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

Prepared by:

United States Environmental Protection Agency
Region 2
New York, New York

July 2010

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FIGURE

TABLES

Acronyms Used in this Document	
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cy	Cubic Yards
EDA	East Disposal Area
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
GM	General Motors
HI	Hazard Index
ILF	Industrial Landfill
µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
MCL	Maximum Contaminant Level
MLC	Motors Liquidation Company
NAPL	Non-aqueous phase liquid
NDA	North Disposal Area
NEILF	Northeast of the Industrial Landfill
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
O&M	Operation and Maintenance
PCBs	Polychlorinated Biphenyls
PRP	Potentially Responsible Party
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SRMT	St. Regis Mohawk Tribe
VOCs	Volatile Organic Compounds
UAO	Unilateral Administrative Order
WWTS	Wastewater Treatment System

EXECUTIVE SUMMARY

This is the second five-year review for the General Motors (Central Foundry Division) Superfund site, located in the Town of Massena, St. Lawrence County, New York. 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 property, on-property soils, and the groundwater has not been completed.

Five-Year Review Summary Form

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

EPA ID *(from WasteLAN)*: NYD091972554

Region: 2	**State:** NY	**City/County:** Town of Massena/St. Lawrence County

SITE STATUS

NPL Status: ■ Final ☐ Deleted ☐ Other (specify)

Remediation Status (choose all that apply): ■ Under Construction ☐ Operating ☐ Complete

Multiple OUs? ■ YES ☐? NO	**Construction completion date:** N/A

Are portions of the site in use or suitable for reuse? ■ YES ☐ NO ☐ N/A

REVIEW STATUS

Lead agency: ■ EPA ☐ State ☐ Tribe ☐ Other Federal Agency

Author name: Anne Kelly

Author title: Remedial Project Manager	**Author affiliation:** EPA

Review period: 7/27/05-7/14/10

Date(s) of site inspection: 1/20/10

Type of review:
☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion ☐ Policy ■ Statutory

Review number: ☐ 1 (first) ■2 (second) ☐ 3 (third) ☐ Other (specify)

Triggering action:
☐Actual RA Onsite Construction at OU __ ☐ Actual RA Start at OU #
☐ Construction Completion ■ Previous Five-Year Review Report
☐ Other (specify)

Triggering action date *(from WasteLAN)*: 7/14/05

Due date ***(five years after triggering action date)***: 7/14/2010

Does the report include recommendation(s) and follow-up action(s)? ■yes ☐ no
s human exposure under control? ■ yes ☐ no
s migration of contaminated groundwater stabilized? ☐ yes ■ no ☐ not yet determined
s the remedy protective of the environment? ■ yes ☐ no ☐ not yet determined
Acres in use or suitable for use: **restricted:**19 **unrestricted:** 199

Five-Year Review Summary Form (continued)

Issues, Recommendations, and Follow-Up Actions

The institutional control that is currently in place (fish advisory) and additional institutional controls that will prohibit the installation of groundwater wells and protect the integrity of the remedies that are and currently and will ultimately be in place need to be incorporated into the selected remedy and implemented.

Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls

The selected remedies have not been fully implemented. Given the potential responsible party's (PRP's) bankruptcy, it is expected that cleanup will advance after the bankruptcy is finalized. It is expected that full remediation of the site with take seven years.

In addition, contaminated soils are located on two privately-owned, unfenced, and uncontrolled parcels (a single owner) located on St. Regis Mohawk Tribe lands that has not been remediated due to the inability to obtain access. EPA continues to work with the Tribe in order to obtain access to complete this action.

New York State now requires annual certifications that institutional and engineering controls that are required by Records of Decision are in place and that remedy-related operation and maintenance (O&M) is being performed. Annually, the PRP will need to certify that the institutional and engineering controls are still in place and that remedy-related O&M is being performed.

Protectiveness Statement

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 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.

I. Introduction

This is the second five-year review for the General Motors Central Foundry (GM) site, located at the 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.

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.

The trigger for this five-year review is the on-site construction start associated with the inactive lagoons.

II. Site Chronology

Table 1 (attached) summarizes the site-related events from discovery until the present.

III. Background

Site Location

The GM site, located on the St. Lawrence River approximately 7 miles east of the Village of Massena, New York, is situated approximately 2 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 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. Tribal (SRMT) lands, known as Akwesasne, are located to the east, and Route 37 and the Raquette River are situated to the south.

Physical Characteristics

The GM Powertrain manufacturing facility is located on approximately 218 acres of industrial and undeveloped land located in an otherwise rural area. There are three disposal areas on the site—the twelve-acre Industrial Landfill (ILF); the North Disposal Area (NDA); and the East Disposal Area (EDA). All three areas contain contaminated soils, debris, and waste materials.

There are four industrial lagoons that contain or have contained PCB-contaminated liquids, sludges, and soils. The site also includes sediments from the St. Lawrence River, soils and sediments from the Raquette River, miscellaneous on-site soils, and Turtle Creek and Turtle Cove (also referred to as "Tribal soils and sediments"). See Figure 1.

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, NY.

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}cm/sec - 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 30-40 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. 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 line (surface water source).

There are approximately 1 dozen 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 plant 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. EPA banned the use of PCBs in 1977, at which time GM began to phase out their use 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 as follows.

In July 2009, manufacturing operations were discontinued at the site. On June 1, 2009, GM and certain subsidiaries ("debtors") filed for bankruptcy. On July 5, 2009, an order was entered approving the sale of substantially all of the debtors' assets to a new and independent company (now known as "General Motors Company"). The sale closed on July 10, 2009. Certain properties, including the site, were not included in the sale and remain with GM, now known as Motors Liquidation Company (MLC). The transfer in ownership does not impact the cleanup plans for the site.

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.

North Disposal Area

The NDA is a subsurface area located adjacent to the 1.5 million-gallon lagoon. It is 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 has indicated that there are high levels of PCBs (6,780 mg/kg) at depths of approximately 45 feet. Also, phenols have been detected in the NDA.

Industrial Landfill

The ILF is a twelve-acre disposal area in the plant'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).

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. Visible spill material on Tribal property was excavated and transported to GM 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 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 plants 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.

Manufacturing Facility/Plant

With the discontinuation of manufacturing operations at the plant, MLC collected samples of the subsurface soils beneath the plant in January 2010. The sample results indicated that approximately 14,000 cubic yards of soil beneath the building have PCB concentrations of greater than the OU1 clean-up level of 10 milligrams per kilogram (mg/kg) PCBs. PCBs were also found in the paint and other areas throughout the building. Current plans are for the building to be demolished (starting in October 2010). Contaminated subsurface soils under the build slab will also be removed.

Initial Response

The GM 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 wastewater treatment system in the early 1980's to reduce 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 significantly reduce the discharge of PCBs to the rivers.

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 is 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 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 and the 500,000-gallon lagoon are currently an active part of the plant's wastewater treatment system. As part of its ongoing operation and maintenance (O&M) of these lagoons, GM has removed a considerable amount of PCB-contaminated sludges from these lagoons.

Basis for Taking Action

In 1985, GM entered into an Administrative Order on Consent (Index No. II CERCLA-50201) with 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.

Since PCBs are the primary contaminant of concern at the site, EPA's baseline risk assessment reviewed the human health risks resulting from exposure to PCBs in the site soils and associated groundwater. The potential routes of human exposure to contamination were the ingestion of wildlife containing PCBs, infant ingestion of breast milk which contains PCBs due to bioaccumulation, ingestion of contaminated drinking water (evaluated as a potential future exposure route), ingestion of and dermal contact with PCB contaminated soil, and inhalation of

dust carrying PCBs. Exposed populations included residents of the St. Regis Mohawk Indian Reservation, Canadians who are downriver of the site, and G.M. workers. In addition, PCBs, from the site were found to pose an unquantified risk to the environment. PCBs were detected in area wildlife and in wetlands, which provide habitat for water birds and other wildlife.

IV. Remedial Actions

Remedy Selection

EPA has issued two Records of Decision (RODs), a ROD amendment, and an Explanation of Significant Differences (ESD) for the site.

The first ROD, which was for Operable Unit 1 (OU1), was signed in December 1990, addressed contamination in the St. Lawrence River, on-property soils, SRMT soils and sediments, the NDA, the Raquette River, surface water runoff, contaminated site-wide groundwater and the industrial lagoons. The major components of the remedy include:

- Excavate and treat SRMT soils greater than 1 milligram per kilogram (mg/kg) PCBs;
- Dredge and treat St. Lawrence River sediments greater than1 mg/kg PCBs;
- Dredge and treat Raquette River sediments greater than1 mg/kg PCBs;
- Excavate and treat Raquette River bank soils greater than1 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 North Disposal Area soils greater than 10 mg/kg PCBs;
- Excavate and treat Industrial Lagoons soils greater than 10 mg/kg PCBs;
- On-site treatment of greater than 10 mg/kg PCBs; on-site disposal of treated wastes;
- On-site treatment of surface water runoff in the EDA; and
- Extraction and treatment of contaminated site groundwater.

The ROD acknowledged the potential technical limitations of dredging of contaminated sediments.

The groundwater PCB cleanup goal specified in the ROD was 0.1 microgram per liter (µg/L), as measured at the boundary of the industrial Landfill and industrial lagoons, based on New York State requirements. A 1 µg/L PCB surface water cleanup goal was selected for the St. Lawrence and Raquette Rivers based on interim federal and state sediment quality criteria guidance as well as the risk assessment.

The second ROD (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:

- Upgrade Industrial Landfill interim cap;

- Excavate and treat East Disposal Area soils with concentrations greater than 500 mg/kg PCBs, oily soils, and sludges; and cap the EDA and;
- Containment, extraction and treatment of contaminated groundwater under ILF and EDA.

In April 1992, 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, 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.

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 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, EPA determined that based on public opposition, a shift in the remediation strategy was warranted. In August 1998, 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, EPA further modified the OU1 ROD and issued an 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.

Remedy Implementation

St. Lawrence River

In addition to the early abatement actions listed above, the first step in GM's multi-phase approach to remediation of the site was the remediation of 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 meeting the cleanup goal of 1 mg/kg PCBs at every location. Despite multiple attempts to eliminate the contamination in the immediate vicinity of the outfall, the PCB levels continued to exceed the cleanup goal. 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[1]. The average PCB concentration in the remaining 8 acres (3 mg/kg) was marginally above the cleanup goal.

Surface Water Control

The 1990 OU1 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.

Inactive 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, 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 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.

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.

Not all of the contaminated soils could be removed from the areas adjacent to the 350,000-gallon lagoon due to stability issues associated with the soil's close proximity to active plant structures. A localized groundwater collection system was installed in this area in the November 2003 and is described below.

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[1] This modification to the remedy will be documented in an ESD.

The 350,000-gallon lagoon was backfilled, retrofitted with a liner and is now used as a process water lagoon and a part of the plant's wastewater treatment system. The 1.5 million-gallon lagoon was also backfilled, lined, and put into service to collect and hold storm water.

Groundwater

The 350,000-gallon lagoon lies immediately adjacent to the GM wastewater treatment building and is also in close proximity to a number of vital plant utility lines and an active water tower. Given the physical constraints, excavation was limited on the western side of the lagoon in order to protect the structural integrity of the wastewater treatment building and the water tower. Since the 10 mg/kg PCB cleanup level could not be met in this area, EPA directed GM to construct a localized groundwater collection system at the location of the 350,000-gallon lagoon. Groundwater at this location is collected and treated in the plant's wastewater treatment system. The groundwater collected in this sump was sampled for PCBs, VOCs, and phenols three times in February 2004 and once in June 2005. The initial sample taken in February 2004 had the only detection at 2.17 µg/L PCBs. A groundwater monitoring well was installed in 2006 immediately downgradient of this lagoon. That monitoring well (MW 701R) has shown the presence of a non-aqueous phase liquid (NAPL). During the first round of sampling in November 2006, the NAPL itself was sampled. Analysis indicated the presence of 2,500,000 µg/L PCBs. During the next round of sampling in May 2007 a groundwater sample was taken of MW701R. While the well still showed the presence of NAPL, the aqueous phase of the sample was analyzed to determine the level of PCBs in the groundwater. This sample had a concentration of 1.1 µg/L PCBs

Similarly, a groundwater collection sump was put in place at the area northeast of the industrial landfill (NEILF) after the excavation of contaminated soils there (see "Soils North East of the Industrial Landfill," below). This sump collects groundwater at the northeastern part of the ILF and transfers it to the plant's wastewater treatment system.

Both of these efforts ensure the protectiveness of the remedy by reducing the potential for migration of contaminants through the groundwater in these localized areas.

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 goals 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 sediments was dredged from the Raquette River.

Tribal Sediments and Soils

A total of five Tribal properties were contaminated with PCBs from the GM site. To date, three properties have been remediated; access agreements are needed for the two remaining properties. GM had originally planned to remediate the Tribal sediments and soils 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 to remediate Cove sediments and associated soils in October 2004. Following the dewatering of the cove, GM excavated contaminated sediments and soils from Turtle Cove (greater than the Tribal sediment clean up standard of 0.1 mg/kg PCBs for sediments and 1 mg/kg PCBs for soil) from October 2004 through March 2005.

Approximately 23,000 cy of contaminated sediments and soils were removed.

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

Access is still needed for soils and sediments on two properties with low levels of PCBs. EPA will continue to work with the St. Regis Mohawk Tribe to obtain access to remediate this property.

Soils North East of the Industrial Landfill

Remediation efforts related to the excavation of PCB-contaminated soils in the 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. Collected groundwater is being transferred by truck to GM's wastewater treatment system (WWTS). In March 2004, GM submitted a proposal to automate the sump and force-main collected groundwater directly to the WWTS. The automated sump system was brought on line in December 2004.

Institutional Controls Implementation and Other Measures

When the RODs, ROD amendment, and ESD were executed, it was determined that institutional controls to prevent exposure of the public to contamination on the plant property were not necessary due to the plant's high level of security. The property is fenced and all personnel and visitors are required to access the site through one manned entrance. With regard to the portions of the site which have not yet been remediated, controls are in place that reduce the potential exposure of workers or visitors to the site. Specifically, signs were placed on unrestricted areas at the EDA infield and NDA indicating the presence of PCB-contaminated soils

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

Contamination will remain on-site above levels that will allow for use with restrictions. While it is anticipated that the property will remain industrial, with the bankruptcy of GM and the change of ownership of the property, additional institutional controls are needed to ensure protectiveness. To document the institutional controls that have already been put into place (fish advisory) and to add additional institutional controls to protect the integrity of the remedies that have and will be implemented at the site and to prevent human exposure to contaminated soils and groundwater, institutional controls will be added to the existing remedies at the site via an ESD.

System Operations/Operation and Maintenance/Monitoring

To maintain the integrity and effectiveness of the ILF interim cap, routine O&M activities are necessary. The inspection/maintenance plan for the cap calls for regular inspection and evaluation of the cap, mowing the vegetation during the growing season, and fence maintenance. Repairs are to be made to the cap, as necessary, to control the effects of settling, subsidence, erosion or other events, and to prevent run-on from eroding or otherwise damaging the final cover. The final inspection/maintenance plan will incorporate long-term groundwater monitoring, and the O&M of the groundwater extraction and treatment facility.

The subaqueous sediment cap was inspected in 1996, 1997, and 2001 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. Fish were monitored for five years after the completion of the cap to determine overall PCB body burden levels. Additional monitoring and inspections will continue.

Groundwater is collected at the NEILF area, as well as at the 350,000-gallon lagoon. Data collected from the sumps from both groundwater collection units are monitored.

The groundwater extraction and treatment system O&M, inspections, landfill maintenance, sampling, monitoring, data evaluation, and reporting costs are approximately $135,000 on an annual basis; these costs are broken down in Table 2 (attached).

V. Progress Since The Last Five-year Review Report

The previous five-year review, which was completed on July 14, 2005, noted that access restrictions needed to be implemented to prevent potential employee exposure to contaminated surface soils located on the EDA and NDA. To prevent this exposure, in October 2005, GM erected signs that restrict access and excavations within these areas.

The 2005 five-year review also noted that the selected remedies had not been fully implemented due to public opposition to the containment remedies selected for the EDA and the Industrial Landfill. Specifically, the SRMT objected to the containment of these unlined landfills in close proximity to the border with Tribal lands. At a meeting with the SRMT in January 2009, the SRMT made several proposals that were ultimately adopted, resulting in the resolution of the outstanding issues related to the remedy.

The previous five-year review also noted that contaminated soils and sediments were located on five privately-owned, unfenced, and uncontrolled parcels located on SRMT lands that had not been remediated due to the inability to obtain access. Through the SRMT's efforts, access was obtained for three of these properties, which were remediated. EPA continues to work with the Tribe in order to obtain access to the remaining two parcels (a single property owner) so that this action may be completed.

VI. Five Year Review Process

Administrative Components

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

Document Review

The documents, data and information reviewed in completing the five-year review are summarized in Table 3.

Community Involvement

The former EPA community relations coordinator for the GM site, Kristen Skopeck, published a notice on April 7, 2010 in the *Massena Courier Observer*, notifying the community of the five-year review process.

The notice indicated that 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. In addition, the notice provided the RPM's address and telephone number for questions related to the five-year review process.

Data Review

St. Lawrence River

Biota sampling on the St. Lawrence River located adjacent to the GM facility was conducted annually from 1997 to 2001, with the collection of young-of-the-year spot-tail shiners (*Notropis hudsonius*). The sampling chronicled a five-year post-dredging time frame.

Spot-tail shiners were 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 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.

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.

The Reynolds Metals Company site dredging and capping remedy was completed in summer 2009. EPA will work with the appropriate governmental agencies to develop a modified St. Lawrence River biota sampling plan.

Groundwater

Groundwater data were collected during the late 1980's during the RI/FS process leading up to the 1990 OU1 ROD. PCBs were detected at concentrations up to 1,300 µg/L in groundwater associated with the site. VOCs were detected in some groundwater samples with maximum vinyl

chloride, dichloroethylene, and trichloroethylene concentrations of 50 µg/L, 686 µg/L, and 50 µg/L, respectively. The highest levels of PCBs and VOC contamination were detected in samples of groundwater downgradient of the ILF.

Since the 1990 OU1 ROD was issued, additional groundwater investigations were conducted in July 2000, October 2000, December 2003, May 2004, November 2006, and May 2007. During the review period, concentrations of trans-1,2 dichloroethylene exceeded the Maximum Contaminant Level (MCL) of 100 µg/L in wells MW-16A at 380 µg/L and 120 µg/L, respectively. The concentrations of trichloroethylene exceeded the MCL of 5 µg/L in wells MW-16A (11 µg/L); and MW-701R (12 µg/L). Concentrations of vinyl chloride exceeded the MCL of 2 µg/L in wells MW-16A (42 µg/L and 39 µg/L), PW-301 (23 µg/L), MW 701R (7.6 µg/L). Concentrations of phenol exceeded the MCL of 1 µg/L in 26 wells. The concentrations ranged from 1.7 µg/L to 21,000 µg/L (well 701R). The concentrations of PCBs were primarily non-detect, with seven samples exceeding the PCB cleanup value of 0.1 µg/L. The maximum concentration was 51 µg/L in Well 16A. The highest levels of PCBs and VOC contamination were detected in samples of groundwater downgradient of the ILF.

Site Inspection

On January 20, 2010 a five-year review-related site inspection was conducted by the RPM. The inspection did not raise any concerns or issues.

Interviews

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

Institutional Controls Verification

New York State now requires annual certifications that institutional controls that are required by RODs are in place and that remedy-related O&M is being performed. To comply with this requirement, on an annual basis, the PRP will need to certify that the institutional and engineering controls are still in place and that remedy-related O&M is being performed.

Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls

Table 4 (attached) summarizes several observations and offers suggestions to resolve the issues.

VII. Technical Assessment

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

Yes. The RODs, as modified by the ROD amendment and the ESD, called for a number of remedial activities which were discussed in the previous 5-year review. This report updates the

status of these remedial activities over the past five years and describes on-going activities. The information provided below provides this information categorized by environmental media.

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 to the 10 mg/kg PCB on-site industrial cleanup objective. The lagoons were backfilled, retrofitted with a liner, and used as a process water lagoon and to collect and hold storm water, respectively. These actions reduced potential impacts to the groundwater and prevent potential direct contact exposures.

PCB-contaminated soils are located on two privately-owned, unfenced, and uncontrolled parcels (a single owner) located on SRMT lands that has not been remediated due to the inability to obtain access from the property owner. While EPA's risk analysis indicates that exposure to these soils falls within EPA's acceptable level of risk, action is needed, since the soils exceed the SRMT's Applicable or Relevant and Appropriate Requirements (ARARs) of 1 mg/kg PCBs. In addition, approximately 14,000 cubic yards of PCB-contaminated soil is located beneath the building. These soils cannot be accessed until the building is demolished.

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.
- 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.

Groundwater: As was noted above, in a number of monitoring wells, concentrations of trans-1,2–dichloroethylene, trichloroethylene, vinyl chloride, and phenol exceeded their respective MCLs and concentrations of PCBs exceeding its cleanup value. The design of the groundwater extraction and treatment system is currently underway. The current and historic data suggest that collection and treatment of all downgradient groundwater will be effective. The ongoing extraction and treatment of contaminated groundwater control the migration of contaminated

groundwater within the site boundary ensuring that groundwater beyond the site boundary meets ARARs for groundwater. These activities prevent potential exposures.

Ecological: It is noted in both the 1991 and 1992 RODs that unquantified risks to the environment were identified. These risks were associated with PCB impacts to fish species in the river, potentially endangered/threatened or species of special concern, and PCBs were also detected in area wildlife (i.e., frogs, snapping turtles, geese, and ducks) and in wetland areas that provide habitat for water birds and other wildlife. There were two cleanup objectives chosen for PCBs in the sediment and soils based upon the location of the contamination. PCB contamination on the Mohawk Reservation had a cleanup goal of 0.1 mg/kg, while PCB contamination on the remainder of the site had a cleanup goal of 1 mg/kg. These cleanup values are still valid. As such, the remedy is protective for ecological receptors at the site, however, long-term monitoring of PCB concentration in fish should continue as the PCB concentrations in fish from the St. Lawrence River, Raquette River, Turtle Creek and cove are still higher than the reference location.

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 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 RAOs 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). The values for PCBs, trichloroethylene, and vinyl chloride are consistent with the MCLs. Comparison of the these remaining values to residential drinking water screening levels (available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/restap_sl_table_run_MAY2010.pdf) found that the concentrations for total phenols were below the non-cancer screening levels of 11,000 µg/L, and the value for 1,2-dichloroethylene assuming mixed isomers was below the screening level of 330 µg/L associated with a non-cancer Hazard Index = 1.

A separate evaluation was conducted for potential vapor intrusion by comparing maximum concentrations in on-site groundwater to the risk-based vapor intrusion values identified in *OSWER Guidance for Evaluating Vapor Intrusion to Indoor Air Pathway from Groundwater and*

Soils for residential exposures. The analysis included vinyl chloride, dichloroethylene, and trichloroethylene. The 2007 groundwater data indicates that the comparison values for vapor intrusion at a 10^{-4} (one in ten thousand) were exceeded for vinyl chloride (maximum concentration 42 ug/l at well MW-16A and comparison value 25 ug/l) and trichloroethylene (maximum concentration of 12 ug/l at well location MW-701R and comparison value 5.3 ug/l). The concentration for 1,1-dichloroethylene (maximum concentration 380 ug/l at well MW-16A and comparison value 190 ug/l) was based on a non-cancer Hazard Quotient of 1, where non-cancer hazards are of concern.

These concentrations are associated with the upper bounds of the risk range based on residential land use. The current draft guidance only provides residential values for comparisons. The exceedence of the comparison values indicates the potential need for further evaluation of the groundwater data in proximity to the building in the event that a building is placed in the area of the highest groundwater concentrations. Appropriate measures should 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 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 have been met in the Raquette River and Turtle Cove. While analysis of the spot-tail shiner data collected for five years did not reveal any obvious increasing or decreasing trends in PCB concentrations; it is anticipated that the remediation of other nearby contaminated sediment sources will have a positive impact by reducing the concentration of PCBs in fish. Collection of additional ecological data in the St. Lawrence River will be performed over the coming years.

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[2].

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

Industrial Landfill: The interim cap was completed in 1988 and provides a barrier to potential exposure to the PCB-contaminated materials through ingestion of contaminated soil and dermal contact with soil. It also eliminates contaminated runoff from the landfill and minimizes leachate generation. Currently, the property is fenced with security guards to prevent access to the property. These measures provide an additional barrier to exposures in addition to the remedial actions and caps that were already completed. While it is anticipated that the property will

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[2] The latest Fish Advisories can be found at the New York State Department of Health's site http://www.nyhealth.gov/environmental/outdoors/fish/fish.htm#advisory.

dichloroethylene, and trichloroethylene. These values will need to be reconsidered in the next five-year review.

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 remedy.

Technical Assessment Summary

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

- The interim cap and vegetative cover are intact and in good condition;
- 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 monitoring will continue in order to assess the protectiveness of this portion of the remedy. Although access restrictions are in place and it is anticipated that the property will remain industrial, with the bankruptcy of GM and the change of ownership of the property, institutional controls are needed to ensure protectiveness. Although the selected remedy calls for permanently capping the ILF, an interim cap was placed on the ILF in 1987-1988, thereby interrupting direct contact (*i.e.*, ingestion or dermal contact with soil) exposures to the public and preventing the potential for runoff. Contaminated soils are being addressed or have been addressed through removal and backfilling with clean soil. This approach reduces or eliminates on-site exposures through dermal contact and ingestion. Potential impacts of contaminated soil and sludges on 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 that is routinely monitored and meets appropriate state and federal standards.

IX. Issues, Recommendations, and Follow-Up Actions

Table 6 (attached) summarizes a recommendation and follow-up action stemming from this 5-year review.

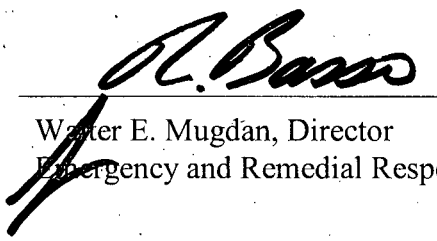
X. Protectiveness Statement

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 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.

XI. Next Review

Since hazardous substances, pollutants or contaminants remain at the site which do not allow for unlimited use or unrestricted exposure, in accordance with 40 CFR 300.430 (f) (4) (ii), the remedial action for the site shall be reviewed no less often than every five years. EPA will conduct another five-year review within five years of the date of this report.

Approved:



7/13/10

Walter E. Mugdan, Director
Emergency and Remedial Response Division

Date

Figure 1

General Motors Site
Site Plan

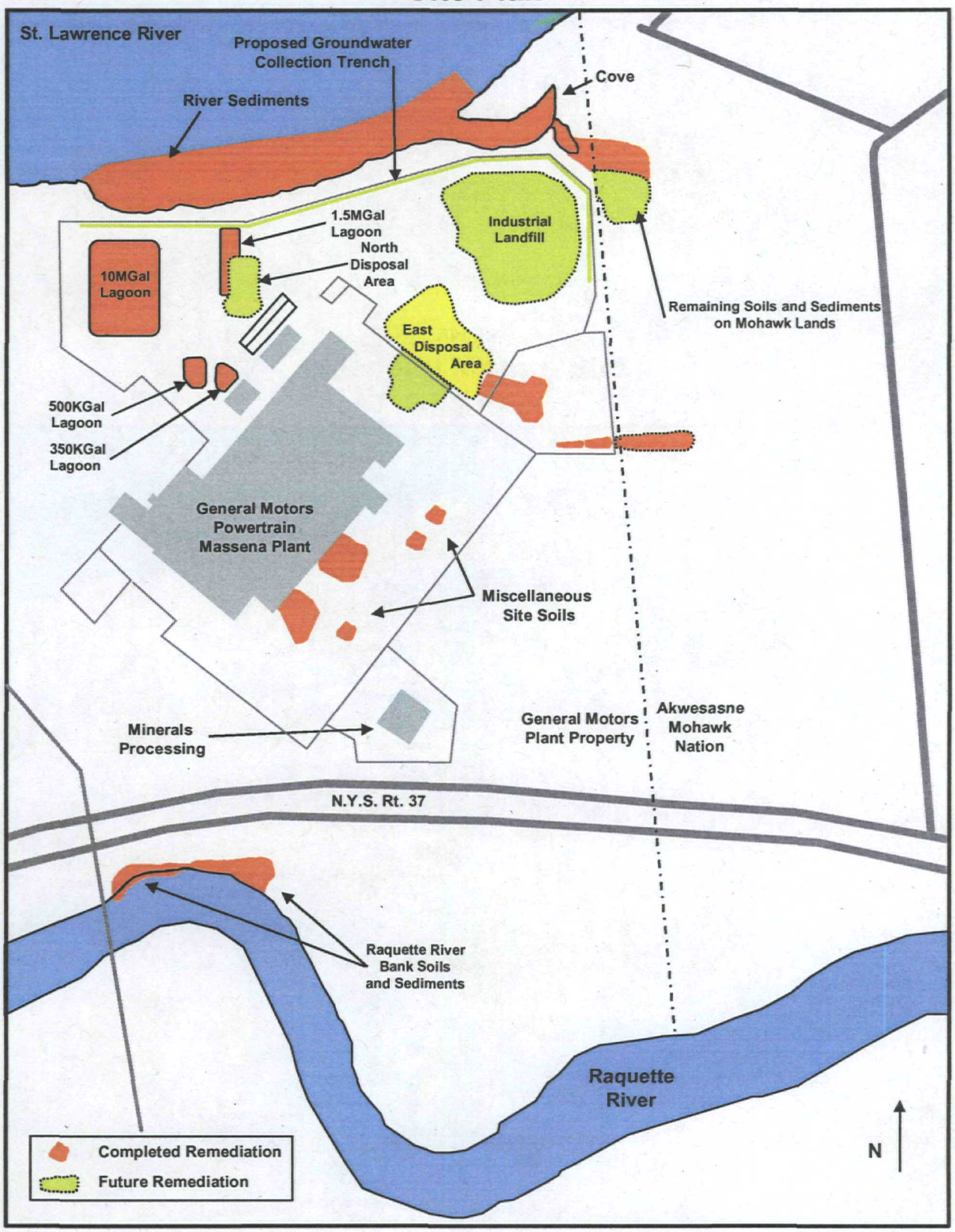


Table 1: Chronology of Site Events	
1959	GM Powertrain commences operation
1980	GM ceases disposal of PCB containing materials on-site. Closure Plans submitted to NYSDEC and EPA for sludge deposit areas (NDA and EDA)
1983	Site listed on NPL
1984-89	GM and EPA negotiate RI/FS Consent Order GM performs 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 amend the ROD by raising the 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

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
2000-1	Groundwater sampling and abandonment of obsolete wells
2000	EPA approves inactive lagoons design; lagoon remediation begins
2002-3	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
2004-7	Turtle Cove Sediments and partial upland soil removal completed on three Tribal properties
2006-7	Soil and groundwater samples collected
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") Certain properties, including the site, were not included in the sale and remain with GM, now known as Motors Liquidation Company (MLC).
2010	MLC collects samples of subsurface soils beneath the plant

Table 2: Annual Operation, Maintenance, and Monitoring Costs

Activity	Cost per Year
St. Lawrence River Cap Inspection and Maintenance	$15,000
Groundwater Monitoring, Sampling and Analysis	$60,000
Site Inspection/Maintenance	$60,000
Total Estimated Cost	*$135,000*

Table 3: 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
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
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

Table 3: Documents, Data, and Information Reviewed in Completing the Five-Year Review	
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
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 Heath, 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, Sevenson 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, 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
Interim Groundwater Characterization Sampling and Analysis, General Motors (GM) Corporation, Massena, NY, Camp Dresser & McKee	2009
Monthly Progress Reports	2005-2010

Table 3: Documents, Data, and Information Reviewed in Completing the Five-Year Review	
EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new Applicable or Relevant and Appropriate Requirements relating to the protectiveness of the remedy have been developed since EPA issued the RODs.	

Table 4: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls	
Comment	**Suggestion**
The selected remedies have not been fully implemented.	Given General Motor's bankruptcy, it is expected that cleanup will advance after the bankruptcy is finalized. It is expected that full remediation of the site with take seven years.
Contaminated soils and sediments are located on two privately-owned, unfenced, and uncontrolled parcels (owned by a single party) located on St. Regis Mohawk Tribe lands that have not been remediated due to the inability to obtain access.	EPA continues to work with the Tribe in order to obtain access to complete this action.
New York State now requires annual certifications that institutional and engineering controls that are required by Records of Decision are in place and that remedy-related operation and maintenance (O&M) is being performed.	Annually, Motors Liquidation Company will need to certify that the institutional and engineering controls are still in place and that remedy-related O&M is being performed.

Table 5: Comparison of Maximum Groundwater Concentration to Residential Risk-Based Concentrations Based on Region IX Preliminary Remediation Goals for Drinking Water			
Chemical of Concern	**Maximum Concentration (µg/L)**	**Concentration HI=1 (µg/L)**	**Cancer Risk 1 x 10^{-6} Concentration (µg/L)**
trans-1,2 Dichloroethylene	297[1]	2.5	n/a[1]
Phenols (total)	21[2]	11,000	n/a[2]
PCB Aroclor 1254	1,700[3]	0.73	0.034
PCB Aroclor 1016	1,700[3]	2.6	0.96
Trichloroethylene	5[4]	9.5	0.028
Vinyl Chloride	119[5]	72	0.02

Notes:

1. The maximum concentration of 297 µg/l was found at well MW-304 during the August 2000 sampling event. The current IRIS file indicates that trans-1,2 dichloroethylene has not undergone a complete evaluation and determination under EPA's IRIS program for evidence of human carcinogenic potential (IRIS Chemical File for trans 1,2-dichloroethylene available on www.epa.gov/iris) and therefore toxicity values for a cancer evaluation are not available.

2. The maximum concentration of total phenols was found at well MW-16A during the August 2000 sampling event. The following summary of the Weight of Evidence for Carcinogenicity was developed based on the IRIS chemical file for phenols. Phenols are classified by EPA as a Group D carcinogen under the 1986 Cancer Guidelines. This classifications indicates that phenols are not classifiable as to human carcinogenicity and therefore quantification of cancer risks is not possible (see IRIS chemical file for phenols at www.epa.gov/iris). Under the Draft Guidelines for Carcinogen Risk Assessment (EPA, 1999), the data regarding the carcinogenicity of phenol via the oral, inhalation, and dermal exposure routes are identified as *inadequate for an assessment of human carcinogenic potential.*

3. The maximum concentration in groundwater of 1,700 µg/l was measured as total PCBs at well MW-306 on August 11, 2000. This well was subsequently abandoned and removed during excavation of the surrounding soils NEILF. The next highest concentration of PCBs was 330 µg/l and was found at well MW-16B on August 11, 2000. The available toxicity values for PCBs on IRIS are for total PCBs (cancer assessment) and Aroclors 1016 and 1254 for noncancer toxicity. The Region IX PRGs present concentrations associated with specific risk levels (i.e., cancer risk of 1 x 10^{-6} and a noncancer HI = 1) based on unspecified mixtures with low risk for Aroclor 1016 and unspecified mixtures with high risk for Aroclor 1254. This assessment provides a comparison of the maximum concentration of total PCBs in groundwater and compares the results to the specific Aroclors based on Region IX calculations.

4. The maximum concentration of TCE was found at well MW-304 on August 11, 2000.

5. The maximum concentration in groundwater of 119 µg/l was measured in well MW-306 on August 11, 2000. This well was subsequently abandoned and removed when the area was excavated during the NEILF soil removal. The next highest concentration found was 37 µg/l which was found in well MW-16A during the May 2004 sampling event.

Table 6: Recommendations and Follow-Up Actions						
Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Institutional controls prohibiting the installation of groundwater wells and to protect the integrity of the remedies that are currently in place are needed.	Institutional controls prohibiting the installation of groundwater wells and to protect the integrity of the remedies that are currently in place need to be implemented.	PRP	EPA	7/11	N	Y
The institutional control that is currently in place (fish advisory) and additional institutional controls prohibiting the installation of groundwater wells and to protect the integrity of the remedies that are currently in place are not part of the selected remedies for the site.	The institutional control that is currently in place and additional institutional controls prohibiting the installation of groundwater wells and to protect the integrity of the remedies that are currently in place need to be incorporated into the remedy.	EPA	EPA	12/10	N	N