FOURTH FIVE-YEAR REVIEW REPORT FOR GM MASSENA CENTRAL FOUNDRY SUPERFUND SITE ST. LAWRENCE COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
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Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
CY	Cubic Yard
DCE	Dichloroethylene
EDA	East Disposal Area
ERT	Environmental Response Team
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
FYR	Five-Year Review
ICs	Institutional Controls
ILF	Industrial Landfill
MCL	Maximum Contaminant Limit
µg/L	Micrograms per liter
mg/kg	Milligrams/kilogram
NDA	North Disposal Area
ng/L	Nanogram per liter
NPL	National Priority List
NY	New York
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
PFAS	Per- and poly-fluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
RACER	Revitalizing Auto Communities Environmental Response Trust
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SMP	Site Management Plan
SRMT	Saint Regis Mohawk Tribe
TCE	Trichloroethylene
TSCA	Toxic Substances Control Act
UAO	Unilateral Administrative Order
UU/UE	Unlimited Use and Unrestricted Exposure
VC	Vinyl chloride
VOC	Volatile Organic Compound

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 (EPA) is preparing this FYR for the General Motors (Central Foundry Division) Superfund site pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (40 Code of Federal Regulations [CFR] Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the site. The triggering action for this statutory FYR is the September 28, 2015 signature date of the previous FYR report. The FYR has been conducted because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The site is being addressed under two operable units (OUs). OU1 addresses contamination in the St. Lawrence River, General Motors (GM) site soils, St. Regis Mohawk Tribal (SRMT) soils and sediments, North Disposal Area (NDA), Raquette River, surface water runoff, groundwater, and industrial lagoons. OU2 addresses contamination in the Industrial Landfill (ILF), East Disposal Area (EDA), and groundwater that flowed beneath those areas. Both OUs are being addressed in this FYR. See Appendix A, Figure 1, for a site plan, which outlines the former GM property boundaries as well as the areas of contamination beyond the property line. It should be noted that the term "site" refers to the all impacted areas whether on the within the property or beyond.

The FYR was led by Anne Kelly, EPA Remedial Project Manager (RPM). Other EPA participants included Joel Singerman (Central New York Remediation Section Chief), Marian Olsen (human health risk assessor), Chuck Nace (ecological risk assessor), Liana Agrios (hydrogeologist), and Larisa Romanowski (community involvement coordinator).

Site Background

The site, located on the St. Lawrence River approximately seven miles east of the Village of Massena, New York, is situated approximately two miles south of the City of Cornwall, Ontario, Canada. Land use in the area surrounding the site is a mix of residential and industrial. The site is situated on approximately 218 acres of industrial and undeveloped land located in an otherwise rural area.

The site is bordered on the north and east by the Mohawk Territory of Akwesasne, and the site also includes portions of the SRMT jurisdiction in Akwesasne. The site sits on the shore of the St. Lawrence River which is in a jurisdictional complex area bordering both Canada and the Mohawk Territory of Akwesasne. The property immediately west of the former GM plant is owned by the St. Lawrence Seaway Corporation, New York State Department of Transportation, and Alcoa, Inc.

and Route 37 and the Raquette River are situated to the south. This Site includes portions of the St. Lawrence and Raquette Rivers. See Appendix A, Figure 2.

In 1959, GM began operating an aluminium die-casting plant on the property. In the mid-1980s, GM ceased die-casting operations at the facility, but continued operations on a smaller scale by casting aluminium parts through a procedure known as the lost-foam process. Until 1980, polychlorinated biphenyls (PCBs) were used as a component of the hydraulic fluids used in the die-casting process.

The handling and on-site disposal of contaminated wastewater sludges resulted in PCB, phenol, and volatile organic compound (VOC) contamination throughout the site.

On June 1, 2009, GM and certain subsidiaries filed for bankruptcy and the ownership of the site was temporarily transferred to the "Motors Liquidation Company." In July 2009, manufacturing operations were discontinued at the facility. In March 2011, the Revitalizing Auto Communities Environmental Response Trust (RACER) was formed and assumed ownership and responsibility for the cleanup of the site.

Appendix B, attached, summarizes the documents utilized to prepare this FYR.

Appendix C, attached, summarizes the site's geology/hydrogeology and land use. For more details related to background, physical characteristics, geology/hydrogeology, land/resource use, and history related to the site, please refer to; https://www.epa.gov/superfund/gm-massena.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: GM Massena Central Foundry		
EPA ID: NYD091972554		
Region: 2	**State:** NY	**City/County:** Massena/St. Lawrence
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Anne Kelly		
Author affiliation: EPA		
Review period: 9/28/2015 – 9/28/2020		

Date of site inspection: 7/6/2020
Type of review: Statutory
Review number: 4
Triggering action date: 9/28/2015
Due date *(five years after triggering action date)*: 9/28/2020

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The site was placed on the Superfund National Priorities List in 1983.

In 1985, GM entered into an Administrative Order on Consent (Index No. II CERCLA-50201) with EPA to perform a remedial investigation/feasibility study (RI/FS) to determine the nature and extent of the contamination and to identify and evaluate remedial alternatives. The RI/FS was completed in 1989. The RI concluded that PCBs were present in fish, soil, sediment, and groundwater. In addition, elevated concentrations of phenols and VOCs are present in surface water, soil, sediment, and groundwater.

Response Actions

Discrete Areas

There are a number of discrete areas of contamination associated with the site, including three disposal areas- ILF; NDA; and EDA; four industrial lagoons; sediments in the St. Lawrence River and the Raquette River; and Tribal land soils and sediments in Turtle Creek and Turtle Cove (collectively referred to as "Tribal soils and sediments"). These areas are described below.

Lagoons

Four unlined industrial lagoons, referred to as the 350,000 gallon lagoon, 500,000 gallon lagoon, 1.5-million gallon lagoon, and 10 million gallon lagoon, were used to process industrial wastes containing PCB-contaminated liquids, sludges, and soils.

Industrial Landfill

The ILF is a twelve-acre former disposal area in the site's northeast corner that contains plant-contaminated foundry sands, debris, and PCB-contaminated sludges. VOCs and phenols were also detected in the landfill.

North Disposal Area

The NDA is a subsurface area located adjacent to the 1.5 million gallon lagoon. Before it was remediated, it was comprised of three distinct areas—a buried interceptor lagoon and two disposal pits. PCB-contaminated sludges and debris were placed in the NDA during the course of plant operations. Sampling at the NDA indicated high levels of PCBs at depths of approximately 45 feet. Also, phenols were detected in the NDA.

East Disposal Area

The EDA was used to dispose of construction and demolition debris, as well as wastewater treatment sludges. In 1975, the failure of a containment berm surrounding the EDA caused water and other materials to flow eastward onto SRMT property.

St. Lawrence River

The St. Lawrence River was contaminated through direct discharge of PCB-contaminated wastewaters through an outfall pipe and through overland surface water runoff. Approximately 10 acres of the St. Lawrence River at the site were contaminated in this manner.

Raquette River

In 1970, PCB-contaminated soils excavated during a plant expansion were placed on the north bank of the Raquette River. Sediments in the Raquette River were contaminated through direct discharge via an outfall pipe from the plant, as well as from surface water runoff from contaminated bank soils.

Tribal Land Soils and Sediments

Tribal land soils were contaminated during a failure of a containment berm surrounding the EDA. Sediments in the three-acre Turtle Cove were contaminated through the runoff of contaminated surface soils and subsurface discharge from the ILF.

Remedy Selection

EPA issued two Records of Decision (RODs) for the site. An OU1 ROD was issued in 1990, addressing contamination in the St. Lawrence and Raquette Rivers, site soils, SRMT soils and sediments, the NDA and industrial lagoons, surface water runoff, and groundwater. An OU2 ROD was issued in 1992, addressing contamination in the EDA and the ILF, as well as groundwater flowing beneath each area.

The major components of the OU1 remedy include:

- Excavate and treat SRMT soils greater than 1 milligram/kilogram (mg/kg) PCBs;
- Dredge and treat St. Lawrence River sediments greater than 1 mg/kg PCBs;
- Dredge and treat Raquette River sediments greater than 1 mg/kg PCBs;
- Excavate and treat Raquette River bank soils greater than 1 mg/kg PCBs;
- Dredge and treat SRMT sediments greater than 0.1 mg/kg PCBs;
- Excavate and treat miscellaneous site soils greater than 10 mg/kg PCBs;
- Excavate and treat NDA soils greater than 10 mg/kg PCBs;
- Excavate and treat active and inactive industrial lagoons with soils greater than 10 mg/kg PCBs;
- On-site treatment of soils and sludges greater than 10 mg/kg PCBs;

- On-site disposal of treated wastes;
- Testing of other PCB treatment technologies;
- On-site treatment of surface water runoff in the EDA; and
- Extraction and treatment of contaminated site groundwater.

The major components of the OU2 remedy include:

- Excavation of soil PCBs at concentrations at or above 500 mg/kg, all sludge, and all visibly-oily soil from the EDA at the site;
- Consolidation and in-place containment of less contaminated soils (containing PCBs at concentrations above 10 mg/kg and below 500 mg/kg) in the EDA and control of groundwater migration from EDA through the use of a composite cap and a slurry wall;[1]
- Recontouring, regrading, and containment of contaminated material in the ILF and control of groundwater migration from the ILF through the use of a composite cap and slurry wall and
- Treatment of excavated material from the EDA by either biological treatment (or another innovative treatment technology which has been demonstrated to achieve site treatment goals) or thermal destruction to be determined by EPA following OU1 treatability testing.

There were no remedial action objectives (RAOs) explicitly identified in either of the RODs.

In April 1992, EPA issued a Unilateral Administrative Order (UAO) to GM (Index No. II CERCLA-20207) to undertake the design and construction of the remedy selected in the 1990 ROD. In August 1992, EPA issued a UAO to GM (Index No. II CERCLA-20215) to undertake the design and construction of the remedy selected in the 1992 ROD.

As stated above, both RODs indicated that the method for on-site treatment would be determined through a treatability study. Based on the results of the treatability studies, in 1995, EPA issued a "Post-Decision" Proposed Plan that identified thermal desorption as the preferred treatment technology for contaminated materials and proposed the designation of a Resource Conservation and Recovery Act (RCRA) Corrective Action Management Unit to contain the contaminated materials at the site. The 1995 Proposed Plan also recommended that the treatment level for contaminated materials be raised to 500 mg/kg PCBs from 10 mg/kg.

Although the modifications to the remedy called for in the 1995 Proposed Plan was fully protective of human health and the environment and in compliance with EPA policies and regulations, EPA determined that based on public opposition, a shift in the remediation strategy was warranted. In 1998, EPA withdrew the 1995 Proposed Plan with the issuance of a new plan that was largely accepted by the public. The 1998 Proposed Plan resulted in a 1999 ROD amendment that allowed for the off-site disposal (rather than on-site treatment with on-site disposal) of St. Lawrence River sediments, Raquette River sediments, soils excavated during the installation of the groundwater control system, and Tribal soils and sediments.

[1] The construction of a slurry wall was contingent on the results of additional groundwater testing to be conducted during the design.

In 2000, EPA further modified the first ROD and issued an Explanation of Significant Differences (ESD), allowing for on-site treatment (via solidification) and off-site disposal rather than on-site treatment (via thermal desorption) and on-site disposal of materials excavated from the inactive lagoons. This plan moved forward with overall community and Tribal support.

In 2009, GM filed for bankruptcy. The ownership of the GM property and responsibility for the cleanup of the site was ultimately transferred to RACER . The transfer in ownership did not impact the cleanup plans for the site.

Status of Implementation

St. Lawrence River Sediments, Raquette River and Turtle Cove

In 1994 and 1995, approximately 13,250 cubic yards (CY) of PCB-contaminated sediment (along with rocks and boulders) were dredged from the St. Lawrence River embayment adjacent to the site. Following dewatering, the dredged material was placed in containment cells at the site and covered. The material within the containment cells was later disposed off-site as part of the NDA and lagoons remedial activities. Although GM successfully removed over 99% of the PCB mass in the sediments, it was unsuccessful in consistently meeting the cleanup level of 1 mg/kg PCBs. Despite multiple attempts to eliminate the contamination in the immediate vicinity of the outfall, the PCB levels continued to exceed the cleanup level. For this reason, a multilayer cap was placed in the St. Lawrence River over a 2-acre area, which reduced the surface concentrations of PCBs in the capped area to less than the 1 mg/kg PCB cleanup goal. The average PCB concentration in the remaining 8 acres was 3 mg/kg. The cap covers an area approximately 300 feet along the shoreline and extends approximately 250 feet into the St. Lawrence River.

In 2002 and 2003, the Raquette River bank area of the Site was addressed. Approximately 7,420 CYs of soil with PCB concentrations greater than 10 mg/kg was removed from the Raquette River bank and disposed off-site; approximately 2,710 CY of soil with PCB concentrations between 1 mg/kg and 10 mg/kg was removed and transferred to the East Disposal Area which was later capped; and approximately 1,440 CY of sediments with PCB concentrations greater than 1 mg/kg was removed and placed in a containment cell at the site. The containment cell material was later disposed off-site as part of the NDA and lagoons remedial activities.

In 2004 and 2005, approximately 18,440 CY of soil and sediment with PCB concentrations less than 10 mg/kg were removed from the Cove and transferred to the EDA and approximately 18,240 CY of sediment with PCB concentrations greater than 10 mg/kg were removed from the Cove and placed in containment cells at the site, including approximately 2,880 CY of sediment that was isolated and covered in the EDA. (BBLES, 2006). The containment cell material was later disposed off-site as part of the NDA and lagoons remedial activities.

Manufacturing Plant Building Demolition

The demolition of the plant was not considered in the RODs but was performed after the GM Bankruptcy after EPA issued a separate Unilateral Administrative Order. Except for the concrete slab, all the former powertrain plant facility was demolished and removed in 2011 in a remedial

effort referred to as the Phase I Demolition. This effort resulted in the off-site disposal of 24,530 tons of Toxic Substances Control Act (TSCA)/hazardous waste and 9,176 tons of non-TSCA and asbestos-containing waste and the recycling of 19,128 tons of metals.

The Phase II Demolition was conducted in 2012 and 2013 and entailed removing the concrete slab, concrete structures beneath the slab (tunnels, basements, etc.), as well as soil contaminated with PCBs greater than 10 mg/kg or phenols greater than 50 mg/kg. This effort included the off-site disposal of 147,175 tons of TSCA/hazardous waste, 16,922 tons of non-TSCA/non-hazardous material, and 1,791 tons of recyclable steel. Concrete that was not impacted was crushed for reuse at the site. All excavations were backfilled with recycled concrete and imported soil fill, and the footprint of the former powertrain plant area was restored with a surface cover consisting of 9 inches of crushed stone or concrete and 3 inches of gravel.

North Disposal Area and Lagoons

In 2013 and 2014, the NDA remedial effort was completed. This effort included the demolition of several outbuildings, removal of four lagoon structures, and removal of soil within the NDA with PCBs greater than 10 mg/kg or phenols greater than 50 mg/kg. This effort included the off-site disposal of 172,693 tons of TSCA/hazardous waste, 32,982 tons of non-TSCA/non-hazardous material, and 767 tons of recyclable steel. All excavations were backfilled with imported clean fill and stormwater conveyance structures were installed. The entire area was restored with 6 inches of vegetated soil.

East Disposal Area

In 2014 and 2015, the following EDA remedial actions were completed:

- Excavation of all sludge, visibly oily soil, and soil and debris with PCB concentrations equal to or greater than 500 mg/kg from the EDA, followed by off-site disposal at a TSCA disposal facility;
- Excavation of soils with PCB concentrations equal to or greater than 10 mg/kg and less than 500 mg/kg from the EDA Infield, (a 6.5-acre area to the west of the EDA footprint) followed by consolidation within the EDA footprint;
- Excavation of soils with phenol concentrations greater than 50 mg/kg from the EDA Infield followed by consolidation within the EDA footprint; and
- Excavation of the temporary stockpiles located in on-site containment cells, followed by consolidation within the EDA footprint.

Approximately 144,000 tons of materials were disposed off-site as TSCA hazardous waste. Non-TSCA material was placed in the EDA and portions of the EDA were regraded to accommodate an engineered cap system (installed as part of the ILF remedial action). All excavations were backfilled with imported clean fill and the EDA Infield was restored with 6 inches of vegetated soil. The EDA was restored as part of the ILF remedial action, which involved construction of a RCRA landfill cap.

Industrial Landfill

In 2015 and 2016, the ILF capping and a 150-foot ILF setback were completed. These efforts included removing approximately 105,000 CY of landfill waste along the northern and eastern slopes of the landfill and placing it on the western side of the ILF. The creation of this setback was not a requirement of the ROD, but was a condition of the GM bankruptcy settlement agreement. This activity included the removal and off-site disposal of approximately 550 tons of material with PCB concentrations greater or equal to 500 mg/kg and/or visibly impacted material. Once all the material had been removed or relocated, a RCRA landfill cap (an approximately 18.3-acre engineered cap) was constructed over the combined ILF and EDA footprints.

10-Million-Gallon Lagoon

In 2017 and 2018, the 10-million-gallon lagoon remedial effort was completed. This included draining the lagoon, demolition of the oil separator structure and the Millwater Pump House, and removing sediment/soils with PCBs greater than 10 mg/kg or phenols greater than 50 mg/kg for off-site disposal.

Final Site Cover

A final cover system was placed over approximately 84 acres of the site to reduce the potential for surface water to come in contact with residual PCBs and to promote positive overland drainage of surface water across the site.

The cover was constructed by placing a demarcation layer (black filter fabric) overlain by a 12-inch soil cover (6-8 inches of imported fill overlain with 4-6 inches of topsoil) and seeded.

As part of the final site cover activities, the stormwater conveyance structures noted above were abandoned.

Groundwater Collection and Treatment

Construction of the groundwater recovery system, which was completed in 2016, consists of eight recovery wells installed along the northern side of the ILF and eastern side of the property (see figures in Appendix C). The former facility's wastewater treatment plant was used to treat the collected water until August 2020 when the new treatment system construction was completed.

Institutional Controls Summary

Institutional controls (ICs) that need to be implemented at the site are summarized in Table 1, below.

Table 1: Summary of Planned and/or Implemented Institutional Controls					
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)**	**IC Objective**	**Title of IC Instrument Implemented and Date (or planned)**
Groundwater	Yes	No	OU1	Prevent the utilization of the groundwater underlying the site proper, prevent the development of the site for residential use, allow access for maintenance and monitoring activities, and perform a vapor intrusion evaluation in areas of future construction to determine whether this would be a pathway of concern and, if the potential for vapor intrusion exists in any such area, install a vapor mitigation system. .	2021
Groundwater	Yes	No	OU2	Prevent the utilization of the groundwater underlying the site proper, prevent the development of the site for residential use, and allow access for maintenance and monitoring activities.	2021
Landfill Cap	Yes	No	OU2	Inspect and maintain integrity of the cap	2021

System Operations, Monitoring and Maintenance

A long-term operation and maintenance plan are under development for all required areas. It is anticipated that the plan will be finalized by September 2021 and incorporated into the Site Management Plan (SMP).

Subaqueous Cap Physical Inspection

Physical inspections of the subaqueous St. Lawrence River cap were conducted in 1996, 1997, 2001, 2006, 2011, 2017 (with underwater video camera by EPA dive team), and 2019 (by the EPA dive team during sampling). The 2017 inspection indicated that the subaqueous cap had maintained its integrity and needed no repairs. No deficiencies in the cap were observed at sample locations during the 2019 sediment and passive sampling event.

Fish Tissue Sampling

Monitoring of fish tissue PCB concentrations in the St. Lawrence River and Turtle Cove was performed for spottail shiners (whole-body composite forage fish) prior to 2008 and for smallmouth bass and brown bullhead (individual adult fish fillet samples) starting in 2008. Spottail shiners were collected from 1997 through 2001 and in 2007. Adult fish sampling was conducted in 2008, 2012, 2016, 2017, and 2018. The data from the 2016 fish sampling effort revealed elevated results that were not consistent with earlier sampling events. Sampling in 2017 and 2018 show overall lower levels of PCBs in fish but remain higher than the upstream and downstream reference locations.

In an attempt to understand the reason for the elevated PCB levels seen in fish in 2016, biomagnification of PCBs in the food chain at the site was evaluated to understand differences in PCB concentrations across dredged areas. In addition to adult fish, round goby and zebra mussels were collected in 2017 by EPA's Environmental Response Team (ERT) scientific divers and RACER Trust. Zebra mussels and round gobies were collected at fourteen locations total across the Sediment Cap/Removal Area, (see Appendix A, Figure 3) Cove, and upstream of site areas.

Both zebra mussels and round goby are invasive species and have been observed in great numbers at the site and throughout the St. Lawrence River.

Passive Sampling and Sediment Sampling

In 2019, 33 passive samplers were deployed to assess the dissolved PCB concentrations in the sediment porewater and surface water of the St. Lawrence River adjacent to the site and determine if PCBs were potentially breaking through the subaqueous cap (see Appendix A, Figure 3). The passive samplers were partially imbedded into the surface for 42 days. The passive sampling devices were analyzed for PCBs in two sections (below the sediment/surface water interface and above the sediment/surface water interface). Additionally, sediment samples were collected next to each passive sampler and analyzed for PCBs.

Groundwater Monitoring

Since the OU1 ROD was issued, groundwater investigations were conducted in July and October 2000, December 2003, May 2004, November 2006, May 2007, November 2014, December 2015 through February 2016, and August 2019 through September 2019. Additionally, a subset of wells was sampled in November 2019, December 2019, and January 2020. The samples are analyzed for PCBs (total aroclors), VOCs (dichloroethylene [DCE], trichloroethylene [TCE], and vinyl chloride [VC]), and total phenols.

Past groundwater quality investigations have indicated the presence of COCs dissolved in the site's groundwater, particularly in monitoring wells located on the northern side of the ILF and northeast of the 10 million gallon lagoon.

Routine maintenance at the site includes maintaining the groundwater collection and treatment system, perimeter fence, and access road and mowing the landfill cap.

Potential impacts from climate change have been assessed at the site. The performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the site. The remedy as designed and implemented takes into consideration the most likely local effects of climate change in the region, which is in-river or upland flooding caused by extreme precipitation events or rapid snowmelt. There are several other local factors that EPA has considered in concluding that the remedy is sufficient to address more intense and extreme weather events that may arise. First, the St. Lawrence River water level is controlled by the Robert Moses Power Dam located upstream of the site. Therefore, flooding of the site is highly unlikely. Second, the toe of the landfill is approximately 15 feet above the surface of the river. Additionally, there are several features of the constructed remedy that ensure it is resilient in the face of future extreme weather events:

- Surface water drainage around the landfill is designed to shed *more than three times* the capacity required by State regulations;
- The landfill cap has two drainage layers, rather than one, to transmit any precipitation that may enter the cap, ensuring that the rainfall or snowmelt are transmitted to a drainage swale via a geocomposite layer as well as a perforated pipe network;
- The subaqueous cap in the St. Lawrence River has a large armor stone layer on top of sand, carbon, and gravel, which was inspected by EPA divers in 2017 and 2019 and has not shown evidence of ice scour or washouts;
- The property has been covered with approximately 400,000 CY of clean fill over and 84 acre area and graded to promote sheet flow runoff and avoid erosion.

It should be noted that the implemented remedy at the site has not experienced damage during storm events, including a 3.5-inch rain event in 2018. There were no washouts, damaged areas, or evidence of taxing the cover soils, geocomposite drainage layer, piping system, or perimeter swales. The stormwater management features associated with the landfill cap system, around the landfill perimeter, and at other areas of the site sufficiently managed all stormwater runoff and infiltration associated with this event.

III. PROGRESS SINCE THE LAST REVIEW

The protectiveness determinations from the last FYR are summarized in Table 2, below.

Table 2: Protectiveness Determinations/Statements from the 2015 FYR

OU	Protectiveness Determination	Protectiveness Statement
01	Will be Protective	The remedy for OU1 is expected to be protective of human health and the environment upon completion of all soil, groundwater, and sediment remedial activities and the implementation of ICs. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that result in unacceptable risks in these areas.
02	Will be Protective	The remedy for OU2 is expected to be protective of human health and the environment upon completion of all

		groundwater remedial activities and the implementation of institutional controls. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that result in unacceptable risks in these areas.
Sitewide	Will be Protective	The remedies are expected to be protective of human health and the environment upon completion of all soil, groundwater, and sediment remedial activities and the implementation of institutional controls. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that result in unacceptable risks in these areas.

There were no recommendations and follow-up actions made in the 2015 FYR. However, it was noted that there were Tribal soils that have not been remediated due to the inability to gain access. EPA, SRMT, and RACER Trust will continue to work to gain access.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2019, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at Superfund sites in New York, New Jersey, Puerto Rico and the U.S. Virgin Islands, including the General Motors (Central Foundry Division) site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, a notice of the commencement of the FYR was posted on the EPA Region 2 website and sent to local public officials. The notice was provided to the SRMT Tribal Council and the town and village of Massena by email on August 25, 2020, with a request that the notice be posted in the town hall and on their respective webpages. The notice was also emailed to representatives of the SRMT Environment Division and the North Country Redevelopment Task Force. The purpose of the notice was to inform the community that EPA would be conducting a FYR to ensure that remedy implemented at the site remains protective of public health and is functioning as designed. In addition, the notice included contact information, including addresses and telephone numbers, for questions related to the FYR process or the site.

Once the FYR is completed, the FYR report will be made available online (www.epa.gov/superfund/gm-massena) and at the site information repositories. The information repositories are maintained at the EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York; the St. Regis Mohawk Tribe Environment Division, 449 Frogtown Road, Akwesasne, NY; and the Massena Public Library, 41 Glen Street, Massena, NY.

Data Review

Fish Tissue

In 2016, the first of three adult fish sampling efforts during the review period was completed. The results for smallmouth bass and brown bullhead tissue samples showed a spike in PCB concentrations compared to previous sampling events and were among the highest ever recorded at the site. The highest PCB concentrations in fish in 2016 occurred in smallmouth bass at 45 mg/kg in the Sediment Cap/Removal Area and 44 mg/kg in the Cove. Brown bullhead also showed similar elevated PCB concentrations in fillets for some individuals, but to a lesser extent. See Appendix A, Figures 4a and 4b, for graphical representation of the historical PCB concentrations in smallmouth bass and brown bullhead. It should be noted that PCB fillet concentrations of 2 mg/kg or higher are considered "Do Not Eat" by the Great Lakes Fish Consumption Advisory Protocol (Anderson *et al*., 1993) and that the EPA ROD for the nearby Grasse River site selected a remediation goal (RG) of 0.05 mg/kg PCBs in fish fillet for the protection of human health and a RG of 0.01 mg/kg PCBs in fish for the protection of Mohawk health based on adult Tribal subsistence consumption rates.

Mean concentration of PCBs in small mouth bass were elevated in 2016 in the capped area at 14 mg/kg; in 2017 and 2018, the mean concentrations in the same area were 2.6 mg/kg and 1.6 mg/kg, respectively. Mean concentrations of PCBs in small mouth bass at Turtle Cove were 13 mg/kg in 2016 and dropped in 2017 and 2018 with PCB concentrations at 0.84 and 4.6 mg/kg PCBs.

Consistent with the literature, the PCB concentrations in the round goby, which consume zebra mussels as a (significant) part of their diet were generally greater than in the zebra mussels, indicating that there is potential biomagnification occurring at the site between the zebra mussels and the round goby and could be a potential source of PCBs in adult fish. The PCB concentrations in round goby ranged from 0.09 mg/kg to 4.6 mg/kg and PCB concentrations in the zebra mussels ranged from non-detect at the reporting limit (0.025 mg/kg) to 1.1 mg/kg. The concentrations in the round goby ranged from 2.4 to 14 times higher (except for one location) than the concentrations detected in the zebra mussels collected at the same location. PCB concentrations for both zebra mussels and round goby were similar between the Sediment Cap/Removal Area and the Cove. The locations upstream of the site had the lowest PCB concentrations.

Fish tissue sampling in 2017 and 2018 showed substantially lower PCB concentrations compared to the 2016 fish sampling event. However, fish collected at the site still show elevated PCBs when compared to the upstream and downstream background samples. For this reason, the sediment and passive sampling event described below was planned.

Sediment Data

The 2019 sediment sampling event was the only sediment sampling event conducted during this review period. Twenty-two samples were collected in the St. Lawrence River portion of the dredged area and ten samples were collected in Turtle Cove. Of the 22 samples collected in the St. Lawrence River, 17 were below the PCB detection limit of 0.3 mg/kg PCBs. Detections ranged

from 0.4 mg/kg PCBs to 3.0 mg/kg PCBs. The St. Lawrence River cleanup level is 1 mg/kg PCBs. See Appendix A, Figure 5.

Ten sediment samples were collected from Turtle Cove with eight of those samples being sent for duplicate analysis at EPA's Region 2 laboratory in Edison, NJ. There was a significant difference between the split samples. Both laboratories used approved extraction techniques, but the EPA lab results were consistently higher than the Merit laboratory. The EPA laboratory used the soxhlet extraction method and the Merit laboratory used a microwave extraction technique, a more time-consuming but commonly used technique in commercial labs. It is suspected that the difference in extraction method accounts for the differing results. The EPA laboratory analyzed eight samples; all samples were above the 0.1 mg/kg cleanup standard for Turtle Cove with results ranging from 0.3 to 13 mg/kg. Samples from Turtle Cove analyzed by the Merit laboratory were consistently lower but show multiple exceedances of the cleanup standard of 0.1 mg/kg.

The 2019 sediment data indicates that there are or have been releases of PCBs to the Cove. Potential sources include groundwater, transport from upland sediments and direct deposition of materials into Turtle Cove.

Sediment Porewater/Passive Sampling

The objective of the passive study was to identify potential source areas of PCBs to fish in the St. Lawrence River and Turtle Cove by looking at dissolved PCB concentrations in the sediment porewater and surface water and to assess the integrity of the subaqueous cap.

Based on the findings, the data indicate that the subaqueous cap continues to function as designed and limits the transport of PCBs from the capped sediments to the river porewater and near surface sediment porewater. The data also indicated that there are elevated concentrations of PCBs in the sediment porewater and surface water in the areas that were previously dredged on either side of the cap and in Turtle Cove in sufficient quantity to result in the fish tissue PCB levels observed in the historic dataset. This seems particularly true at several locations (ERT-05, ERT-06, ERT-09, ERT-16, ERT-17 and ERT-19) where PCB concentrations were generally the highest and may constitute source areas (See Appendix A, Figure 3, for the sample locations, Figure 5 for PCB concentrations in sediment and Figure 6 for passive sampling data). These data are currently under review by EPA, SRMT and New York State Department of Environmental Conservation (NYSDEC).

EPA's initial conclusion is that previously dredged areas adjacent to the cap and in Turtle Cove may be the source of PCBs that have been documented in fish tissue. There are, however, other potential sources of PCBs to the St. Lawrence River and Turtle Cove that may be contributing to PCBs observed in fish tissue. Future sampling will be designed to determine the source of PCBs.

Groundwater

During the review period, samples were collected from December 2015 through February 2016 and August/September 2019. In general, the higher concentrations of COCs continue to be detected in monitoring wells associated with the ILF; monitoring well MW-16A had PCB concentrations

of 25.5 micrograms per liter (µg/L) in 2016 and 2.36 µg/L in 2019. PCBs in monitoring well MW-16B showed 153 µg/L in 2016 and 135µg/L during the 2019 sampling event.

Monitoring well MW-302S north east of the 10 million gallon lagoon has also shown consistent PCB contamination with levels at 1.11 µg/L in 2016 and 0.42 µg/L in 2019. Phenols were detected in monitoring well MW-804LT in 2015 at 2.39 µg/L in 2016 but was not detected in the 2019 sampling event. Six monitoring wells in the vicinity of the 10 million gallon lagoon have been sampled quarterly since the fall of 2019 to assess any potential change in groundwater quality. One round of this quarterly sampling was missed due to the COVID-19 travel restrictions.

Polychlorinated Biphenyls

During the review period, the highest concentrations of total PCBs were detected in four monitoring wells; MW-16B and MW-302S, which are screened in the upper till and marine sand clay deposit zone, and MW-16A and PW-301, which are screened in the glaciolacustrine and lower till zone (Appendix D). The highest concentration of PCBs was detected in monitoring well MW-16B at a concentration of 153 µg/L during the winter 2015/2016 sampling event. Total PCB concentrations detected in the immediate vicinity of the ILF in monitoring wells MW-16A, MW-16B, and PW-301 have decreased since the 2014 monitoring event, but concentrations remain above the site cleanup standard of 0.1 µg/L (Appendix D). Total PCB concentrations detected in monitoring well MW-302S, located west of the NDA and northeast of the 10 million gallon lagoon, have also been above the site cleanup standard of 0.1 µg/L, Sump-J4, located in the vicinity of the NDA, also had an exceedance of PCBs during the winter 2015/2016 sampling event with a detection of 3.66 µg/L. By contrast, on the east side of the ILF, no PCBs were detected during the review period.

Volatile Organic Compounds

During the review period, elevated concentrations of trans-1,2-DCE (a breakdown product of TCE), which during previous review periods was elevated at 120 µg/L in 2016 was reduced to 16µg/L in 2019 in MW16A. VC also dropped from 120 µg/L to 16 µg/L in MW16A. In spite of these reductions in contaminant levels, concentrations of VOCs detected in monitoring wells MW-16A, MW-16B, MW-706, and MW-707 exceeded site cleanup standards of 5 µg/L for trans-1,2-DCE and 2 µg/L for VC. While TCE was detected in monitoring wells MW-16A, MW-16B, and MW-706, the concentrations did not exceed the regulatory standard of 5 µg/L. These wells are all in the immediate vicinity of the ILF. Monitoring well MW-16B is screened in the upper till and marine sand and clay zone, monitoring wells MW-16A and MW-706 are screened in the glaciolacustrine and lower till zone and monitoring well MW-707 is screened in the deeper lower till zone.

The highest concentrations of VOCs were detected in monitoring well MW-16A during the winter 2015/2016 sampling event. This well has historically recorded the highest total concentrations of VOCs at the site. Concentrations of trans-1,2-DCE and VC were detected in this well at 120.9 µg/L and 120 µg/L, respectively, during the winter 2015/2016 sampling event. However, concentrations of trans-1,2-DCE detected in this well during the August/September 2019 sampling event decreased below regulatory standards. Concentrations of VC in this well exceeded regulatory

standards during both the winter 2015/2016 and August/September 2019 sampling events.

Concentrations of VC detected in monitoring well PW-301 were lower than historical detections and were below the cleanup standard during this review period.

A comparison of PCB concentrations between samples collected in 2014, prior to the operation of the collection system and samples collected in 2019 indicate a significant decrease in PCB concentration levels (98% reduction at monitoring well MW-16A, 99% reduction at monitoring well PW-301, and 50% reduction at monitoring well MW-16B) between pre- and post-pumping conditions. Phenols in monitoring well MW-16A dropped to 0.050 µg/L (ND) in 2019 from 0.24 µg/L in 2014. Phenols in monitoring well MW-804LT dropped from 2.39 µg/L to 0.050 µg/L in 2019. DCE concentrations in monitoring well MW-16A were reduced from 460 µg/L in 2015 to 3.5 µg/L in 2019. monitoring well MW-16B saw similar reductions in DCE which was measured at 62 µg/L in 2014 and 0.07 µg/L in 2019.

During the review period, sixty monitoring wells were abandoned. As a result, thirty-three monitoring wells remain (the remaining wells are identified on the figure in Appendix D). Many of these wells were installed in the 1980s as part of the original site investigations and are no longer needed for long-term, post-remediation monitoring. The final long-term monitoring network will be identified in the SMP.

Groundwater sampling locations and contaminant levels are depicted in Appendix D.

Total Phenolic Compounds

There were two detections of total phenolic compounds (phenols) above the site cleanup standard of 1 µg/L during this review period. The highest concentration of total phenols was detected at a concentration of 4.24 µg/L in monitoring well MW-12, is located off-site approximately 1,400 feet west of the former central foundry plant building footprint and screened in the bedrock. Monitoring well MW-804LT, located north of the ILF and screened in the lower till, had a total phenols concentration of 2.39 µg/L. Detections of total phenols in monitoring wells MW-14B, MW-15A, MW-16B, MW-24A, and MW-302S had been above the site cleanup standard of 1 µg/L during the previous review period, but were below the site cleanup standard during this review period. See Appendix D for groundwater sampling locations and contaminant levels.

Emerging Contaminants Sampling

As part of a recent NYSDEC-led sampling program, monitoring wells MW-302S, MW-602, MW-604, MW-703, MW-713, and PW-301 were sampled for previously uncharacterized contaminants in August to September 2019, including 1,4-dioxane and per- and poly-fluoroalkyl substances (PFAS). Monitoring wells MW-302S, MW-604, MW-703, and PW-301 are in the northern area of the site near the St. Lawrence River, while monitoring wells MW-602 and MW-713 are located in the eastern area of the site in the vicinity of the ILF. Of the six wells sampled, there was one reported detectable concentration of 1,4-dioxane and five reported detectable concentrations of PFAS. The concentration of 1,4-dioxane at monitoring well PW-301 was 0.0758 µg/L is below the New York State's maximum contaminant level(MCL) of 1.0 µg/L.

Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) concentrations and were detected in monitoring wells MW-302S, MW-602, MW-604, MW-703, and PW-301 at concentrations of 12.5 nanogram per liter (ng/L), 2.11 ng/L, 14.7 ng/L, 4.39 ng/L, and 8.73 ng/L, respectively. The New York State MCL for PFOA and PFOS is 10 ng/L. These data will result in additional groundwater monitoring, and monitoring of the groundwater treatment system in coordination with NYSDEC.

Site Inspection

A FYR site inspection was conducted on July 6, 2020. In attendance were EPA's on-site field representative, Dino Zack, of AECOM, Craig Arquette, SRMT representative, Aaron Richardson of Arcadis, consultant to RACER and David Grant, RACER Site manager. The purpose of the inspection was to assess the integrity of the remedy. No significant issues were identified other than some minor housekeeping issues. A punch list was developed and submitted to EPA, SRMT and NYSDEC on August 10, 2020 with a follow-up conference call on August 13, 2020. The EPA project manager was on-site prior to the pandemic, on October 29, 2019.

V. TECHNICAL ASSESSMENT

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

The RODs, as modified by the ROD amendment and ESD, call for a number of remedial activities that are discussed below. As previously noted, PCBs in fish and sediments in the St. Lawrence River continue to be investigated. It should be noted that the remedy is not complete with Tribal upland soils and sediments not yet remediated, and construction of the groundwater collection and treatment system is not complete.

On-Site Soils and Sludges: From July 2000 through June 2001, the sludge in the 350,000- and 1.5-million gallon lagoons were solidified, and contaminated soils were excavated. The lagoons were backfilled, retrofitted with a high-density polyethylene liner, and put back into service as process water lagoons and to collect and hold storm water, respectively. In 2013, these lagoons, as well as PCB-contaminated sludge and soils in the NDA, were excavated to the 10 mg/kg PCBs cleanup level and restored. Clean up levels were not achieved in discrete areas of the NDA where oils and PCBs were found at depth in the excavation. Due to the proximity of the deep excavation to the St. Lawrence River and potential safety concerns, the excavation was discontinued, and five groundwater sumps were installed in these areas to pump oils that are collected and monitor any impact from these oils. Because no oils were observed in the collection sumps, the sumps were abandoned in 2018, during the restoration of the NDA.

Off-Site Soils and Sediments: PCB-contaminated soils are located on three, unfenced residential parcels located on SRMT lands that have not been remediated due to the inability to obtain access. If access is granted and sampling plans approved, sampling of soils and sediments will take place in late 2020, which will be followed by the remedial design and the remedial action. The soils and sediments exceed the SRMT's Applicable or Relevant and Appropriate Requirements of 0.1 mg/kg PCBs for sediments and 1 mg/kg for soils as identified in the ROD.

Groundwater: The concentrations of VOCs and PCBs exceed their cleanup values in a number of monitoring wells. Recent pump test data suggest that contaminated groundwater is likely being captured by the groundwater collection system in OU2; however, a full report has not been submitted. The system will be fully evaluated, and data reviewed with SRMT and NYSDEC to determine if groundwater is a potential source of contamination to Turtle Cove. Additional monitoring for OU1 will continue to determine if source removal had a favorable impact on groundwater levels.

Sediments: While the sediment cleanup goals were met during the remediation of Turtle Cove, sediment sampling conducted in fall 2019 shows PCB contamination above the Tribal clean up levels. The source of this contamination will be investigated but could be the result of overland flow of contaminated soils and sediments from the un-remediated upland Tribal soils and sediments and/or the periodic deposition of debris and ash into the Cove. Additional sampling may be needed, and additional remedial measures may be taken to address the contaminated sediments. The 2019 sediment sampling detected PCBs above the cleanup level of 1 mg/kg PCBs in the St. Lawrence River after the 1995 dredging. While there was a spike in PCB levels in fish tissue in 2016, those levels were lower in 2017 and 2018, but remain of concern. Additional investigations will take place to determine if the PCBs in the sediments are the source of PCBs in fish.

Institutional controls have not been implemented but are expected to be in 2021.

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

The risk assumptions and cleanup levels used at the time of the remedy remain valid (remedial action objectives were not explicitly identified in the RODs).

Groundwater: This FYR focused on two primary exposure pathways–direct ingestion (as a potable drinking water source) and the possibility of vapor intrusion if buildings were to be constructed over the plume.

The evaluation of the direct contact pathway with contaminated groundwater showed that this is not a completed pathway, because nearby residents and on-site workers obtain drinking water from a public water system that meets appropriate drinking water standards. Groundwater cleanup levels were established for PCBs (0.1 µg/L), phenol (1 µg/L), trans 1,2-DCE (100 µg/L), TCE (5 µg/L) and VC (2 µg/L). The cleanup levels for PCBs, TCE, and VC at the time the RODs were the MCLs; they are still considered protective (*i.e.,* within the risk range and/or below the goal of protection of a Hazard Quotient equal to unity).

The groundwater data from the site are evaluated using the OSWER Vapor Intrusion Screening Level calculator available at https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator. Overall, many of the sampling results are below their respective screening levels for vapor intrusion for commercial properties. However, results may suggest the potential for vapor intrusion in the areas identified in the event of future development. PCBs were above the screening level of 1.11 µg/L PCBs in MW 16A, MW16B, PW 301 and MW 302S in 2015. However, after

several years of groundwater collection, the screening level of 1.1 µg/L PCBs is exceeded at MW 16 and MW16B, at the core of the groundwater collection system at the landfill toe of slope.

The TCE screening level of 7.43 µg/L for commercial properties was not exceeded at any well during the five year evaluation period.

The vinyl chloride screening level for commercial properties is 2.45 µg/L. This screening level was exceeded at MW 16A at 16 µg/L and MW 706 at 8.2 µg/L; both wells are associated with the landfill groundwater collection system.

Appropriate measures through institutional controls will be taken to assure that future property owners are aware of the need to conduct further analysis (*e.g.*, evaluate the concentrations of VOCs in monitoring wells located near future development areas to determine whether additional sampling or installation of a vapor mitigation system during construction is appropriate). This applies only to the areas of the site where Vapor Intrusion Screening Levels have been exceeded.

Sediments: While the sediment PCB cleanup goals were met in the Raquette River and Turtle Cove, elevated PCB levels were recently detected in Turtle Cove and the St. Lawrence River. Despite the elevated levels, exposure risks are minimal as swimming and wading in the dredged area is unlikely because physical hazards, limited access, and river currents limit the potential frequency and duration of swimming and wading in the St. Lawrence River at the site in the dredged area.

Fish, Waterfowl, Game and Snapping Turtle Consumption*:* New York State Department of Health (NYSDOH) has issued fish consumption advisories for the St. Lawrence River (whole river) and Turtle Cove. The latest advisories are available at https://www.health.ny.gov/publications/2769.pdf. Mohawk consumption advisories for fish and wildlife can be found at https://www.srmt-nsn.gov/_uploads/environment/GameAdvisory_Nov2014.pdf. SRMT has also published the "Akwesasne Family Guide to Eating Locally Caught Fish" which can be viewed at https://www.srmt-nsn.gov/_uploads/environment/FishAdvisory_Nov2013.pdf

Soils: Residential properties where access was granted for remediation meet the residential cleanup goal of 1 mg/kg PCBs. This value remains protective. There remain residential properties where access for remediation has not been granted and soil remains above the cleanup level.

Toxicity Values. The main contaminant of concern at the site is PCBs. At the current time, the Integrated Risk Information System, EPA's database for toxicity values used in risk assessment, is updating the toxicity information for PCBs for noncancer health effects. Future FYRs will need to evaluate any changes in the toxicity values for chemicals at the site that may impact the protectiveness of the remedy.

Since the last FYR, the toxicity values for groundwater contaminants have not changed and the established MCLs for these chemicals remain protective.

Ecological: The 1991 and 1992 RODs identified unspecified ecological risks to fish, ducks, geese, frogs, and turtles due to elevated PCBs in tissue, as well as concentrations of dioxin and mercury in fish tissue. The exposure assumptions and pathways that were previously evaluated are still valid. Although toxicity values for site-related contaminants may have changed due to new research, the conclusions reached from using older toxicity values remain valid. There were two cleanup values chosen for PCBs in the sediment and soils based upon the location of the contamination. PCB contamination on the SRMT lands had a cleanup goal of 0.1 mg/kg, while the PCB contamination on the remainder of the GM portion of the site had a cleanup goal of 1 mg/kg. These cleanup values are still valid. As described earlier, the 2016 fish sampling data showed a spike in PCB concentrations, followed by decreases in subsequent years. In addition to continued biota monitoring, investigations to identify a source of the PBCs will be undertaken, with additional actions as necessary.

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

There is no information that calls into question the protectiveness of the selected remedies.

VI. ISSUES/RECOMMENDATIONS

Table 3, below, presents the recommendations and follow-up actions for this FYR.

Table 3: Issues and Recommendations

<table>
<tr><th colspan="5">Issues/Recommendations</th></tr>
<tr><td colspan="5">OU(s) without Issues/Recommendations Identified in the Five-Year Review:</td></tr>
<tr><td colspan="5">OU2</td></tr>
<tr><td colspan="5">Issues and Recommendations Identified in the Five-Year Review:</td></tr>
<tr><td rowspan="3">OU(s): 01</td><td colspan="4">Issue Category: Remedy Performance</td></tr>
<tr><td colspan="4">Issue: An IC requiring the performance of a vapor intrusion evaluation in areas of future construction to determine whether this would be a pathway of concern and, if the potential for vapor intrusion exists in any such area, install a vapor mitigation system, is not part of the selected remedy for the site.</td></tr>
<tr><td colspan="4">Recommendation: An IC requiring the performance of a vapor intrusion evaluation in areas of future construction to determine whether this would be a pathway of concern and, if the potential for vapor intrusion exists in any such area, install a vapor mitigation system, needs to be incorporated into the remedy via an ESD.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Oversight Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>Yes</td><td>PRP</td><td>EPA</td><td>12/31/2021</td></tr>
</table>

OU(s): 01	**Issue Category:** Changed Site Conditions			
	Issue: Contaminated sediments have been detected in the previously-remediated Turtle Cove and St. Lawrence River. The source of this contamination is unknown.			
	Recommendation: Following the remediation of the Tribal soils, Cove sediments need to be resampled and, if appropriate, based upon those sample results, measures taken to address the contaminated sediments. Additional sampling and/or biota sampling will be needed to delineate PCB sediment contamination in the St. Lawrence River. Additional investigations should be performed to determine the source of PCBs and whether additional remediation efforts are necessary to ensure protectiveness.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2023

OTHER FINDINGS

There are no other findings for this FYR.

VII. PROTECTIVENESS STATEMENTS

Table 4, below, presents the operable unit and sitewide protectiveness statements.

Table 4: Protectiveness Statements

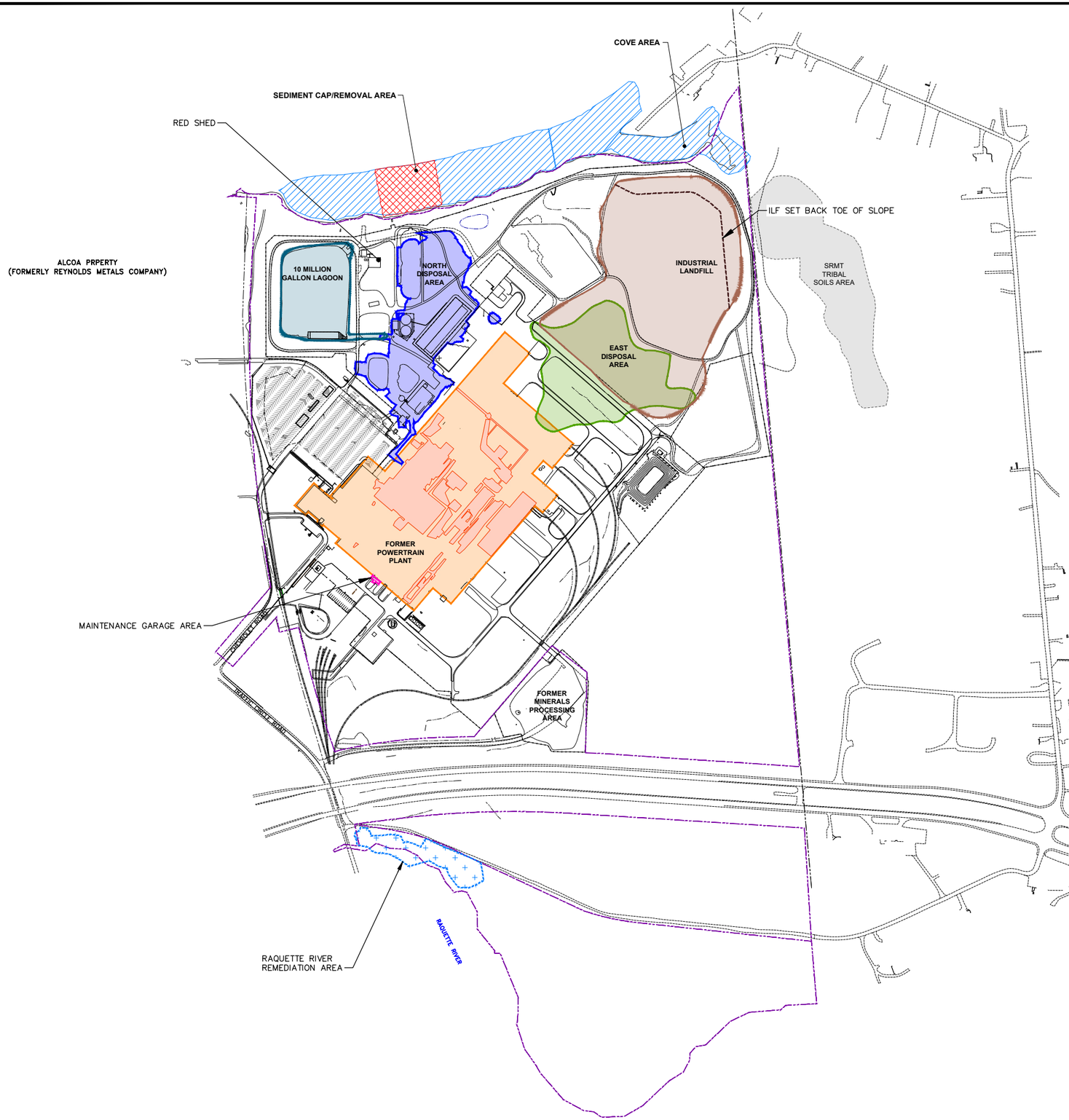
Protectiveness Statements		
Operable Unit: 01	*Protectiveness Determination:* Protectiveness Deferred	*Planned Addendum Completion Date:* 9/30/2023
Protectiveness Statement: A protectiveness determination for OU1 cannot be made until the remedy is complete and additional sampling to determine the source of PCBs in the previously-remediated Turtle Cove and St. Lawrence River has been conducted and whether additional remediation efforts are necessary to ensure protectiveness. It is expected that a report addendum containing a protectiveness statement will be issued within three years of the date of this report.		
Operable Unit: 02	*Protectiveness Determination:* Will be Protective	*Planned Addendum Completion Date:* Click here to enter a date

Protectiveness Statement: The remedy for OU2 is expected to be protective of human health and the environment upon completion of all groundwater and soil remedial activities and the implementation of ICs. In the interim, remedial activities completed, to date, have adequately addressed all exposure pathways that result in unacceptable risks in these areas.
Sitewide Protectiveness Statement
Protectiveness Determination: Protectiveness Deferred — *Planned Addendum Completion Date:* 9/30/2023
Protectiveness Statement: A protectiveness determination cannot be made until the remedy is complete and additional sampling to determine the source of PCBs in the previously-remediated Turtle Cove and St. Lawrence River has been conducted and whether additional remediation efforts are necessary to ensure protectiveness.

VIII. NEXT REVIEW

The next FYR report for the site is required five years from the completion date of this review.

APPENDIX A – Figures



LEGEND:

- MONITORING WELL
- PROPERTY LINE
- PHASE I DEMOLITION LIMITS
- PHASE II EXCAVATION AREAS
- NDA REMEDIATION AREA
- EDA REMEDIATION AREA
- ILF SET BACK AND CAP AREA
- 10 MG LAGOON REMEDIATION AREA
- MAINTENANCE GARAGE EXCAVATION AREA
- SEDIMENT REMOVAL AREA
- SEDIMENT CAP
- RAQUETTE RIVER REMEDIATION AREA
- SRMT TRIBAL SOILS AREA
- FORMER GM PROPERTY BOUNDARY

GENERAL NOTES:

1. BASEMAP INFORMATION TAKEN FROM DRAWING BY WILL LAMICA (JUNE 2005).
2. ALL FEATURE LOCATIONS ARE APPROXIMATE.
3. LIMITS OF PHASE I DEMOLITION AREA, PHASE II EXCAVATION LIMITS ARE APPROXIMATE ONLY.
4. LIMITS OF THE NDA REMEDIATION AREA, EDA REMEDIATION AREA, ILF REMEDIATION AREA, 10 MG LAGOON AREA, AND MAINTENANCE GARAGE AREA AS PROVIDED ON AS-BUILT DRAWINGS FOR EACH RESPECTIVE AREA.

0 280' 560'
GRAPHIC SCALE

GM MASSENA
CENTRAL FOUNDRY DIVISION SUPERFUND SITE
MASSENA, NEW YORK

SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

CITY: SYRACUSE, NY GROUP: ENVCAD DB: K.SARTORI PIC: /TM: A. RICHARDSON LYR:ON=*; OFF=REF
C:\Users\ksarton\BIM 360\Arcadis\ANA - RACER TRUST\Project Files\MASSENA CENTRAL FOUNDRY SITE 1\2020\300433010\1-DWG\GMMassena-01-Fig 1-SitePln.dwg LAYOUT: 1 SAVED: 9/21/2020 12:50 PM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 9/21/2020
3:33 PM BY: SARTORI, KATHERINE
XREFS: IMAGES:
GMMASSENABORDER-XLD
X-Base-1

Figure 2: Site Location Map

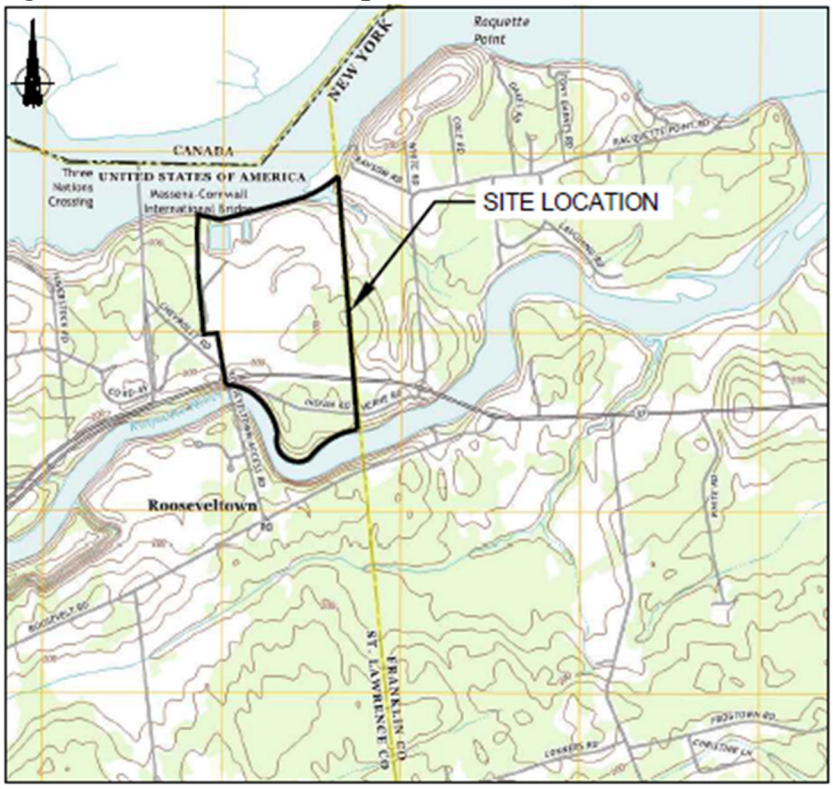


Figure 3: Sediment and Passive Sampler Locations

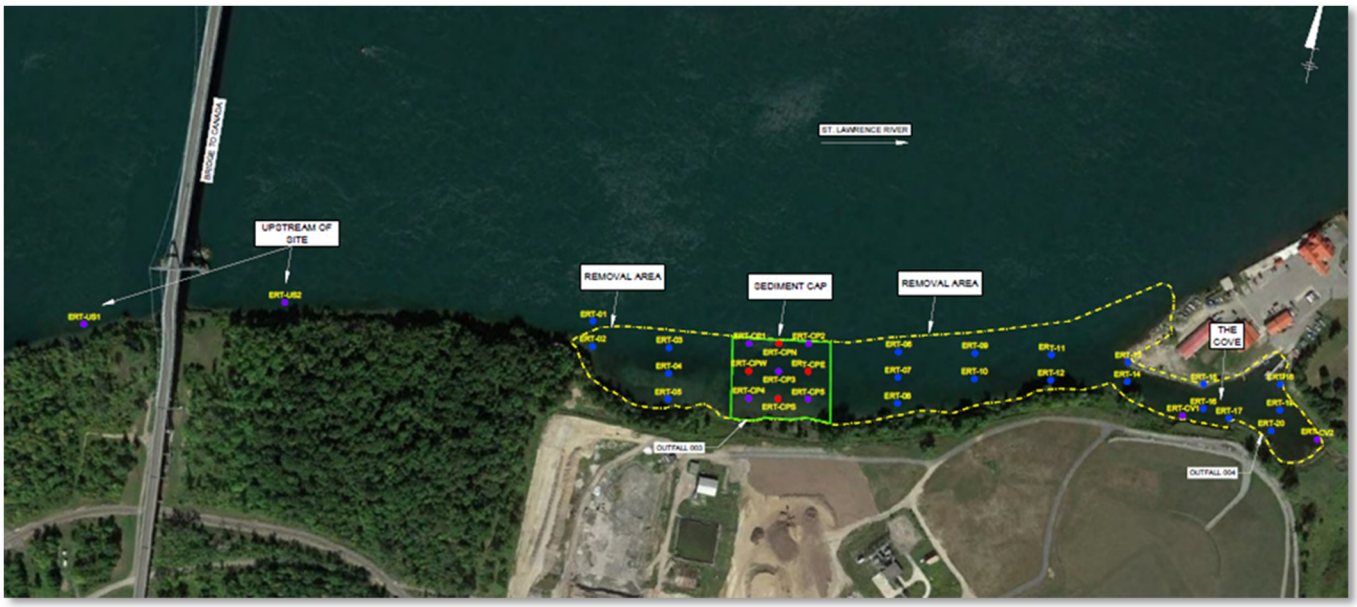
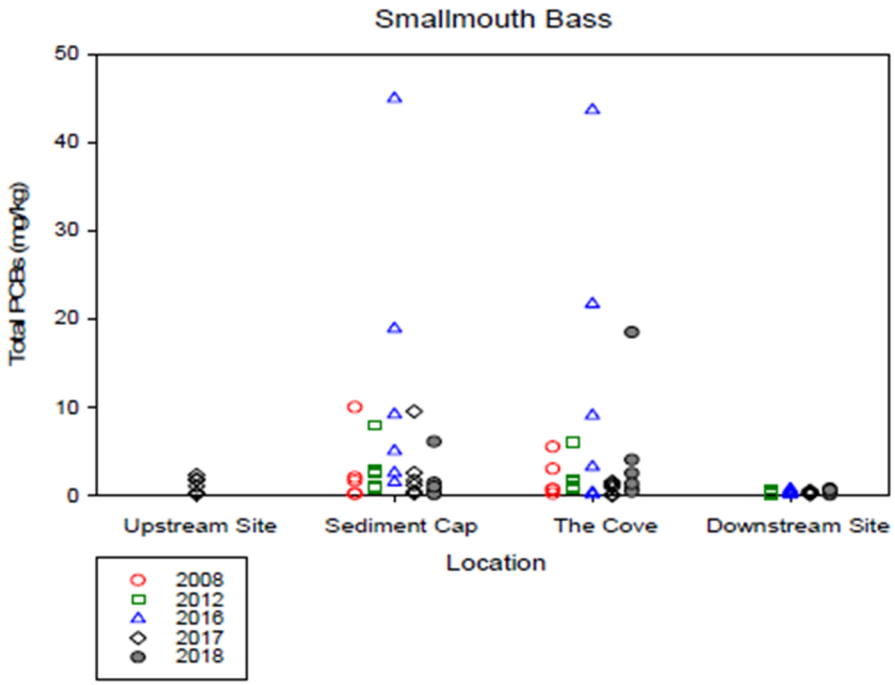


Figure 4a: Historical PCB Concentrations in Smallmouth Bass and Brown Bullhead *(Total PCBs)*



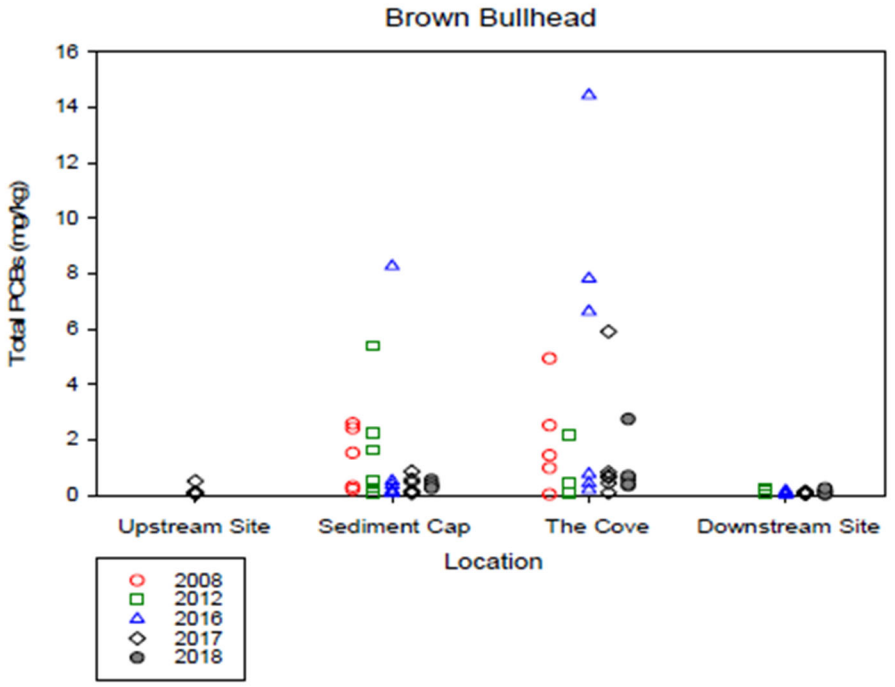
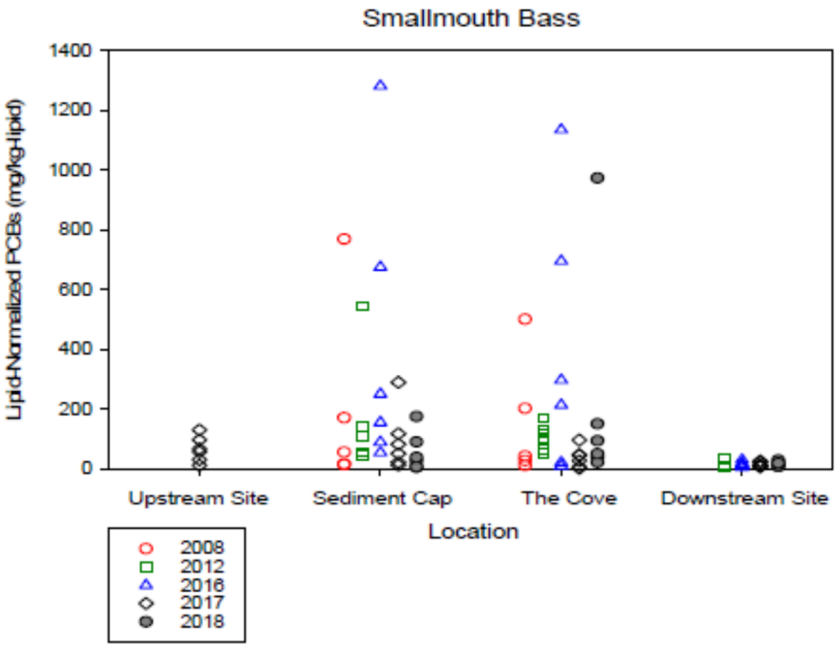


Figure 4b. Historical PCB Concentrations in Smallmouth Bass and Brown Bullhead *(Lipid-Normalized)*



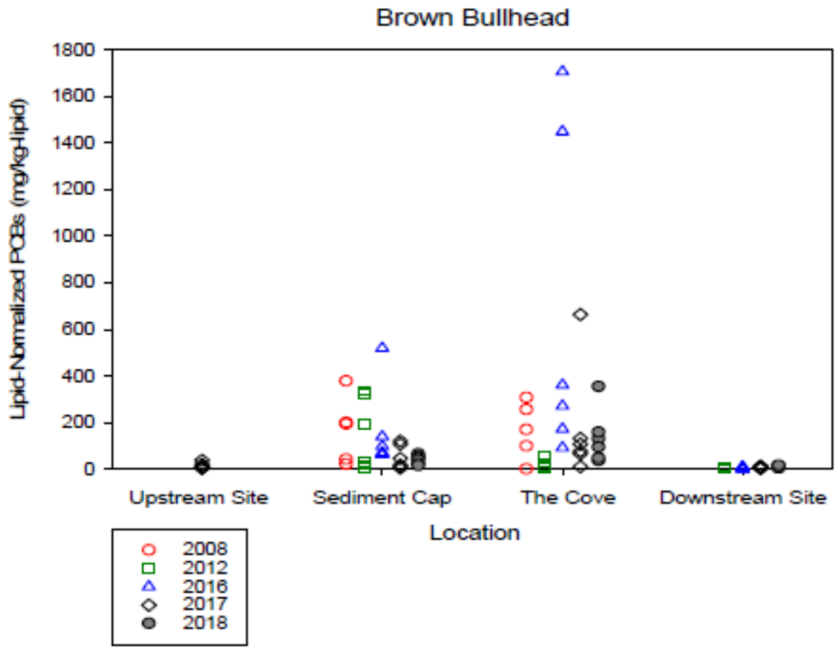


Figure 5: Surface Sediment PCB Concentrations

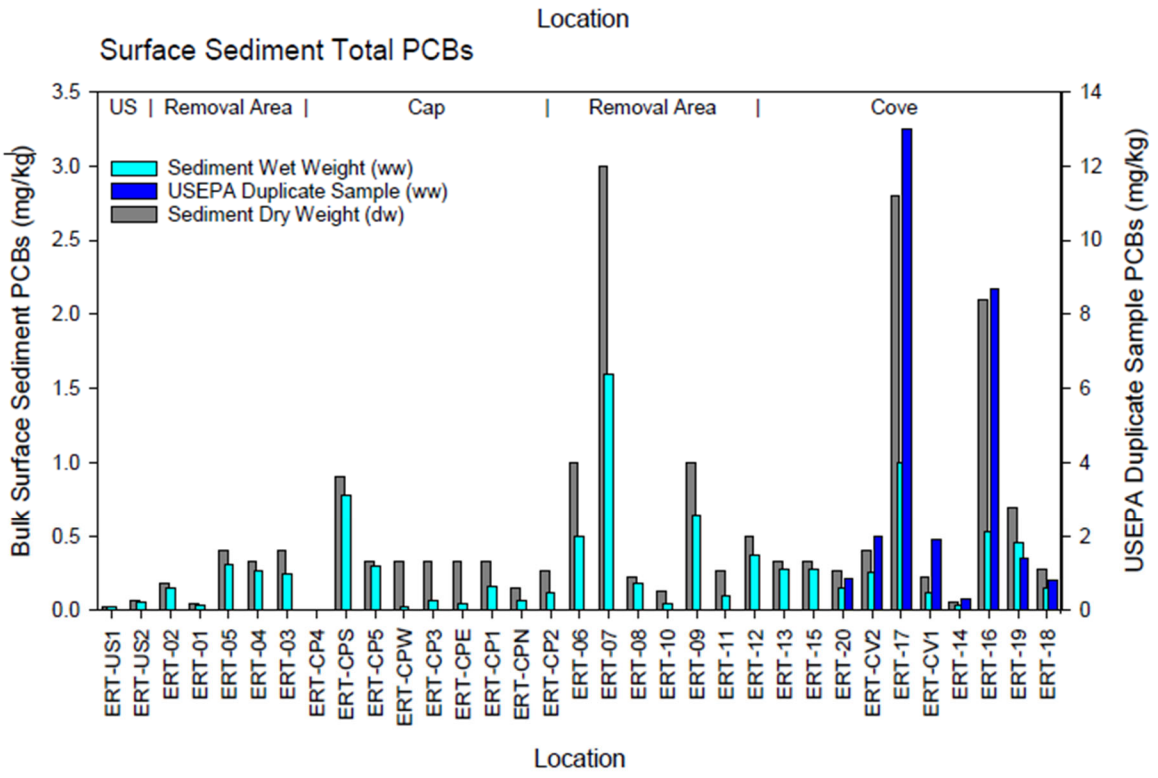
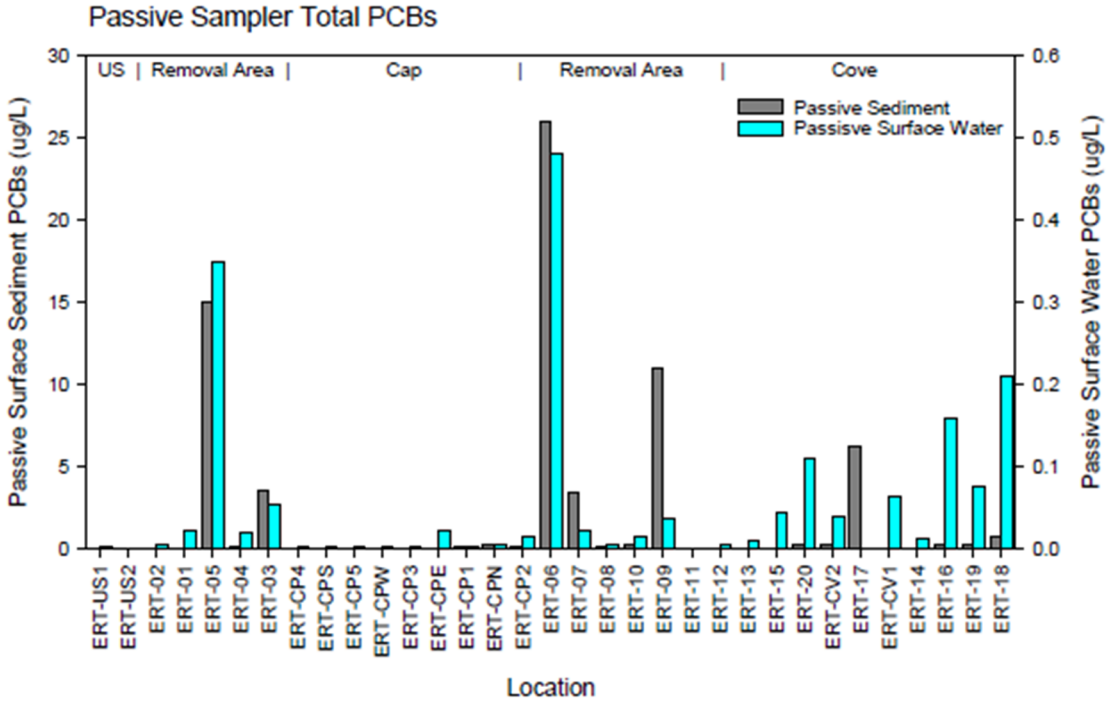


Figure 6: Sediment and Passive Sampler Results



APPENDIX B – Reference List

Documents, Data, and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	**Date**
Record of Decision for OU 1 at General Motors Corporation, Central Foundry Division, Massena, NY, EPA	1990
Record of Decision for OU 2 at General Motors Corporation, Central Foundry Division, Massena, NY, EPA	1992
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APPENDIX C – Geology/Hydrogeology and Land Use

Site Geology

The site is underlain by approximately 100 feet of unconsolidated materials that overlay bedrock. The unconsolidated materials, which are predominantly glacial in origin, are divided into five deposits based on their depositional history and physical properties. From top to bottom, these deposits are fill, clay, upper till, glaciolacustrine silty fine sand, and lower till.

The native fill unit primarily consists of silt and sand that ranges in thickness from approximately 5 to 10 feet and may be locally absent. The clay unit has been interpreted to be of marine or glaciolacustrine (glacial lake) origin (RMT 1986). CDM, Inc. (CDM; 2009) subdivides the clay unit into two members: an upper clay and a lower clay. Standard penetration test data provided in CDM (2009) indicate that the upper clay is of low to moderate density, with standard penetration resistance (N-values) ranging from 4 to 20, while the lower clay has significantly lower strength and density, with N-values ranging between 0 and 3. Collectively, the clay unit is present at an approximately 600-foot-wide band that parallels the St. Lawrence River (RMT 1986) and pinches out near the western end of the 10 million gallon lagoon. The lower clay unit appears to be mainly present beneath the 10 MG Lagoon. The clay unit is thickest beneath the 10 million gallon lagoon (approximately 23 feet) and thins to the west to approximately 10 feet.

The upper and lower till deposits are continuous across the area encompassed by the NDA and Lagoons. The till deposits are very dense mixtures of gravel, sand, silt, and clay in varying proportions and contain cobbles and boulders. The upper till deposit is generally less than 10 feet thick, except near the western end of the 10 million gallon lagoon, where it is nearly 30 feet thick. The lower till is approximately 60 feet thick. Both till deposits are very dense, with N-values commonly exceeding 50; N-values exceeding 100 are not uncommon in the tills.

The glaciolacustrine deposit is sandwiched between the till deposits and is discontinuous, pinching out south of the NDA, and to the west, beneath the 10 million gallon lagoon. This deposit consists mainly of thinly bedded silt and fine sand, with variable amounts of gravel and clay, and is generally very dense, with N-values ranging from 22 to 100+. The thickness of the unit ranges from approximately 10 to 15 feet.
Bedrock beneath the site consists of the Ogdensburg dolostone, a gray-to-black colored dolomite, or magnesium limestone.

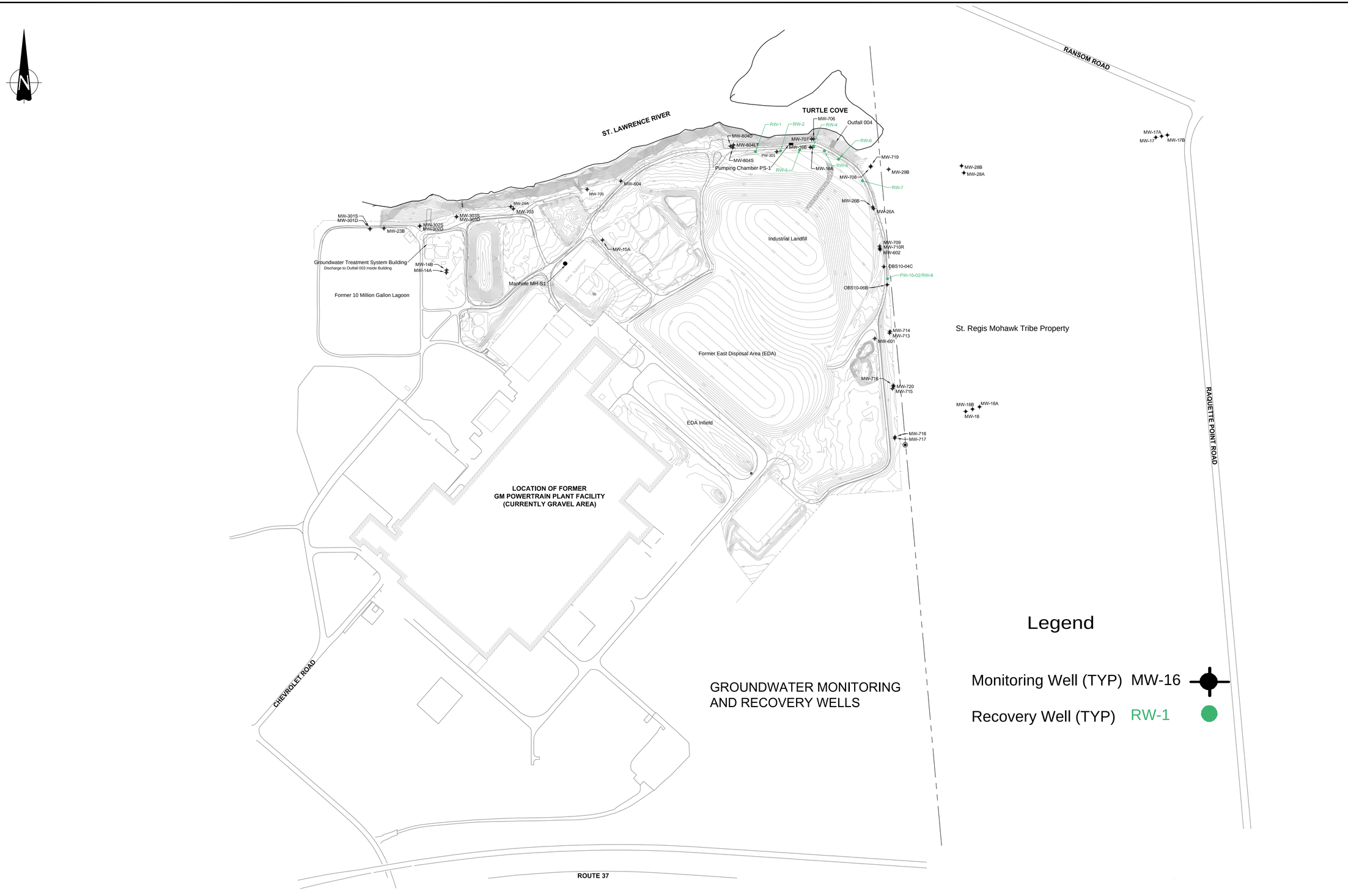
The depth to the water table is generally 5 to 10 feet. Of the five unconsolidated deposits, the glaciolacustrine unit yields modest quantities of groundwater, while the yield of the remaining deposits is poor. Groundwater moves generally north-northeastward, discharging to the St. Lawrence River.

Land and Resource Use

Manufacturing at the GM Site was discontinued in July 2009, but the property remains zoned for industrial purposes. Some areas of contamination are found beyond GM's property on residential SRMT lands. All residences within close proximity to the site receive their water from a Tribal public drinking water supply (surface water source).

There are approximately 35 homes along the GM/Tribal border. The closest homes to the site are situated on the shore of the remediated Turtle Cove and Turtle Creek. The St. Lawrence River represents the international border with Canada and is an active marine shipping thoroughfare for ships traveling to and from the Great Lakes through the nearby Eisenhower Locks. It is also used for recreational boating. The Raquette River to the south is primarily used for recreational purposes.

APPENDIX D – Long-Term Groundwater Monitoring Well Locations and Concentration Graphs



P:\351612 - RACER 2015\GROUND WATER\ - DRAWINGS\DWG\2018-01-24 MW ABANDONMENT.DWG 1/26/2018 2:43 PM

Revision	Date

	Date
Designed	
Drawn EWP	
Checked	
Approved	
Date	

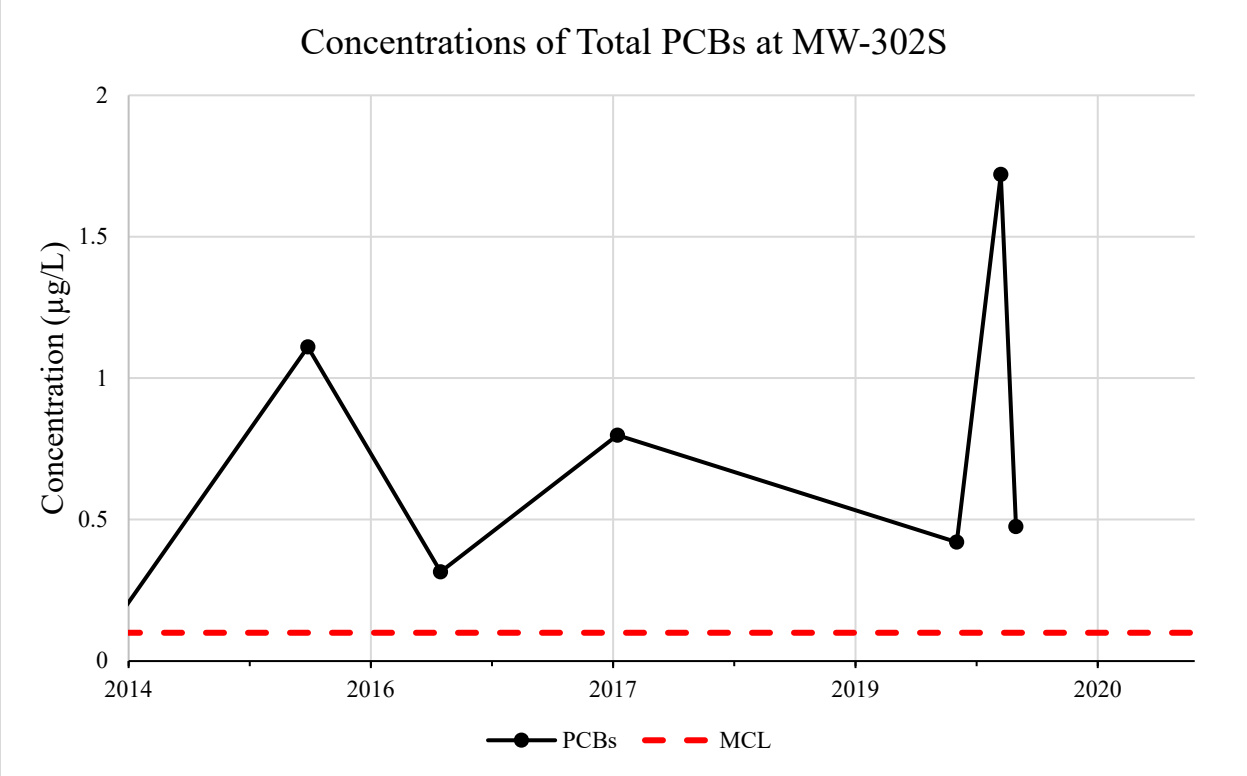
MOTT MACDONALD M M
Certificate No. 24GA28016600
111 Wood Avenue South
Iselin, New Jersey 08830-4112

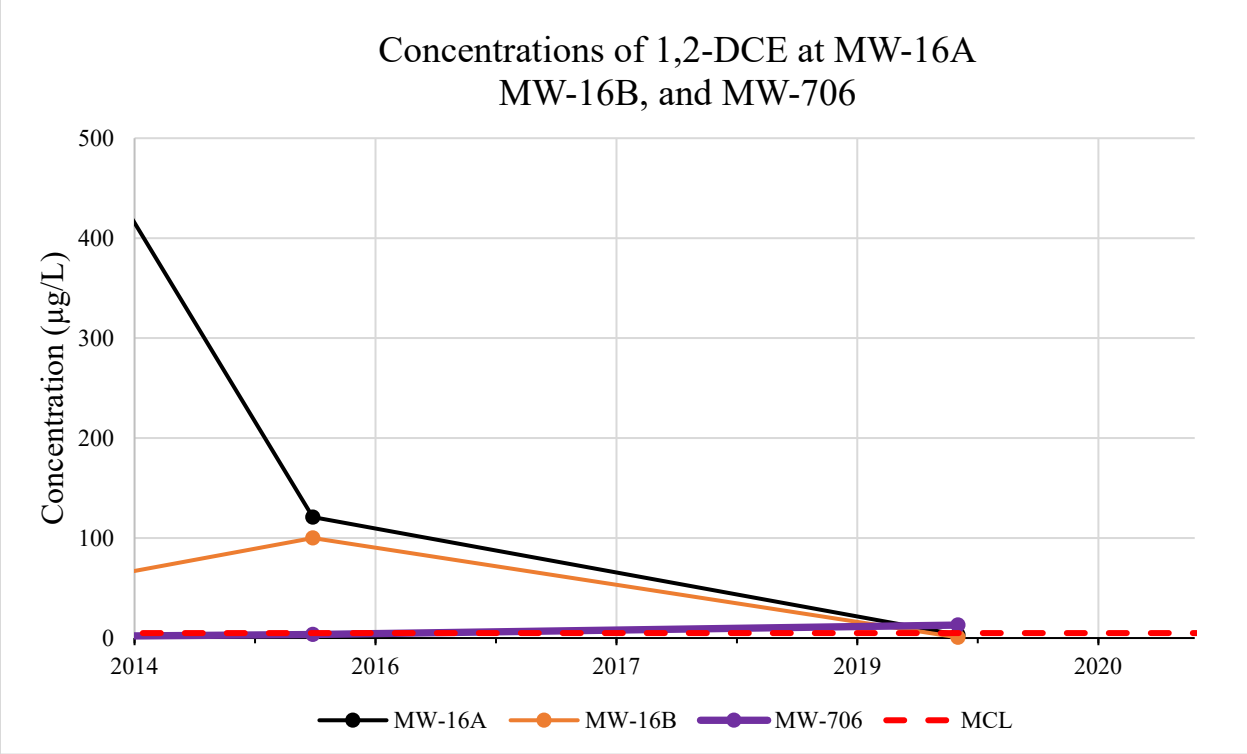
RACER TRUST
DETROIT, MI

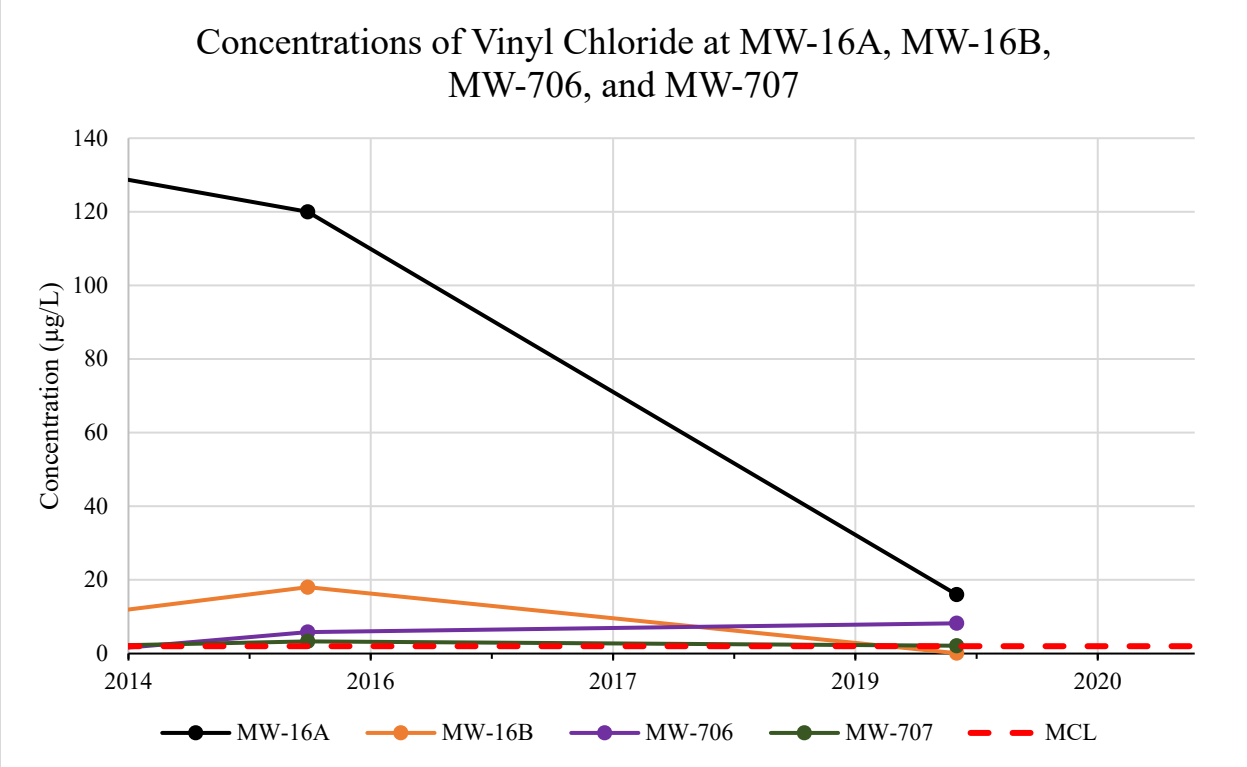
CENTRAL FOUNDRY SUPERFUND SITE - MASSENA, NY

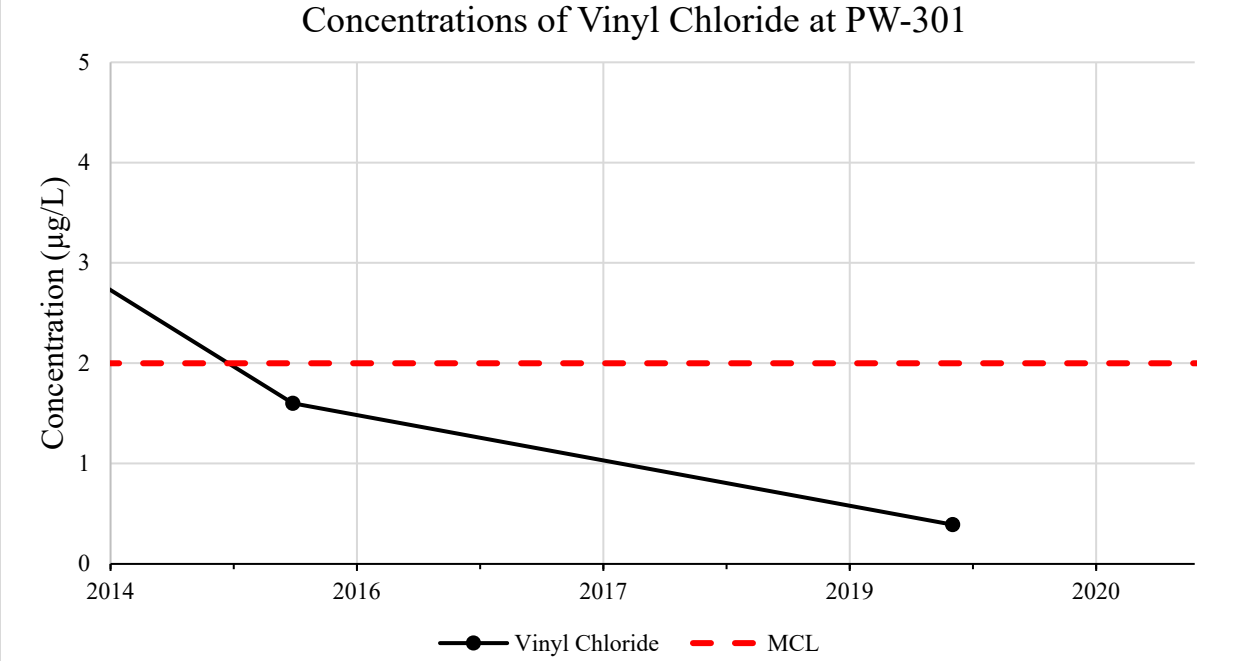
Figure 2 - Site Plan

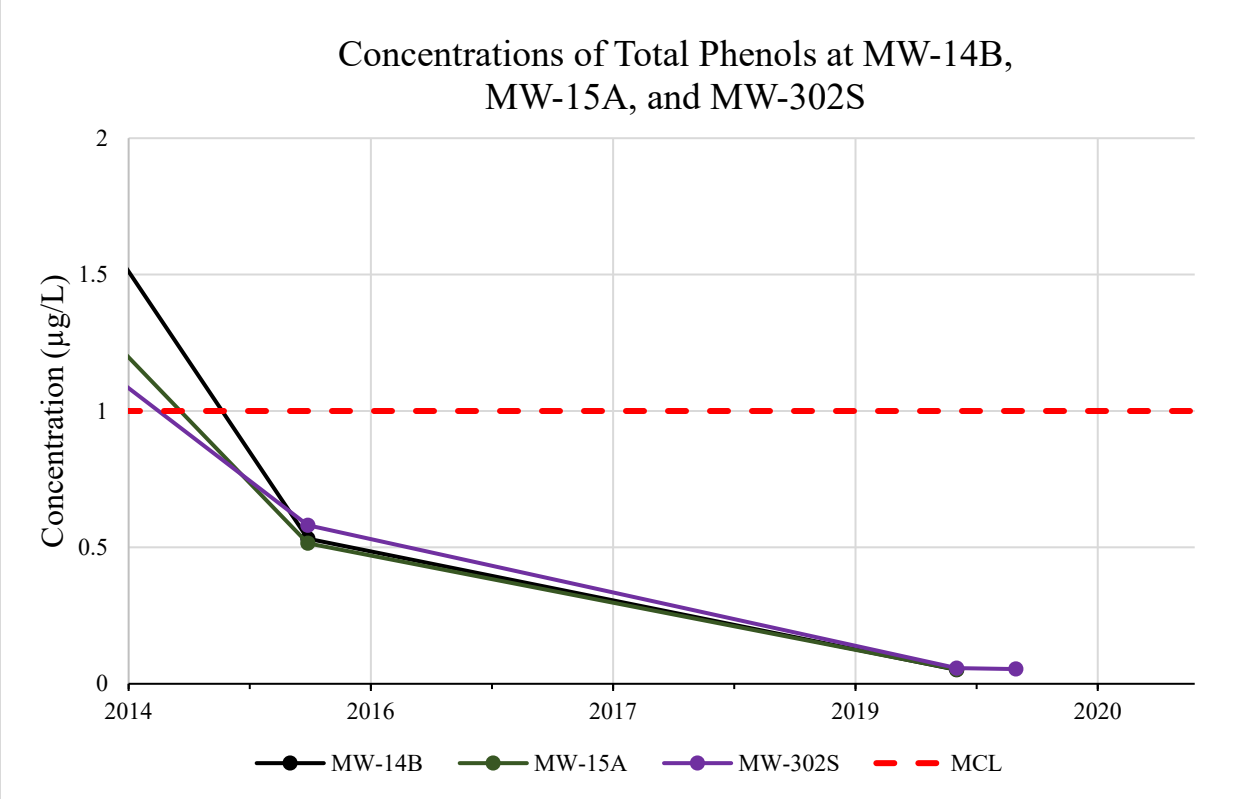
Job	No.	
351612	B/O 1	Total 1

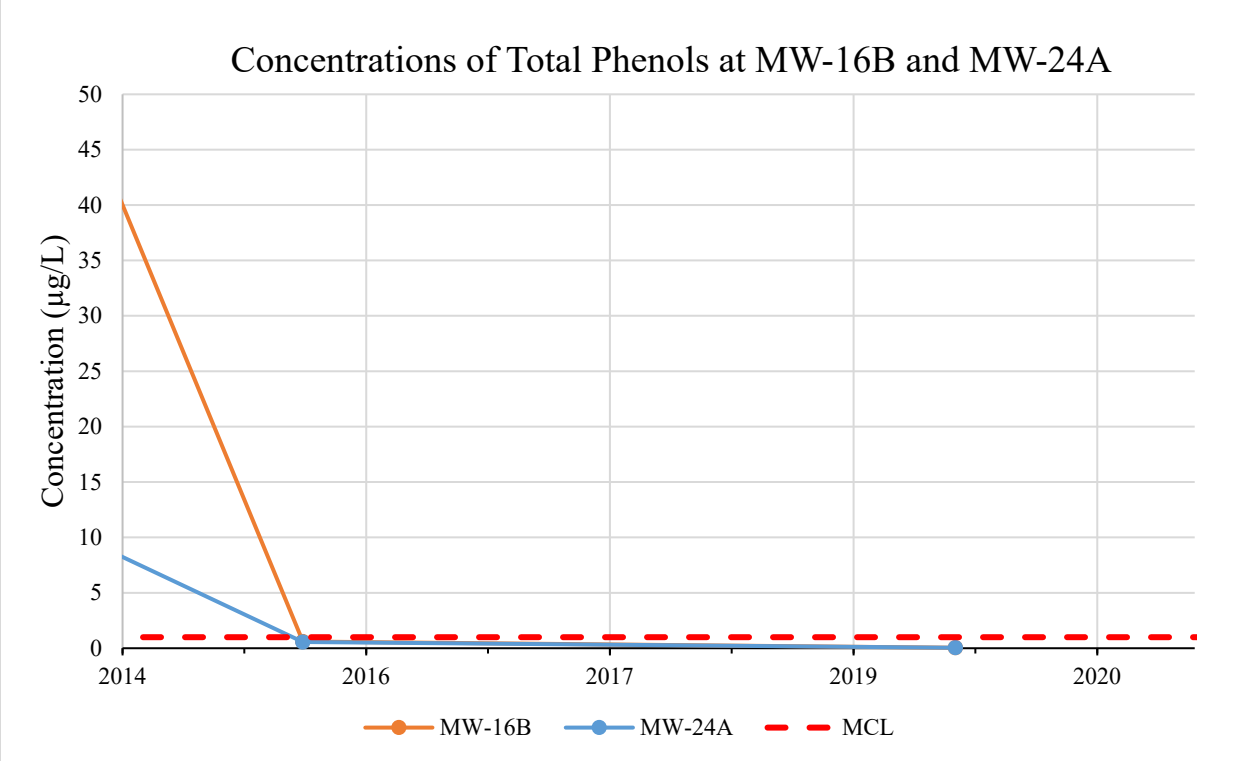

Concentrations of Total PCBs at MW-302S
Concentration (µg/L)
2
1.5
1
0.5
0
2014
2016
2017
2019
2020
PCBs
MCL


Concentrations of 1,2-DCE at MW-16A
MW-16B, and MW-706
Concentration (µg/L)
500
400
300
200
100
0
2014
2016
2017
2019
2020
MW-16A
MW-16B
MW-706
MCL


Concentrations of Vinyl Chloride at MW-16A, MW-16B, MW-706, and MW-707
Concentration (µg/L)
140
120
100
80
60
40
20
0
2014
2016
2017
2019
2020
MW-16A
MW-16B
MW-706
MW-707
MCL


Concentrations of Vinyl Chloride at PW-301
Concentration (µg/L)
5
4
3
2
1
0
2014
2016
2017
2019
2020
Vinyl Chloride
MCL


Concentrations of Total Phenols at MW-14B, MW-15A, and MW-302S
Concentration (µg/L)
2
1.5
1
0.5
0
2014
2016
2017
2019
2020
MW-14B
MW-15A
MW-302S
MCL


Concentrations of Total Phenols at MW-16B and MW-24A
Concentration (µg/L)
50
45
40
35
30
25
20
15
10
5
0
2014
2016
2017
2019
2020
MW-16B
MW-24A
MCL