0000000235
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.00000000117	<0.000000000967 BJK u	**0.00000000348 JK j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.00000000183	<0.000000000415	<0.0000000235
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.00000000252	<0.0000000102 BJ u	**0.000000107**
2378TCDD TEQ EPA89 (International) [2]	2.0E-10	0.0	0.0	2.2E-10

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE							
		FL-03-1 11/15/05	FL-03-1 11/08/07	FL-03-1 12/03/09	FL-03-1 11/11/11	FL-03-1 11/07/13	FL-03-1 11/08/18	FL-03-1 09/18/23	(DU-23302) FL-03-1 09/18/23
Dioxins									
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000003	<0.000000003	<0.00000000943	<0.00000000102	<0.00000000244	<0.00000000493	<0.00000000611	<0.00000000596 uj
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000003	<0.000000002	<0.0000000472	<0.0000000051	<0.00000000131	<0.0000000000777	<0.0000000237	<0.0000000236 uj
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000007	<0.000000003	<0.0000000472	**0.00000000528 J**	<0.00000000153	<0.00000000069	<0.0000000237	<0.0000000236 uj
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000007	**0.000000003**	<0.0000000472	<0.0000000051	<0.00000000155	<0.0000000000778	<0.0000000237 uj	**0.0000000517 K j**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000007	**0.000000008**	<0.0000000472	**0.00000000643 J**	<0.00000000151	<0.0000000000715	<0.0000000237	**0.000000032 K j**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000009**	**0.000000026**	**0.00000000485 BJ**	<0.0000000318 BJ u	**0.00000000383 J**	**0.00000000106 BJ**	**0.000000009 J j**	**0.000000249 j**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.000000077**	**0.000000308**	<0.0000000387 BJ u	<0.000000303 Bu	<0.0000000216 JK u	<0.0000000795 BJ u	**0.0000000775 K j**	**0.000000439 j**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000004	**0.000000002**	<0.00000000943	<0.00000000102	<0.00000000152	<0.00000000227	<0.00000000609	<0.00000000701 uj
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.00000003	<0.000000001	<0.0000000472	**0.00000000337 J**	<0.00000000139	<0.0000000000998	<0.0000000237	<0.0000000236 uj
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000472	<0.00000000338 JK u	<0.00000000131	<0.0000000000999	<0.0000000237	<0.0000000236 uj
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.000000002	<0.0000000472	**0.00000000524 J**	<0.00000000117	<0.0000000000746	<0.0000000237	<0.0000000236 JK u
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.000000002	<0.0000000472	**0.0000000044 Jj**	<0.0000000000982	<0.0000000000778	<0.0000000237	<0.0000000236
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000002	<0.000000002	<0.0000000472	**0.00000000503 J**	<0.00000000176	<0.0000000000837	<0.0000000237	<0.0000000236 BJ uj
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.000000002	<0.0000000472	**0.00000000463 J**	<0.00000000114	<0.0000000000787	<0.0000000237	<0.0000000236 uj
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.0000000472	<0.0000000051	**0.0000000016 BJ**	<0.0000000000884 BJ u	**0.0000000046 JK j**	**0.0000000431 j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.0000000472	<0.0000000051	<0.00000000158	<0.0000000000402	<0.0000000237	**0.00000000934 JK j**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000006	<0.000000008	<0.0000000036 BJK u	<0.0000000331 BJK u	<0.00000000408	<0.0000000108 BJK u	**0.000000106000**	**0.000000377 j**
2378TCDD TEQ EPA89 (International)[2]	2.0E-10	1.7E-10	1.9E-09	4.9E-10	3.3E-09	5.4E-11	1.1E-11	3.2E-10	1.2E-08

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE						
		FL-03-2 11/15/05	FL-03-2 11/08/07	FL-03-2 12/03/09	FL-03-2 11/07/13	FL-03-2 11/08/18	(DU-18405) FL-03-2 11/08/18	FL-03-2 09/18/23
Dioxins								
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000003	<0.000000002	<0.0000000098	<0.00000000026	<0.00000000177	<0.00000000369uj	<0.00000000525
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000001	<0.000000049	<0.0000000013	<0.0000000000802 JK u	<0.00000000172 uj	<0.00000000236
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000003	<0.000000003	<0.000000049	<0.00000000113	<0.0000000000683	<0.0000000000862 uj	**0.00000000222 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000003	<0.000000003	<0.000000049	<0.00000000112	<0.0000000000774	<0.00000000093 uj	<0.00000000236
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000003	<0.000000003	<0.000000049	<0.0000000011	<0.00000000071	<0.0000000000875 uj	<0.00000000236
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	<0.000000003	<0.000000002	**0.00000000208 BJ**	<0.00000000233	<0.0000000000964 BJK u	<0.00000000295 BJK u	**0.00000000766 JK j**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.000000014**	**0.000000025**	<0.000000011 BJ u	**0.0000000217 J**	<0.0000000133 BJK u	**0.0000000256 BJ j**	**0.00000000463 J**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000098	<0.00000000164	<0.0000000014	<0.0000000267uj	<00000000761
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000049	<0.00000000132	<0.0000000000857	<0.0000000017 uj	<0.00000000236
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000049	<0.00000000123	<0.0000000007	<0.0000000017uj	<0.00000000236
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000004	<0.000000001	<0.000000049	<0.0000000000818	<0.0000000000528	<0.00000000142 JK u	<0.00000000236
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000004	<0.000000001	<0.000000049	<0.00000000067	<0.0000000000518	**0.00000000154 Jj**	<0.00000000236
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000004	<0.000000001	<0.000000049	<0.00000000118	<0.0000000000631	**0.00000000173 BJ j**	**0.00000000132 JK j**
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000004	<0.000000001	<0.000000049	<0.0000000000753	<0.0000000000523	**0.0000000000979 BJ j**	<0.00000000236
1,2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.000000049	<0.00000000095	<0.00000000136 BJ u	**0.0000000136 Jj**	**0.00000000287 JK j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.000000049	<0.00000000144	<0.0000000000479	<0.00000000284 BJK u	<0.00000000236
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000005	<0.000000003	<0.00000000195 BJ u	<0.00000000353	<0.0000000091 BJK u	**0.000000305 j**	**0.0000000573 K j**
2378TCDD TEQ EPA89 (International)[2]	2.0E-10	1.4E-11	2.5E-11	2.1E-11	2.2E-11	0.0	8.9E-10	5.2E-10

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE					
		FL-04-1 11/15/05	FL-04-1 11/09/06	FL-04-IR 02/21/07	FL-04-IR-F[4] 02/21/07	FL-04-IR 12/03/08	(DU-08405) FL-04-IR 12/03/08
Dioxins							
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000005	**0.000000007**	<0.000000008	<0.000000003	<0.0000000106	<0.00000001
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000005	**0.000000004**	<0.000000003	<0.000000003	<0.000000053	<0.0000000501
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000002	<0.000000004	<0.000000003	<0.000000053	<0.0000000501
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	**0.000000008**	<0.000000004	<0.000000003	<0.000000053	<0.0000000501
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	**0.000000008**	**0.000000026**	<0.000000004	<0.000000003	<0.000000053	<0.0000000501
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000036**	**0.000000133**	**0.000000007**	**0.000000003**	<0.00000000486 BJu	<0.00000000403Bju
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.00000102**	**0.00000314**	**0.00000013**	**0.000000014**	<0.0000000196 BJKu	<0.0000000188BJu
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.000000002	<0.000000002	<0.0000000106	<0.00000001
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.000000001	<0.000000002	<0.000000053	<0.0000000501
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.000000001	<0.000000002	<0.000000053	<0.0000000501
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000002	<0.000000001	<0.000000053	<0.0000000501
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000002	<0.000000001	<0.000000053	<0.0000000501
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000002	<0.000000001	<0.000000053	<0.0000000501
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000002	<0.000000001	<0.000000053	<0.0000000501
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000002	<0.000000007	<0.000000001	<0.000000002	<0.000000053	<0.0000000501
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000002	<0.000000007	<0.000000001	<0.000000002	<0.000000053	<0.0000000501
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000005	<0.000000005	<0.000000002	<0.000000002	<0.000000106	<0.0000001
2378TCDD TEQ EPA89 (International)[2]	2.0E-10	2.2E-09	1.7E-08	2.0E-10	4.4E-11	0.0	0.0

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE			
		FL-04-IR-F[4] 12/03/08	(DU-08405) FL-04-IR-F[4] 12/03/08	FL-04-2 12/03/08	FL-04-2-F[4] 12/03/08
Dioxins					
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	r	<0.0000000103	<0.0000000103	r
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	r	<0.0000000514	<0.0000000514	r
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	r	<0.0000000514	<0.0000000514	r
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	r	<0.0000000514	<0.0000000514	r
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	r	<0.0000000514	<0.0000000514	r
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	present j	<0.0000000514	<0.00000000412 BJKu	present j
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	present j	**0.0000000191** J	<0.000000019 Bju	present j
2,3,7,8-Tetrachlorodibenzofuran	--	r	<0.0000000103	<0.0000000103	r
1,2,3,7,8-Pentachlorodibenzofuran	--	r	<0.0000000514	<0.0000000514	r
2,3,4,7,8-Pentachlorodibenzofuran	--	r	<0.0000000514	<0.0000000514	r
1,2,3,4,7,8-Hexachlorodibenzofuran	--	r	<0.0000000514	<0.0000000514	r
1,2,3,6,7,8-Hexachlorodibenzofuran	--	r	<0.0000000514	<0.0000000514	r
1,2,3,7,8,9-Hexachlorodibenzofuran	--	r	<0.0000000514	<0.0000000514	r
2,3,4,6,7,8-Hexachlorodibenzofuran	--	r	<0.0000000514	<0.0000000514	r
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	r	<0.0000000514	<0.0000000514	r
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	r	<0.0000000514	<0.0000000514	r
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	r	<0.000000103	<0.000000103	r
2378TCDD TEQ EPA89 (International)[2]	2.0E-10	NC	1.9E-11	0.0	NC

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE							
		FL-05-1 11/16/05	FL-05-1 11/08/07	(DU-07405) FL-05-1 11/08/07	FL-05-1 12/3/2009	FL-05-1 11/11/2011	FL-05-1 11/7/2013	FL-05-1 11/8/2018	FL-05-1 9/18/2023
Dioxins									
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000005	<0.000000004	<0.000000005	<0.00000000971	<0.0000000102	<0.00000000205	<0.00000000276	<0.00000000686
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000004	<0.000000006	<0.0000000485	<0.000000051	<0.00000000146	<0.000000000605	<0.0000000237
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000004	<0.000000006	<0.0000000485	<0.000000051	<0.00000000377	<0.000000000825	<0.0000000237
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	**0.00000001**	**0.000000007**	**0.000000007**	<0.0000000485	**0.00000000841 J**	<0.00000000376	<0.000000000893	<0.0000000237
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	**0.000000058**	**0.000000046**	**0.000000054**	<0.0000000485	<0.000000051	<0.00000000965 JK u	<0.000000000839	<0.0000000237
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000318**	**0.000000248**	**0.000000282**	0.0000000189 BJ	**0.000000103 B**	**0.0000000599**	**0.00000000441 BJ**	**0.0000000144 JK j**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.00000917**	**0.00000738**	**0.00000834**	0.000000246 B	**0.0000015 B**	**0.00000084**	**0.0000000482J**	**0.000000123**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000003	<0.00000000971	<0.0000000102	<0.00000000205	<0.00000000154	<0.00000000716
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.000000001	<0.0000000485	<0.000000051	<0.00000000121	<0.000000000875	<0.0000000237
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.000000001	<0.0000000485	<0.000000051	<0.00000000114	<0.000000000922	<0.0000000237
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000002	<0.0000000485	<0.000000051	<0.00000000119	<0.000000000495	<0.0000000237
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000002	<0.0000000485	<0.000000051	<0.000000000995	<0.000000000489	**0.0000000011 JK j**
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000002	<0.0000000485	<0.000000051	<0.00000000164	<0.000000000579	**0.00000000157 JK j**
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000002	<0.0000000485	<0.000000051	<0.00000000112	<0.000000000502	<0.0000000237
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.000000001	<0.0000000485	<0.000000051	<0.000000000996	<0.00000000055 BJK u	**0.00000000433 JK j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.000000001	<0.0000000485	<0.000000051	<0.00000000149	<0.000000000477	<0.0000000237
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000007	<0.000000006	<0.000000007	<0.0000000971	<0.0000000207 BJK u	<0.00000000293	<0.00000000775 BJK u	**0.000000078 K j**
2378TCDD TEQ EPA89 (International) [12]	2.0E-10	1.9E-08	1.5E-08	1.7E-08	4.4E-09	3.4E-09	1.4E-09	9.2E-11	6.6E-10

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE					
		FL-05-2 11/16/05	FL-05-2 11/08/07	FL-05-2 12/03/09	FL-05-2 11/07/13	FL-05-2 11/08/18	FL-05-2 09/18/23
Dioxins							
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000002	<0.0000000101	<0.00000000205	<0.00000000305	<0.00000000476
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000002	<0.0000000503	<0.00000000118	<0.00000000066	<0.0000000238
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000002	<0.000000002	<0.0000000503	<0.00000000139	<0.000000000181	<0.0000000238
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000002	<0.000000002	<0.0000000503	<0.00000000136	**0.000000000445 J**	<0.0000000238
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000002	<0.000000002	<0.0000000503	<0.00000000135	<0.000000000205 JK u	<0.0000000238
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000006**	**0.000000004**	<0.0000000503	<0.0000000028 JK u	<0.000000000647 BJK u	**0.00000000578 JK j**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.000000265**	**0.000000129**	<0.000000011 BJK u	**0.0000000327 J**	<0.0000000106 BJK u	**0.000000087100**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000101	<0.0000000019	<0.00000000156	<0.00000000602
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.0000000503	<0.00000000157	<0.000000000708	<0.0000000238
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.0000000503	<0.00000000144	<0.000000000707	<0.0000000238
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.0000000503	<0.000000000841	<0.000000000367 JK u	<0.0000000238
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.0000000503	<0.00000000069	<0.000000000259	<0.0000000238
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.0000000503	<0.0000000012	<0.000000000529 BJK u	<0.0000000238
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.0000000503	<0.000000000759	<0.000000000244	<0.0000000238
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.0000000503	<0.00000000158 BJK u	<0.00000000042	**0.00000000635 JK j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.0000000503	<0.00000000126	<0.000000000538	<0.0000000238
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000006	<0.000000003	<0.000000101	<0.00000000418	<0.00000000822 BJ u	**0.0000000952 K j**
2378TCDD TEQ EPA89 (International) [12]	2.0E-10	3.3E-10	1.7E-10	0.0	3.3E-11	4.5E-11	3.0E-10

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE					
		FL-06-1 11/15/05	FL-06-1 11/09/06	(DU-06402) FL-06-1 11/09/06	FL-06-1 03/29/06	FL-06-1-F[4] 03/29/06	FL-06-IR 02/22/07
Dioxins							
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	0.000000011	0.00000001	0.000000009	<0.000000005	<0.000000004	<0.000000007
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000008	0.000000004	0.000000004	<0.000000004	<0.000000004	<0.000000003
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000007	<0.000000002	<0.000000006	<0.000000004	<0.000000004	<0.000000002
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	0.000000009	0.000000009	0.000000008	<0.000000004	<0.000000004	0.000000002
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	0.000000075	0.000000067	0.000000072	0.00000001	0.000000003	0.000000012
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	0.000000186	0.000000177	0.000000172	0.000000021	0.000000009	0.000000041
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	0.00000396	0.00000174	0.00000281	0.000000178	0.000000034	0.000000876
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.000000003	<0.000000003	<0.000000004	<0.000000002
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.000000002	<0.000000002	<0.000000003	<0.000000002
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.000000002	<0.000000002	<0.000000003	<0.000000002
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000002	<0.000000002	<0.000000003	<0.000000001
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000002	<0.000000002	<0.000000003	<0.000000001
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000002	<0.000000002	<0.000000003	<0.000000001
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000004	<0.000000002	<0.000000002	<0.000000002	<0.000000003	<0.000000001
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.000000002	<0.000000002	<0.000000001	0.000000001
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.000000002	<0.000000002	<0.000000001	<0.000001
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000006	<0.000000005	<0.000000004	<0.000000003	<0.000000003	<0.000000003
2378TCDD TEQ EPA89 (International)[12]	2.0E-10	2.5E-08	2.3E-08	2.4E-08	1.4E-09	4.2E-10	2.7E-09

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE				
		FL-06-IR-F[4] 02/22/07	FL-06-IR 12/03/08	FL-06-IR-F[4] 12/03/08	FL-06-2 12/03/08	FL-06-2-F[4] 12/03/08
Dioxins						
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000003	<0.0000000113	r	<0.0000000111	<0.0000000102
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000002	<0.0000000566	r	<0.0000000554	<0.0000000509
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000003	<0.0000000566	r	<0.0000000554	<0.0000000509
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000003	<0.0000000566	r	<0.0000000554	<0.0000000509
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000003	<0.0000000566	0.0000000108Jj	<0.0000000554	<0.0000000509
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	0.000000008	0.00000000975 BJ	0.0000000727j	0.0000000111 BJ	<0.00000000839 Jku
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	<0.000000003	<0.0000000373BKJu	0.000000436j	<0.00000005 BJu	0.0000000587 J
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000002	<0.0000000113	r	<0.0000000111	<0.0000000102
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.0000000566	r	<0.0000000554	<0.0000000509
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.0000000566	r	<0.0000000554	<0.0000000509
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.0000000566	0.0000000138Jj	<0.0000000554	<0.0000000509
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.0000000566	<0.0000000104JKu	<0.0000000554	<0.0000000509
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000002	<0.0000000566	r	<0.0000000554	<0.0000000509
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000002	<0.0000000566	r	<0.0000000554	<0.0000000509
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000002	<0.0000000566	0.0000000276Jj	0.00000000168 J	<0.0000000509
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000002	<0.0000000566	r	<0.0000000554	<0.0000000509
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000004	<0.000000113	0.0000000577Jj	<0.000000111	<0.000000102
2378TCDD TEQ EPA89 (International)[12]	2.0E-10	8.0E-11	9.8E-11	4.0E-09	1.3E-10	5.9E-11

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [2]	LOCATION/SAMPLE DATE						
		FL-07-1 11/16/05	FL-07-1 11/8/2007	FL-07-1 12/3/2009	FL-07-1 11/11/2011	FL-07-1 11/7/2013	FL-07-1 11/7/2018	FL-07-1 9/19/2023
Dioxins								
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000007	<0.000000003	<0.000000000962	<0.00000000102	<0.000000000198	<0.000000000318	<0.000000000715 uj
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000007	<0.000000001	<0.00000000481	<0.000000051	<0.000000000907	<0.000000000863	<0.00000000236 uj
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	**0.000000004**	<0.000000003	<0.00000000481	<0.000000051	<0.000000000814	<0.000000000501	<0.00000000236 uj
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	**0.000000008**	<0.000000003	<0.00000000481	<0.000000051	<0.000000000815	<0.000000000551	<0.00000000236 uj
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	**0.000000021**	<0.000000003	<0.00000000481	<0.000000051	<0.000000000798	<0.000000000513	<0.00000000236 uj
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000332**	**0.000000027**	**0.0000000141 BJ**	<0.0000000477 BJ u	**0.0000000102 J**	<0.000000000198 BJK u	**0.0000000387** j-
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.0000155**	**0.00000165**	**0.000000473 B**	**0.00000165 B**	**0.000000383**	**0.0000000259 BJ**	**0.00000370 j-**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000007	<0.000000001	<0.000000000962	<0.00000000102	<0.000000000143	<0.000000000156	<0.000000000641 uj
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000000481	<0.000000051	<0.000000000113	<0.000000000078	<0.00000000236 uj
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000000481	<0.000000051	<0.000000000104	<0.000000000806	<0.00000000236 uj
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000000481	<0.000000051	<0.000000000096 JK u	<0.000000000381	<0.00000000236
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000000481	<0.000000051	<0.000000000425	<0.000000000384	<0.00000000236 uj
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000000481	<0.000000051	<0.000000000721	<0.000000000419	<0.00000000236 uj
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000000481	<0.000000051	<0.000000000476	<0.000000000389	<0.00000000236 uj
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.00000000481	<0.000000051	<0.000000000904	<0.000000000911 BJK u	**0.0000000293** j-
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.00000000481	<0.000000051	<0.000000000131	<0.000000000455	<0.00000000236 uj
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000009	<0.000000003	<0.00000000962	<0.000000102	<0.000000000234	<0.000000000134 BJ u	**0.000000258** j-
2378TCDD TEQ EPA89 (International) [1,2]	2.0E-10	2.2E-08	1.9E-09	6.1E-09	1.7E-09	4.9E-10	2.8E-11	4.6E-09

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE					
		FL-07-2 11/16/05	FL-07-2 11/8/2007	FL-07-2 12/3/2009	FL-07-2 11/7/2013	FL-07-2 11/7/2018	FL-07-2 9/19/2023
Dioxins							
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000005	<0.000000003	<0.00000000098	<0.000000000261	<0.000000000202	<0.000000000489 uj
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000005	<0.000000003	<0.000000049	<0.000000000145	<0.000000000567	<0.0000000237 uj
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000002	<0.000000049	<0.000000000181	<0.000000000633	<0.0000000237 uj
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000002	<0.000000049	<0.000000000178	<0.000000000656	<0.0000000237 uj
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	**0.000000014**	<0.000000002	<0.000000049	<0.000000000175	<0.000000000629	<0.0000000237 uj
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000064**	**0.000000009**	**0.000000000247 BJ**	**0.000000000362 J**	<0.000000000943 BJK u	**0.0000000214 J j**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.000000969**	**0.000000164**	<0.0000000291 BJ u	**0.0000000327 J**	<0.000000000817 BJ u	**0.000000360 j-**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000000098	<0.000000000165	<0.000000000122	<0.000000000493 uj
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.000000049	<0.000000000113	<0.000000000609	<0.0000000237 uj
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.000000001	<0.000000049	<0.000000000119	<0.000000000638	<0.0000000237 uj
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000049	<0.000000000107	<0.000000000436	<0.0000000237
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000049	<0.000000000873	<0.000000000427	<0.0000000237 uj
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000049	<0.000000000152	<0.000000000549 BJK u	<0.0000000237 uj
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.000000049	<0.000000000095	<0.000000000433	<0.0000000237 uj
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000002	<0.000000002	<0.000000049	<0.000000000105	<0.000000000856 BJK u	**0.0000000181 JK j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000002	<0.000000002	<0.000000049	<0.000000000163	<0.000000000402	<0.0000000237 uj
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000006	<0.000000002	<0.000000098	<0.000000000337	<0.000000000105 BJ u	**0.000000214 K j**
2378TCDD TEQ EPA89 (International) [1,2]	2.0E-10	3.0E-09	2.5E-10	2.5E-10	6.9E-11	0.0	9.7E-10

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE			
		FL-08-1 11/16/05	FL-08-1 12/03/08	FL-08-1-F [4] 12/03/08	FL-08-2 12/03/08
Dioxins					
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000005	<0.000000011	<0.0000000105	<0.0000000108
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000004	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000004	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000004	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000004	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.00000001**	<0.00000000414BJKu	<0.0000000525	<0.00000000259 BJKu
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.00000132**	**0.000000181 B**	**0.000000151**	<0.0000000127 Bju
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000011	<0.0000000105	<0.0000000108
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.0000000548	<0.0000000525	<0.0000000542
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.0000000548	<0.0000000525	<0.0000000542
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000003	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000003	<0.0000000548	<0.0000000525	<0.0000000542
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000005	<0.00000011	<0.000000105	<0.0000000016 BJu
2378TCDD TEQ EPA89 (International) [2]	2.0E-10	1.4E-09	1.8E-10	1.5E-10	0.0

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE							
		FL-09-1 11/16/05	FL-09-1 11/9/2007	FL-09-1 12/3/2009	FL-09-1 11/11/2011	(DU-11402) FL-09-1 11/11/2011	FL-09-1 11/7/2013	FL-09-1 11/7/2018	FL-09-1 9/19/2023
Dioxins									
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000005	<0.000000003	<0.0000000093	<0.0000000104	<0.0000000102	<0.00000000285	<0.00000000328	<0.00000000825 uj
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000006	<0.000000003	<0.0000000465	**0.0000000114 Jj**	<0.000000051	<0.00000000122	<0.000000000985	<0.0000000236 uj
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	**0.000000003**	<0.0000000465	<0.0000000126 JK u	<0.000000051	<0.00000000211	<0.000000000638	**0.00000000493 JK j**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000006	**0.000000005**	<0.0000000465	**0.0000000248 Jj**	<0.000000051	<0.00000000205	<0.000000000713	**0.00000000972 J j**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	**0.000000007**	**0.000000021**	<0.0000000465	**0.0000000257 Jj**	<0.000000051	<0.00000000646 JK u	<0.00000000066	**0.00000000887 J j**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000047**	**0.000000193**	**0.0000000117 BJ**	**0.000000112 B**	**0.000000141 B**	<0.0000000574 K u	**0.00000000175 BJ**	**0.000000164 j-**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.00000559**	**0.0000182**	0.000000565 B	**0.00000619 Bj**	**0.00000977 Bj**	**0.00000367**	**0.0000000388 J**	**0.000001170 j-**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.0000000093	<0.0000000104	<0.0000000102	<0.00000000223	<0.00000000156	<0.00000000742 uj
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.0000000465	**0.0000000143 Jj**	<0.000000051	<0.0000000015	<0.000000000857	<0.0000000236 uj
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000002	<0.0000000465	**0.0000000113 Jj**	<0.000000051	<0.00000000136	<0.000000000952	<0.0000000236 uj
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000465	**0.0000000145 Jj**	<0.000000051	<0.000000000798	<0.000000000605	<0.0000000236
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000465	**0.000000016 Jj**	<0.000000051	<0.000000000698	<0.000000000611	**0.0000000165 J**
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000465	<0.0000000148 JK u	<0.000000051	<0.00000000113	<0.0000000007	<0.0000000236 uj
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.0000000465	**0.0000000154 Jj**	<0.000000051	<0.000000000744	<0.000000000598	<0.0000000236 uj
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000003	<0.000000006	<0.0000000465	<0.0000000184 JK u	<0.000000051	<0.0000000018 BJK u	<0.00000000118 BJ u	**0.000000224 P j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000003	<0.000000006	<0.0000000465	<0.0000000521	<0.000000051	<0.00000000128	<0.000000000319	<0.0000000236 uj
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000005	<0.000000008	<0.000000093	<0.0000000635 BJ u	<0.0000000184 BJK u	<0.00000000355	<0.0000000092 BJK u	**0.000000733 j-**
2378TCDD TEQ EPA89 (International)[2]	2.0E-10	6.8E-09	2.3E-08	6.8E-09	2.9E-08	1.1E-08	3.7E-09	5.6E-11	9.8E-09

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [3]	LOCATION/SAMPLE DATE					
		FL-09-2 11/16/05	FL-09-2 11/9/2007	FL-09-2 12/3/2009	FL-09-2 11/7/2013	FL-09-2 11/7/2018	FL-09-2 9/19/2023
Dioxins							
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000009	<0.000000003	<0.00000001	<0.000000000245	<0.000000000587 Ku	<0.00000000472
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000002	<0.00000005	<0.000000000113	<0.000000000819	<0.0000000236
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000004	<0.00000005	<0.000000000139	<0.000000000508 JK u	**0.00000000178 JK j**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000004	<0.00000005	<0.000000000138	<0.000000000545	<0.0000000236
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000004	<0.000000004	<0.00000005	<0.000000000136	<0.000000000504	**0.000000000531 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000004**	**0.000000005**	**0.00000000182 BJ**	**0.00000000412 J**	<0.000000000542 BJK u	**0.0000000113 J**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.000000095**	**0.000000113**	<0.0000000215 BJ u	**0.0000000418 J**	**0.0000000991**	**0.0000000124**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000004	<0.000000001	<0.00000001	<0.000000000151	**0.0000000153**	<0.000000000484
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000005	<0.00000000011	**0.00000000171 J**	<0.0000000236
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000005	<0.000000000103	<0.00000000011	<0.0000000236
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000005	<0.000000000799	<0.000000000179 JK u	<0.0000000236
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000005	<0.000000000654	**0.0000000013 J**	<0.0000000236
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000005	<0.000000000113	**0.000000000065 BJ**	<0.0000000236
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000001	<0.00000005	<0.000000000724	<0.000000000044	<0.0000000236
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.00000005	<0.000000000691	<0.000000000159 BJ u	**0.000000000941 JK j**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000003	<0.000000004	<0.00000005	<0.000000000138	<0.000000000398	<0.0000000236
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000008	<0.000000002	<0.0000001	<0.000000000314	<0.000000000148 BJ u	**0.000000113**
2378TCDD TEQ EPA89 (International)[2]	2.0E-10	1.4E-10	1.6E-10	1.8E-10	8.3E-11	1.9E-09	6.8E-10

PARAMETER [1]	NORTH CAROLINA DRINKING WATER STANDARD [2]	LOCATION/SAMPLE DATE		
		FL-10-1 11/16/05	FL-10-1 12/03/08	FL-10-1-F [3] 12/03/08
Dioxins				
2,3,7,8-Tetrachlorodibenzo-p-dioxin	--	<0.000000007	<0.0000000112	<0.00000001
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	--	<0.000000005	<0.000000056	<0.0000000502
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000007	<0.000000056	<0.0000000502
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	<0.000000007	<0.000000056	<0.0000000502
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	--	<0.000000007	<0.000000056	<0.0000000502
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	**0.000000016**	<0.00000000764 BJu	<0.0000000502
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	--	**0.0000018**	**0.000000226 B**	**0.0000000496 J**
2,3,7,8-Tetrachlorodibenzofuran	--	<0.000000004	<0.0000000112	**0.0000001**
1,2,3,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.000000056	<0.0000000502
2,3,4,7,8-Pentachlorodibenzofuran	--	<0.000000002	<0.000000056	<0.0000000502
1,2,3,4,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000056	<0.0000000502
1,2,3,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000056	<0.0000000502
1,2,3,7,8,9-Hexachlorodibenzofuran	--	<0.000000003	<0.000000056	<0.0000000502
2,3,4,6,7,8-Hexachlorodibenzofuran	--	<0.000000003	<0.000000056	<0.0000000502
1,2,3,4,6,7,8-Heptachlorodibenzofuran	--	<0.000000003	<0.000000056	<0.0000000502
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	<0.000000003	<0.000000056	<0.0000000502
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	--	<0.000000005	<0.00000000237 BJKu	<0.0000001
2378TCDD_TEQ_EPA89 (International) [2]	2.0E-10	2.0E-09	2.3E-10	1.0E-08

Sample locations for 2023 groundwater sampling event.

1: Analytical results are reported in milligrams per liter (mg/L) unless otherwise noted.

2: For TEQ_EPA89: International Toxicity Equivalence Factor (I-TEF) methodology from USEPA (USEPA, 1989).

3: The future residential use of groundwater estimates resulted in a risk just above the lower end of the cancer risk range for ingestion of groundwater containing dioxin. The State of North Carolina is proposing to modify their drinking water standard for dioxin, regarding the application of the standard to dioxin TEQ rather than 2,3,7,8-TCDD. Therefore, groundwater will be monitored in the Former Landfill No. 1 Area for dioxin TEQ using the USEPA I-TEF method (USEPA, 1989). The monitoring will assess whether groundwater is approaching the proposed 15A NCAC 02L .0202 (North Carolina 2L) drinking water standard (effective April 1, 2013) of 2.0 x 10-10 mg/L dioxin I-TEQ through natural attenuation.

[3] Filtered sample.

< Concentration less than the Quantitation Limit.

B (organic) Present in analytical method blank.

J Estimated concentration.

j Concentration considered an estimate based on data validation.

K (Organic) Detection limit may be elevated due to the presence of an unrequested analyte.

P Concentration onsidered an estimate based on chlorodiphenyl ether interference being present at retention time.

r Unusable data. Present or Absent only

u Laboratory reported detection not validated during data validation process.

Bolding indicates constituent detection.

Shading indicates concentration exceeds comparison criteria.

Source: the Site's *OU-1 Year 19 Annual Monitoring Report* (January 2024)

Table I-2: OU-1 Wetland Soil Sampling Results, 2005 to 2023

PARAMETER[1]	ECOLOGICAL CLEANUP LEVELS[2]	LOCATION/SAMPLE DATE										
		FLWS-01 11/14/05	(DU-05401) FLWS-01 11/14/05	FLWS-01 11/09/06	FLWS-01 11/06/07	FLWS-01 12/05/08	FLWS-01 12/03/09	FLWS-01 11/05/13	FLWS-01 11/15/16	FLWS-01 11/07/18	FLWS-01 11/02/21	FLWS-01 09/18/23
Metals												
Chromium	110	5.0	5.0	5.0	5.0	5.3	5.63	5.3	4.5	8.55	7.9	9.8
Mercury	0.4	<0.1	<0.1	0.0506	0.1	0.031B	0.055 j	0.030 j	0.065	0.0211	<0.024	0.0085

PARAMETER[1]	ECOLOGICAL CLEANUP LEVELS[2]	LOCATION/SAMPLE DATE							
		FLWS-03 11/14/05	FLWS-03 11/09/06	(DU-06401) FLWS-03 11/09/06	FLWS-03 11/06/07	(DU-07404) FLWS-03 11/06/07	FLWS-03 12/05/08	FLWS-03 12/03/09	FLWS-03 11/05/13
Metals									
Chromium	110	13	10	6.0	5.0	5.0	2.0	2.18	1.7
Mercury	0.4	0.1	0.0149	0.0156	<0.1	<0.1	0.004B	<0.031 uj	0.006 Jj

PARAMETER[1]	ECOLOGICAL CLEANUP LEVELS[2]	LOCATION/SAMPLE DATE												
		FLWS-04 11/14/05	FLWS-04 11/09/06	FLWS-04 11/06/07	FLWS-04 12/05/08	FLWS-04 12/03/09	FLWS-04 11/05/13	FLWS-04 11/15/16	(DU-16402) FLWS-04 11/15/16	FLWS-04 11/07/18	FLWS-04 11/02/21	(DU-21401) FLWS-04 11/02/21	FLWS-04 09/18/23	(DU-23301) FLWS-04 09/18/23
Metals														
Chromium	110	28	11	95	128	13.7	111	4.19	5.47	9.25	4.5	5.5	6.03	5.57
Mercury	0.4	<0.1	0.0487	0.3	0.3	0.006 Jj	0.353 j	0.009 J	0.005 J	0.03	<0.027	<0.024	0.0072	0.0079

PARAMETER[1]	ECOLOGICAL CLEANUP LEVELS[2]	LOCATION/SAMPLE DATE					
		FLWS-05 11/14/05	FLWS-05 11/09/06	FLWS-05 11/06/07	FLWS-05 12/05/08	FLWS-05 12/03/09	FLWS-05 11/05/13
Metals							
Chromium	110	7.0	6.0	8.0	60	8.37	5.9
Mercury	0.4	<0.1	0.006	<0.1	0.033 B	0.005 Jj	0.005 Jj

PARAMETER[1]	ECOLOGICAL CLEANUP LEVELS[2]	LOCATION/SAMPLE DATE										
		FLWS-06 11/14/05	FLWS-06 11/09/06	FLWS-06 11/06/07	FLWS-06 12/05/08	FLWS-06 12/03/09	FLWS-06 11/05/13	FLWS-06 11/15/16	FLWS-06 11/07/18	(DU-18406) FLWS-06 11/07/18	FLWS-06 11/02/21	FLWS-06 09/18/23
Metals												
Chromium	110	8.0	212	60	4.8	12.5	150	75.5	6.66 j	11.5 j	6.4	8.95
Mercury	0.4	<0.1	1.06	0.2	0.23	0.018 Jj	2.01 j	0.68	0.036	0.041	0.030	0.037

Sample locations for 2021 wetland soil sampling event.

(1) Analytical results are reported in milligrams per kilogram (mg/kg) unless otherwise noted.

(2) Ecological cleanup target levels are defined in the Record of Decision dated June 19, 2002.

< Concentration less than the Quantitation Limit.

B (inorganic) The analyte has been detected between the method detection limit and the reporting limit.

J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

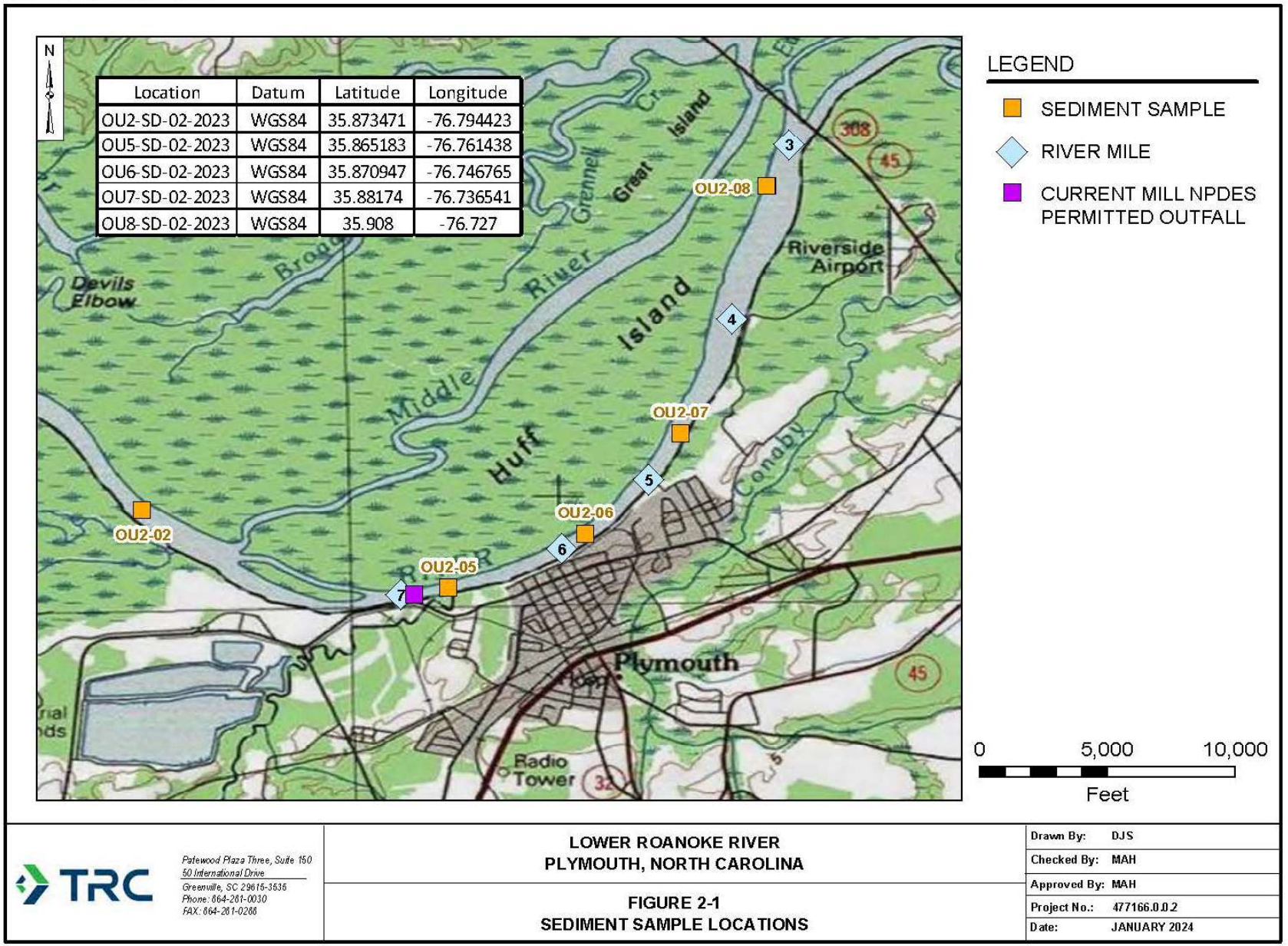
j Estimated concentration

Bolding indicates constituent detection.

Shading indicates concentration exceeds comparison criteria.

Source: the Site's *OU-1 Year 19 Annual Monitoring Report* (January 2024)

Figure I-2: OU-2 Sediment Sampling Locations



Source: the Site's *OU-2 Year 12 Monitored Natural Recovery Report* (February 2024)

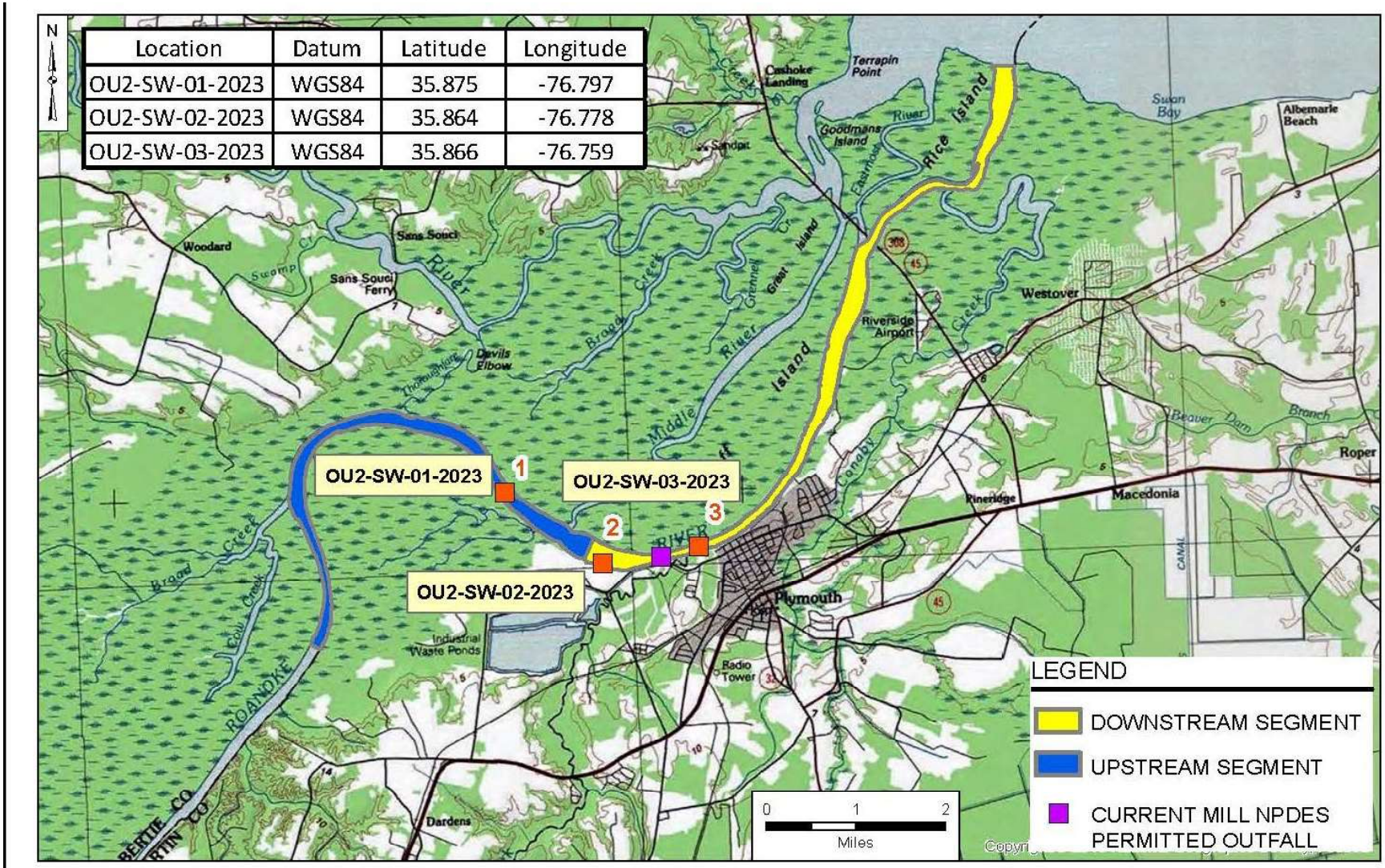
Table I-3: OU-2 Shallow Sediment Dioxin Concentrations, 2023

LOCATION/ TIMING		PARTY COLLECTING DATA	RANGE (ug/kg)	NUMBER	AVERAGE (ug/kg) [STD DEV]
Reference (Upstream)	Historical Data	USEPA	0.0073 to 0.021	15	0.015 [0.0038]
		Weyerhaeuser	0.0017 to 0.013	4	0.0094 [0.0053]
		Combined Data	0.0017 to 0.021	19	0.014 [0.0046]
	2012 MNR Performance Monitoring		0.0020 to 0.0078	10	0.0050 [0.0022]
	2015 MNR Performance Monitoring		0.0014 to 0.012	9	0.0058 [0.0038]
	2023 MNR Performance Monitoring		0.000078 to 0.00090	9	0.00035 [0.00023]
Downstream	Historical Data	USEPA	0.0029 to 0.18	43	0.038 [0.039]
		Weyerhaeuser	0.015 to 0.072	23	0.029 [0.014]
		Combined Data	0.0029 to 0.18	66	0.035 [0.033]
	2012 MNR Performance Monitoring		0.00070 to 0.52	37	0.039 [0.098]
	2015 MNR Performance Monitoring		0.0016 to 0.10	38	0.017 [0.023]
	2023 MNR Performance Monitoring		0.00059 to 0.37	38	0.031 [0.070]

Notes:
All sample data from 0 to 15 cm (0 to 6 inches).
Dioxin reported as I-TEQ.
Duplicate samples counted in total number.
Values calculated using the 1989 Mammalian TEF, where non-detect equals 0.

Source: the Site's *OU-2 Year 12 Monitored Natural Recovery Report* (February 2024)

Figure I-3: OU-2 Surface Water Sampling Locations, 2023



TRC Patewood Plaza Three, Suite 150 50 International Drive Greenville, SC 29615-3535 Phone: 864-281-0030 FAX: 864-281-0288	LOWER ROANOKE RIVER PLYMOUTH, NORTH CAROLINA FIGURE 3-1 SURFACE WATER SAMPLING LOCATIONS	Drawn By: DJS Checked By: MAH Approved By: MAH Project No.: 477166.0002 Date: JANUARY 2024

Source: the Site's *OU-2 Year 12 Monitored Natural Recovery Report* (February 2024)

Table I-4: OU-2 Surface Water Dioxin Sampling Concentrations, 2012 to 2023

LOCATION	DATE	2,3,7,8 TCDD (ng/L)	SPECIFIC CONDUCTANCE (mS/cm)	DISSOLVED OXYGEN (mg/L)	pH (s.u.)	TEMPERTURE (°C)	TURBIDITY (ntu)
	TARGET LEVEL	0.000005[(1)]					
OU2-SW-01	07/14/2012	< 0.000854	--	--	--	--	--
	08/09/2013	< 0.00255	0.141	6.41	6.91	25.31	17.2
	06/27/2014	< 0.00183	0.111	5.26	6.62	25.73	19.7
	07/07/2015	< 0.00177	0.118	7.65	6.81	31.29	14.8
	11/22/2017	< 0.00421	0.111	7.01	6.37	16.35	26.0
	11/12/2019	<0.00415	0.070	6.15	8.11	15.80	33.7
	09/21/2023	<0.00574	0.120	6.56	7.15	26.06	8.7
OW2-SW-02	06/25/2012	< 0.00103	--	--	--	--	--
	06/05/2013	< 0.00106	0.143	6.35	6.82	25.06	13.3
	06/10/2014	< 0.00152	0.111	5.28	6.62	25.17	22.5
	06/23/2015	< 0.00178	0.116	9.55	6.86	32.49	14.2
	11/08/2017	< 0.00513	0.121	7.25	5.88	16.81	29.1
	11/12/2019	<0.00545	0.072	6.33	8.02	15.82	29.0
	09/21/2023	<0.00473	0.120	6.39	7.08	25.19	8.6
OW2-SW-03	06/25/2012	< 0.000705	--	--	--	--	--
	06/05/2013	< 0.0047	0.172	6.38	6.34	24.19	17.9
	06/10/2014	< 0.00159	0.124	5.46	6.09	25.51	20.6
	06/23/2015	< 0.00213	0.176	7.62	6.69	31.93	0.00
	11/08/2017	< 0.00393	0.223	8.63	5.08	17.00	114
	11/12/2019	<0.00789	0.109	5.89	7.52	16.02	29.0
	09/21/2023	<0.00475	0.190	6.78	6.32	22.42	8.2

[(1)] Groundwater quality standard specified by Title 15A subchapter 2B of the North Carolina Administrative Code (15A NCAC 02B).

ng/L nanograms per liter

mg/L milligrams per liter

mS/cm microsiemens per centimeter

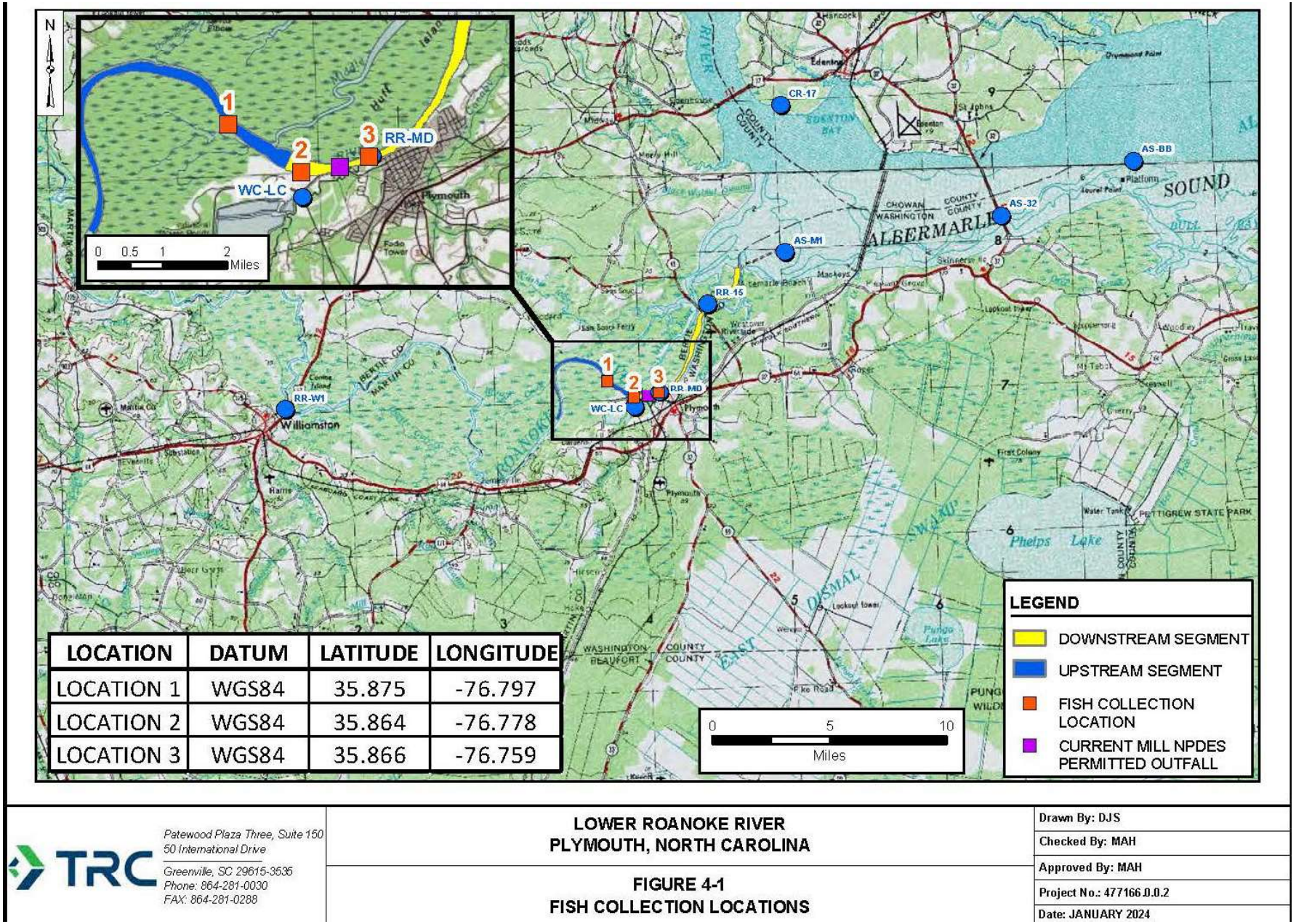
ntu nephelometric turbidity unit

s.u. standard units

°C degrees Celsius

Source: the Site's *OU-2 Year 12 Monitored Natural Recovery Report* (February 2024)

Figure I-4: OU-2 Fish Collection Location Sampling, 2023



LOCATION	DATUM	LATITUDE	LONGITUDE
LOCATION 1	WGS84	35.875	-76.797
LOCATION 2	WGS84	35.864	-76.778
LOCATION 3	WGS84	35.866	-76.759

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FAX: 864-281-0288

LOWER ROANOKE RIVER
PLYMOUTH, NORTH CAROLINA

FIGURE 4-1
FISH COLLECTION LOCATIONS

Drawn By: DJS
Checked By: MAH
Approved By: MAH
Project No.: 477166.0.0.2
Date: JANUARY 2024

Source: the Site's *OU-2 Year 12 Monitored Natural Recovery Report* (February 2024)

Table I-5: OU-2 Fish Tissue Dioxin Analytical Results, 2023

STATION	SPECIES	SAMPLE TYPE [1]	NUMBER OF FISH PER COMPOSITE	AVG. WT. (g)	AVG. LENGTH (mm)	% LIPID	TEQ WHO TEFs (ng/kg)	TEQ I-TEFs (ng/kg)	ESTIMATED WHOLE FISH CONCENTRATIONS		
									CALCULATED % LIPID [2]	CALCULATED TEQ WHO TEFs (ng/kg) [2]	CALCULATED TEQ I-TEFs (ng/kg) [2]
Location 1	Redear	Carcass	9	117	190	3.86	0.00	0.02	3.77	0.00	0.02
	Redear	Fillet	9	6		1.99	0.01	0.01			
	Redear	Carcass	6	175	211	3.89	0.09	0.09	3.83	0.09	0.09
	Redear	Fillet	6	7		2.14	0.19	0.19			
	Largemouth bass	Carcass	5	527	346	3.82	0.03	0.04	3.60	0.03	0.03
	Largemouth bass	Fillet	5	70		1.95	0.00	0.00			
	Largemouth bass	Carcass	5	617	404	6.04	0.57	0.37	5.43	0.37	0.24
	Largemouth bass	Fillet	5	327		4.29	0.00	0.01			
	Blue catfish	Fillet	6	142	536	5.89	0.49	0.50	5.89	0.49	0.50
	Blue catfish	Fillet	6	209	656	9.80	0.92	0.92	9.80	0.92	0.92
	Channel catfish	Fillet	4	116	513	5.88	0.58	0.58	5.88	0.58	0.58
Location 2	Redear	Carcass	10	170	212	5.98	0.91	0.83	5.55	0.81	0.74
	Redear	Fillet	10	20		1.95	0.01	0.01			
	Redear	Carcass	10	217	229	5.67	0.55	0.51	5.21	0.48	0.45
	Redear	Fillet	10	31		1.95	0.00	0.00			
	Largemouth bass	Carcass	6	496	338	5.86	4.24	3.90	5.34	3.67	3.38
	Largemouth bass	Fillet	6	77		1.97	0.00	0.00			
	Largemouth bass	Carcass	7	727	382	1.92	1.98	1.92	1.92	1.75	1.70
	Largemouth bass	Fillet	7	97		1.94	0.00	0.00			
	Blue catfish	Fillet	4	90	481	1.92	0.86	0.73	1.92	0.86	0.73
	Blue catfish	Fillet	5	141	544	4.29	0.16	0.16	4.29	0.16	0.16
	Blue catfish	Fillet	6	188	589	12.78	0.18	0.18	12.78	0.18	0.18
Location 3	Redear	Carcass	9	192	220	3.99	1.03	0.97	3.77	0.92	0.86
	Redear	Fillet	9	23		1.95	0.00	0.00			
	Redear	Carcass	10	238	235	5.91	0.07	0.08	5.47	0.06	0.07
	Redear	Fillet	10	30		1.95	0.00	0.00			
	Largemouth bass	Carcass	5	570	367	3.91	2.32	2.21	3.69	2.03	1.93
	Largemouth bass	Fillet	5	83		2.14	0.00	0.00			
	Largemouth bass	Carcass	5	841	401	1.97	0.20	0.20	1.97	0.18	0.18
	Largemouth bass	Fillet	5	116		1.96	0.00	0.00			
	Blue catfish	Fillet	4	45	359	1.96	0.00	0.00	1.96	0.00	0.00
	Blue catfish	Fillet	4	70	445	1.94	0.52	0.54	1.94	0.52	0.54
	Blue catfish	Fillet	6	120	514	4.31	0.06	0.06	4.31	0.06	0.06

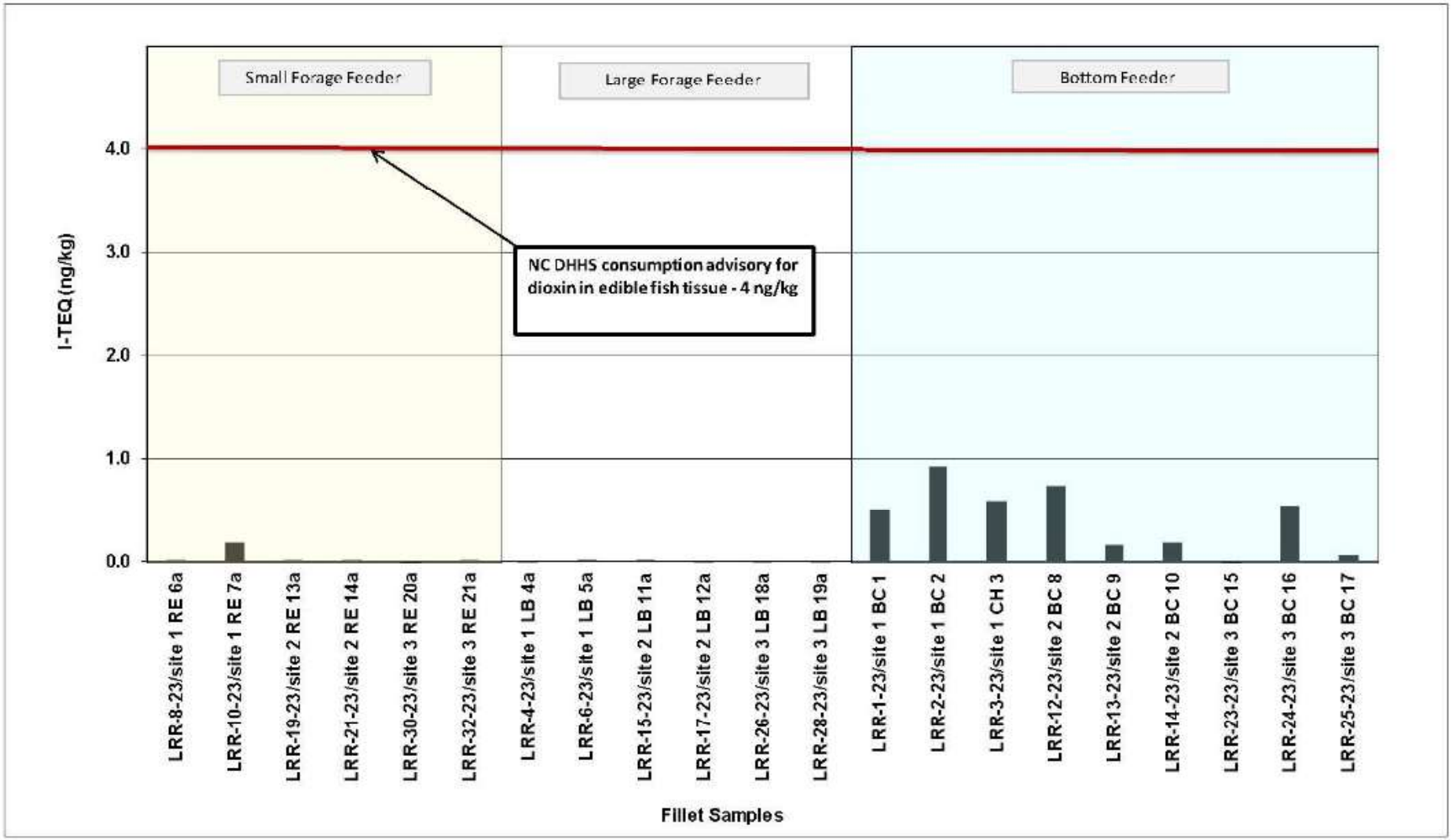
[1] Each small and large forage feeder composite was segregated into a carcass and fillet sample. The carcass sample is comprised of the whole body minus one fillet. The fillet sample is the remaining fillet of the respective fish.

[2] Whole fish % lipid and TEQ concentrations were calculated using the individual carcass and fillet concentrations on a weighted basis using the following equation:
Whole fish concentrations = [(avg. wt. of carcass * concentration of carcass) + (avg. wt. of fillet * concentration of fillet)]/(avg. wt. of carcass + avg. wt. of fillet)

Units are grams (g), millimeters (mm), milligrams per kilogram (mg/kg) and nanograms per kilogram (ng/kg) wet weight, as noted.

Source: the Site's *OU-2 Year 12 Monitored Natural Recovery Report* (February 2024)

Figure I-5: OU-2 Fish Fillet Tissue Dioxin Analytical Results by Fish Guild, 2023



Source: the Site's *OU-2 Year 12 Monitored Natural Recovery Report* (February 2024)

Figure I-6: OU-2 Fish Fillet Tissue Dioxin Analytical Results Over Time

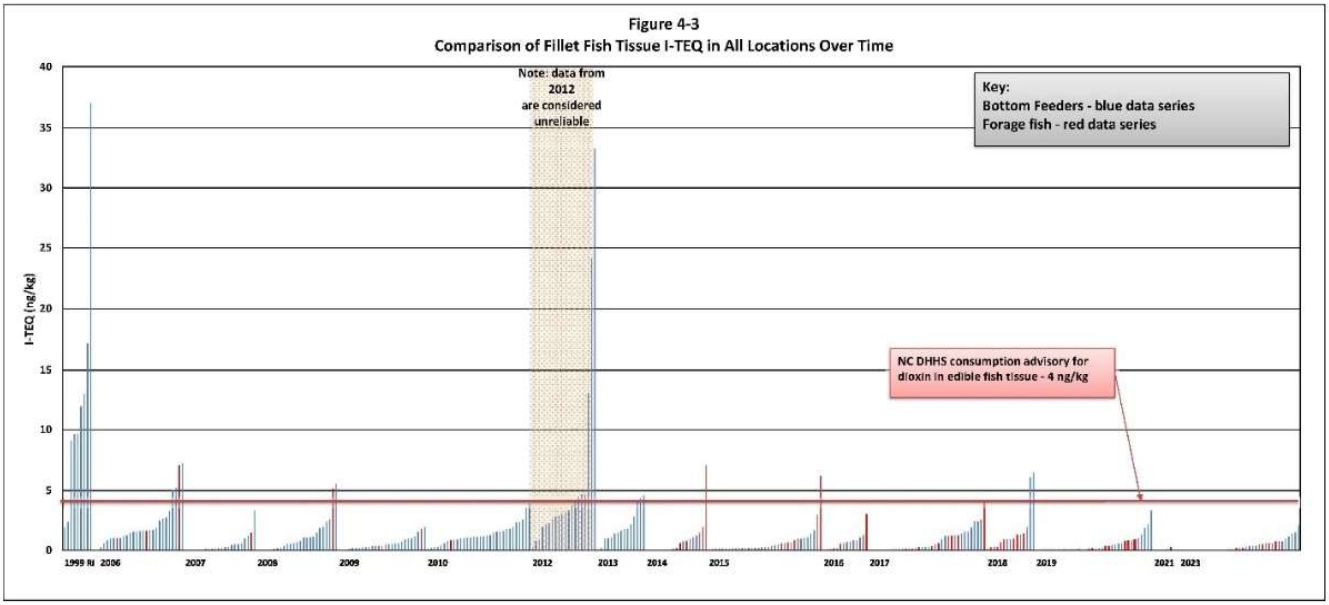
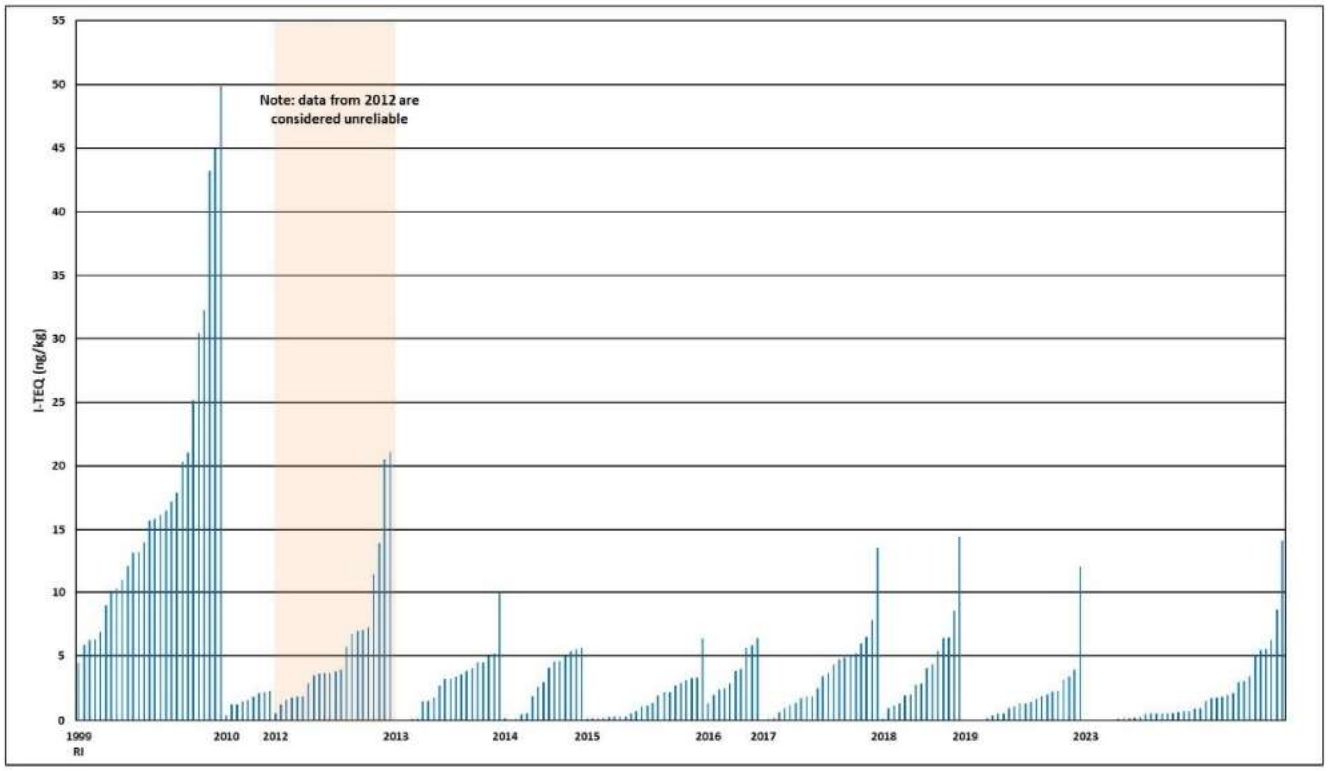
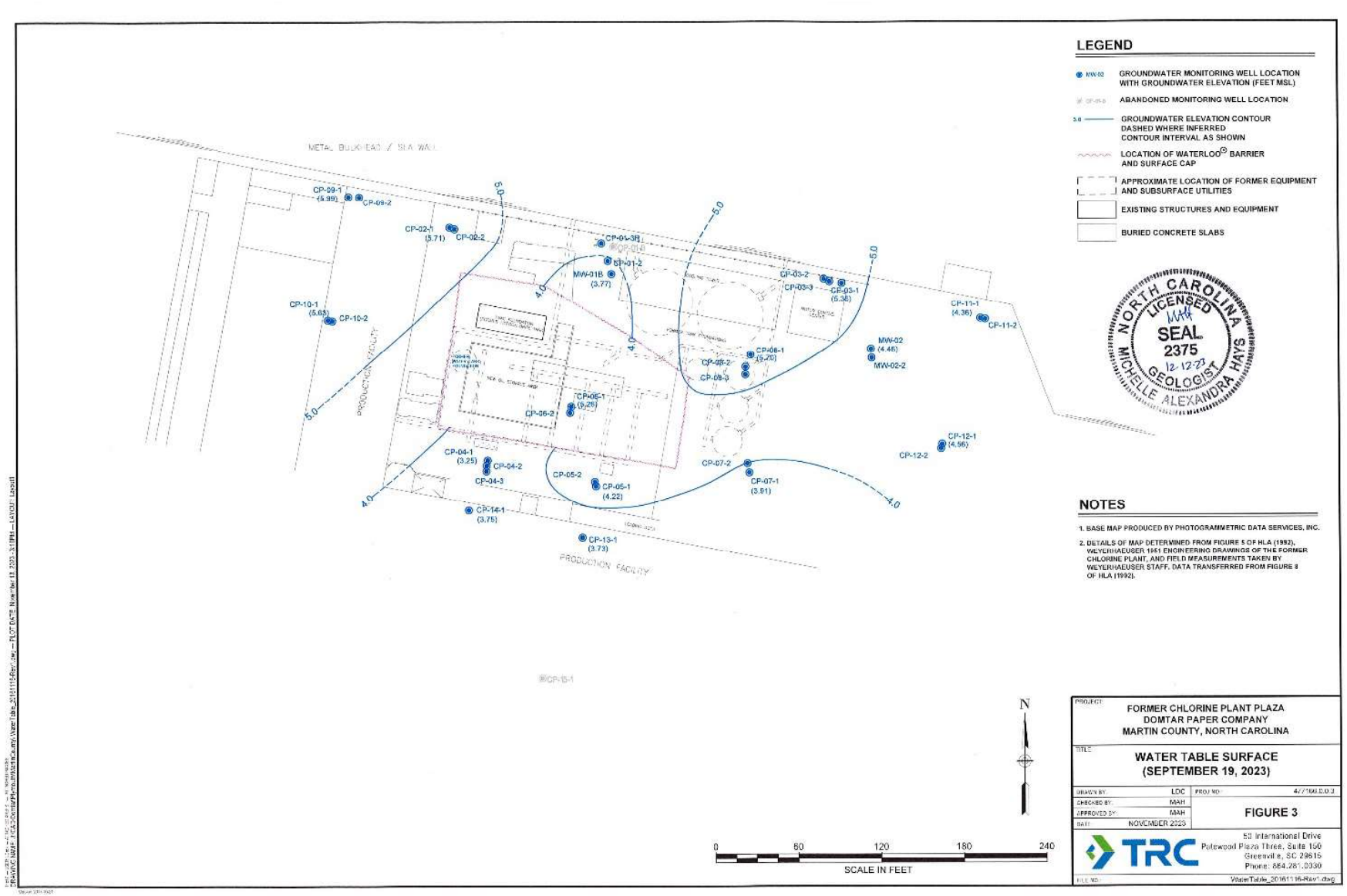


Figure I-7: OU-2 Whole Fish Tissue Dioxin Analytical Results Over Time



Source: the Site's *OU-2 Year 12 Monitored Natural Recovery Report* (February 2024)

Figure I-8: OU-3 Groundwater Sampling Locations, 2023



Source: the Site's *OU-3 Year 19 Monitoring Report* (December 2023)

Table I-6: OU-3 Mercury Groundwater Concentrations, 2006 to 2023

WELL ID	SAMPLE DATE	MERCURY[1] (mg/L)
Alluvial aquifer (water table)		
MW-01B	01/24/06	**0.001**
	11/07/06	**0.0027**
	05/30/07	**0.0015**
	11/07/07	**0.001**
	05/13/08	**0.0012**
	12/05/08	**0.0015**
	12/01/09	**0.00206**
	11/16/10	**0.00113 j**
	11/10/11	**0.0013**
	11/05/12	**0.0024**
	11/06/13	**0.0016**
	11/06/14	**0.00093**
	11/16/16	**0.0011**
	11/06/18	**0.00049**
	09/22/23	**0.00024**
MW-02	01/25/06	<0.0002
	11/07/06	<0.0002
	05/30/07	<0.0002
	11/07/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005
	11/10/11	<0.0001
	11/06/13	<0.0001
	11/07/18	<0.00008 J
	09/23/23	<0.0002
CP-02-1	01/25/06	**0.0012**
	11/08/06	**0.0005**
	05/31/07	<0.0002
	11/08/07	**0.0002**
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	**0.00011 J**
	11/16/10	<0.0002
	11/10/11	<0.0001
	11/05/12	<0.0001
	11/06/13	<0.0001
	11/06/14	**0.00044**
	11/16/16	**0.00016**
	11/07/18	**0.00021**
	11/03/21	**0.00085 j+**
	09/22/23	<0.0002
CP-03-1	01/24/06	<0.0002
	11/07/06	<0.0002
	05/30/07	<0.0002
	11/07/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005
CP-04-1	01/25/06	**0.0681[2]**
	11/08/06	**0.084**
	05/31/07	**0.0089**
	11/08/07	**0.014**
	05/13/08	**0.0089**
	12/05/08	**0.0078**
	12/02/09	**0.00114**
	11/16/10	**0.00339**
	11/10/11	**0.0055**
	11/05/12	**0.0056**
	11/06/13	**0.034**
	11/06/14	**0.048**
	11/16/16	**0.0053**
	11/06/18	**0.01**
	11/03/21	**0.0024 j+**
	09/22/23	**0.000452**

WELL ID	SAMPLE DATE	MERCURY[1] (mg/L)
Alluvial aquifer (water table)		
CP-05-1	01/25/06	**0.0101**
	11/08/06	**0.027**
	05/31/07	**0.0137**
	11/08/07	**0.069**
	05/13/08	**0.024**
	12/05/08	**0.0079**
	12/02/09	**0.00757**
	11/16/10	**0.0107**
	11/10/11	**0.026**
	11/05/12	**0.0087**
	11/06/13	**0.0081**
	11/06/14	**0.0064**
	11/16/16	**0.0079**
	11/06/18	**0.0039**
	11/03/21	**0.0065 j+**
	09/23/23	**0.000395**
CP-06-1	11/10/11	**0.028**
	11/06/13	**0.073**
	11/16/16	**0.064**
	11/06/18	**0.12 j**
	11/03/21	**0.10 j+**
	09/23/23	**0.0012**
CP-07-1	01/25/06	<0.0002
	11/07/06	<0.0002
	05/03/99	<0.0002
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005
	11/10/11	<0.0001
	11/06/13	**0.00015**
	11/16/16	**0.00013**
	11/06/18	**0.00013**
	09/22/23	<0.0002
CP-08-1	01/25/06	**0.0014**
	11/07/06	**0.0004**
	05/30/07	**0.0015**
	11/08/07	**0.0012**
	05/13/08	**0.0014**
	12/05/08	**0.0007**
	12/01/09	**0.00152**
	11/10/11	**0.00084**
	11/06/13	**0.0012**
	11/16/16	**0.00043**
	11/07/18	**0.00035**
	09/23/23	<0.0002
CP-09-1	01/24/06	**0.0007**
	11/08/06	<0.0002
	05/31/07	<0.0002
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	**0.00011 J**
	11/10/11	<0.0001
	11/06/13	<0.0001
	11/06/18	**0.00058**
	09/23/23	<0.0002
CP-10-1	01/24/06	<0.0002
	11/08/06	<0.0002
	05/31/07	<0.0002
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	<0.0005
	11/10/11	<0.0001
	11/06/13	<0.0001
	11/06/18	<0.00008 J

WELL ID	SAMPLE DATE	MERCURY[1] (mg/L)
Alluvial aquifer (water table)		
CP-11-1	01/24/06	<0.0002
	11/07/06	<0.0002
	05/30/07	<0.0002
	11/07/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005
CP-12-1	01/24/06	<0.0002
	11/07/06	<0.0002
	05/30/07	<0.0002
	11/07/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005
CP-13-1	01/25/06	<0.0002
	11/08/06	<0.0002
	05/31/07	<0.0002
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	**0.0001 J**
	11/10/11	<0.0001
	11/06/13	<0.0001
	11/06/18	<0.00004 J
CP-14-1	01/25/06	<0.0002
	11/08/06	<0.0002
	05/31/07	<0.0002
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	**0.00008 J**
	11/10/11	<0.0001
	11/06/13	<0.0001
	11/07/18	<0.00009 J
CP-15-1	01/25/06	<0.0002
Alluvial aquifer (-20 ft elevation)		
MW-02-2	01/25/06	<0.0002
	11/07/06	<0.0002
	05/30/07	<0.0002
	11/07/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005
	11/07/18	<0.0001 J
CP-01-2	01/24/06	<0.0002
	11/07/06	**0.0056**
	05/30/07	**0.0038**
	11/08/07	**0.0011**
	05/13/08	<0.0005
	12/05/08	**0.0022**
	12/02/09	**0.0015**
	11/16/10	**0.00973**
	11/10/11	0.00043
	11/05/12	**0.0024**
	11/06/13	**0.0021**
	11/06/14	**0.0022**
	11/16/16	**0.005**
	11/06/18	**0.0075**
	09/22/23	<0.0002

WELL ID	SAMPLE DATE	MERCURY[1] (mg/L)
Alluvial aquifer (-20 ft elevation)		
CP-02-2	01/25/06	<0.0002
	11/08/06	<0.0002
	05/31/07	<0.0002
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	**0.00009 J**
	11/10/11	<0.0001
	11/06/13	<0.0001
	11/07/18	**0.00035**
	09/22/23	<0.0002
CP-03-2	01/24/06	<0.0002
	11/07/06	**0.0004**
	05/30/07	<0.0002
	11/07/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005
CP-04-2	01/25/06	**0.0006**
	11/08/06	<0.0002
	05/31/07	<0.0002
	11/08/07	**0.0007**
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	<0.0005
	11/06/18	<0.00009 J
	09/22/23	<0.0002
CP-05-2	01/25/06	<0.0002
	11/08/06	<0.0002
	05/31/07	<0.0002
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	**0.00018 J**
	11/06/18	<0.00005 J
CP-07-2	01/25/06	**0.0002**
	11/07/06	**0.0003**
	05/30/07	**0.0002**
	11/08/07	**0.0003**
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	**0.00008 J**
	11/06/18	<0.0001
	09/22/23	<0.0002
CP-08-2	01/25/06	<0.0002
	11/07/06	**0.0006**
	05/30/07	**0.0007**
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	**0.00065**
CP-09-2	01/24/06	<0.0002
	11/08/06	<0.0002
	05/31/07	**0.0002**
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	<0.0005

WELL ID	SAMPLE DATE	MERCURY[1] (mg/L)
Alluvial aquifer (-20 ft elevation)		
CP-10-2	01/24/06	<0.0002
	11/08/06	**0.0004**
	05/31/07	<0.0002
	11/08/07	**0.0002**
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	<0.0005
CP-11-2	01/24/06	<0.0002
	11/07/06	<0.0002
	05/30/07	<0.0002
	11/07/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005
CP-12-2	01/24/06	**0.0004**
	11/07/06	**0.0002**
	05/30/07	**0.0002**
	11/07/07	**0.0003**
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	**0.00008 J**
Marine sand		
CP-01-3	01/24/06	**0.0002**
CP-01-3R	11/14/07	**0.0023**
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005
	11/06/13	<0.0001
	11/06/18	**0.00014**
	09/22/23	<0.0002
CP-03-3	01/24/06	<0.0002
	11/07/06	<0.0002
	05/30/07	<0.0002
	11/07/07	<0.0002
	05/13/08	<0.0005
	12/05/08	**0.00071**
	12/01/09	<0.0005
	11/06/13	<0.0001
	11/07/18	<0.00009 J
CP-04-3	01/25/06	<0.0002[2]
	11/08/06	<0.0002
	05/31/07	<0.0002
	11/08/07	<0.0002
	05/13/08	<0.0005
	12/05/08	<0.0005
	12/02/09	<0.0005
	11/06/13	<0.0001
	11/06/18	<0.00005 J
CP-08-3	11/14/07	**0.0021**
	05/18/08	<0.0005
	12/05/08	<0.0005
	12/01/09	<0.0005

Bolded value indicates a concentration was detected.

Sample locations for 2023 groundwater sampling event.

(1) Gray shaded values indicate an exceedance of the North Carolina groundwater qua 0.001 mg/L (15A NCAC 2L.0202).

J Estimated < MRL and > MDL

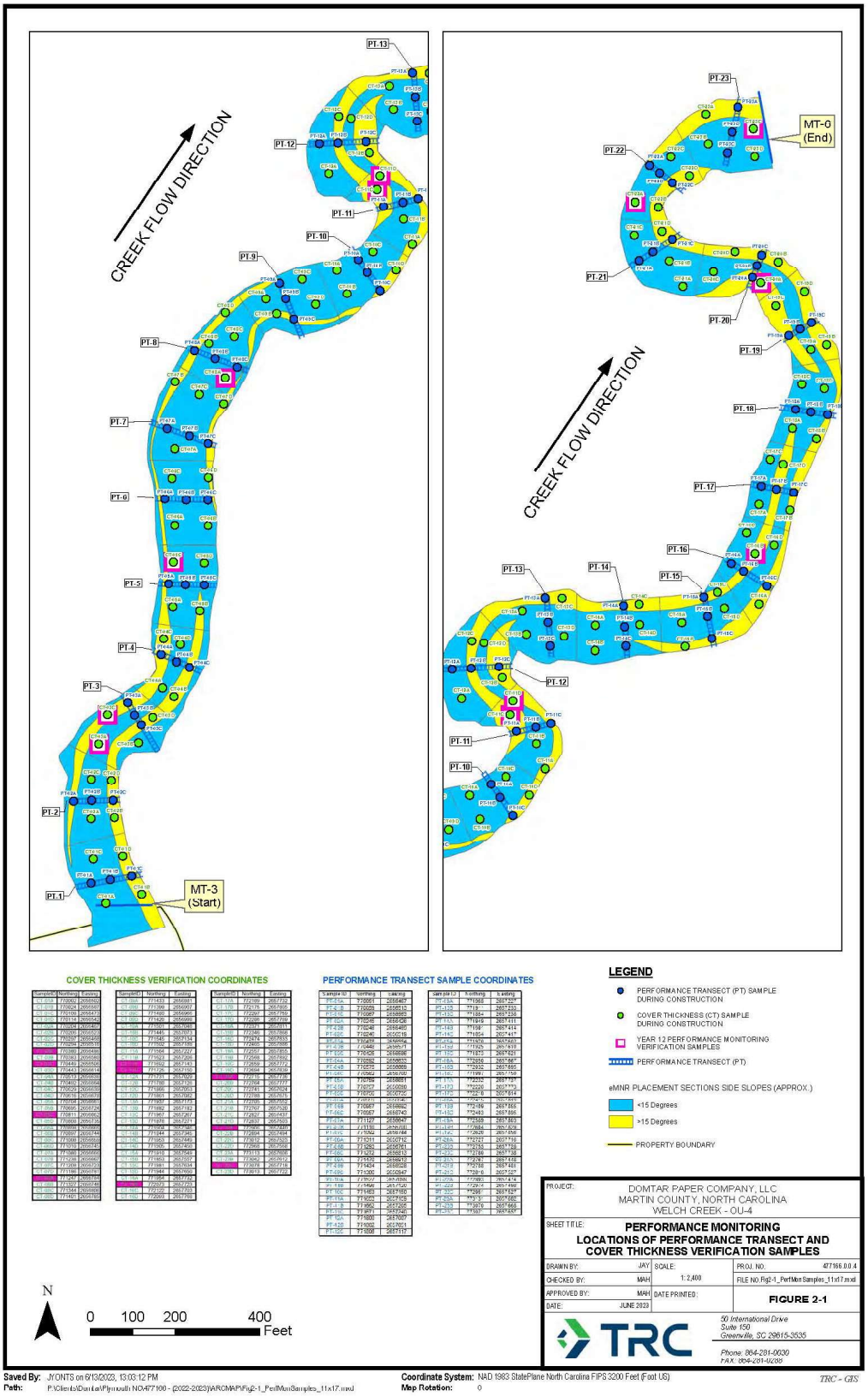
j+ Concentration considered biased high based on data validation.

j Concentration considered an estimate based on data validation.

< Concentration less than the Quantitation Limit.

Source: the Site's *OU-3 Year 19 Monitoring Report* (December 2023)

Figure I-9: OU-4 Sediment Sampling Locations



Source: the Site's *OU-4 Year 12 Enhanced Monitoring Recovery Performance Monitoring Report* (February 2024)

Table I-7: OU-4 Sediment Sampling Physical Characteristics

GENERAL LOCATION	SAMPLE[1]	DATE	INITIAL CAP THICKNESS[2] (in.)	CAP THICKNESS (2023) (in.)	VARIANCE BETWEEN INITIAL AND 2023 (in.)	COMPACTION[3]	DISTURBANCE[4]	SCOUR	DEBRIS	ORGANISMS	BIOTURBATION
Between MT-3 and GT-5	CT-03A	09/21/23	2.50	2.50	0.00	good	none	none	none	none	none
	CT-03C	09/21/23	3.60	3.50	-0.10	good	none	minimal	minimal; twigs	none	none
Between GT-5 and GT-10	CT-05C	09/21/23	4.50	2.75	-1.75	good	none	none	none	none	yes
	CT-08A	09/21/23	2.75	2.50	-0.25	good	none	minimal	moderate; leaves and twigs	none	none
	CT-11C	09/21/23	2.50	3.00	0.50	good	none	minimal	moderate; heavy leaves and twigs	none	none
	CT-11D	09/21/23	3.60	2.25	-1.35	good	none	minimal	moderate; twigs	none	none
	CT-16B	09/21/23	3.00	3.00	0.00	good	none	none	none	none	none
	CT-20A	09/21/23	3.50	3.00	-0.50	good; two layers of sand visible	yes	yes	none	none	none
Between GT-10 and MT-6	CT-22A	09/21/23	2.25	2.25	0.00	good	none	none	none	none	minimal
	CT-23C	09/21/23	3.50	3.00	-0.50	good	none	minimal	minimal; twigs	none	yes
Design Cap Thickness			2.0 - 4.0 in.								

[1] Core samples were randomly selected.
[2] Measurements obtained 24-hours following sand cap installation from December 2011 through February 2012.
[3] Compaction refers to the presence of voids observed in the core tube and the physical characteristics of the sand installation.
[4] Disturbance refers to the integrity of the sand cap.

Source: the Site's *OU-4 Year 12 Enhanced Monitoring Recovery Performance Monitoring Report* (February 2024)

Figure I-10: OU-4 Sediment I-TEQ Over Time

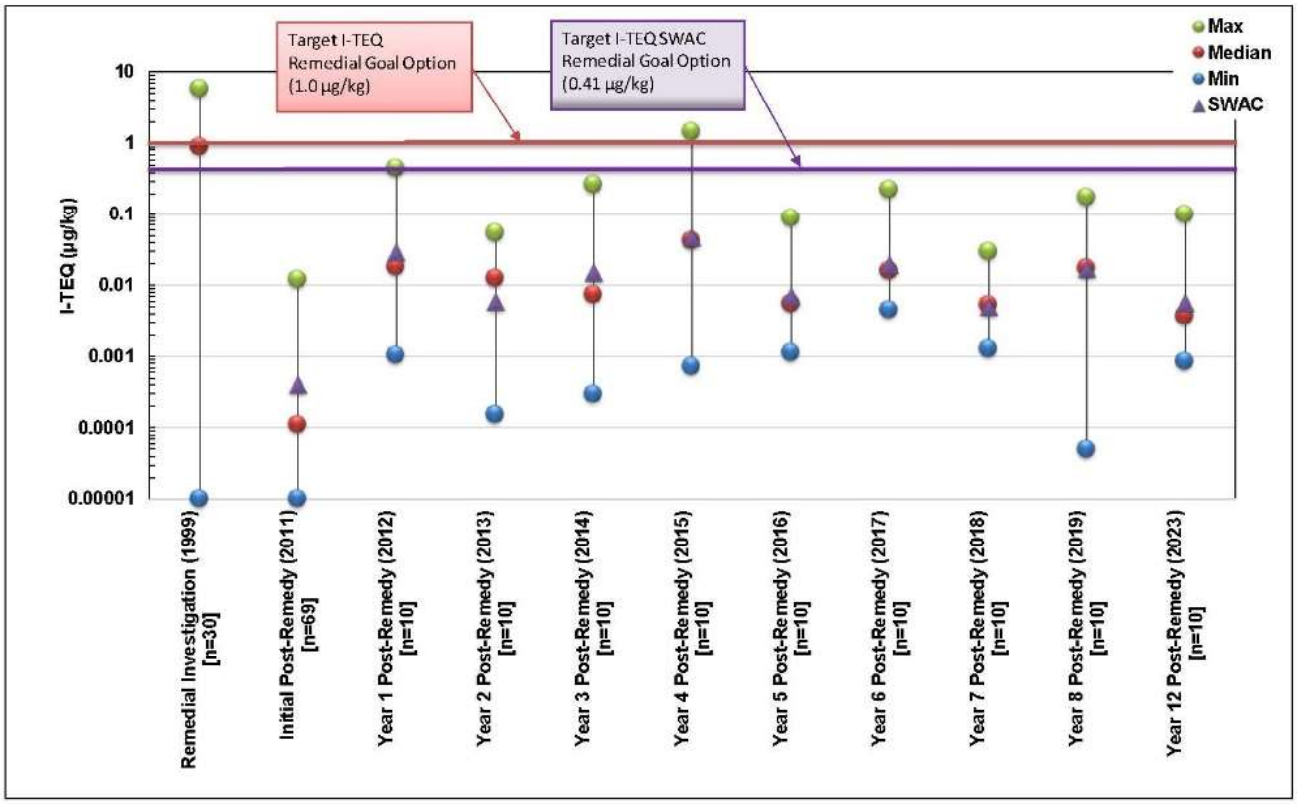


Table I-8: OU-4 Sediment TOC

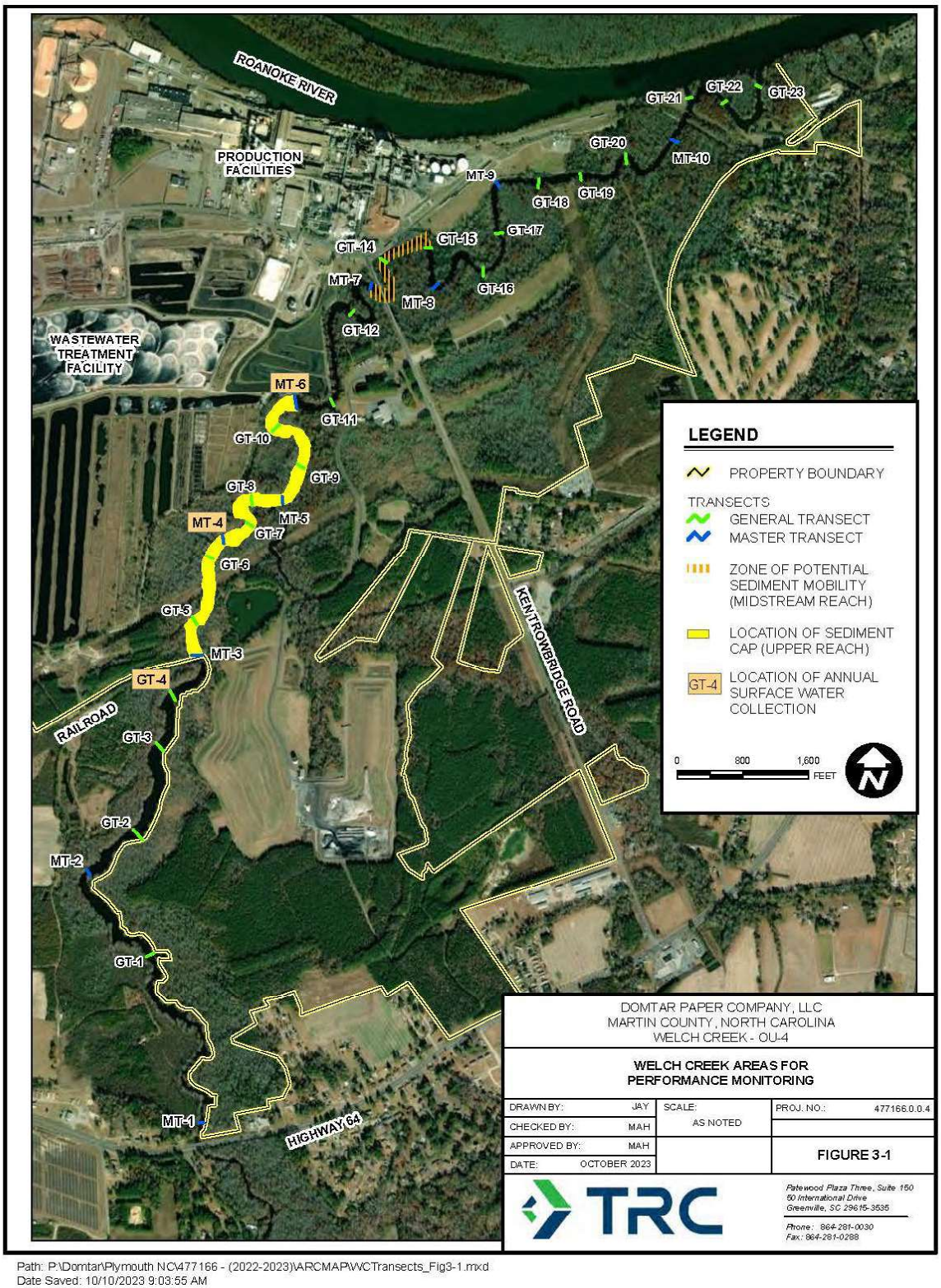
Table 2-3
Summary of Total Organic Carbon in Sediment

SAMPLE ID	DATE	TOC[(1)]
CT-03A	09/21/23	533
CT-03C	09/21/23	14900
CT-05C	09/21/23	1230
CT-08A	09/21/23	1260
CT-11C	09/21/23	9770
CT-11D	09/21/23	9650
CT-16B	09/21/23	1330
CT-20A	09/21/23	3150
CT-22A	09/21/23	7990
CT-23C	09/21/23	3520

(1) Analytical results are reported in milligrams per kilograms (mg/kg).

Source: the Site's *OU-4 Year 12 Enhanced Monitoring Recovery Performance Monitoring Report* (February 2024)

Figure I-11: OU-4 Surface Water Sampling Locations



Source: the Site's *OU-4 Year 12 Enhanced Monitoring Recovery Performance Monitoring Report* (February 2024)

Table I-9: OU-4 Surface Water Sampling Results, 2012 to 2023

PARAMETER[1]	NC SWQC[2]	LOCATION/SAMPLE DATE								
		SW-2012-GT4 11/06/12 (Year 1)	SW-2013-GT4 11/04/13 (Year 2)	SW-2014-GT4 11/04/14 (Year 3)	SW-2015-GT4 11/03/15 (Year 4)	SW-2016-GT4 11/14/16 (Year 5)	SW-2017-GT4 11/07/17 (Year 6)	SW-2018-GT4 11/05/18 (Year 7)	SW-2019-GT4 11/12/19 (Year 8)	SW-2023-GT4 09/20/23 (Year 12)
Dioxin										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (ng/L)	0.000005	<0.00417	<0.000923	<0.00204	<0.604	<0.00136	<0.00352	<0.00334	NA	<0.00471
Metals										
Aluminum, total recoverable	--	**0.15 B**	**0.120 B**	<0.090 BJ	<0.11 B	**0.110**	**0.070 J**	<0.07 BJ	<0.03	**0.032**
Barium, total recoverable	--	**0.035**	**0.046**	**0.048**	**0.055**	**0.047**	**0.046**	**0.033**	**0.044**	**0.0405**
Calcium, total recoverable	--	**8.73**	**11.7**	**12.2**	**13.0**	**11.7**	**12.40**	**12.30**	**12.1**	**10.4**
Iron, total recoverable	1.0	**1.19**	**2.97**	**2.02**	**2.96**	**2.87**	**2.82**	**1.92**	**1.54**	**1.37**
Magnesium, total recoverable	--	**2.04**	**2.86**	**2.93**	**3.28**	**2.86**	**3.03**	**3.38**	**3.31**	**2.49**
Manganese, total recoverable	--	**0.029**	**0.145**	**0.189**	**0.226**	**0.167**	**0.161**	**0.080**	**0.102**	**0.152**
Titanium, total recoverable	--	<0.050	**0.001 BJ**	<0.050	**0.001 J**	<0.001	**0.001 J**	<0.001 BJ	**0.001 J**	<0.005
General Chemistry										
Solids, total suspended	--	**6.5 j**	<5.0	<5.0	**14.0**	<5.0	**5.0**	**5.5**	<5.0	**8.4**
Solids, total suspended, volatile	--	<10 uj	<10	<10	<10	<5.0	<5.0	**6.5**	<5.0	**10.8 j**
Dissolved organic carbon	--	**15.0**	**12.1**	**35.8**	**11.9**	**11.6**	**8.5**	**11.0**	**11.2**	**13.3 j-**
Total organic carbon	--	**18.5**	**11.6**	**23.1 j+**	**12.8**	**12.3**	**10.7**	**12.4**	**11.2**	**14.1**
Field Parameters										
Conductance, specific (mS/cm)	--	0.113	0.102	0.156	0.110	0.225	0.151	0.151	0.116	0.120
DO	--	5.45	3.10	6.05	0.69	2.45	8.13	1.63	3.71	0.70
pH	--	6.16	6.67	6.31	7.07	7.08	5.95	6.61	8.13	6.59
ORP (mV)	--	--	177	165	87	186	--	--	297	31.2
Temperature (°C)	--	9.74	14.68	13.16	16.43	16.48	17.16	18.7	13.39	29.69
Turbidity (ntu)	--	4.53	5.87	7.41	6.63	6.78	--	2.28	4.1	5.3

[1] Analytical results are reported in milligrams per liter (mg/L) unless otherwise noted.

[2] Surface water quality criteria specified by Title 15A subchapter 2B of the North Carolina Administrative Code (15A NCAC2B).

NA Not analyzed. The glassware was broken upon arrival at the laboratory

B Analyte was found in the associated method blank as well as in the sample.

J Estimated value. Concentration found below MRL.

j Concentration considered an estimate based on data validation.

uj Not detected; quantitation limit may be inaccurate or imprecise.

X Indicates a calibration issue associated with DOC; see case narrative of analytical report.

+ Estimated value, biased high.

Bolding indicates constituent detection.

PARAMETER[1]	NC SWQC[2]	LOCATION/SAMPLE DATE								
		SW-2012-MT4 11/06/12 (Year 1)	SW-2013-MT4 11/04/13 (Year 2)	SW-2014-MT4 11/04/14 (Year 3)	SW-2015-MT4 11/03/15 (Year 4)	SW-2016-MT4 11/14/16 (Year 5)	SW-2017-MT4 11/07/17 (Year 6)	SW-2018-MT4 11/05/18 (Year 7)	SW-2019-MT4 11/19/19 (Year 8)	SW-2023-MT4 09/20/23 (Year 12)
Dioxin										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (ng/L)	0.000005	<0.00367	<0.00111	<0.00133	<0.00247	<0.00271	<0.00316	<0.00623	<0.00294	<0.00482
Metals										
Aluminum, total recoverable	--	**0.16 B**	**0.120 B**	<0.080 BJ	<0.09 BJ	**0.120**	**0.090 J**	<0.05 BJ	**0.04 J**	**0.027**
Barium, total recoverable	--	**0.036**	**0.047**	**0.050**	**0.058**	**0.048**	**0.048**	**0.032**	**0.045**	**0.036**
Calcium, total recoverable	--	**9.17**	**13.0**	**13.6**	**13.5**	**12.6**	**13.4**	**12.6**	**12.9**	**9.68**
Iron, total recoverable	1.0	**1.39**	**3.52**	**2.37**	**2.25**	**3.07**	**3.04**	**2.16**	**1.94**	**1.13**
Magnesium, total recoverable	--	**2.07**	**3.08**	**3.21**	**3.45**	**3.00**	**3.20**	**3.36**	**3.49**	**2.34**
Manganese, total recoverable	--	**0.032**	**0.189**	**0.228**	**0.206**	**0.189**	**0.188**	**0.105**	**0.134**	**0.147**
Titanium, total recoverable	--	<0.0004	**0.001 BJ**	<0.050	**0.001 J**	<0.001	**0.002 J**	<0.001 BJ	**0.001 J**	<0.005
General Chemistry										
Solids, total suspended	--	**7.0 j**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**5.2**
Solids, total suspended, volatile	--	<10 j	<10	<10	<10	<5.0	<5.0	**5.5**	<5.0	**6.6 j**
Dissolved organic carbon	--	**17.4**	**12.9**	**37.1**	**12.4**	**12.7**	**8.7 j**	**12.1**	**11.7**	**13.6 j-**
Total organic carbon	--	**19.9**	**12.4**	**24.2 j+**	**12.4**	**13.2**	**10.0**	**12.8**	**11.5**	**14.0**
Field Parameters										
Conductance, specific (mS/cm)	--	0.116	0.113	0.186	0.115	0.247	0.182	0.157	0.127	0.17
DO	--	7.58	3.58	6.91	0.00	2.06	9.58	1.08	2.30	1.63
pH	--	6.16	6.85	6.36	7.16	6.85	5.46	6.73	7.91	6.48
ORP (mV)	--	--	168	171	168	204	--	--	255	89.7
Temperature (°C)	--	9.69	14.79	12.70	16.39	15.92	17.93	18.96	13.65	27.34
Turbidity (ntu)	--	5.26	6.43	8.48	5.97	1.2	--	3.56	4.4	4.79

PARAMETER[1]	NC SWQC[2]	LOCATION/SAMPLE DATE								
		SW-2012-MT6 11/06/12 (Year 1)	SW-2013-MT6 11/04/13 (Year 2)	SW-2014-MT6 11/04/14 (Year 3)	SW-2015-MT6 11/03/15 (Year 4)	SW-2016-MT6 11/14/16 (Year 5)	SW-2017-MT6 11/07/17 (Year 6)	SW-2018-MT6 11/05/18 (Year 7)	SW-2019-MT6 11/12/19 (Year 8)	SW-2023-MT6 09/20/23 (Year 12)
Dioxin										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (ng/L)	0.000005	<0.00364	<0.00110	<0.00165	<0.00109	<0.00203	<0.0459	<0.00253	<0.00242	<0.00478
Metals										
Aluminum, total recoverable	--	**0.18 B**	**0.13 B**	<0.110 B	<0.13 B	**0.160**	**0.150**	<0.06 BJ	**0.06 J**	**0.030**
Barium, total recoverable	--	**0.037**	**0.048**	**0.050**	**0.052**	**0.050**	**0.048**	**0.031**	**0.048**	**0.039**
Calcium, total recoverable	--	**9.82**	**13.4**	**14.2**	**13.6**	**13.8**	**14.4**	**12.8**	**13.6**	**10.5**
Iron, total recoverable	1.0	**1.84**	**4.09**	**2.18**	**2.59**	**3.78**	**2.59**	**2.22**	**2.48**	**1.27**
Magnesium, total recoverable	--	**2.27**	**3.09**	**3.29**	**3.48**	**3.29**	**3.60**	**3.45**	**3.65**	**2.67**
Manganese, total recoverable	--	**0.042**	**0.222**	**0.213**	**0.214**	**0.214**	**0.123**	**0.106**	**0.15**	**0.153**
Titanium, total recoverable	--	**0.001 J**	**0.001 BJ**	<0.050	**0.001 J**	**0.001 J**	**0.004 J**	<0.001 BJ	**0.001 J**	<0.005
General Chemistry										
Solids, total suspended	--	**7.5 j**	**5.5**	<5.0	**6.0**	**5.5**	**5.0**	<5.0	**6.5**	**4.0**
Solids, total suspended, volatile	--	<10 j	<10	<10	<10	<5.0	<5.0	**6.5**	<5.0	**6.20 j**
Dissolved organic carbon	--	**18.4**	**12.9**	**22.9 Xj**	**13.4**	**13.8**	**8.5**	**11.5**	**11.8**	**13.5 j-**
Total organic carbon	--	**19.3**	**12.7**	**14.5 j+**	**13.8**	**13.9**	**22.5 j**	**12.8**	**11.7**	**13.6**
Field Parameters										
Conductance, specific (mS/cm)	--	0.128	0.119	0.199	0.135	0.322	0.242	0.173	0.143	0.16
DO	--	8.48	4.60	7.46	0.79	2.09	9.14	1.74	1.81	1.63
pH	--	5.99	6.9	6.44	7.35	6.76	5.20	6.38	7.75	6.33
ORP (mV)	--	--	130	157	319	208	--	--	231	125.3
Temperature (°C)	--	9.63	14.99	12.15	16.72	13.98	18.8	20.53	13.55	30.13
Turbidity (ntu)	--	7.67	9.20	7.21	5.45	0.19	--	2.02	6.90	13.80

Source: the Site's *OU-4 Year 12 Enhanced Monitoring Recovery Performance Monitoring Report* (February 2024)

Table I-10: OU-4 Benthic and Diversity Index Scores

Table 4-3
North Carolina Biotic Index and Shannon-Weaver Diversity Index Values, April 2023

SITE	NCBI	NCBI CLASSIFICATION[1]	SHANNON DIVERSITY
Qualitative Samples (Dip Net – Near Shore)			
REF(GT-4)	7.65	2	2.83
MT-3	8.37	1	2.49
MT-4	8.02	1	3.05
MT-6	8.17	1	2.74
Quantitative Samples (Ponar – Thalweg)			
REF(GT-4)	8.29	1	1.80
MT-3	7.44	2	2.83
MT-4	7.08	2	2.77
MT-6	7.31	2	2.12

[1] NCBI Classification - Coastal A

5	<5.42	More Pristine
4.6	5.42 – 5.46	
4.4	5.47 – 5.51	
4	5.52 – 6.00	
3.6	6.01 – 6.05	
3.4	6.06 – 6.10	
3	6.11 – 6.67	
2.6	6.68 – 6.72	
2.4	6.73 – 6.77	
2	6.78 – 7.68	
1.6	7.69 – 7.73	
1.4	7.74 – 7.79	
1	>7.79	More Stress

Source: the Site's *OU-4 Year 12 Enhanced Monitoring Recovery Performance Monitoring Report* (February 2024)

Table I-11: OU-4 Benthic Dioxin Concentrations, 2013 to 2023

CONSTITUENT	LOCATION/SAMPLE DATE															
	REFERENCE (Upstream: GT-4) 07/11/13	REFERENCE (Upstream: GT-4) 06/18/14	REFERENCE (Upstream: GT-4) 05/16/16	REFERENCE (Upstream: GT-4) 05/23/23	MT-3 07/10/13	MT-3 06/17/14	MT-3 05/16/2016	MT-3 05/23/2023	MT-4 07/10/13	MT-4 06/17/14	MT-4 05/16/2016	MT-4 05/22/2023	MT-6 07/09/13	MT-6 06/17/14	MT-6 05/16/2016	MT-6 05/22/2023
Dioxins																
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1.43	2.46	1.17	0.628	0.949	<1.56 Ku	1.70	1.44	1.92	2.54	2.75	7.06	2.21	<2.24 Ku	1.79	1.20 K
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	<0.0453	<0.393	<0.0925	<0.0587	<0.0400	<0.430	<0.0929	0.112 J	<0.0701 JK u	<0.483	<0.112	0.280 J	<0.0385	<0.451	<0.0947 JK u	<0.112
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	<0.0390	<0.305	<0.0612	0.101 BJ	<0.0406	<0.335	<0.119 BJK u	0.132 BJ	<0.0351	<0.350	<0.0498	0.149 BJ	<0.0316	<0.427	<0.280 BJ u	0.108 BJ
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.112 J	<0.319	<0.0943 JK u	0.0425 JK	<0.147 JK u	<0.359	0.512 J	0.0493 JK	0.197 J	<0.359	<0.296 JK u	0.276 JK	0.199 J	<0.466	0.540 J	0.0916 JK
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	<0.170 JK u	<0.287	<0.116 JK u	0.0396 BJK	<0.0408	<0.320	0.234 J	0.0381 BJK	<0.0349	<0.326	<0.153 JK u	0.0520 BJK	<0.0318	<0.411	0.312 J	0.0320 BJK
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	<1.61 BJ u	1.09 J	1.88 BJ	0.454 BJ	<1.15 BJ u	<0.496 JKu	30.5 B	0.554 BJ	<1.26 BJ u	0.662 J	3.39 B	0.522 BJK	<2.35 BJ u	<1.24 JKu	18.9 B	0.573 BJK
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	<20.2 Bu	15.8	<26.8 Bu	5.94 B	<16.5 Bu	6.96	410 B	7.46 B	<15.9 Bu	11.2	47.3 B	10.2 B	<31.9 Bu	29.4	136 B	8.20 B
2,3,7,8-Tetrachlorodibenzofuran	9.27	<17.6 Ku	4.57	1.59	6.03	8.98	9.98	3.77	12.2	9.98	16.1	15.4	11.5	<13.9 Ku	10.3	3.84
1,2,3,7,8-Pentachlorodibenzofuran	0.141 J	<0.336	<0.0830	<0.0735	<0.0693 JK u	<0.467	<0.0925	<0.0631	<0.0378	<0.395	<0.0954	<0.126	<0.0745 JK u	<0.383	<0.0901	<0.171
2,3,4,7,8-Pentachlorodibenzofuran	<0.0507	<0.332	<0.0869	<0.0717	0.0812 J	<0.440	<0.0907	<0.0610	<0.0370	<0.373	<0.0953	0.441 J	<0.0353	<0.364	0.224 J	<0.167
1,2,3,4,7,8-Hexachlorodibenzofuran	<0.0875	<0.249	<0.0903 BJK u	0.119 BJK	<0.0428	<0.383	<0.0875 BJK u	0.153 BJ	<0.0617	<0.234	<0.0963 BJK u	0.149 BJK	<0.0900	<0.41	<0.0664	0.349 BJ
1,2,3,6,7,8-Hexachlorodibenzofuran	<0.0764	<0.205	<0.0534	0.0751 BJ	<0.0376	<0.339	<0.0981 BJ u	0.0679 BJK	<0.0534	<0.198	<0.0643	0.0881 BJK	<0.0778	<0.348	<0.105 BJK u	0.153 BJ
1,2,3,7,8,9-Hexachlorodibenzofuran	<0.111	<0.261	<0.0708	0.111 BJK	<0.0519	<0.417	<0.092	0.119 BJ	<0.0749	<0.253	<0.0814	0.170 BJK	<0.113	<0.463	<0.0819	0.203 BJ
2,3,4,6,7,8-Hexachlorodibenzofuran	<0.0805	<0.207	<0.0547	0.0409 BJK	<0.0384	<0.340	0.176 J	0.0592 BJ	<0.0572	<0.193	<0.0678	0.0270 BJK	<0.0816	<0.351	0.156 J	0.108 BJK
1,2,3,4,6,7,8-Heptachlorodibenzofuran	<0.386 BJ u	<0.302	<0.233 BJK u	0.956 BJ	<0.252 BJK u	<0.374	0.801 BJ	0.952 BJP	<0.265 BJ u	<0.326	<0.310 BJK u	1.14 BJ	<0.367 BJ u	<0.331	0.656 BJ	2.57 B
1,2,3,4,7,8,9-Heptachlorodibenzofuran	<0.0778	<0.376	<0.0745	0.214 BJK	<0.0751	<0.469	0.296 BJ	0.189 BJK	<0.0690	<0.414	<0.0616	0.131 BJK	<0.0666	<0.401	<0.0604	0.637 BJK
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	<1.14 BJ u	<0.636	0.870 BJ	18.0 B	<1.01 BJ u	<0.745	2.36 BJ	18.7 B	<1.06 BJK u	<0.732	<0.610 BJK u	24.3 B	<1.19 BJ u	<0.785	2.23 BJ	71.4 B
2378TCDD_TEQ_EPA89 (I-TEQ)	2.38	2.49	1.65	0.88	1.59	0.91	3.52	1.98	3.16	3.56	4.44	9.10	3.38	0.03	3.37	1.81
2378TCDD_TEQ_WHO2005_Mammalian	2.37	2.48	1.65	0.86	1.58	0.90	3.23	2.01	3.16	3.55	4.41	9.21	3.38	0.01	3.23	1.73

Reported in ng/kg Wet Weight
B Analyte was found in the associated method blank as well as in the sample.
J Estimated value. Concentration found below MRL.
u Indicates the compound was analyzed, but not detected.
K Estimated maximum possible concentration. Ion abundance ratios were outside theoretical acceptance limits.
P Estimated maximum possible concentration. Chlorodiphenyl ether interference was present at the retention time.

Table I-12: OU-4 Benthic I-TEQ Values, 1999 to 2023

YEAR	REFERENCE (UPSTREAM: MT-1)	REFERENCE (UPSTREAM: GT-4)	MT-3	MT-4	MT-6	MT-8	DOWNSTREAM AVERAGE CONCENTRATION
1999	1.61				19.2	12.0	15.6
2013		2.38	1.59	3.16	3.38		2.71
2014		2.49	0.91	3.56	0.03		1.12
2016		1.65	3.52	4.44	3.37		3.78
2023		0.88	1.98	9.10	1.81		4.30

Reported in nanogram per kilogram (ng/kg) wet weight.

Source: the Site's *OU-4 Year 12 Enhanced Monitoring Recovery Performance Monitoring Report* (February 2024)

Table I-13: OU-4 Fish Tissue Analytical Results, 2023

STATION	SPECIES	SAMPLE TYPE [1]	NUMBER OF FISH PER COMPOSITE	AVG. WT. (g)	AVG. LENGTH (mm)	% LIPID	TEQ WHO TEFs (ng/kg)	TEQ I-TEFs (ng/kg)	ESTIMATED WHOLE FISH CONCENTRATIONS		
									CALCULATED % LIPID [2]	CALCULATED TEQ WHO TEFs (ng/kg) [2]	CALCULATED TEQ I-TEFs (ng/kg) [2]
MT-1 to MT-2 (Upstream)	Bluegill	Carcass	5	60	156	7.37	3.25	3.26	7.41	3.00	3.02
	Bluegill	Fillet	5	6		7.80	0.35	0.37			
	Largemouth bass	Carcass	5	579	360	5.57	6.25	6.26	5.06	5.39	5.40
	Largemouth bass	Fillet	5	93		1.87	0.04	0.04			
	Yellow Bullhead	Fillet	5	40	336	1.87	0.49	0.51	1.87	0.49	0.51
MT-3 to MT-6	Bluegill	Carcass	3	62	151	7.70	5.56	5.58	7.49	4.99	5.00
	Bluegill	Fillet	3	8		5.74	0.26	0.29			
	Bluegill	Carcass	3	95	165	5.78	0.63	0.64	5.60	0.64	0.64
	Bluegill	Fillet	3	9		3.71	0.75	0.72			
	Largemouth bass	Carcass	4	519	356	3.74	9.91	9.91	3.46	8.65	8.65
	Largemouth bass	Fillet	4	89		1.87	1.33	1.33			
	Largemouth bass	Carcass	3	665	381	5.53	15.82	15.83	5.09	14.04	14.05
	Largemouth bass	Fillet	3	92		1.89	1.12	1.12			
	Yellow Bullhead	Fillet	3	37	325	1.92	1.50	1.46	1.92	1.50	1.46
	White Catfish	Fillet	3	50	383	1.90	0.00	0.02	1.90	0.00	0.02
MT-7 to MT-8	Redear	Carcass	4	138	198	9.24	6.43	6.43	8.41	5.51	5.51
	Redear	Fillet	4	25		3.71	0.32	0.33			
	Largemouth bass	Carcass	5	452	334	3.71	3.27	3.27	3.44	2.91	2.90
	Largemouth bass	Fillet	5	76		1.88	0.78	0.74			
	Largemouth bass	Carcass	3	673	424	7.34	2.14	2.15	6.37	1.77	1.78
	Largemouth bass	Fillet	3	144		1.87	0.05	0.05			
	Channel Catfish	Fillet	3	162	546	7.52	0.85	0.60	7.52	0.85	0.60
MT-8 to GT-19 (Downstream)	Redear	Carcass	4	118	193	5.75	7.34	7.34	5.17	6.23	6.24
	Redear	Fillet	4	21		1.90	0.01	0.02			
	Largemouth bass	Carcass	5	413	331	5.63	1.90	1.90	5.12	1.68	1.68
	Largemouth bass	Fillet	5	67		1.96	0.36	0.36			
	Brown Bullhead	Fillet	2	44	323	7.67	2.09	2.10	7.67	2.09	2.10

[1] Each small and large forage feeder composite was segregated into a carcass and fillet sample. The carcass sample is comprised of the whole body minus one fillet. The fillet sample is the remaining fillet of the respective fish.

[2] Whole fish % lipid and TEQ concentrations were calculated with the individual carcass and fillet concentrations on a weighted basis using the following equation: Whole fish concentrations = [(avg. wt. of carcass * concentration of carcass) + (avg. wt. of fillet * concentration of fillet)]/(avg. wt. of carcass + avg. wt. of fillet)

Source: the Site's *OU-4 Year 12 Enhanced Monitoring Recovery Performance Monitoring Report* (February 2024)

Figure I-12: OU-4 Fish Fillet Tissue I-TEQ Analytical Results Over Time

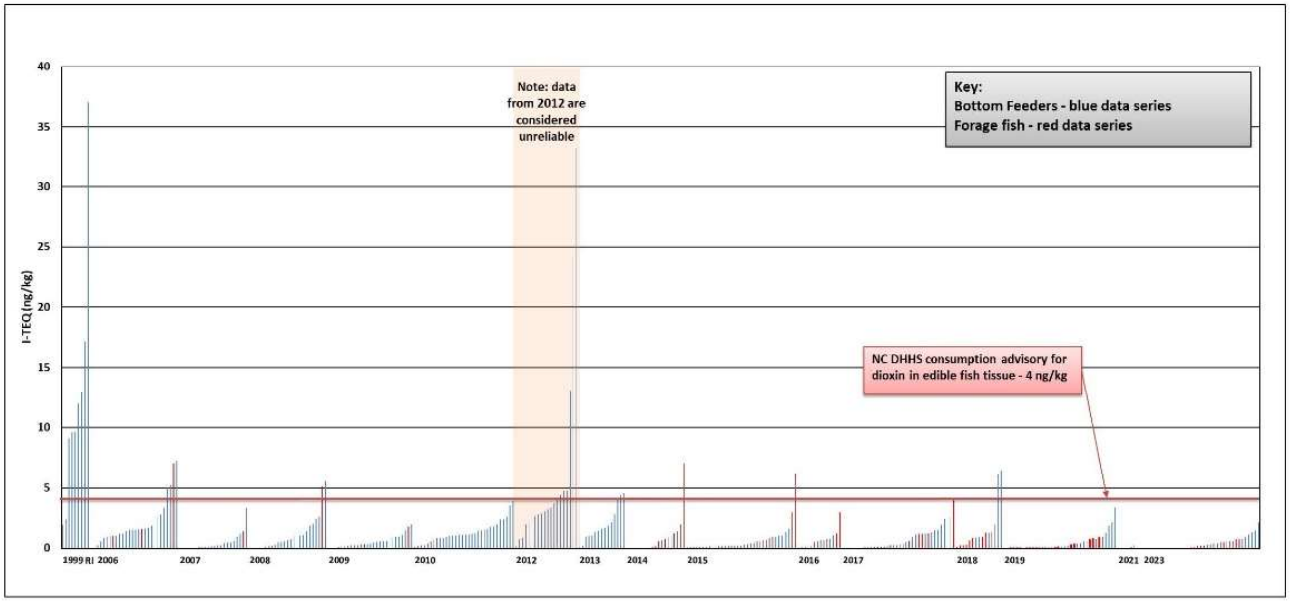
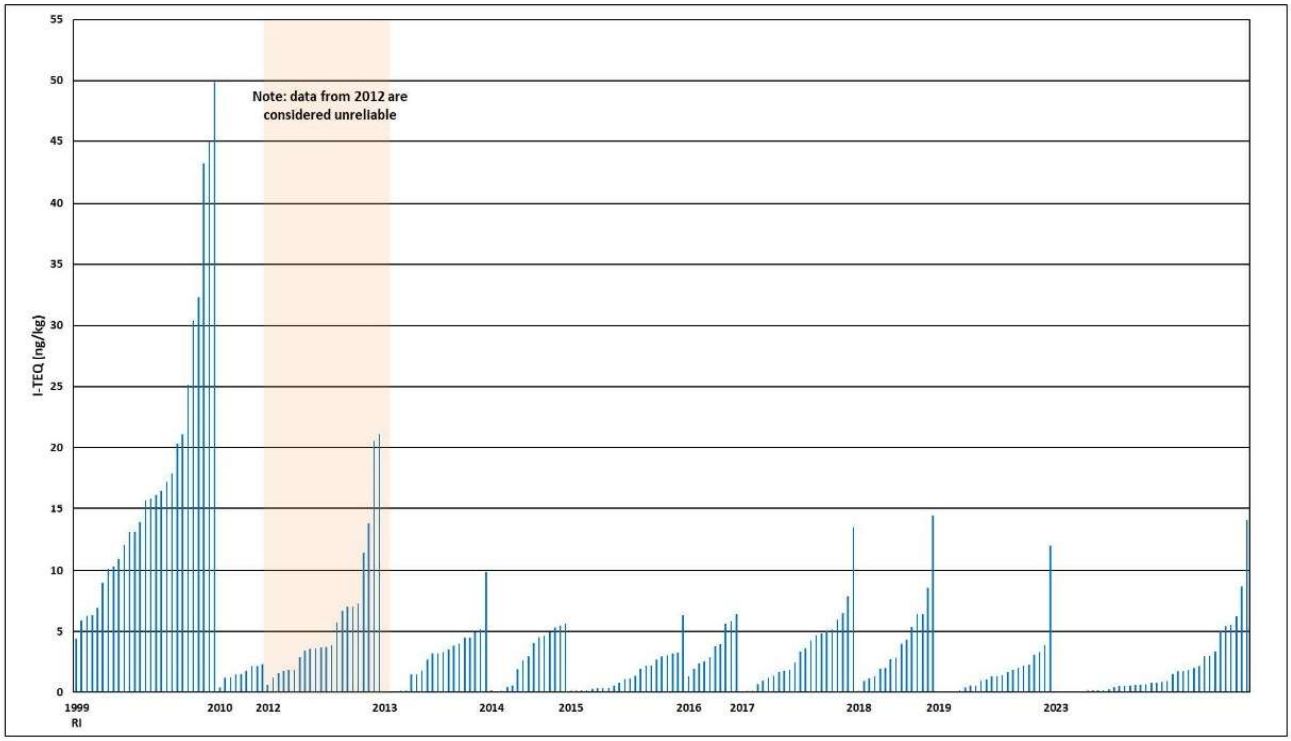


Figure I-13: OU-4 Whole Fish Tissue I-TEQ Analytical Results Over Time



Source: the Site's *OU-4 Year 12 Enhanced Monitoring Recovery Performance Monitoring Report* (February 2024)

APPENDIX J – DETAILED ARARS REVIEW

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the remedy are reviewed.

Groundwater ARARs

The OU-1 ROD established the North Carolina groundwater standard for dioxin as an ARAR for the Site. The OU-3 ROD established the North Carolina groundwater standard for mercury as an ARAR for the Site. The state of North Carolina 2L groundwater standards are lower than federal primary drinking standards for dioxin and mercury. The standard for 2,3,7,8-TCDD (specifically, the 2,3,7,8-TCDD congener) has not changed (Table J-1). While the current groundwater standard for mercury has changed slightly since the time of the ROD, the change is not significant because analytical results are typically rounded to match the same number of significant digits as the standard. In addition, no one drinks the groundwater and monitoring data are compared to the current, lower North Carolina standard. Therefore, the change does not affect the protectiveness of the remedy.

Table J-1: Previous and Current ARARs for Groundwater COCs

COC	ROD Standard[a]	Current Standard[c]	Change
2,3,7,8-TCDD	2×10^{-10} mg/L[b]	2×10^{-10} mg/L	None
Mercury	1.1 µg/L	1 µg/L	More stringent[d]

Notes:

a. Based on the lower of federal maximum contaminant levels and state of North Carolina primary groundwater standards (15A NCAC 02L.0202). Cleanup goals are from the OU-1 and OU-3 RODs. The state of North Carolina 2L groundwater standards are lower than federal primary drinking standards for dioxin and mercury.

b. Applies specifically to the 2,3,7,8-TCDD congener. This was a to-be-considered criteria.

c. North Carolina 2L groundwater standards: http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20l/15a%20ncac%2002l%20.0202.pdf (accessed 8/9/2024).

d. While the current standard is lower than what it was at the time of the ROD, the change is not significant since analytical results are rounded to match the same number of significant digits as the standard.

mg/L = milligrams per liter
µg/L = micrograms per liter

Surface Water ARARs

The OU-3 and OU-4 RODs identified the North Carolina 2B surface water standards as ARARs for the Site. The OU-3 surface water standard for mercury has not changed since the ROD was issued (Table J-2). The OU-4 surface water cleanup level of 1.4×10^{-5} ng/L for Welch Creek was based on the North Carolina 2B surface water standard for TCDD at the time the ROD was published, which has since been revised to the more stringent value of 5×10^{-6} ng/L (Table J-2).

Table J-2: Previous and Current ARARs for Surface Water

COC	ROD Standard[a]	Current Standard[c]	Change
2,3,7,8-TCDD	1.4×10^{-5} ng/L[b]	5×10^{-6} ng/L[d]	More stringent
Mercury	0.012 µg/L	0.012 µg/L	None

Notes:

a. Based on the state of North Carolina 2B surface water standards: 15A NCAC 02L.0202. Cleanup goals are sourced from the OU-3 and OU-4 RODs.
b. Applies specifically to the 2,3,7,8-TCDD congener.
c. North Carolina 2B surface water standards: http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/subchapter%20b%20rules.pdf (accessed 8/9/2024).
d. The current standard applies to dioxin, not just the 2,3,7,8-TCDD congener.

ng/L = nanograms per liter
µg/L = micrograms per liter

Fish Consumption Advisory

At the time the OU-2 and OU-4 RODs were issued, the fish consumption advisories in place for the LRR and Welch Creek were based on a dioxin level of 3 ng/kg. The current concentration (as of December 2013) for dioxin consumption advisories in North Carolina is 4 ng/kg TEQ, according to the NC DEQ Standard Operating Procedures for Fish Tissue Assessments. The new advisory is less stringent but does not affect remedy performance.

APPENDIX K – SCREENING-LEVEL RISK REVIEW

The cleanup levels for dioxin in soil were established before there was an oral noncancer toxicity value, or RfD available. In 2012 the EPA published an oral RfD on the EPA's IRIS, recommending a noncancer RfD for 2,3,7,8-TCDD of 7 x 10^{-10} milligrams per kilogram per day. To evaluate whether the OU-1 soil cleanup levels remain protective in light of the toxicity value update, they were compared to the EPA's industrial RSLs. RSLs incorporate the most recent chemical-specific toxicity values. Institutional controls limit land uses at OU-1 to commercial and industrial uses only.

As shown in table K-1, the dioxin cleanup levels are associated with cancer risk levels that are within the EPA's risk management range of 1 x 10^{-4} to 1 x 10^{-6} and at or below the EPA's target noncancer HQ of 1. Therefore, the dioxin cleanup levels remain protective. As discussed in Question B, the landfill cap prevents direct contact with contaminated material below the cap; there are no complete exposure pathways.

Table K-1: Screening-Level Risk Evaluation of OU-1 Soil Dioxin Cleanup Levels

COC	ROD Industrial Cleanup Level (mg/kg)[a]	Industrial RSL[b] (mg/kg)		Cancer Risk[c]	Noncancer HQ[d]
		1 x 10^{-6} Risk	HQ = 1.0		
OU-1 Soil Dioxin TEQ (based on WHO mammalian method)	0.00037	0.00002	0.0007	0.00002	0.5
OU-1 Soil Dioxin TEQ (based on WHO avian method)	0.00077	0.00002	0.0007	0.00004	1

Notes:

a. Sourced from the OU-1 ROD.

b. Current EPA RSLs, dated November 2024, are available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (accessed 5/30/2025).

c. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk: cancer risk = (cleanup level ÷ cancer-based RSL) × 10^{-6}.

d. The noncancer HQ was calculated using the following equation: HQ = cleanup level ÷ noncancer-based RSL.