

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name	<u>GM CENTRAL FOUNDRY (Massena)</u>	ProjectID: 02-04
Last Updated:	08/23/02	
City:	Massena	
County:	St. Lawrence	
State:	NY	
Country:	USA	
Bodies of Water:	St. Lawrence River; Raquette River; Turtle Creek	
US EPA Region:	II	
Status (Active, Complete, or Monitoring Only):	Complete	
Date On NPL:	1984	
ROD/ESD Date:	1990; 1998 (Post-Decision Proposed Plan); 1999 (ROD Amendment)	
Operable Unit:	OU-1	
Areas of Concern (length or acres):	In the St. Lawrence River, an eleven-acre, 2,500 ft. long nearshore area. An additional description follows. Source: ROD, December 1990 (Reference A-76): “Based on a 1 ppm PCB cleanup level, the PCB hotspot in the St. Lawrence River extends from approximately 1,200 feet above the GM outfall to 700 feet below the mouth of Turtle Creek and approximately 300 feet from the shore. The PCB hotspot in the Raquette River, based on a 1 ppm PCB cleanup level, extends to the soils on the riverbank and to the sediments in the river which are along the shore approximately 250 feet upriver and 250 feet downriver from the GM outfall. The approximate limits of the PCB hotspot in Turtle Creek extend from the cove at the mouth of Turtle Creek to a point 2,500 feet upstream from the mouth of Turtle Creek.”	
Other Characteristics of Water Body:	St. Lawrence River nearshore flow rates are up to 2.0 fps.	
Contaminants of Concern:	PCBs (1242 and 1248)	
Source of Contamination:	General Motors (GM) Powertrain facility (formerly GM Central Foundry); primarily PCBs in hydraulic fluids used in aluminum diecasting machinery. PCBs in nearshore sediments were primarily from historical discharges through one outfall pipe (along with a possible contribution from an upstream source).	
Contaminated Area Physical Characteristics:	An eleven acre, 2,500-foot long nearshore area located in the St. Lawrence River adjacent to the GM facility. In five of six quadrants, within the 11 acres, pre-remediation sediment PCB concentrations ranged from 0.04 to 2,500 ppm based on 28 samples. Sediment PCB concentrations ranged from 6 to 10,000 ppm based on 13 samples taken in the remaining quadrant. In the 1990 ROD, EPA reports PCB concentrations in the Raquette River area of up to 390 ppm and in Turtle Creek up to 48 ppm. The 1990 ROD also indicates that NYSDEC has measured PCBs up to 3,100 ppm in Turtle Creek.	
Type of Regulatory Action:	Superfund. Final.	
Overall Status Summary:	Dredging of the St. Lawrence River portion of the site was completed in November 1995. Overall construction activities occurred from May 8 to December 19, 1995. A 2,500 foot long nearshore river area was enclosed by sheetpiling and was hydraulically dredged; 13,800 cy of sediment and rock (in situ) were removed. The sediments were dewatered and placed onsite in lined cells, pending a decision on ultimate disposal. The ROD required the onsite treatment of sediment containing greater than 10 ppm PCBs to less than 10 ppm and disposal of treated and	

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untreated sediment containing less than 10 ppm in an onsite landfill. Strong public opposition to onsite thermal treatment and a reduction in commercial disposal costs since the original ROD was issued were two factors that led EPA to reconsider the disposal option. (A 1999 ROD Amendment, described below, allowed for offsite disposal.) Boulders that were removed as part of the dredging were either placed in lined cells located in areas of low PCB concentration or were power washed and reused in shoreline restoration.

One of the six quadrants, a 1.72 acre dredged area, was also capped due to the presence of PCBs at post-dredging average PCB levels of 27 ppm. The cap had an average thickness of 13 inches of sand (mixed with activated carbon), then 11 inches of gravel, and 8.5 inches of stone. EPA's decision to have this area capped "was made only after it was determined that dredging had not been successful in that area" (Reference B-199). The remaining five quadrants (9 acres) exhibited a post-dredging average of 3 ppm PCBs and were not capped. Five years of annual fish monitoring and cap inspection have occurred since completion of the remediation. The cove adjacent to the river embayment, however, has not yet been remediated due to difficulties obtaining access from the owner (the St. Regis Mohawk tribe).

A March 1999 ROD Amendment changed the method of disposal for sediment with PCB concentrations greater than 10 ppm from onsite treatment to disposal at an offsite TSCA-permitted facility. The ex-situ dewatered volume of sediment resulting from the 1995 removal totaled 10,230 cy. The offsite transport (by rail) and disposal of the stockpiled sediment was completed in Fall 1999. A total of 7,830 cy of sediment were disposed of at a cost of \$2.7 million (\$345 per cy). Prior to loading into railcars the sediment was screened to remove rocks and boulders, thereby reducing the volume of sediment requiring offsite disposal from the initial 10,230 cy to 7,830 cy. A plan has been submitted by GM to EPA to allow onsite disposal of these rocks and boulders.

Remediation of the Raquette River and Turtle Creek was also designated in the original ROD. The Raquette has primarily a rocky bottom and flows along the southern boundary of the GM site and into the St. Lawrence River. The 1999 Amended ROD called for the removal of an estimated 2,600 cy of bank soils and 1,400 cy of sediments from the Raquette River and disposal of the removed sediments in the same manner as the sediment removed from the St. Lawrence River. A remedial work plan for performing the remedial activities in the Raquette River was submitted to EPA by GM in August 2001.

Remediation in the Raquette River commenced in August 2002, with the bulk of the work involving removal of contaminated bank soils. Some sediments are being removed from about a one-acre area using a vac truck. Disposal is to offsite commercial TSCA and non-TSCA landfills.

Turtle Creek and associated cove have not been remediated due to the absence of an access agreement with the property owner, the St. Regis Mohawk Tribe.

Remedial Action Planned: ☒

Risk Assessment: ☒

Remedial Action Implemented: ☒

Status of Dredging ☐

PRPs: ☒

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<i>Contacts:</i>	<input checked="" type="checkbox"/>
<i>References:</i>	<input checked="" type="checkbox"/>
<i>Modeling:</i>	<input type="checkbox"/>
<i>Fishing Advisory:</i>	<input checked="" type="checkbox"/>
<i>Key Conditions:</i>	capping, commercial landfill, dedicated landfill or CDF, dredging, Great Lakes AOC, post monitoring, property access issues, rail transport for disposal

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Target Sediment Cleanup Standards (TSCS):	1 ppm PCBs. As much sediment as technically feasible; Hot Spot area delineation was based on 1 ppm PCBs for St. Lawrence and Raquette Rivers and 0.1 ppm PCBs for Turtle Creek.	
How TSCS Established:	Technical feasibility. In response to public comments to the proposed plan (documented in the 1990 ROD), EPA explained that it "modified its cleanup level for the St. Lawrence and Raquette River to 1 ppm PCBs. The 1 ppm PCB cleanup in the St. Lawrence and Raquette Rivers was based on interim federal and State sediment quality criteria guidance as well as on EPA's risk assessment. Application of interim federal sediment quality criteria guidance indicated that a PCB cleanup level in sediments should be between 0.08 and 2 ppm. State levels well below 1 ppm were required to achieve protection of the environment. EPA's risk assessment for the Site demonstrated that a 1 ppm PCB cleanup level in sediment corresponded to a 4×10^{-5} excess cancer risk."	
Target Bank and Floodplain Cleanup Levels (if applicable):	N/A	
Other Target:	None	
Environmental Sample Data References:	<ul style="list-style-type: none">• Sediment:• Water:• Fish:	
Estimated Target Volume:	The 1990 ROD projected dredging/treatment/disposal of 62,000 cy of sediments. Based on an extensive sampling program performed in 1993 and as referenced in a 1994 media statement (Reference B-29), the total targeted for removal was defined as 29,000 cy (which included some limited sediment removal in Turtle Creek and the Raquette River).	
Planned Disposal Method:	The 1990 ROD specified that sediment containing 10 ppm PCBs be thermally treated to below 10 ppm and that treated and untreated sediment with PCB concentrations of less than 10 ppm be disposed of in an onsite landfill meeting New York State TSCA requirements.	
Estimated Calendar Time to Implement Remedy:		
Estimated Time to Implement Remedy:	Not available	
Estimated Cost to Implement Remedy:	The 1990 estimated present worth for remediation of river/creek sediments and other site-related remediation activities specified under the 1990 ROD is \$78 million dollars.	
Stated Remedial Action Objectives (and Source):	Source: ROD, December 1990 (Reference A-76): "Hotspots in the St. Lawrence and Raquette Rivers and Turtle Creek will be dredged and excavated to remove PCBs. All PCB contaminated sediments in the hotspots will be removed given the technological limitations associated with dredging. EPA anticipates that residual PCB levels in dredged hotspot areas will be no greater than 1 ppm in the St. Lawrence and Raquette Rivers. In selecting the 1 ppm cleanup goal in the St. Lawrence and Raquette Rivers, EPA has balanced its desire for a very low cleanup level which will minimize residual risk with the constraints posed by the limitations of dredging as a means of removing sediment. EPA	

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believes that a 1 ppm cleanup goal in the St. Lawrence and Raquette Rivers is achievable and provides an acceptable measure of protection to human health."

"EPA intends to comply with the Tribal PCB ARAR by removing sediments with PCB concentrations greater than 0.1 ppm PCBs in Turtle Creek. However, technical limitations may preclude removal of sediments to 0.1 ppm PCBs. If this is the case, EPA will remove all contaminated sediments to the extent practicable due to the limitations of dredging technology. Sediment resuspension will be minimized through the use of engineering controls. However, if, as a result of dredging, resuspended sediments settle on Tribal land, they will be subject to the Tribal sediment ARAR."

Measures of Success to be Used:

Primarily documentation of acceptable level of dredging effort (e.g., number of dredge passes, time spent dredging, bathymetric surveys). In addition, post-dredging sediment verification samples will be collected.

Planned Monitoring and Restoration:

Post-remediation monitoring is being performed in accordance with the St. Lawrence River Monitoring and Maintenance Plan (BBL Environmental Services, Inc., Dec. 1996). This plan was prepared, submitted to the Agencies, and implemented, as requested by the Agencies.

BIOTA MONITORING:

Fish monitoring efforts include annual collections of juvenile spottail shiners, a resident minnow species common to the St. Lawrence River. If the prescribed number of spottails are not available, either the emerald shiner or longnose dace will be taken as a substitute species. Data describing whole-body PCB concentrations (and lipid content) in spottails are being used to monitor the effects that sediment remediation activities may have on PCB concentrations in nearby populations of St. Lawrence River aquatic biota. The monitoring objective is to provide a measure of the effectiveness of recently completed remedial actions at OU-1 and future remedial actions at the cove in reducing the bioavailability of sediment-based PCBs to resident aquatic biota of the St. Lawrence River.

Sampling efforts include the collection of seven whole-body composite samples from each sample location for a maximum total of 14 samples. Annual fall collections will be completed for a duration of five years. The need for continual biological monitoring activities at the site will be addressed after completion of the fifth year of monitoring in 2001.

CAP MONITORING and MAINTENANCE:

Cap monitoring is being accomplished through visual and diver-assisted inspections. (This is the cap that was added onto 1.72-acre Quadrant No. 3 due to elevated PCBs post-dredging.) Maintenance activities, if necessary, will include additions of stone to the armor layers, in the event deficiencies are identified during routine inspections. Visual inspections have been conducted in shallow water areas from the shoreline and/or by wading, and use of a boat in deeper water. In deeper water areas or areas that cannot be clearly inspected from the shoreline, by wading or by boat, video camera or diver-assisted visual inspections have been performed to complement the other visual inspection activities.

Beginning with the first year of monitoring and maintenance activities (1996), visual inspection (via shoreline or wading and boat) was performed. Diver-assisted inspections will be performed (with particular attention focused towards portions of the cap in deeper waters), during the first year of monitoring and maintenance activities and in alternate years thereafter. Following three years of cap inspection activities (of which the first and third years will include diver-assisted

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inspection), the frequency of diver-assisted visual inspections will be evaluated. The diver-assisted inspection interval may be adjusted to once every five years, or potentially abandoned, if insignificant sediment cap deficiencies are identified for deeper portions of the cap. However, visual inspection via shoreline, wading, or boat will continue to be performed annually (with the exception of a trigger event). A visual cap inspection will be performed following the incidence of a trigger event (e.g., a severe storm of high-flow event or a boating accident or vessel grounding in the capped area)

Agency Position on Sediment Removal (and Source):

Source: ROD, December 1990 (Reference A-76):

As summarized by EPA in the ROD Responsiveness Summary, EPA has balanced the desire for very low cleanup levels to minimize risk with the constraints posed by dredging limitations. EPA believes dredging will be effective for the following reasons:

- Much of the area to be dredged is shallow and close to shore;
- Sediment resuspension can be reduced by use of sheet pile walls and selection of dredging technique;
- Short-term impacts from dredging are less than the current risks posed by contaminated sediments;
- If resuspended sediments are deposited downstream (identified by monitoring), they can be dredged.

From the EPA Responsiveness Summary in the ROD: "Therefore, in an attempt to minimize residual risks, EPA selected 1 ppm as a cleanup goal in the St. Lawrence and Raquette Rivers. In selecting the 1 ppm cleanup goal in the St. Lawrence and Raquette Rivers, EPA also balanced its desire for a very low cleanup level which will minimize residual risk with the constraints posed by the limitations of dredging as a means of removing sediment. EPA believed that a 1 ppm cleanup goal in the St. Lawrence and Raquette Rivers would be achievable and provide an acceptable measure of protection to human health. The 0.1 ppm cleanup goal for Turtle Creek selected by EPA was based on Tribal requirements. This level may not be achievable in all areas due to the technical limitations of dredging as a means of removing sediment."

Source: Unilateral Administrative Order (March 1992):

"Respondent may . . . petition EPA for a review of the technical practicability of meeting EPA's St. Lawrence and Raquette River sediment cleanup goal of 1 ppm PCBs; the Tribe's ARAR of 0.1 ppm for Reservation sediments; . . . all of which are required by EPA's OU I ROD. Respondent's petition to EPA must demonstrate . . . that attainment of the requirements is impracticable from an engineering perspective. In the cases of Reservation sediments . . . set forth above, Respondent's petition will be for a waiver of Tribal, federal, or State ARARs. In the case of EPA's St. Lawrence River and or Raquette River sediment cleanup goal, Respondent's petition shall be for a modification of the sediment cleanup goal set forth in EPA's OU I ROD."

"In the case of any St. Lawrence River System sediments, Respondent's petition for EPA's review may be made only after Respondent has attempted to excavate or dredge such sediments in accordance with the EPA-approved ROD."

"To demonstrate that dredging of St. Lawrence or Raquette River sediments to achieve a 1.0 ppm cleanup level is technically impracticable from an engineering perspective, Respondent may show, for example, that dredging has physically removed as much of the contaminated material that overlies the underlying non-contaminated material as is practicable; or that the reduction in PCB concentrations from the most recent dredging pass is not statistically significant as

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compared with the concentrations measured after the prior dredging pass (es). EPA shall determine what is "statistically significant".

"To demonstrate that excavation or dredging of Turtle Creek sediments to achieve a 0.1 ppm PCB cleanup level is technically impracticable from an engineering perspective, respondent may show, for example, that the reduction in PCB concentrations from the most recent dredging pass or excavation cut is not statistically different as compared with the concentrations measured after the prior dredging pass (es) or excavation cut(s)."

Follow-up after dredging (EPA Letter to NYS DEC, January 1996 -- Reference B-199):

"During the course of the dredging, GM attempted to meet the 1 ppm cleanup goal in the St. Lawrence River. Pre- and post-dredging sediment samples were generally sediment cores which were hand-augered through sediment to refusal at the till layer. However, as the amount of sediment decreased following dredging, the core consisted of increasing amount of weathered till. Sediments were sampled in a 75' grid in Q2, Q4, Q5, and Q6 and a 50' grid in Q1 and Q3. By the end of October 1995, average PCB concentrations in all six quadrants were less than 4 ppm, with the exception of Q3. In addition, with the exception of Q3, PCB concentrations in all individual sediment samples were below 10 ppm."

"In summary, EPA's decision to cap Q3 was made only after it was determined that dredging had not been successful in that area. EPA believed that further dredging would not have significantly reduced levels in Q3 and given the worsening weather conditions, elected to cap that area which was an order of magnitude more contaminated than the rest of the river. This decision was based on a recognition that there are technical limitations associated with dredging."

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RA Type: Baseline Human Health & Ecological; Public Health

RA Status: Complete

RA Objectives: From Reference A-366, "... to determine the magnitude and probability of actual or potential harm to public health and the environment posed by releases of hazardous substances from the GMC-CFD site."

Company Performing RA: PRC Environmental Management, Inc.; Gradient Corporation; New York State Department of Health

RA Reference Report: References A-366, A-367, and A-579

RA Summary and Conclusions: The PRC RA Report (Part 1) prepared for GMC is for both the land-based site as well as sediments. A separate RA Report was prepared for EPA by Gradient Corporation (Reference A-367). Both reports are baseline risk assessments. Conclusions re sediments and fish are as follows:

PRC (Reference A-366): "Potentially significant risks to human health from ingestion of aquatic life were identified under both probable-case and worst-case conditions. The concentrations of PCBs in the adjacent surface water exceeded the ambient water quality criteria (AWQC) for the ingestion of aquatic life. PRC was provided preliminary data from NYSDEC concerning mean PCB concentrations in fish from various sampling locations in the St. Lawrence River and its tributaries. PRC evaluated first, sport fish PCB concentrations because certain types of fish are likely to be preferentially consumed, and second, mean PCB concentrations in all fish sampled. PRC found that the mean sport fish fillet PCB concentrations did not exceed the FDA and State of New York limit of 2 ppm at any sampling stations. PRC found that the mean PCB concentrations for all fish fillets exceeded this limit at the Grasse/St. Lawrence River sampling station (upstream of GMC-CFD) and downstream of GMC-CFD."

"Further, PRC used the fish fillet data to calculate the upperbound excess cancer risk for ingestion of sport fish and all fish from the background station and downstream stations on the St. Lawrence River and its tributaries. PRC identified a potentially significant calculated carcinogenic risk from the ingestion of both sport fish and all fish. Even for the background station, the risks under the worst case for ingesting all fish for both adults and children, 3E-03 and 9E-04, was outside the target range of 1E-04 (one cancer per ten thousand persons exposed) to 1E-07. For ingesting of either sport fish or all fish from the remaining stations downstream of the background location, all the risks for both probable and worst case scenarios equaled or exceeded the target range. In addition, risks upstream from of GMC-CFD but downstream of the background stations were not significantly different from those downstream of GMC-CFD, making it difficult to assess the impact of potential releases from GMC-CFD. Based on PRC's assumptions and calculations presented above, ingesting aquatic life from these surface waters may present potentially significant risks to human health."

"No potentially significant carcinogenic risks were identified from dermal exposure to sediment under probable case conditions. The only carcinogenic risk from sediment exposure that exceeded EPA's benchmark of 1 E-06 was the worst-case dermal exposure to St. Lawrence River sediments." (but was less than 1 E-04).

Gradient (Reference A-367): "The species of fish most commonly consumed by the Mohawk Indians are Northern Pike, Perch, Rock and Smallmouth Bass, Brown Bullhead, and Walleye (Lickers, 1989; Selikoff and Hammond, 1986). Data from these six species were used in the risk assessment."

"Northern Pike and Brown Bullhead have average PCB-lipid concentrations of 3,140 ppm and 2,020 ppm, respectively. These fish-lipid concentrations are factors of two to three times higher than sediment concentrations at the site, which is consistent with the known bioconcentration of PCBs in fish. Thus,

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although the available data were from separate fish and sediment/water sampling studies, concentrations in the sediment were consistent with concentrations determined in fish."

"The average PCB concentration (in fillets) for all fish was 1.7 ppm (Table2). This value will be used for the "most probable" exposure scenario. The average PCB concentration for fish captured at an outfall location at the Site was 6.9 ppm. This value will be used as a "worst case" exposure scenario, because it is possible that individuals may do most of their fishing in this area."

"For the estimation of chronic human health risks in the Mohawk Indian population, an average of 130 grams/day of fish over a lifetime was assumed for an individual fish consumption rate. This is roughly equivalent to 2 pounds of fish per week. This value is higher than the average value recommended by the U.S. EPA for recreational fishermen (30 g/day), but consistent with EPA's recommendation for a 90th percentile value for recreational fishermen (140 g/day (U.S. EPA, 1989b). Fishing is a major activity for the Mohawk Indians, and consumption of fish among this population is thought to be much higher than among other U.S. populations, including the average sports fisherman."

"The risk calculations assume that a person eats contaminated fish from the Site for a 70-year lifetime. Contamination with the average (most probable) or the highest average (worst case) estimated concentrations in fish were utilized for these scenarios. The excess carcinogenic risk for the most probable scenario was 2.4×10^{-2} , while the excess risk for the worst case scenario was 1.0×10^{-1} . The HI for the most probable scenario was 31.6, while the HI for the worst case scenario was 128."

The following describes the results of the Health Outcome Data Evaluation as provided by NYSDOH (Reference A-579):

"A 1986 study concluded that there was a direct relationship between blood levels of PCBs and mercury and the amount of fish eaten by the Akwesasne residents. The conclusion drawn from this report states, in summary, that consumption was significant and positively associated with blood and hair mercury levels. The mercury levels found in these biological media in St. Regis examinees were relatively low when compared with results reported in studies of other groups exposed to mercury-contaminated fish. Similarly, the report concludes that although PCB levels in the fat and serum were associated with consumption of locally caught fish, the levels of PCBs in the fat and serum samples obtained from Akwesasne residents did not exceed the means and ranges reported in studies of other populations without known unusual exposures."

"A 1992 collaborative study was conducted to investigate levels of 68 PCB congeners, total PCBs, p,p'-dichlorodiphenyl dichloroethene (p,p'-DDE), mirex, and hexachlorobenzene in the breast milk of Mohawk women from Akwesasne (the St. Regis Mohawk Indian Reservation). The study was initiated at the request of a Mohawk midwife who was concerned that breast-fed Akwesasne might be at higher risk of exposure to these chemicals, since these compounds are present in relatively high concentrations in environmental, fish, and wildlife samples collected in the area and because these chemicals concentrate in milk fat and other lipids. Ninety-three Mohawk women who gave birth between 1988 and 1992 were interviewed and provided a breast milk sample. The interview included sociodemographic characteristics, lifestyle variables, and occupational, residential, reproductive and dietary histories. The comparison population consisted of 154 nursing women from the Women and Infant Care (WIC) clinics of Warren and Schoharie counties who gave birth during the same period."

"Mohawk mothers who gave birth in 1986-1989 had a higher geometric mean PCB concentration in breast milk than controls (0.602 vs. 0.375 ppm; $p = 0.009$). Beginning with mothers who participated in 1990, however, Mohawks did not have elevated average levels of total PCBs or individual congeners relative to the comparison group. Mohawk women showed a significant decline in their milk PCB concentration

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depending on when they participated, while levels in controls remained relatively stable over time. These differences paralleled similar differences in fish consumption. Mohawk women who participated later in the study reported that they consumed less local fish and were also more likely to remove the skin and trim the fat from the fish than women who participated earlier in the study.”

“PCB congener analysis suggested that Mohawk mothers, especially those with the greatest estimated lifetime exposure to PCBs from the consumption of local fish, had a congener pattern that was closer to that of perch caught near GM-CFD than did the controls.”

“The total PCB concentrations in breastmilk of both Mohawk and control mothers were on average similar to those reported to other American studies. This observation, together with the fact that the dietary intakes of most of the Mohawk mothers were well below Acceptable Daily Intakes and possible reference doses, suggests that it is unlikely that they are at increased risk for major health effects as a result of their exposure to PCBs, p,p'DDE, mirex, or hexachlorobenzene.”

“Although both the Mohawk and control infants were probably exposed to greater doses of these chemicals than bottle-fed infants, the known benefits of nursing are considered to outweigh the risks from chemical contamination at the low concentrations found in this and most other investigations.”

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Physical Target:	11-acre nearshore hot spot in St. Lawrence River, adjacent to plant site.	
Goals:	Attempt to remove >85% of contaminated sediment; test sediment to determine if < 1 ppm PCB exists in the dredged areas; if not, second dredging attempt to be made to remove >85% of remaining sediments.	
Primary Contractor:	Sevenson Environmental Services	
Other Contractors:	BBL Environmental Services (supervising contractor) and Blasland, Bouck & Lee (consultant)	
Generic Remediation Method:	Hydraulic dredging; wet excavation (for rocks and boulders); capping (one dredged sub-area)	
Equipment:	Sediments and rock from deeper portions of the river were removed using both a barge-mounted backhoe and an 8-inch horizontal auger dredge; 2,500 feet of steel sheetpile were used to isolate the removal area from the rest of the river. Internal silt curtains were used to further isolate areas >500 ppm PCBs. Shoreline sediments too shallow to be removed via dredging were excavated "in-the-dry" using a Portadam system and backhoe.	
Material Handling:	<p>Boulders and debris were loaded directly into an unlined 20 cy rolloff on the barge and the rolloff was offloaded by crane at the shore. The dredged sediments were transferred from the dredge via a floating pipeline to an onshore shaker tank desander, than a booster pump. The booster pump delivered the sediments up the river embankment to a 1.5 million gallon concrete settling basin. From there, a submersible pump pumped the sediments to an onsite dewatering and waste water treatment facility (WWTF). The decant in the basin was pumped directly to the WWTF.</p> <p>The materials used in the sediment cap were supplied by Barrett Paving Materials based in Norwood, New York. Materials for all three cap layer components were placed in the river utilizing a PC-220 long stick backhoe and two 25 cy roll-offs positioned on a 30-foot by 60-foot Flexi-float barge. This same barge-mounted equipment was used for earlier mechanical removal of rocks. Materials delivered from Barrett were stockpiled on shore directly adjacent to the river. Materials were then loaded into the two roll-offs utilizing an additional land based backhoe. When each roll-off was filled, the barge moved into position for the systematic placement of a lift of cap component materials. The components of each cap layer were installed in a similar fashion.</p> <p>The cap design called for each of the three layers, sand, gravel, and stone, to be a minimum of 6-inches thick. During placement, however, a 9-inch layer was targeted to ensure adequate cover. A total of 4,205 tons of sand (with 7.5 tons of activated charcoal added), 3,348 tons of gravel, and 2,634 tons of armor stone were placed with as-built average thicknesses of 13 inches, 11 inches, and 8.5 inches respectively.</p>	
Volume Removed:	13,800 (in-situ) cy of sediment and rocks. Due to elevated residual PCB concentrations, a 1.72-acre section of the 11 acres dredged was capped with an average thickness of 13 inches of sand (mixed with activated carbon), then 11 inches of gravel, followed by 8.5 inches of stone for armoring. (These are actual thicknesses determined following placement; the target had been a minimum of 6 inches of each.)	
Calendar Time:	May 8 to December 19, 1995	
Time To Implement:	Approximately 6 months for dredging, typically 2 shifts per day (6 AM until dark), 5 days per week. Placement of the materials for the 1.72-acre cap took approximately one month (November 9 through December 7, 1995.)	

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Total Cost:	\$12.7 million; \$920 per cy.	
Dredging Cost:	Dredging "only" costs unavailable.	
Disposal of Sediment:	<p>Sediment was dewatered by filter presses and, along with some rock, was stockpiled in three onsite lined holding cells (lining consisted of 40 ml geotextile covered by a layer of sand) pending offsite disposal. The in-situ 13,800 cy resulted in 10,230 ex-situ dewatered cubic yards. Boulders segregated during dredging were powerwashed and used in shoreline restoration. An August 1998 Proposed Plan issued by EPA to dispose of the stockpiled materials at an offsite commercial landfill was approved.</p> <p>A ROD Amendment was issued in March 1999 specifying the offsite transport (by rail) and disposal of the 10,230 cy of stockpiled sediment and rock at a commercial TSCA-permitted landfill at a proposed cost of \$2.3 million (\$225/cy). The offsite disposal of 7,830 cy of stockpiled sediment was completed in Fall 1999 at a cost of \$2.7 million (\$345/cy). The material was disposed at the Safety-Kleen Grassy Mountain facility (formerly known as USPCI), Tooele, Utah, which is permitted to accept waste containing greater than 50 ppm PCBs, under a nation-wide contract between Safety-Kleen and GM.</p> <p>Prior to being loaded onto railcars, rocks and boulders were segregated from sediment using a six-inch grizzly, reducing the volume of sediment requiring offsite disposal from 10,230 cy to 7,830 cy. The rocks and boulders were power washed and stored onsite. A plan has been submitted to EPA for their permanent onsite disposal. The screened sediment was loaded onto trucks for transport to the rail loading area where it was stockpiled for loading onto gondola cars. Air monitoring was performed during sediment handling at both the holding cells and the rail loading area.</p> <p>Sediment disposal was performed concurrently with the disposal of about 5,830 cy of contaminated sludge from onsite lagoons and a small quantity of miscellaneous materials. For the entire operation, an estimated 13,660 cy (20,860 tons) were sent offsite for disposal at a cost of \$4.2 million.</p>	
Volume of Water:	43 million gallons	
Method of Water Treatment:	Water was treated at an onsite temporary wastewater treatment facility consisting of clarifiers, mixed-media filters, cartridge filters, and granular activated carbon. Treated water was discharged back to the river. Details are provided in Reference A-12.	
Water Discharge Limit:	65 ppt PCBs per Aroclor, or 300 ppt PCBs (total of all Aroclors)	
Air Monitoring During Remediation:	Particulates/NIOSH 5503 (PCBs); data showed that elevated PCB emissions did occur periodically during dredging at the sediment stockpile area.	
Water Monitoring During Remediation:	<p>Monitoring stations were located in the river around the perimeter of the work area outside the sheetpiling to measure for turbidity, TSS, and PCBs during dredging operations. Monitoring requirements were for turbidity (28 NTUs above background levels) at 13 locations and daily for PCBs (2 ug/L downgradient of in-river activities) adjacent to and downstream of the containment perimeter. Water column sampling for PCBs was discontinued at about the project duration midpoint. Reportedly (Reference B-199), water column sample results remained within pre-determined limits and were generally at background levels. Results were: 18 of 923 turbidity measurements above 28 NTUs (31-127 NTUs) (sheetpile modifications reduced this to one exceedance for the project remainder); and one of 146 water column samples collected during dredging exceeded 2 ug/L (5.19 ug/L) PCBs. In addition, upstream and downstream large volume monitoring was performed by Enviro Canada and GM monitored public water intake areas during dredging.</p>	

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Outcome: Removal of 13,800 in-situ cubic yards was accomplished from the St. Lawrence River hot spot. Disposal was at an offsite commercial landfill, after dewatering. Despite multiple dredge passes (up to 30 in some areas), the cleanup level of 1 ppm PCBs was not achieved, based on post-dredging sediment verification samples. Specifically:

- In 5 of 6 quadrants, the average PCB concentration was approximately 3 ppm with no verification sample exceeding 10 ppm.
- In 1.72-acre Quadrant No. 3, the average PCB concentration was 27 ppm and, with one exception, no verification sample exceeded 100 ppm. An analysis of samples collected within 50 feet of this location at different intervals during the removal process showed that this elevated level was isolated. Quadrant No. 3 was subsequently capped with sand (mixed with activated carbon)/gravel/stone.

EPA approved the outcome in a letter of January 1996 (Reference B-199) and stated: "During the course of the dredging, GM attempted to meet the 1 ppm cleanup goal in the St. Lawrence River. Pre- and post-dredging sediment samples were generally sediment cores which were hand-augered through sediment to refusal at the till layer. However, as the amount of sediment decreased following dredging, the core consisted of increasing amount of weathered till. Sediments were sampled in a 75' grid in Q2, Q4, Q5, and Q6 and a 50' grid in Q1 and Q3. By the end of October 1995, average PCB concentrations in all six quadrants were less than 4 ppm, with the exception of Q3. In addition, with the exception of Q3, PCB concentrations in all individual sediment samples were below 10 ppm."

"In summary, EPA's decision to cap Q3 was made only after it was determined that dredging had not been successful in that area. EPA believed that further dredging would not have significantly reduced levels in Q3 and given the worsening weather conditions, elected to cap that area which was an order of magnitude more contaminated than the rest of the river. This decision was based on a recognition that there are technical limitations associated with dredging."

Restoration and Post-Monitoring:

Numerous verification samples were collected during dredging. Samples were generally sediment cores which were hand-augered through the residual sediment to refusal at the till layer. As the residual layer of sediment decreased due to the dredging, cores consisted of increasing amounts of weathered till. Ultimately, despite multiple passes with the dredge, none of the six sub-areas were able to be remediated to the 1 ppm PCB target level. In 5 of 6 sub-areas, all discrete verification samples contained less than 10 ppm PCBs. In one quadrant sub-area, Quadrant No. 3, PCB concentrations were higher. Despite multiple dredge passes (up to 30 in some areas), PCB concentrations in Quadrant No. 3 ranged up to 100 ppm. Quadrant No. 3 was capped with sand (mixed with activated carbon), gravel, and stone. None of the 6 sub-areas were able to be consistently remediated to the 1 ppm PCB target level.

Post-remediation monitoring is being performed in accordance with a St. Lawrence River Monitoring and Maintenance Plan, prepared in 1996 after the remediation (Reference A-409). The Plan has been submitted to the Agencies and is being implemented as requested by the Agencies but, to date, the Agencies have yet to approve the plan. An impediment to implementing and interpreting the post-monitoring program is that a targeted cove area adjacent to the remediated hot spot could not be remediated due to property access limitations.

Fish monitoring includes the annual collection for five years of juvenile spottail shiners, a resident minnow species common to the St. Lawrence River, from the area of the remediated hot spot and from the adjacent cove. Data describing whole-body PCB concentrations (and lipid content) in spottails are to be used to monitor the effects of the remedy on PCB concentrations in nearby populations of St. Lawrence River aquatic biota. The objective of the monitoring is to provide a

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measure of the effectiveness of the recently completed remedy in reducing the bioavailability of sediment-based PCBs to resident aquatic biota of the St. Lawrence River, and provide a baseline for future remedial actions for the cove.

Sampling commenced in Fall 1997 and is being performed in the hot spot area only, due to the inability of GM to gain access to the cove from the St. Regis Mohawk Tribe. During sampling, a sufficient number of spottail shiners is collected to produce seven whole-body composite samples. Sampling was most recently performed in Fall 2001, the last year of the required five-year monitoring program and the annual monitoring reports have been issued.

Results of the fish sampling conducted from 1997 to 2000 are summarized as follows (total PCBs; wet-weight): 1997) 1.2 ppm average; 1.8 ppm maximum; 1998) 3.59 ppm average; 5.4 ppm maximum; 1999) 2.43 ppm average; 6.8 ppm maximum; and 2000) 1.5 ppm average; 2.2 ppm maximum. These data are much lower than data reported by the Ontario Ministry of Environment (OME) from 1988 (21.5 ppm) and 1989 (22.6 ppm). Since 1989, the data appear to indicate a general downward trend in spottail shiner PCB concentrations with the exception of two samples by NYSDEC in 1992 (5.7 and 65 ppm wet-weight). The reliability of these results, however, remains uncertain due to the large variability between the two samples and the uncertainty in actual sampling locations. Similar variability, although not as great, is also evident in the data collected by the OME in 1989. The variability may be due to several factors, including specific sampling locations, differences in fish lengths and sizes, or species mobility.

Annual monitoring of the cap is being accomplished visually in nearshore and shallow water areas of less than four feet deep and by video camera or diver-assisted inspections in water depths greater than four feet deep. Shallow-water inspections are by wading into the river at transects perpendicular to the river bank. In addition to visual observations, a steel rod is used to probe the cap for areas deficient of armoring material. Maintenance activities, as necessary, include the addition of stone to the armor layer, in the event deficiencies are identified during these inspections. A few discrete areas (1,300 ft.2) within 15 feet of the shoreline were noted as deficient in armor during the 1997 and 1998 inspections; a total of 30-35 cy of No. 4 rock were placed over these areas for restoration. No deficiencies were identified during the 1999, 2000, and 2001 inspections. In deep-water areas or areas that cannot be clearly inspected from the shoreline or by wading, video camera and diver-assisted visual inspections have been performed. Deep-water cap areas are required to be inspected every three years; the next inspection is scheduled for 2003. To-date there have been no armor deficiencies detected in the cap in deep-water cap areas.

Site-Specific Difficulties: Large quantities of rocks requiring removal in advance of dredging were not anticipated, and large rocks, once removed, left holes which were not efficiently dredged. In 1994, the first contractor, OHM, attempted to use silt curtains, which proved ineffective in part due to river currents. Severson Environmental Services subsequently used sheet pile when it took over the project in 1995. A "last minute" requirement by, and agreement with, EPA to cap Quadrant No. 3 occurred due to elevated residual PCB levels.

During sediment transport by rail to Utah for disposal, several gondola cars filled with sediment were "lost" for a few weeks in a rail switchyard.

Monitoring Data

References:

- *Sediment*
- *Water:*
- *Fish:*

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Project Name: ***GM CENTRAL FOUNDRY (Massena)***

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POTENTIALLY RESPONSIBLE PARTIES

Project Name ***GM CENTRAL FOUNDRY (Massena)***

ProjectID: 02-04

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Reference Type: A

ReferenceID: 12

Title: **Report of Site Visit to GM Powertrain's St. Lawrence River Site**

Location: AEM

Category: Site Update

Prepared by/Author: Parsons Engineering Science, Inc.

**Preparer/Author
Address:** Liverpool, NY

Prepared For: Parsons Engineering

Date Published: September 29, 1995

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 76

Title: **Declaration for the Record of Decision**

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region II

**Preparer/Author
Address:** 290 Broadway
New York, NY 10007-1866

Prepared For: General Public

Date Published: December 1990

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 351

Title: **Post-Decision Proposed Plan: General Motors Superfund Site**

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region II

**Preparer/Author
Address:** New York, NY

Prepared For: General Public

Date Published: August 1998

**Key Words and
Phrases:**

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: A

ReferenceID: 366

Title: *Baseline Risk Assessment (Part I) and Risk Assessment of Potential Remedial Actions (Part II) at the General Motors Corporation - Central Foundry Division*

Location: AEM

Category: Risk Assessment

Prepared by/Author: PRC Environmental Management, Inc.

**Preparer/Author
Address:**

Prepared For: GMC - Central Foundry Division

Date Published: September 11, 1989

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 367

Title: *Baseline Risk Assessment for GM / Massena Site (Draft)*

Location: AEM

Category: Risk Assessment

Prepared by/Author: Gradient Corporation

**Preparer/Author
Address:** 44 Brattle Street
Cambridge, MA 02138

Prepared For: US EPA Region II

Date Published: September 15, 1989

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 409

Title: *St. Lawrence River Monitoring and Maintenance Plan*

Location: AEM

Category: Monitoring, Post

Prepared by/Author: BBL Environmental Services, Inc.

**Preparer/Author
Address:** 6723 Towpath Road
Box 66
Syracuse, NY 13214-0066

Prepared For: General Motors Powertrain

Date Published: December 1996

**Key Words and
Phrases:**

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: A

ReferenceID: 410

Title: *St. Lawrence River Sediment Removal Project Remedial Action Completion Report*

Location: AEM

Category: Contaminated Sediments: Remediation Final Report

Prepared by/Author: BBL Environmental Services, Inc.

Preparer/Author Address: 6723 Towpath Road
Box 66
Syracuse, NY 13214-0066

Prepared For: General Motors Powertrain

Date Published: June 1996

Key Words and Phrases:

Reference Type: A

ReferenceID: 411

Title: *St. Lawrence River Monitoring and Maintenance Annual Inspection Report (January 1998)*

Location: AEM

Category: Monitoring, Post

Prepared by/Author: BBL Environmental Services, Inc.

Preparer/Author Address: 6723 Towpath Road
Box 66
Syracuse, NY 13214-0066

Prepared For: General Motors Powertrain

Date Published: January 1998

Key Words and Phrases:

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: A

ReferenceID: 412

Title: *St. Lawrence River Monitoring and Maintenance Annual Inspection Report (January 1999)*

Location: AEM

Category: Monitoring, Post

Prepared by/Author: BBL Environmental Services, Inc.

Preparer/Author Address: 6723 Towpath Road
Box 66
Syracuse, NY 13214-0066

Prepared For: General Motors Powertrain

Date Published: January 1999

Key Words and Phrases:

Reference Type: A

ReferenceID: 576

Title: *Sediment and Water Column Investigation of the St. Lawrence and Raquette Rivers*

Location: AEM

Category: Site Update

Prepared by/Author: IT Corporation

Preparer/Author Address: Edison, NJ

Prepared For: GM - Central Foundry Division

Date Published: May 18, 1989

Key Words and Phrases:

Reference Type: A

ReferenceID: 577

Title: *Record of Decision Amendment: General Motors Corporation, Central Foundry Division, Massena, NY*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region II

Preparer/Author Address:

Prepared For: General Public

Date Published: March 1999

Key Words and Phrases:

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: A

ReferenceID: 579

Title: *Public Health Assessment for General Motors (Central Foundry Division) Massena, St. Lawrence County, New York, Region 2. CERCLIS No. NYD091972554*

Location: AEM

Category: Risk Assessment

Prepared by/Author: New York State Department of Health

Preparer/Author Address: Albany, NY

Prepared For: Agency for Toxic Substance and Disease Registry

Date Published: April 19, 1999

Key Words and Phrases:

Reference Type: A

ReferenceID: 666

Title: *Feasibility Study for the Remedial Investigation / Feasibility Study (Task 12) - GMC-CFD Massena Facility - DRAFT*

Location: AEM

Category: RI/FS

Prepared by/Author: RMT, Inc.

Preparer/Author Address: 744 Heartland Trail
P.O. Box 8923
Madison, WI 53708-8923

Prepared For: General Motors Corporation, Central Foundry Division

Date Published: November 1989 (Revision)

Key Words and Phrases:

REFERENCES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Reference Type: A

ReferenceID: 730

Title: ***St. Lawrence River Monitoring and Maintenance Annual Inspection Report (January 2000)***

Location: AEM

Category: Monitoring, Post

Prepared by/Author: BBL Environmental Services, Inc.

**Preparer/Author
Address:**

Prepared For: General Motors Powertrain, Massena, NY

Date Published: January 2000

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 731

Title: ***St. Lawrence River Monitoring and Maintenance Annual Inspection Report (January 2001)***

Location: AEM

Category: Monitoring, Post

Prepared by/Author: BBL Environmental Services, Inc.

**Preparer/Author
Address:**

Prepared For: General Motors Powertrain, Massena, NY

Date Published: January 2001

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 1

Title: ***Personal letter from US EPA to AEM with an attached update of the dredging results for the General Motors Central Foundry***

Location: AEM

Category: Site Update

Prepared by/Author: Anne E. Kelly, RPM

**Preparer/Author
Address:** US EPA Region II
290 Broadway
New York, NY 10007-1866

Prepared For: AEM, Inc.

Date Published: April 18, 1997

**Key Words and
Phrases:**

REFERENCES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Reference Type: B

ReferenceID: 28

Title: ***Superfund in Action - General Motors Superfund Site
GM Dredging Begins***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region II

**Preparer/Author
Address:** 290 Broadway
New York, NY 10007-1866

Prepared For: General Public

Date Published: 1995 Summer

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 29

Title: ***Media Statement***

Location: AEM

Category: Site Update

Prepared by/Author: GM and US EPA Region II

**Preparer/Author
Address:** c/o General Motors Powertrain
Rt. 37 East, Box 460
Massena, NY 13662-0460

Prepared For: Public

Date Published: September 15, 1994

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 199

Title: ***Letter: US EPA Region II (Jackson) to NYSDEC (Ouderkirk) re
Capping of Quadrant No. 3***

Location: AEM

Category: Site Update

Prepared by/Author: Lisa P. Jackson, RPM

**Preparer/Author
Address:** US EPA Region II
290 Broadway
New York, NY 10007-1866

Prepared For: NYSDEC, Watertown, NY 13601

Date Published: January 17, 1996

**Key Words and
Phrases:**

REFERENCES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Reference Type:

B

ReferenceID: 341

Title:

General Motors (Central Foundry Division) Fact Sheet

Location:

AEM

Category:

Site Update

Prepared by/Author:

US EPA Region II

**Preparer/Author
Address:**

http://www.epa.gov/region02/superfund/site_sum/0201644c.htm

Prepared For:

General Public

Date Published:

April 1998

**Key Words and
Phrases:**

Reference Type:

B

ReferenceID: 375

Title:

**Letter: GM (Premo) to US EPA Region II Re: St Lawrence
River Sediment Removal Project Closure**

Location:

AEM

Category:

Site Update

Prepared by/Author:

Douglas C. Premo, GM Project Coordinator

**Preparer/Author
Address:**

Massena, NY

Prepared For:

US EPA Region II

Date Published:

November 3, 1995

**Key Words and
Phrases:**

Reference Type:

B

ReferenceID: 376

Title:

**Letter: US EPA Region II (Peterson) to GM (Premo) Re:
Capping of Quadrant 3**

Location:

AEM

Category:

Capping/Placement

Prepared by/Author:

Carole Peterson

**Preparer/Author
Address:**

US EPA Region II
New York, NY

Prepared For:

GM

Date Published:

November 22, 1995

**Key Words and
Phrases:**

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: B

ReferenceID: 440

Title: *EPA Modifies Cleanup Action for Contaminated Materials in Two Lagoons at the General Motors Superfund Site in Massena, New York*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region II

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: April 24, 2000

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 485

Title: *GM Threatened with Lawsuit Over Massena (NY) PCB Site*

Location: AEM

Category: Site Update

Prepared by/Author: New York State

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: March 15, 2001

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 777

Title: *Realizing Remediation I - Great Lakes Contaminated Sediments
St. Lawrence River - General Motors Site
(see Reference A-905)*

Location: AEM

Category: Dredging; Remedial (Contaminated Sediments)

Prepared by/Author: US EPA Great Lakes National Program Office (GLNPO)

**Preparer/Author
Address:** 77 West Jackson Boulevard (G-17J)
Chicago, IL 60604

Prepared For: General Public

Date Published: August 1, 2002

**Key Words and
Phrases:**

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: B

ReferenceID: 831

Title: *Realizing Remediation II - Updated Summary:
St. Lawrence River: General Motors Site (GM Central Foundry)
(see Reference A-907)*

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author: US EPA Great Lakes National Program Office (GLNPO)

**Preparer/Author
Address:** 77 West Jackson Boulevard (G-17J)
Chicago, IL 60604

Prepared For: General Public

Date Published: July 2000

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 965

Title: *e-mail re: Question re GM Massena Site*

Location: AEM

Category: Site Update

Prepared by/Author: Anne Kelly

**Preparer/Author
Address:** US EPA Region II

Prepared For: AEM, Inc.

Date Published: August 27, 2002

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 163

Title: *Manufacturers mount mission to mop up Massena*

Location: AEM

Category: Site Update

Prepared by/Author: Debra K. Rubin

**Preparer/Author
Address:**

Prepared For: Engineering News-Record (ENR)

Date Published: August 21, 1995

**Key Words and
Phrases:**

REFERENCES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Reference Type: C

ReferenceID: 184

Title: **GM agrees to \$85 million Massena cleanup**

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: June 19, 1992

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 185

Title: **GM agrees to second-phase fix**

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: October 23, 1992

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 186

Title: **GM-Massena dredging delayed**

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: November 18, 1994

**Key Words and
Phrases:**

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: C

ReferenceID: 187

Title: ***ROD Amendment Alters Remedy at GM; Off-Site Disposal Adds \$4.4M to Cost***

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: April 2, 1999

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 428

Title: ***The Business Side - General Motors***

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: October 21, 2002

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 566

Title: ***GM Gets Another ROD Amendment; Excavation to Continue this Summer***

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: April 28, 2000

**Key Words and
Phrases:**

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: C

ReferenceID: 571

Title: *Sediment Remediation Can Improve Great Lakes Water Quality*

Location: AEM

Category: Miscellaneous

Prepared by/Author: (1) John H. Hartig, (2) Lisa Maynard, (3) Michael A. Zarull, (4) Gail Krantzberg

Preparer/Author (1) Greater Detroit American Heritage River Institute

Address: Detroit, MI
(2) International Joint Commission
Windsor, Ontario, Canada
(3) National Water Research Institute
Burlington, Ontario, Canada
(4) Ontario Ministry of Environment

Prepared For: Water Environment & Technology (WE&T)

Date Published: October 1999

**Key Words and
Phrases:**

Reference Type: D

ReferenceID: 11

Title: *GM to begin dredging to clean up St. Lawrence River near it's
Massena, New York plant*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region II

Preparer/Author 290 Broadway
Address: New York, NY 10007-1866

Prepared For: Press Release

Date Published: September 9, 1994

**Key Words and
Phrases:**

REFERENCES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Reference Type: D

ReferenceID: 12

Title: ***GM, landfills facing fines following disposal of PCBs***

Location: AEM

Category: Miscellaneous

Prepared by/Author: The Associated Press

**Preparer/Author
Address:**

Prepared For: The Buffalo (NY) Newsday

Date Published: March 19, 1991

**Key Words and
Phrases:**

Reference Type: D

ReferenceID: 70

Title: ***EPA modifies Massena superfund cleanup`***

Location: AEM

Category: Site Update

Prepared by/Author: Associated Press

**Preparer/Author
Address:**

Prepared For: The Saranac Lake (NY) Adirondack Daily Enterprise

Date Published: March 26, 1999

**Key Words and
Phrases:**

Reference Type: D

ReferenceID: 71

Title: ***EPA Selects Cleanup Action for Contaminated Soils and
Sediments at the General Motors Superfund Site in Massena, New
York***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region II

**Preparer/Author
Address:** New York, NY

Prepared For: General Public

Date Published: March 25, 1999

**Key Words and
Phrases:**

REFERENCES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Reference Type: D
Title: ***Pollution remedy has mixed record***
Location: AEM
Category: Site Update
Prepared by/Author: Alex Nussbaum
Preparer/Author Address:
Prepared For: The Hackensack (NJ) Record
Date Published: August 27, 2001
Key Words and Phrases:

ReferenceID: 269

Reference Type: D
Title: ***Mohawks await cleanup of toxic mound***
Location: AEM
Category: Miscellaneous
Prepared by/Author: Hart Seely (Syracuse Herald American)
Preparer/Author Address:
Prepared For: The Glens Falls (NY) Post Star
Date Published: June 26, 2001
Key Words and Phrases:

ReferenceID: 360

Reference Type: D
Title: ***GM's Cleanup of PCBs at NY Site Likely to Take 2 More Yrs***
Location: AEM
Category: Site Update
Prepared by/Author: Dow Jones Newswires
Preparer/Author Address:
Prepared For: General Public
Date Published: October 15, 2002
Key Words and Phrases:

ReferenceID: 451

REFERENCES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Reference Type: E

ReferenceID: 58

Title: ***Hydrodynamic Studies and Contaminant Transport in a Complex River System***

Location: AEM

Category: Modeling

Prepared by/Author: (1) George W. Crouse, (2) Peter R. Jacobson and (3) Edward H. Owens

Preparer/Author (1 and 2) Woodward-Clyde Consultants

Address: Plymouth Meeting, PA

(3) Woodward-Clyde Consultants
Seattle, WA

Prepared For: Great Lakes '90 HMCRI Conference

Date Published: 1990

**Key Words and
Phrases:**

Reference Type: E

ReferenceID: 124

Title: ***Sediment Management Seminar 2000 Proceedings (Reference E-121)***

Location: AEM

Category: Dredging; Remedial (Contaminated Sediments)

Prepared by/Author: Blasland, Bouck & Lee, Inc.

Preparer/Author 6723 Towpath Road

Address: P.O. Box 66

Syracuse, NY 13214

Prepared For: Attendees

Date Published: February 10-11, 2000

**Key Words and
Phrases:**

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: E

ReferenceID: 240

Title: *Remediation of Sediments by Dredging: Methods and Case Histories*

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author: Bradford S. Cushing

Preparer/Author Address: AEM, Inc.

Prepared For: WODCON XV Conference, Las Vegas, NV

Date Published: June 28 - July 2, 1998

Key Words and Phrases:

Reference Type: H

ReferenceID: 21

Title: *St. Lawrence River -- GM Massena: Post-Dredging PCB Concentrations (Surface) (average = 9.2 ppm)*

Location: AEM

Category: Monitoring, Post

Prepared by/Author:

Preparer/Author Address:

Prepared For:

Date Published: May 2000

Key Words and Phrases:

Reference Type: I

ReferenceID: 75

Title: *PCB Dredging Site - Engineering Remedial Design (CERCLA), Construction Oversight*

Location: AEM

Category: Site Update

Prepared by/Author: Advanced GeoServices Corporation

Preparer/Author Address:

Prepared For: Distribution

Date Published: Undated

Key Words and Phrases:

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: L

ReferenceID: 114

Title: *Sediment Remediation Projects in the U.S. Using Capping or Burial*

Location: AEM

Category: Capping/Placement

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:**

Prepared For: Distribution

Date Published: September 25, 2001

**Key Words and
Phrases:**

Reference Type: L

ReferenceID: 135

Title: *Maximum Baseline Cancer Risks for Contaminated Sediment Sites*

Location: AEM

Category: Risk Assessment

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:**

Prepared For: Distribution

Date Published: October 22, 2001

**Key Words and
Phrases:**

Reference Type: L

ReferenceID: 172

Title: *EPA's Evolving Position on Remedial Dredging*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:** Malvern, PA 19355

Prepared For: Internal Distribution

Date Published: Undated

**Key Words and
Phrases:**

REFERENCES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Reference Type: M
Title: ***Multidisciplinary Study of PCBs at a Waste Site***
Location: AEM
Category: Site Update
Prepared by/Author: David O. Carpenter, M.D.
Preparer/Author Address: University at Albany - SUNY
Prepared For: Research Brief from Internet
Date Published: March 14, 1995
Key Words and Phrases:

ReferenceID: 61

Reference Type: M
Title: ***Multidisciplinary Study of PCBs at Akwesasne***
Location: AEM
Category: Risk Assessment
Prepared by/Author: David O. Carpenter, M.D.
Preparer/Author Address: University of Albany - SUNY
Albany, NY
Prepared For: NIEHS/EPA Superfund Basic Research Program
Date Published: October 22, 1998 (last updated)
Key Words and Phrases:

ReferenceID: 165

Reference Type: M
Title: ***Environmental Dredging: An Evaluation of Its Effectiveness in Controlling Risks***
Location: AEM
Category: Contaminated Sediments: Overview of Issues
Prepared by/Author: Blasland, Bouck & Lee, Inc.
Preparer/Author Address: 6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Prepared For: General Electric Company
Date Published: August 2000
Key Words and Phrases:

ReferenceID: 248

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: M

ReferenceID: 319

Title: *SEDTEC Report: Removal Technology - Severson
Environmental, Hydraulic Cutter*

Location: AEM

Category: Site Update

Prepared by/Author: Environment Canada

**Preparer/Author
Address:**

Prepared For: Distribution

Date Published: September 28, 1996

**Key Words and
Phrases:**

Reference Type: M

ReferenceID: 342

Title: *Memo re: Summary of the Impacts of Remedial Dredging*

Location: AEM

Category: Miscellaneous

Prepared by/Author: Quantitative Environmental Analysis, LLC.

**Preparer/Author
Address:**

Prepared For: Internal Distribution

Date Published: February 27, 2001

**Key Words and
Phrases:**

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: M

ReferenceID: 420

Title: *Results of Contaminated Sediment Cleanups Relevant to the Hudson River:
St. Lawrence River - General Motors, New York (GM Central Foundry)*

Location: AEM

Category: Contaminated Sediments: Overview of Issues

Prepared by/Author: Joshua Cleland

**Preparer/Author
Address:**

Prepared For: Scenic Hudson
9 Vassar Street
Poughkeepsie, NY 12601

Date Published: October 2000

**Key Words and
Phrases:**

Reference Type: N

ReferenceID: 43

Title: *Phone Memo re: Conversation with Jim Hartnett, GM*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:**

Prepared For: Internal File

Date Published: August 23, 2002

**Key Words and
Phrases:**

REFERENCES

Project Name GM CENTRAL FOUNDRY (Massena)

ProjectID: 02-04

Reference Type: R

ReferenceID: 9

Title: *Letter to PRP re: Case Histories: Contaminated Sediment Sites*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

**Preparer/Author
Address:** Malvern, PA 19355

Prepared For: General Motors-Powertrain, submitted to

Date Published: August 14, 1998

**Key Words and
Phrases:**

Reference Type: R

ReferenceID: 22

Title: *Letter to PRP re: Case Histories: Contaminated Sediment Sites
(with oral response from GM)*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc. with response from GM

**Preparer/Author
Address:** Malvern, PA 19355

Prepared For: General Motors-Powertrain, submitted to

Date Published: September 9, 1998

**Key Words and
Phrases:**

Reference Type: S

ReferenceID: 20

Title: *Unilateral Administrative Order (Page 19 only)*

Location: AEM

Category: Legal

Prepared by/Author: US EPA Region II

**Preparer/Author
Address:** New York, NY

Prepared For: General Motors Corporation

Date Published: March 1992

**Key Words and
Phrases:**

FISH ADVISORIES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Advisory: St. Lawrence River

AdvisoryID: 17

Extent: Bay at St. Lawrence - Franklin County Line

Pollutant: PCBs (total)

Species: all fish

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: Great Lake

Advisory Number: 2101

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

Advisory: St. Lawrence River

AdvisoryID: 18

Extent: Bay at St. Lawrence - Franklin County Line

Pollutant: PCBs (total)

Species: all fish

Population: NCSP

Population Definition: No Consumption-Subpopulation(s): Advises against consumption for populations that are potentially at greater risk, e.g., pregnant or nursing women, and small children.

Advisory Type: Great Lake

Advisory Number: 2101

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

Advisory: St. Lawrence River

AdvisoryID: 78

Extent: Entire River

Pollutant: PCBs (total)

Species: all fish

Population: NCSP

Population Definition: No Consumption-Subpopulation(s): Advises against consumption for populations that are potentially at greater risk, e.g., pregnant or nursing women, and small children.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

FISH ADVISORIES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Advisory: St. Lawrence River

AdvisoryID: 74

Extent: Entire River

Pollutant: PCBs (total)

Species: carp-common

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

Advisory: St. Lawrence River

AdvisoryID: 71

Extent: Entire River

Pollutant: PCBs (total)

Species: catfish-channel

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

Advisory: St. Lawrence River

AdvisoryID: 70

Extent: Entire River

Pollutant: PCBs (total)

Species: eel-american

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

FISH ADVISORIES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Advisory: St. Lawrence River

AdvisoryID: 79

Extent: Entire River

Pollutant: PCBs (total)

Species: perch-white

Population: RGP

Population Definition: Restricted Consumption-General Population: Advises the general population to restrict the size of the organisms and/or the frequency of meals consumed.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

Advisory: St. Lawrence River

AdvisoryID: 72

Extent: Entire River

Pollutant: PCBs (total)

Species: salmon-chinook

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

Advisory: St. Lawrence River

AdvisoryID: 73

Extent: Entire River

Pollutant: PCBs (total)

Species: salmon-coho

Population: RGP

Population Definition: Restricted Consumption-General Population: Advises the general population to restrict the size of the organisms and/or the frequency of meals consumed.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

FISH ADVISORIES

Project Name **GM CENTRAL FOUNDRY (Massena)**

ProjectID: 02-04

Advisory: St. Lawrence River

AdvisoryID: 76

Extent: Entire River

Pollutant: PCBs (total)

Species: trout-brown

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

Advisory: St. Lawrence River

AdvisoryID: 75

Extent: Entire River

Pollutant: PCBs (total)

Species: trout-brown

Population: RGP

Population Definition: Restricted Consumption-General Population: Advises the general population to restrict the size of the organisms and/or the frequency of meals consumed.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

Advisory: St. Lawrence River

AdvisoryID: 77

Extent: Entire River

Pollutant: PCBs (total)

Species: trout-lake

Population: NCGP

Population Definition: No Consumption-General Population: Advise against consumption by the general population.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815

FISH ADVISORIES

Project Name ***GM CENTRAL FOUNDRY (Massena)***

ProjectID: 02-04

Advisory: St. Lawrence River

AdvisoryID: 81

Extent: Entire River

Pollutant: PCBs (total)

Species: trout-rainbow

Population: RGP

Population Definition: Restricted Consumption-General Population: Advises the general population to restrict the size of the organisms and/or the frequency of meals consumed.

Advisory Type: Great Lake

Advisory Number: 748

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Tony Forti

Contact Number: 518-402-7815
