

**Third Five-Year Review Report  
General Motors (Central Foundry Division) Superfund Site  
St. Lawrence County  
Town of Massena, New York**



**Prepared by**

**U.S. Environmental Protection Agency  
Region 2  
New York, New York**

**September 2015**

**Approved by:**

A handwritten signature in black ink, appearing to read "Walter E. Mugdan", is written over a horizontal dashed line.

**Walter E. Mugdan, Director  
Emergency and Remedial Response Division**

**Date:**

A handwritten date "Sept. 28, 2015" is written in black ink over a horizontal dashed line.

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## **Executive Summary**

This is the third five-year review for the General Motors (Central Foundry Division) Superfund site, located in the Town of Massena, St. Lawrence County, New York. The triggering action for this statutory five-year review is the date of the completion of the July 2010 second five-year review. The remedies for both operable units are expected to be protective of human health and the environment upon completion of all groundwater, soil and sediment remedial activities and the implementation of institutional controls. In the interim, remedial actions have been completed in the St. Lawrence River, Raquette River, and Turtle Cove and, when combined with the existing fish advisories, these measures address unacceptable exposure pathways in these areas. For those properties on Tribal lands where access has been granted, remedial actions have been completed to be protective for current uses. Remediation of the remaining Tribal soils and sediments, on-property soils at the 10 million gallon lagoon and the groundwater has not been completed.

## Five-Year Review Summary Form

### SITE IDENTIFICATION

**Site Name:** General Motors (Central Foundry Division) site

**EPA ID:** NYD091972554

**Region:** 2

**State:** NY

**City/County:** Town of Massena/St. Lawrence County

### SITE STATUS

**NPL Status:** Final

**Multiple OUs?**

Yes

**Has the site achieved construction completion?**

No

### REVIEW STATUS

**Lead agency:** EPA

*[If "Other Federal Agency", enter Agency name]:* [Click here to enter text.](#)

**Author name (Federal or State Project Manager):** Anne Kelly

**Author affiliation:** EPA

**Review period:** 7/14/2010 - 9/13/2015

**Date of site inspection:** 7/1/2015

**Type of review:** Statutory

**Review number:** 3

**Triggering action date:** 7/13/2010

**Due date (five years after triggering action date):** 7/13/2015

### OU PROTECTIVENESS STATEMENT

<i>Operable Unit:</i> 01	<i>Protectiveness Determination:</i> Will be Protective	<i>Addendum Due Date (if applicable):</i> N/A
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*Protectiveness Statement:*

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 institutional controls. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that result in unacceptable risks in these areas.

<i>Operable Unit:</i> 02	<i>Protectiveness Determination:</i> Will be Protective	<i>Addendum Due Date (if applicable):</i> N/A
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*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 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 PROTECTIVENESS STATEMENT

<i>Protectiveness Determination:</i> Will be Protective	<i>Addendum Due Date (if applicable):</i> N/A
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*Protectiveness Statement:*

The remedies at the site 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.

## **Introduction**

This is the third five-year review for the General Motors (GM) Central Foundry site (Site or GM Site), located at the former GM Powertrain manufacturing facility in the Town of Massena, St. Lawrence County, New York and was conducted by Environmental Protection Agency (EPA) Remedial Project Manager (RPM) Anne Kelly. The review was conducted pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §9601 *et seq.* and 40 CFR 300.430(f)(4)(ii) and in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of five-year reviews is to ensure that implemented remedies protect public health and the environment and that they function as intended by the site decision documents. This report will become part of the site file.

The triggering action for this statutory five-year review is the date of the completion of the July 2010 second five-year review.

A five-year review is required at this site due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. This site is being addressed as two operable units (OUs). OU1 addresses contamination in the St. Lawrence River, GM Site soils, St. Regis Mohawk Tribal soil and sediments, the North Disposal Area, the Raquette River, surface water runoff, groundwater and the industrial lagoons. OU2 addresses contamination in the Industrial Landfill, East Disposal Area, and groundwater that flowed beneath those areas. Both OUs are under construction and being addressed in this five-year review.

## **Site Chronology**

See Table 1 for the site chronology.

## **Background**

### *Physical Characteristics*

The GM 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 by the St. Lawrence River, which is the international border with Canada. The property immediately west of the GM plant is owned by the St. Lawrence Seaway Corporation, New York State Department of Transportation (NYSDOT) and Alcoa, Inc.

St. Regis Mohawk Tribe (SRMT) lands, known as Akwesasne, are located to the east, and Route 37 and the Raquette River are situated to the south. Figure 1 identifies the Site's location.

### *Site Geology/Hydrogeology*

Groundwater flow through the site generally reflects the surface topography, flowing primarily to the north toward the St. Lawrence River, with shallower units exhibiting a strong northeastern component. Bedrock is not exposed at the GM Site. The nearest outcropping of bedrock is found three miles to the South near Helena, New York.

Over most of the site, there is a downward hydraulic gradient from the overburden to the bedrock. The reverse is the case for the area within 300 feet of the St. Lawrence River, where potentiometric heads in the overburden are the lowest at the Site and the heads are higher in the bedrock, indicating an upward flow from bedrock to overburden. Overburden ranges from 60- to 120-foot in thickness at the Site. There are eight stratigraphic units overlying the bedrock at the Site. These are dominated by glacial tills, clays, and sandy depositional units.

Within the three distinct till layers on Site there can be found silts, clays, sand and gravel as well as thin discontinuous layers of sand or gravel. These till units exhibit low permeability ( $10^{-6}$  centimeters per second [cm/sec] to  $10^{-7}$  cm/sec). A large percentage of the groundwater flow at the Site is confined to one layer, the upper glaciolacustrine unit, which is found at depths of 30 to 40 feet below the surface. While this unit has a considerably higher permeability ( $10^{-3}$  cm/sec) than the others on-site, it is confined beneath by low permeability glacial till. It occurs only on the northern part of the site within 13,000 feet of the St. Lawrence River and east of the 10 million-gallon lagoon (described below). The glaciolacustrine unit is surrounded by low-permeability tills to the west, east and south. The St. Lawrence River is a receptor for groundwater and there is also limited shallow groundwater flow southward toward the Raquette River.

The groundwater at the Site is classified by New York State as a drinking water source; however, groundwater at the GM Site is not used for drinking water or any other purposes.

### *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.

The property immediately west of the GM Site is property owned by the St. Lawrence Seaway Corporation, NYSDOT and Alcoa, Inc.

### *History of Contamination*

The facility was originally built as a die-casting plant to produce aluminum cylinder heads for the Chevrolet Corvair in 1959. Polychlorinated biphenyls (PCBs) were used as a component in hydraulic fluids to provide protection from fire and thermal degradation associated with the high-temperature, high-pressure environment of die-casting machines. The EPA banned the use of PCBs in 1977, at which time GM began to phase out their use of PCB's in plant processes. In their place, GM substituted non-PCB-containing mineral-based oils. In the mid-1980s, GM ceased die-casting operations at the facility, but continued operations on a smaller scale, casting aluminum parts through a procedure known as the lost-foam process. GM also began to cast iron parts using this process in the mid-1990s. The facility began producing new engine block and head motor components which, starting in 1996, returned the facility to near-capacity production levels.

PCBs are the primary contaminant of concern in all media; however, phenols and volatile organic compounds (VOCs) have also been found at the site. Much of the contamination at the facility and surrounding areas can be attributed to the handling and on-site disposal of contaminated wastewater sludges.

There are a number of discrete areas of contamination associated with the site, including three disposal areas—the Industrial Landfill (ILF); North Disposal Area (NDA) and East Disposal Area (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 discrete areas are described below.

#### Industrial Landfill

The ILF was a twelve-acre disposal area in the Site's northeast corner. The ILF contains plant contaminated foundry sands, debris, and PCB-contaminated sludges. VOCs, phenols and phthalates have also been detected in the landfill (an interim cap was constructed 1987-1988).

#### North Disposal Area

The NDA was a subsurface area located adjacent to the 1.5 million-gallon lagoon. 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 (6,780 milligram per kilogram [mg/kg]) at depths of approximately 45 feet. Also, phenols were detected in the NDA.

#### East Disposal Area

The EDA is unlined and was formerly 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.

### Lagoons

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

### 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 GM 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.

### *Initial Response*

The Site was placed on the Superfund National Priorities List in September 1983 as a result of contamination related to GM's past waste disposal practices.

Significant upgrades were made to the facility's wastewater treatment system (WWTS) in the early 1980's to reduce the discharge of PCBs through the plant's outfalls. This included recycling over 90% of plant wastewater and installing carbon treatment prior to discharge.

In order to reduce direct exposure and prevent runoff to the St. Lawrence River, from 1987-1988, as an interim measure, the ILF was capped with one foot of clay, soil, and was seeded. Access restrictions, including site fencing, were put in place at that time.

Until 1988, GM collected stormwater from the southern side of the plant and discharged the water through a storm sewer line which once lead to the Raquette River. In late 1988, GM modified the underground lines to redirect collected surface water to the 10 million-gallon lagoon, which was subsequently treated by the plant's water treatment system before being discharged to the St. Lawrence River. The storm sewer line leading to the Raquette River was sealed at a manhole near

the GM plant.

In 1992, pursuant to a Unilateral Administrative Order (UAO) (Index No. II CERCLA-20207) issued by the EPA, GM took measures to ensure that materials containing PCBs were not conveyed from the storm sewer line leading to the Raquette River located on the north side of Route 37. Specifically, a brick and mortar bulkhead was built in the 36-inch diameter influent pipe at the catch basin on the north side of Route 37. In addition, the pipe and catch basin interiors were cleaned and sealed with grout and improvements were made to the concrete spillway.

The 10 million-gallon lagoon remains an active part of the Site storm water and remedial water treatment system.

### *Basis for Taking Action*

In 1985, GM entered into an Administrative Order on Consent (Index No. II CERCLA-50201) with the EPA to perform a remedial investigation and feasibility study (RI/FS) to determine the extent to which PCBs were present in the soil, groundwater, and sediments. The RI was completed in June 1989; the FS was completed in November 1989.

Based on the information provided by the RI and FS, the EPA conducted a risk assessment to determine if PCBs, VOCs, and phenols in surface water, soil, sediment, and groundwater presented a risk to human and ecological receptors. The human health risk assessment concluded unacceptable risks existed for SRMT residents consuming fish or wildlife in the area. In addition, New York State Department of Environmental Conservation (NYSDEC) and SRMT also conducted a study of area fish and came up with the following conclusions:

- The river area adjacent to the GM site was one principal PCB source area as reflected by concentrations of fish;
- Relatively high concentrations of polychlorinated dibenzofurans were present in fish from the mouth of Turtle Creek; and
- PCB, dioxin, and mercury exceeded the criteria for wildlife that consumed fish in the area.

## **Remedial Actions**

### *Remedy Selection*

EPA has issued two Records of Decision (RODs) for the site. The first ROD for OU1, which was signed in December 1990, addressed contamination in the St. Lawrence River, GM on-site soils, SRMT soils and sediments, the NDA, the Raquette River, surface water runoff, contaminated site-wide ground water and the industrial lagoons. The major components of the remedy include:

- Excavate and treat SRMT soils greater than 1 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 Industrial Lagoons 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 second ROD for OU2 was signed in March 1992; it addressed contamination in the ILF, EDA, and the contaminated groundwater that flows beneath those areas. The major components of the 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. (The slurry wall was contingent on the results of additional groundwater testing to be conducted during design. See page 41 of the ROD Decision Summary.);
- 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 (The slurry wall was contingent on the results of additional groundwater testing to be conducted during design.);
- 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 the EPA following OU1 treatability testing.

In April 1992, the EPA issued a 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, the 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, the EPA issued a "Post-Decision" Proposed Plan which identified thermal desorption as the preferred treatment technology for contaminated materials and proposed the designation of a Resource Conservation and Recovery Act 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, the EPA determined that based on public opposition, a shift in the remediation strategy was warranted. In August 1998, the EPA officially withdrew the 1995 Proposed Plan with the issuance of a new plan which was largely accepted by the public. The 1998 Proposed Plan resulted in a March 1999 ROD amendment, which 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, as well Tribal soils and sediments.

Additionally, in April 2000, the 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.

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” (MLC). 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. The transfer in ownership did not impact the cleanup plans for the Site.

### *Remedy Implementation*

#### St. Lawrence River

In addition to the early abatement actions noted above, the first step in GM’s multi-phase remediation approach was to address contamination in the St. Lawrence River. The dredging of the St. Lawrence River sediments was ready to begin in 1994. However, since the silt curtains that were deployed as the sediment containment system were unable to withstand the currents in the St. Lawrence River, the dredging was postponed while the sediment containment system was redesigned. The redesigned system consisted of interlocking steel sheet pile panels which completely enclosed the area to be dredged and greatly reduced the potential for off-site migration during the dredging.

GM began dredging in June 1995 and ended operations in late November of the same year. In all, GM dredged approximately 10 acres in the St. Lawrence River, removing over 13,000 cubic yards (CY) of sediment. 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 before capping was 3 mg/kg.

### Surface Water Control

The 1990 ROD required that GM take measures to prevent surface water runoff onto Tribal lands and minimize the movement of contaminated surface soils from the GM facility. In 1995, GM completed this effort. The soils in the area of the EDA were re-contoured and re-vegetated directing any surface waters to a newly constructed 1.5 million-gallon storm water lagoon and treatment system.

### Lagoons

The first portion of remedial activities for the lagoons involved solidifying the sludge in the 350,000-gallon lagoon. This work proceeded without the health-based air action levels for PCBs or dust particulates being exceeded until the third week. At that time, GM, the EPA, and the SRMT government agencies received complaints from plant employees and nearby residents about dust and odors. The work was suspended and GM constructed a temporary enclosure over the lagoon in which solidification activities for the treatment of materials from both the 350,000-gallon lagoon and the 1.5-million gallon lagoon could take place. The structure allowed the solidification of the materials from both lagoons to move forward, by capturing and treating air emissions thereby preventing air impacts to the plant workers and the surrounding community. On-site treatment of materials from the inactive lagoons took place from July 24, 2000 through June 18, 2001.

After the removal of sludges from the lagoons, GM began excavation of contaminated soils remaining in the lagoons to the 10 mg/kg PCB on-site cleanup level. Excavations were performed where data indicated that the cleanup level had been exceeded or wherever visually-stained soils were found. Not all of the contaminated soils could be removed from the areas at depth adjacent to the 350,000-gallon lagoon due to stability issues associated with the soil's close proximity to active plant structures. A groundwater collection sump was installed, the 350,000-gallon lagoon was then backfilled, retrofitted with a liner, and was then put into use by GM as a process water lagoon. After the bankruptcy, this unit was taken out of service. A total of 19,605 CY of treated sludges and soils were removed from the site as part of this effort and were shipped via rail car to an approved hazardous waste disposal facility. The 1.5 million-gallon lagoon was also backfilled, lined, and put into service by GM to collect and hold storm water.

In 2013, the RACER Trust successfully remediated three waste water treatment lagoons as well as several other significant areas of contamination, the plant WWTS, waste water aeration basins, the Butler building, all oily waste lines as well as the NDA and associated interceptor lagoon. Residual contamination remained at depths in the area of the NDA and 1.5 million-gallon lagoon. To address this issue, five groundwater collection sumps were installed within the footprint of the former NDA and 1.5 million-gallon lagoon. The groundwater collection sumps were installed to address remnant bottom and side-slope soils that could not be completely remediated to the ROD-specified cleanup standard for PCBs. In total, approximately 126,000 CY of material was excavated and managed, and approximately 166,500 tons PCB-contaminated soils were disposed

of offsite during this effort.

### Groundwater

The groundwater remedy has not yet been fully implemented. It is expected that the groundwater collection system will be installed in 2016. As was noted above, two localized groundwater collection systems had been functioning at the site; at the 350,000-gallon lagoon prior to its remediation in 2013 and another collection system at the northeast corner of the ILF.

The groundwater collection trench north of the ILF continues to collect groundwater which is pumped via force main to the on-Site water treatment system. During the review period, two pumping tests were performed on the northwest and east side of the ILF which included the installation of new pumping and observation wells as part of a pre-design investigation; these new wells were included in the November 2014 sampling event. This groundwater collection system continues to function and will either be replaced or enhanced in conjunction with the implementation of the comprehensive groundwater remedy planned for 2016.

### Raquette River

The remediation of the Raquette River PCB-contaminated bank soils and river sediments began in June 2002 and ended in May 2003. The remediation effort was successful in reaching the cleanup levels of 10 mg/kg PCBs for bank soils and 1 mg/kg PCBs in Raquette River sediments. It should be noted that while the cleanup level for surface soils is 10 mg/kg PCBs, the surface soils on the banks of the Raquette River do not exceed 1 mg/kg PCBs. However, at depths greater than one foot, soils meet the 10 mg/kg cleanup level. Over 10,000 CY of soil were removed from the Raquette River Banks as part of this remedial effort. Of that, approximately 7,420 CY was contaminated with PCBs above 10 mg/kg and shipped to an off-site disposal facility. Approximately 1,440 CY of sediment was dredged from the Raquette River.

### Tribal Sediments (Turtle Cove)

GM had originally planned to remediate the Tribal sediments in Turtle Cove during the 1995 remediation of the St. Lawrence River. At that time, however, access to remove contaminated sediments was denied. With the assistance from the SRMT's Environment Division, access was granted in October 2004. Following the dewatering of the cove, GM excavated contaminated sediments (greater than the Tribal sediment clean up level of 0.1 mg/kg PCBs) from Turtle Cove from October 2004 through March 2005.

### Tribal Soils

A total of five Tribal properties were shown to have PCB-impacted soils. To date three of these properties have been remediated to Tribal cleanup standards. In the fall of 2005 remediation of soils immediately upland of the Cove was performed. All soils greater than the Tribal soil clean up standard of 1 mg/kg PCBs were removed from this property.

The 2004/2005 Cove remediation project (sediments and soils) resulted in the removal of approximately 18,240 CY of soils and sediments with PCB concentrations greater than 10 mg/kg, and 15,300 CY of soils and sediments with PCB concentrations less than 10 mg/kg were removed.

In 2007 access was granted to an additional two upland properties. During the remediation of these two properties, approximately 1,710 CY of soil with PCB concentrations greater than 1 mg/kg were removed.

Access is still needed to address soils on two additional parcels with PCBs exceeding the Tribal cleanup level; to date access to these properties has been denied by the property owner.

#### Soils Northeast of the Industrial Landfill

Remediation efforts related to the excavation of PCB-contaminated soils in the northeast of the ILF (NEILF) was performed from May 2003 and December 2004. The area had been defined from previous soil investigation programs and was focused on removing a lens of contaminated soils which acted as a primary conduit of contaminated groundwater from under the ILF to sediments and surface water in Turtle Cove and, ultimately, into the St. Lawrence River.

In order to excavate the contaminated soils at depths, clean overburden soil was removed and placed in an on-site containment cell. Approximately 5,050 CY of contaminated soils were then removed from the excavation area. By the end of September 2003, all contaminated soils above the 10 mg/kg cleanup level had been removed and backfill of the excavation pit and construction of a groundwater collection sump began.

Backfilling and sump construction were completed in October 2003. The sump was designed to collect groundwater moving into the area from the ILF. The sump has been operated continuously from October 2003. Groundwater is pumped to the WWTS.

#### Manufacturing Facility/Plant

With the discontinuation of manufacturing operations at the plant, samples were collected of subsurface soils beneath the plant in January 2010. The sample results indicated that soil beneath the building had PCB concentrations of greater than the OU1 clean-up level of 10 mg/kg PCBs. PCBs were also found in the paint and other areas throughout the building. The demolition of the building was completed by the RACER Trust in 2011. The building slab and contaminated sub-slab soils were successfully remediated in 2012.

#### Industrial Landfill

The remediation of the ILF is currently underway. A portion of the landfill has been relocated; so that no waste is within 150 feet of the Tribal border or the water line at Turtle Cove and the St.

Lawrence River. Approximately ten acres of the landfill is now capped with a multilayer RCRA cap. The remaining 9 acres will be capped in 2016.

### *System Operations/Operation and Maintenance*

The subaqueous sediment cap was inspected in 1996, 1997, 2001, 2006, and 2011 with an underwater video camera. Inspections indicated that the deep water cap needed no repairs, but some armoring along the near-shore areas was required. Repairs to the armor stone layer were made. Annual near shore inspections of the cap continue to be conducted.

Fish were monitored annually from 1997-2001 and again in 2007, 2008 and 2012 to determine overall PCB body burden levels. Spot-tail shiners were initially selected as the principal target species for the monitoring effort as an indicator species for monitoring the bioavailability of organochlorine residues because juveniles of this species have a limited home range, and the species are relatively short-lived with an average life span typically less than three years. The later sampling events in 2008 and 2012 focused on adult species rather than spot tail shiners.

The limited home range and life span were of particular importance in monitoring the site. Ten acres of contaminated sediments were dredged in the St. Lawrence River. This area was located immediately adjacent to two areas with significant PCB contamination—the three-acre Turtle Cove to the immediate east and the 30-acre Reynolds Metals Company site to the immediate west. These areas had not, at the time, been dredged. It was recognized that any biota samples collected from the GM site could be subject to the influences of the two significant PCB sources in the immediate area.

Groundwater is collected from the NEILF collection system and, prior to decommissioning in 2014, the 350,000-gallon lagoon. Data collected from the sumps from both groundwater collection units are monitored.

Once the final groundwater system and ILF remedies have been implemented, the operations and maintenance (O&M) plan will be used to reflect the system requirements.

Potential site impacts from climate change have been assessed, and 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.

### **Progress Since Last Five-Year Review**

The previous five-year review, which was completed in July 2010, concluded that:

“The remedies for both OUs were expected to be protective of human health and the environment upon completion of all groundwater, soil and sediment remedial activities and the implementation of institutional controls. In the interim, remedial actions have been completed in the St. Lawrence River, Raquette River, and Turtle Cove and, when combined with existing fish advisories, these

measures address exposure pathways associated with unacceptable risk in these areas. For those properties on Tribal lands where access has been granted, remedial actions have been completed and are protective for current uses. Remediation of two Tribal parcels, on-property soils, and the groundwater have not been completed.”

In 2009, GM and certain subsidiaries filed for bankruptcy. The 2010 five-year review noted that the selected remedies had not been fully implemented. Given GM’s bankruptcy, the five-year review anticipated that cleanup would advance after the bankruptcy was finalized. In 2011, RACER Trust was formed and assumed ownership and responsibility for the cleanup of the Site. The transfer in ownership allowed the cleanup of the Site to proceed.

The 2010 five-year review noted that institutional controls prohibiting the installation of groundwater wells and to protect the integrity of the remedies are needed. The five-year review also called for the incorporation into the remedy of the institutional control that is currently in place (fish advisory). Institutional controls to prevent exposure of the public to contamination on the Site are not necessary at this time due to the Site’s current high level of security (24 hours/day, seven days/week). Following the completion of the ongoing work at the Site, the additional institutional controls will be affected and a modification to the decision document will be completed.

The 2010 five-year review also noted that contaminated soils and sediments are located on two privately-owned, unfenced and uncontrolled parcels (owned by a single party) located on SRMT lands that have not been remediated due to the inability to obtain access from the property owner. The EPA continues to work with the Tribe in order to obtain access to complete this action.

## **Five-Year Review Process**

### *Administrative Components*

The five-year review team consisted of Anne Kelly (RPM), Ed Modica (hydrogeologist), Marian Olsen (human health risk assessor) and Charles Nace (ecological risk assessor).

### *Community Involvement*

The EPA community involvement coordinator for the GM site, Larisa Romanowski, published a notice on in the *Massena Courier Observer*, notifying the community of the five-year review process.

The notice indicated that the EPA would be conducting a five-year review to ensure that the site is protective of public health and the environment and that the implemented components of the remedy are functioning as designed. It also indicated that once the review was completed, the results would be made available at the local site repositories.

## *Document Review*

The documents, data and information which were reviewed in completing this five-year review are summarized in Table 2.

## *Data Review*

### St. Lawrence River

Biota sampling on the St. Lawrence River located adjacent to the GM Site was conducted annually from 1997 to 2001 and again in 2007, with the collection of young-of-the-year spot-tail shiners (*Notropis hudsonius*).

Fish species observed in the capped area include spot-tail shiner, darters, carp, smallmouth bass, largemouth bass, northern pike, yellow perch, log perch, sculpin, white sucker, rock bass, drum brown bull head, American eel, and black crappie. No physical anomalies were observed.

Analysis of the spot-tail shiner data did not reveal any obvious increasing or decreasing trends in PCB concentrations. During the five-year sampling effort, mean total PCB concentrations in spot-tail shiners ranged from 1.2 mg/kg to 3.7 mg/kg. Mean lipid-normalized PCBs varied from 13 mg/kg-lipid to 75 mg/kg-lipid. The lack of a clear trend between sampling years is reflected in the fact that the highest and lowest mean PCB concentrations were documented in successive years. The highest PCB concentrations occurred in 1998 and 2001, while the lowest PCB concentrations occurred in 1997 and 2000.

Adult fish sampling was performed in 2008 and 2012, which consisted of smallmouth bass and brown bullhead from three areas: Turtle Cove, over the capped area, and downstream of the site. These species were collected to assist in evaluating the continuing need for fish advisories. The concentrations were compared to historic concentrations from these species and a decreasing trend was observed for both species from all three areas. Although the concentrations had decreased, the concentrations detected still support the need for a fish advisory. Given that the concentrations of PCBs in recent sampling events show a decreasing trend, it appears that the dredging and capping had a positive impact on fish populations in the St. Lawrence River. However, additional long-term fish tissue monitoring will need to be conducted to determine if the trend continues.

### Groundwater Data Review

Since the OU1 ROD was issued, additional groundwater investigations were conducted in July and October of 2000, December 2003, May 2004, November 2006, May 2007, and most currently, in November 2014. These data results, in conjunction with information from the two groundwater containment activities ongoing at the NEILF and the 350,000-gallon lagoon, will inform the design of the comprehensive groundwater remedy.

### *Site Inspection*

On July 1, 2015 a five-year review site inspection was conducted by the Remedial Project Manager, Anne Kelly. Also in attendance were representatives from NYSDEC and SRMT Environment Division.

### *Interviews*

No interviews were conducted in conjunction with this five-year review.

### *Institutional Controls Verification*

Fish advisories have been posted for the entire St. Lawrence River, as well as Turtle Cove, to prevent or limit exposure to contaminated fish.

Institutional controls to prevent exposure of the public to contamination on the plant property are not necessary at this time due to the Site's current high level of security (24 hours/day, 7 days/week). The property is fenced and all personnel and visitors are required to access the site through one manned entrance. Once site cleanup is nearing completion, EPA will work with the State and the SRMT to ensure appropriate Institutional Controls are implemented.

## Technical Assessment

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

The RODs, as modified by the ROD amendment and the ESD, called for a number of remedial activities which are discussed below.

**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 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 (greater than 60 feet below surface) in the excavation. Due to the proximity of the deep excavation to the St. Lawrence River, and potential safety concerns, a series of five groundwater sumps were installed in these areas to monitor and any impact from these residual oils. Groundwater monitoring has been and will continue to be done in these areas.

**Off Site Soils and Sediments:** PCB-contaminated soils are located on two, unfenced, and uncontrolled parcels located on SRMT lands that has not been remediated due to the inability to obtain access. While the EPA's risk analysis indicates that exposure to these soils falls within the EPA's acceptable level of risk, action is needed, since the soils and sediments exceed the SRMT's Applicable or Relevant and Appropriate Requirements (ARARs) of 0.1 mg/kg PCBs for sediments and 1 mg/kg for soils identified in the ROD.

**Sediments:** The following sediment-related remediation activities were conducted:

- Raquette River PCB-contaminated bank soils and river sediments reached the cleanup goals of 10 mg/kg PCBs for bank soils and 1 mg/kg in sediments, with the surface soils on the banks of the River not exceeding 1 mg/kg PCBs during remedial efforts in 2002.
- Turtle Cove was excavated to 0.1 mg/kg in March 2005. The final sediment sample cleanup data indicates a mean concentration of 0.0195 mg/kg and a 95% Upper Confidence Limit on the Mean of 0.03 mg/kg. These statistical values are below the cleanup goal of 0.1 mg/kg.
- St. Lawrence River was remediated in 1995 and a multilayer cap was installed over a 2 acre area. This reduced the surface concentration of PCBs in the capped area to less than the 1 mg/kg PCB cleanup goal.

The actions at the Raquette River, Turtle Cove, and the St. Lawrence River have reduced the uptake of contaminated sediments by aquatic and piscivorous receptors. These actions have also reduced the concentrations in surface sediment where potential direct exposures may occur. Currently, fish advisories remain in place at the Raquette River, Turtle Cove, and the St. Lawrence River to further reduce potential exposures to PCBs in fish. The combination of remedial actions and fish advisories meet the goals of the remedy.

The remedies that were implemented served to reduce the exposure to contaminated sediments through dredging and capping. The results of multiple years of sampling for spot tailed shiners indicated that concentrations of PCBs had decreased from pre-remedy implementation values, but the concentrations had

leveled off in the 2007 data set. Additional fish tissue from adult species was collected in 2012, which consisted of smallmouth bass and brown bullhead from three areas: Turtle Cove, over the capped area, and downstream of the site. The concentrations, when compared to historic concentrations from these species show a decreasing trend for both species from all three areas. Although the concentrations had decreased, the concentrations detected still support the need for a fish advisory. Given that the concentrations of PCBs have been shown to be decreasing, combined with lower concentrations being detected in fish as the distance from the site increases, the remedy appears to be functioning as intended. Additional long-term monitoring will be continued to determine if the trend continues.

**Summary:** The components of the implemented remedies described above are functioning as intended by the decision documents. It is expected that once the remaining portions of the remedy are implemented, they will function as intended by the decision documents, as well.

*Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy 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 five-year review 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, since nearby residents and on-site workers obtain drinking water from a public water system that meets appropriate standards. Groundwater cleanup levels were established for PCBs (0.1 µg/l), total phenols (1 µg/l), 1,2-dichloroethylene (DCE) (100 µg/l), trichloroethylene (TCE) (5 µg/l) and vinyl chloride (2 µg/l). The values for PCBs, TCE, and vinyl chloride are consistent with the method calibration limits (MCLs). Comparison of these remaining values to residential drinking water screening levels (available at:

[http://www.epa.gov/reg3hwmd/risk/human/rbconcentration\\_table/Generic\\_Tables/pdf/restap\\_sl\\_table\\_run\\_MAY2010.pdf](http://www.epa.gov/reg3hwmd/risk/human/rbconcentration_table/Generic_Tables/pdf/restap_sl_table_run_MAY2010.pdf))

found that the selected cleanup levels for these contaminants are still protective.

The groundwater data from the site are evaluated using the OSWER Vapor Intrusion Screening Level calculator. The maximum detected concentration in groundwater are compared to the reported concentrations for PCBs, TCE, phenol, 1,2-DCE, and vinyl chloride. Overall, the majority of the screening sampling results are below their respective screening levels for vapor intrusion. These results suggest the potential for vapor intrusion in the areas identified in the event of future building. Appropriate measures will be taken to assure that future property owners are aware of the need to conduct further analysis *e.g.*, evaluate the concentrations of volatile organic compounds in monitoring wells located near future development areas to determine whether additional sampling or installation of a vapor mitigation system during construction is appropriate.

**Sediments:** The sediment goals were met in the Raquette River and Turtle Cove. Swimming and wading in the dredged area is unlikely. The 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.. Additionally, the overall reduction in sediment concentrations and the capping within this area will further reduce potential risks in the unlikely event that an individual recreates within this area.

**Ecological:** The 1991 and 1992 RODs for the site 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.

**Fish, Waterfowl and Snapping Turtle Consumption:** The recommendations in the New York State Department of Health fish consumption advisories for the St. Lawrence River (whole river) and the embayment at the St. Lawrence/Franklin County Line (also known as Turtle Cove) from 2010/2011 are consistent with those in the previous five- year review. The latest Fish Advisories are available at: <http://www.nyhealth.gov/environmental/outdoors/fish/fish.htm#advisory>.

**Soils:** Residential properties where access was granted for remediation meet the residential cleanup goal of 1 mg/kg PCBs. This value remains protective.

**Toxicity Values.** The main contaminant of concern at the site was PCBs. At the current time, the Integrated Risk Information System, the EPA's database for toxicity values used in risk assessment, is updating the toxicity information for PCBs for non-cancer health effects. Future five-year reviews will need to evaluate any changes in the current toxicity values at the site. In addition, groundwater cleanup levels were established for PCBs (0.1 µg/l), total phenols (1 µg/l), 1,2-DCE (100 µg/l), trichloroethylene (5 µg/l) and vinyl chloride (2 µg/l). Since the last five-year review, the toxicity values for trichloroethylene and cis- and trans-1,2-dichloroethylene were updated and the current MCLs remain protective.

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

No other issues have been identified that could call into question the protectiveness of the remedy.

#### *Technical Assessment Summary*

Based upon the results of the five-year review, it has been concluded that:

- The fence around the site is intact and in good repair;
- The monitoring wells are functional;
- There is no evidence of trespassing or vandalism;
- Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposures to contaminated fish.

Contaminated sediments have been addressed and post-remediation fish tissue monitoring and inspections will continue in order to assess the performance of this portion of the remedy. Contaminated soils are being addressed or have been addressed through removal and backfilling with clean soil and this site has a high level of security with a manned access entrance 24 hours a day/seven days a week. This approach reduces or eliminates on-site exposures through dermal contact and ingestion. Potential impacts groundwater are being addressed or have been addressed through removal of the contaminated sources. Limited groundwater

extraction and treatment actions are addressing some of the contaminants in the groundwater. The community utilizes public water, extracted from the St. Lawrence River, which is routinely monitored and meets appropriate and federal standards.

### **Issues, Recommendations and Follow-Up Actions**

There remain Tribal soils that have not been remediated due to the inability to gain access to the property. EPA, SRMT and RACER Trust will continue to work to gain access to the property.

### **Protectiveness Statement**

OU1

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 institutional controls. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that result in unacceptable risks in these areas.

OU2

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 institutional controls. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that result in unacceptable risks in these areas.

Site-wide

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.

### **Next Review**

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

## Tables

<b>Table 1: Chronology of Site Events</b>	
1959	GM Powertrain commences operation
1980	GM ceases disposal of PCB containing materials on-site. Closure Plans submitted to NYSDEC and EPA for sludge deposit areas (NDA and EDA)
1983	Site listed on NPL
1984-89	GM and EPA negotiate RI/FS Consent Order GM performs multi-phase remedial investigation and studies
1987-88	GM places an interim cap on Industrial Landfill
1990	EPA issues Record of Decision (OU1)
1992	EPA issues Record of Decision (OU2)
1992	Supplemental data collection performed
1994	GM performs wetland/floodplains/cultural resources assessment GM submits design plans to address stormwater controls GM performs treatability study
1994	GM submits preliminary design for groundwater, ILF and EDA
1995	EPA issues Proposed Plan to raise treatment threshold; EPA receives thousands of comments objecting to the plan
1995	GM successfully dredges St. Lawrence River GM constructs stormwater controls system
1996	Post-remedial annual monitoring of St. Lawrence River initiated Discussion regarding ROD Amendment continue
1998	EPA requests additional groundwater and landfill studies GM submits
1999	EPA issues ROD Amendment for OU1
1999	GM disposes of stockpiled St. Lawrence River sediments

<b>Table 1: Chronology of Site Events</b>	
1999	GM performs additional Raquette River, groundwater and landfill sampling
2000	GM Submits Industrial Landfill geotechnical analysis
2000	EPA issues ESD for limited portions of OU1
2000-01	Groundwater sampling and abandonment of obsolete wells
2000	EPA approves inactive lagoons design; lagoon remediation begins
2002-03	Raquette River remediation completed
2002	Inactive lagoons soil remediation completed
2003	GM performs excavation of soil northeast of the Industrial Landfill
2003	GM installs groundwater sump and force main piping at the 350,000-gallon lagoon
2004-07	Turtle Cove Sediments and partial upland soil removal completed on three Tribal properties
2005	First five-year review
2009	Manufacturing at the Site discontinued
2009	GM and certain subsidiaries file for bankruptcy. Order entered approving sale of substantially all of debtors' assets to a new and independent company (now known as "General Motors Company")
2010	Second five-year review
2011	Revitalizing Auto Communities Environmental Response Trust is formed and takes ownership of the GM Massena property

<b>Table 2: Documents, Data, and Information Reviewed in Completing the Five-Year Review</b>	
<b>Document Title, Author</b>	<b>Date</b>
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
Record of Decision Amendment (OU 1), General Motors Corporation, Central Foundry Division, Massena, NY, EPA	1999
Explanation of Significant Difference OU1, General Motors Corporation, Central Foundry Division, Massena, NY, EPA	2000

**Table 2: Documents, Data, and Information Reviewed in Completing the Five-Year Review**

Draft Remedial Investigation Report for Remedial Investigation/Feasibility Study at GMC – CFD Massena Facility - Volume I, RMT	1986
Draft Remedial Investigation Report for Remedial Investigation/Feasibility Study at GMC – CFD Massena Facility - Volume II, RMT	1986
Phase II Remedial Investigation Addendum Report for Remedial Investigation/Feasibility Study - Appendices, RMT	1988
Draft Feasibility Study for the Remedial Investigation/Feasibility Study GMC – CFD Massena Facility, RMT	1989
Preliminary Design Report for the Industrial Landfill, East Disposal Area/Containment Area and Site-Wide Groundwater Controls - Volume I, Camp Dresser & McKee	1994
Preliminary Design Report for the Industrial Landfill, East Disposal Area/Containment Area and Site-Wide Groundwater Controls - Volume II, Camp Dresser & McKee	1994
Fish PCB Concentrations and Consumption Patterns Among Mohawk Women at Akwesasne, Journal of Exposure Analysis and Epidemiology, Fitzgerald, E.F., Hwang, Brix, K.A., Bush, B., Cook, K., and Worsick, P.	1995
St. Lawrence River Sediment Removal Project Remedial Action Completion Report, BBL Environmental Services	1996
St. Lawrence River Monitoring and Maintenance Plan, BBL Environmental Services	1996
St. Lawrence River Monitoring and Maintenance Annual Report, BBL Environmental Services	1998
St. Lawrence River Monitoring and Maintenance Annual Inspection Report, BBL Environmental Services	1999
Industrial Landfill/GWCT Sampling & Analysis Report, Camp Dresser & McKee	2000
St. Lawrence River Monitoring and Maintenance Annual Inspection Report, BBL Environmental Services	2000
Industrial Landfill, General Motors Corp., Massena, New York, Camp Dresser & McKee Subsurface Investigation and Stratigraphy Parameters for Stability Analysis	2000
Wastewater Treatment System Interim Solids Removal & St. Lawrence River Sediment Disposal Completion Report, BBL Environmental Services	2000
Raquette River Bank Sampling & Analysis Report, Camp Dresser & McKee	2000
Groundwater Monitoring and Well Abandonment Work Plan, BBL Environmental Services	2000
St. Lawrence River Monitoring and Maintenance Annual Inspection Report, BBL Environmental Services	2001

**Table 2: Documents, Data, and Information Reviewed in Completing the Five-Year Review**

Groundwater Monitoring and Well Abandonment Completion Report, BBL Environmental Services	2001
Inactive Lagoons Interim Completion Report, GM Powertrain, Massena, NY, BBL Environmental Services	2001
Local Fish Consumption and Blood PCB levels among Women at Akwesasne. New York State Department of Health, Center for Environmental Health	2002
350,000 Gallon Lagoon, Final Design Specifications, General Motors Powertrain, Massena, NY, REALM	2003
Revised Final Specifications, Renovating the Former 350,000 Gallon Lagoon, General Motors Powertrain, Massena, NY, BBL Environmental Services, Inc.	2003
Groundwater Sampling Work Plan -2003, General Motors Powertrain, Massena, NY, BBL Environmental Services	2003
Raquette River Bank Site Remedial Action Completion Report, General Motors Powertrain, Massena, NY, BBL Environmental Services	2004
Cove Remedial Action Work Plan, GM Powertrain, Massena, NY, Severson Environmental Services, Inc. and BBL Environmental Services	2004
Environmental Monitoring and Clean-Up Confirmation Work Plan GM Powertrain, Massena, NY, BBL Environmental Services	2005
Site-Wide Groundwater Controls, Final Design Report, Text (Volume 1 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Groundwater Controls, Final Design Report, Drawings(Volumes 2 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Groundwater Controls, Final Design Report, Technical Specifications (Volume 3 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Groundwater Controls, Final Design Report, Draft CQAP Text (Volume 4 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Groundwater Controls, Final Design Report, Draft Post-Closure Monitoring Plan (Volume 5 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Groundwater Controls, Final Design Report, Draft Post-Closure O&M Manual (Volume 6 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Draft Soils Northeast of the Industrial Landfill Remedial Action Completion Report, GM Powertrain, Massena, NY, BBL Environmental Services	2005

**Table 2: Documents, Data, and Information Reviewed in Completing the Five-Year Review**

Weekly status Meeting Reports	2010-2015
Completion Report GM Massena– Phase 1 Building Demolition	2014
Completion Report GM Massena– Phase 2 Building Demolition	2014
Results of 2012 St. Lawrence River Fish Collection Activities RACER trust (Former GM Massena Superfund Site)	2013