FOURTH FIVE-YEAR REVIEW REPORT FOR THE REYNOLDS METALS SUPERFUND SITE ST. LAWRENCE COUNTY TOWN OF MASSENA, NEW YORK

Prepared by

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LIST OF ABBREVIATIONS & ACRONYMS

BHHRA	Baseline Human Health Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CY	Cubic yards
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
mg/kg	milligram per kilogram
ng/kg	nanograms per kilogram
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU	Operable unit
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated biphenyls
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RMC	Reynolds Metals Corporation
ROD	Record of Decision
RPM	Remedial Project Manager
SAV	Submerged Aquatic Vegetation
SRMT	Saint Regis Mohawk Tribe
TDBFs	Total dibenzofurans
TEFs	Toxicity Equivalence Factors
µg/kg	microgram per kilogram
UU/UE	Unlimited use/Unlimited exposure
YOY	Young of year

I. INTRODUCTION

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

The U.S. Environmental Protection Agency (EPA) is preparing this FYR for the Reynolds Metals Superfund Site (Site) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit (OU), which will be addressed in this FYR. OU1 addresses the sediment remedy.

The FYR was led by Pamela Tames, the EPA Remedial Project Manager (RPM). Participants included Abigail DeBofsky, EPA ecological risk assessor, Rachel Griffiths, EPA hydrogeologist, Marian Olsen, EPA human health risk assessor, Larisa Romanowski, EPA Community Involvement Coordinator (CIC), Kelly Hale, New York State Department of Environmental Conservation (NYSDEC) representative, and Jessica L. Jock, Saint Regis Mohawk Tribe (SRMT) Remediation and Restoration Program Manager. Alcoa Inc., the potentially responsible party, was notified of initiation of the FYR. The FYR began on October 5, 2020.

Site Background

The Reynolds Metals Corporation (RMC) facility, a recently-shuttered aluminum production plant, is located on the St. Lawrence River, approximately eight miles east of the Village of Massena, New York. The RMC facility is bordered on the north by the St. Lawrence River, which is the international border with Canada. The properties immediately east of the RMC facility are owned by the St. Lawrence Seaway Corporation, New York State Department of Transportation, and the Revitalizing Auto Communities Environmental Response Trust (formerly General Motors Company property). SRMT tribal lands, known as Akwesasne, are located to the east, and Route 37 and the Grasse River are situated to the south and west, respectively.

The Site encompasses a portion of the St. Lawrence River bordering the RMC facility (the facility, which is not part of the Site, was addressed under New York State authorities). See Appendix A, Figure 1, for the Site's location.

The RMC facility was constructed in 1958 for the production of aluminum from alumina (aluminum oxide). Through its operation, various types of industrial wastes were generated,

disposed of, and spread throughout the grounds. The facility also discharged contaminants to the St. Lawrence River through four outfalls known as Outfalls 001, 002, 003, and 004. Discharges from Outfall 001 included water from the facility's wastewater treatment system. Outfall 002 discharged contact cooling water and stormwater runoff from the facility. The discharge traveled down an open ditch on the RMC property prior to entering the St. Lawrence River. Outfall 003 carried treated discharge from the facility sanitary treatment plant through a submerged pipe that discharged approximately 100 feet from the shore. Outfall 004 carried intermittent runoff from northern areas of the plant directly to the St. Lawrence.

Appendix C, attached, summarizes the documents utilized to prepare this FYR. Appendix D, attached, summarizes the physical characteristics, geology/hydrogeology, land use, and facility response actions. For more details related to the Site, please refer to: http://epa.gov/superfund/reynolds-metals-ny.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Reynolds Metals		
EPA ID: NYD002245967		
Region: 2	**State:** NY	**City/County:** Massena, St. Lawrence County
SITE STATUS		
NPL Status: Non-NPL		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**		
Author name (Federal or State Project Manager): Pamela Tames		
Author affiliation: EPA		
Review period: 2/2/2016 - 2/2/2021		
Date of site inspection: Click here to enter a date		
Type of review: Statutory		
Review number: 4		
Triggering action date: 2/2/2016		
Due date *(five years after triggering action date)*: 2/2/2021		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In January 1989, RMC completed an initial study of sediment contamination in the St. Lawrence River adjacent to its plant. In September 1989, pursuant to a Unilateral Administrative Order (Index No. II CERCLA-90230) issued by EPA, RMC agreed to investigate and clean up contamination in the river system surrounding the RMC facility, referred to as the "Reynolds Study Area." In August 1991, RMC submitted a report that characterized the nature and extent of contamination in the Reynolds Study Area. Based upon the results of this investigation, it was determined that approximately 30 acres of sediments, covering a 3,500-foot portion of the St. Lawrence River and extending 450 feet out from the shoreline, were contaminated with polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and total dibenzofurans (TDBFs) from discharges from the facility and that the contaminated sediments presented both a potential ecological and human health risk from ingestion of contaminated sediments and fish.

Response Actions

EPA issued a ROD for the site in September 1993. Although remedial action objectives (RAOs) were not specifically identified in the ROD, the implicit goals were to:

- Prevent human and biota contact with contaminated sediments;
- Reduce and/or prevent human ingestion of fish caught from the St. Lawrence River; and
- Reduce short-term impacts to surface water and air expected during remedial activities.

The major components of the remedy included:

- Dredge St. Lawrence River sediments that contain greater than 1 milligram per kilogram (mg/kg) PCBs, greater than 10 mg/kg total PAHs, and greater than 1 microgram per kilogram (µg/kg) TDBFs;
- On-site treatment of the dredged sediments with PCB concentrations greater than 25 mg/kg by thermal desorption; and
- Consolidation of the untreated dredged sediments containing between 1 mg/kg and 25 mg/kg PCBs and the treated dredged sediments in Black Mud Pond, a disposal pit located on the grounds of the facility, prior to its capping in conformance with NYSDEC's January 1992 ROD.

A ROD amendment was signed by EPA in September 1998. The major components of the amendment include:
- Treatment and disposal of all dredged sediments with concentrations exceeding 500 mg/kg PCBs at an approved off-site facility;
- Disposal of all dredged sediments with concentrations of PCBs between 50 mg/kg and 500 mg/kg at an approved off-site facility;
- Consolidation of all dredged sediments with concentrations of PCBs less than 50 mg/kg in the on-site Industrial Landfill, which will be capped in conformance with NYSDEC's ROD (Black Mud Pond was capped in 1996 and was no longer available); and

● After implementation of the dredging project, if it is determined that technological limitations preclude the attainment of the cleanup goals, then other remedial actions, such as capping, can be performed to assure attainment of the cleanup goals.

An Explanation of Significant Differences (ESD) was issued in December 2008, documenting changes to the 1993 ROD and the 1998 ROD amendment following the 2001 dredging of the Site. The ESD concluded that:

● Capping the remaining contaminated cells was the proper way to complete the remedial action at the site. EPA was concerned that additional dredging might recontaminate remediated cells and that residual PAHs in a smaller subset of cells might still need to be addressed through the placement of a cap.
● The 23 cells with total PAH concentrations between 10 mg/kg and 20 mg/kg would not require supplemental remediation since much of their low molecular weight PAHs would readily break down over a relatively short period of time bringing their total PAH levels to below the action level of 10 mg/kg.

Status of Implementation

In 2000, RMC, now Alcoa, completed the remedial design for the dredging project and a design for a subaqueous cap, should it be needed. The design divided the river study area into four subareas, labeled Areas A, B, C, and D. The contaminated portions of each subarea were further subdivided into individual dredge cells based on triangular sampling grids with a grid spacing of 70 feet for Areas A, B, and D, and 50 feet for Area C. The remediation area was defined by 268 dredge cells, with an average cell size of approximately 0.08 acres. A three-foot wide, 625-foot long strip of shoreline in Area C was also included in the remediation area.

In April 2001, Alcoa's contractor constructed a containment system consisting of 3,829 feet of interlocking steel sheet pile panels that completely enclosed the area to be dredged, greatly reducing the potential for sediment migration during the dredging. Dredging began soon after using Cable Arm environmental buckets and WINOPS[1] positioning systems and continued through mid-October 2001. Of the 30 acres in the remediation area, 21.8 acres required dredging. After the first pass dredging, which removed an estimated 63,265 cubic yards (CY) of sediment, post-dredging sampling indicated that 134 cells required redredging. Several cells required numerous rounds of redredging. The redredging removed an additional 22,390 CY of sediment. A total mass of approximately 20,200 pounds of PCBs were removed from the St. Lawrence River.[2]

Sixty-nine thousand CY of sediment with PCB concentrations less than 50 mg/kg were stabilized with Portland cement and disposed of in the landfill on the facility. The remaining 16,655 CY (14,920 tons of sediment with PCB concentrations greater than 50 mg/kg and 5,360 tons of

[1] WINOPS is the registered trademark name of dredge positioning software. WIN refers to Windows and OPS stands for offshore positioning software.

[2] Soil sample results from the facility indicated that the PCBs, PAHs, and TDBFs were collocated. Since it was presumed that the PCBs, PAHs, and TDBFs in the sediments were also collocated, the dredging effort utilized PCBs as an indicator compound.

sediment with PCB concentrations greater than 500 mg/kg) were shipped to Chemical Waste Management in Model City, New York, an approved hazardous waste facility, for disposal; sediments with PCB concentrations greater than 500 mg/kg were treated prior to disposal.

The removal of the sheet pile wall and demobilization in advance of the onset of winter began in mid-October 2001 concurrently with the completion of post-remedial action sampling activities. Sample results indicated that 12 cells did not meet the cleanup goal of 1 mg/kg PCBs even though these cells underwent several dredge passes. A decision was made to cap 15 cells, which included these recalcitrant cells, as well as three cells that were located in the midst of the 12 cells, with a three-layer cap consisting of 6 inches of gravel, 12 inches of sand, and a 9-inch armor layer. Because there was not enough time remaining in the construction season to install all three layers of the cap, Alcoa was directed to increase the depth of the gravel layer to 12 inches and place the remaining two layers the following spring.

Measurements taken following the placement of the gravel showed that the average thickness of the gravel layer was 2.3 feet, with a range of 1.0 to 6.9 feet. Post-dredging sampling in 2001 for TDBFs in 32 cells showed that 30 cells met the cleanup goal and two did not (indicating that the TDBF-contaminated sediments were collocated with the PCB-contaminated sediments). Post-dredging sample results from 96 cells showed that numerous cells had levels of PAHs above the cleanup goal, indicating that the PAHs were not always collocated with the PCBs and the TDBFs. As a result of these findings, the completion of the PCB cap was put on hold until the full extent of remaining PAH contaminated sediments could be determined. Based upon the results of additional sediment sampling conducted in 2002, 2003, 2004, and 2006, it was concluded that 76 of the 268 cells contained PAH levels above the cleanup goal of 10 mg/kg. Fifty-three of these cells had total PAHs above 20 mg/kg and the remaining 23 cells had total PAH concentrations between 10 mg/kg and 20 mg/kg (the majority of which had a concentration of 13 mg/kg or less).

The 0.75-acre PCB cap, completed during the 2009 construction season, included the placement of a 12-inch sand layer over the existing gravel layer (placed in 2001) followed by a 6-inch armor layer over 15 cells, 12 of which contained PCBs over 1 mg/kg. One shoreline cell, part of the cluster of 15 cells, which had elevated PCBs, was excavated prior to capping to maintain the original bathymetry. In addition, 50 cells that contained total PAH levels above 20 mg/kg were capped with a 6-inch sand layer followed by a 6-inch armor layer. Three shoreline cells that had elevated levels of PAHs were also capped following excavation to maintain the original bathymetry. At the completion of capping, a six-inch habitat (substrate) layer was placed over the armor layer at every capped cell located outside the nearshore boundary to facilitate the reestablishment of the submerged aquatic vegetation and benthic communities. In addition, a small volume of substrate was placed within the nearshore area to fill in spaces between the armor stone.

Institutional Controls Summary

The ROD, as modified by the ROD amendment and ESD, did not call for institutional controls due to the lack of public access to the shoreline and depth of the river within the site. Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposure to contaminated fish. The 2015 New York State Fish Advisory for the St. Lawrence Seaway is located at http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/regional/st_lawrence.ht

m#table. The 2013 Saint Regis Mohawk Fish Advisory for Akwesasne Waters including the St. Lawrence Seaway is located at https://www.srmt-nsn.gov/_uploads/environment/FishAdvisory_Nov2013.pdf. The 2014 Saint Regis Mohawk Game Advisory for the area is located at https://www.srmt-nsn.gov/_uploads/environment/GameAdvisory_Nov2014.pdf.

Systems Operations/Operation & Maintenance

To maintain the integrity and effectiveness of the subaqueous caps, monitoring the caps for erosion and making repairs as necessary was required annually for the first five years. Although a cap maintenance plan for the site was not finalized until 2012, the subaqueous sediment caps were inspected in the spring of 2011 using probes along with an underwater video camera. The cap maintenance plan was revised in 2015 to require inspection of the caps using probes and underwater video camera once every five years and following significant hydrodynamic events. Testing of the physical integrity of the capped portions of the Site was performed between October 30 and November 3, 2017. The monitoring also measured the amount of habitat layer and/or deposited sediment overlying the armor stone. Video observations of the capped areas were recorded in addition to using probes.

In July 2017, benthic invertebrate sampling was performed at 15 Site locations, 10 capped areas and five uncapped areas, plus eight upstream background locations. The submerged aquatic vegetation (SAV) was inspected in August 2017. Young-of-year (YOY) fish were monitored for PCBs in spring 2016 and 2018. Adult fish were monitored for PCBs also in 2016 and 2018. Future monitoring will include monitoring of YOY and adult fish for PCBs at least twice during each FYR period.

Potential site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site. The remedy as designed and implemented takes into consideration the most likely local effect of climate change in the region, which is in-river caused by extreme precipitation events or rapid snowmelt. Other local factors that EPA has considered in concluding that the remedy is sufficient to address more intense and extreme weather events that may arise include: (1) the St. Lawrence River water level is controlled by the Robert Moses Power Dam located upstream of the site; (2) the constructed remedy was designed to ensure it is resilient in the face of future extreme weather events; (3) the subaqueous caps in the St. Lawrence River have a large armor stone layer on top of sand and gravel, which was inspected by Arcadis, Alcoa's contractor in 2010, 2011, 2012, 2013, 2014 and 2017 and has not shown evidence of ice scour or washouts; (4) per the long term monitoring plan, the caps will undergo additional inspections following extreme weather events in addition to the regularly scheduled inspection.

III. PROGRESS SINCE THE LAST REVIEW

The protectiveness determinations from the last FYR are summarized in Table 1, below.

Table 1: Protectiveness Determinations/Statements from the 2016 FYR

OU #	Protectiveness Determination	Protectiveness Statement
01	Protective	The OU1 remedy protects human health and the environment. The dredging and capping of contaminated sediments have been completed, removing ecological exposure and direct contact (i.e., ingestion of contaminated sediments) exposures to the public. Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposure to contaminated fish.
Sitewide	Protective	The OU1 remedy protects human health and the environment. The dredging and capping of contaminated sediments have been completed, removing ecological exposure and direct contact (i.e., ingestion of contaminated sediments) exposures to the public. Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposure to contaminated fish

There were no issues and recommendations identified in the last FYR. However, the suggestions from the last FYR are updated in Table 2, below.

Table 2: Status of Suggestions from the 2016 FYR

OU #	Comment	Suggestion	Current Status	Current Implementation Status Description*	Completion Date (if applicable)
01	Now that the remediation has been completed, St. Lawrence ecological data is needed.	Adult fish sampling should be performed twice during each 5-year period concurrently with the adult fish sampling at the adjacent Superfund sites.	Completed	Adult fish sampling was performed in 2016 and 2018 during this 5-year review period concurrently with the adjacent Superfund sites. Adult fish sampling will continue to be performed twice during each 5 year review period.	10/2/2018
01	Twenty-three cells containing PAHs at levels between 10 and 20 mg/kg were not capped with the expectation that the PAHs would break down, but only six of these cells	The remaining seventeen cells should be sampled during the next sediment sampling event to confirm that their PAH levels have also dropped below the site	Completed	The total PAH results from the seventeen uncapped locations were all less than 10 mg/kg (range of 0.042 to 8.7 mg/kg), with the exception of two cells between 10 and 20 mg/kg (D-27 result was 15.7 mg/kg and D-116 result was 10.8 mg/kg) and two cells above 20 mg/kg (A-20	9/27/2017

	were sampled in 2011 and 2013 to confirm this.	action level of 10 mg/kg.		result was 26.6 mg/kg and C-7 result was 86.3 mg/kg)	
01	Sediment sampling data for Cell A-20 indicated PCBs and PAHs significantly above the remedial cleanup goals. Supplemental sampling data collected around this location suggest that the elevated concentrations are very limited in areal extent.	Additional follow-up monitoring of this cell should be completed to document the rate of sediment accumulation. The use of Beryllium-7 sampling may be useful to determine the rate of sediment deposition.	Ongoing	Sediment analysis of Cell A-20 in 2013 showed levels of PAHs and PCBs at 148.51 mg/kg and 42.2 mg/kg, respectively. The 2017 sediment analysis of Cell A-20 showed improvement in PAH and PCB levels at 26.6 mg/kg and 9.5 mg/kg, respectively indicating that sediment deposition is occurring. Cell A-20 will continue to be monitored.	
	The caps have been stable over the last 5 years and progress has been made in the recovery of the benthic, fish and aquatic community since the completion of the remedial action.	As a result, the level of required monitoring can be reduced. Therefore, adult and YOY fish will be monitored twice over the next five year period and the benthic community, sediment, submerged aquatic vegetation and physical condition of the cap will be monitored once over the next five year period.	Completed	This monitoring schedule will be completed during each Five Year Review period.	11/3/2017

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On September 22, 2020, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at Superfund sites in New York, New Jersey, Puerto Rico and the U.S. Virgin Islands, including the Reynolds Metals site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, a notice of the commencement of the FYR was posted on the EPA's Region 2 website and sent to local public officials. The notice was provided to the Town and Village of Massena by email on January 6, 2021, with a request that the notice be posted in the respective municipal offices and on the Town of Massena webpage. The notice was also distributed via email to the SRMT's Tribal Council and Environmental Division at that time. The purpose of the public notice was to inform the community that EPA would be conducting the fourth FYR to ensure that the remedy implemented at the Site remains protective of public health and the environment and is functioning as designed. In addition, the notice included the RPM and the CIC office and email addresses and telephone numbers for questions related to the FYR process or the Site. The notice indicated that once the FYR is completed, the results will be made available at the local Site repositories and on EPA's Site webpage, http://epa.gov/superfund/reynoldsmetals. In addition, efforts will be made to reach out to stakeholders and local public officials to inform them of the results.

The information repositories are maintained at the Massena Public Library, 41 Glenn Street, Massena, New York 13662, Saint Regis Mohawk Tribe – Environment Division, 449 Frogtown Road, Akwesasne, New York 13655 and the EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York, as well as on the EPA's website. An appointment is necessary to visit the Records Center (212-637-4308).

Data Review

Young of Year and Adult Fish

Mean PCB concentrations in whole-body YOY spottail shiner samples at the Site in 2016 were the lowest concentrations observed over the course of the monitoring program, with declines observed from 2010 to 2016. Mean wet weight PCB concentrations in 2010 at the Site were 0.92 mg/kg (range of 0.49 to 1.3 mg/kg) compared to 0.028 mg/kg (range of non-detect to 0.052 mg/kg) in 2016, and 0.384 mg/kg (range of 0.219 to 0.614 mg/kg) in 2018. Mean TDBF concentrations in whole-body YOY spottail shiner samples at the Site decreased from 3.5 nanograms per kilogram (ng/kg) (range of 3.2 to 3.7 ng/kg) in 2010 to 1.7 ng/kg (range of 1.6 to 1.7 ng/kg) in 2016. In 2018, the TDBF results increased to a mean of 3.83 ng/kg (range of 3.5 to 4.3 ng/kg). The TDBF concentrations in the background areas remained non-detect.

The edible fillets of adult smallmouth bass and adult brown bullhead were analyzed in 2016 and 2018 for PCBs. Smallmouth bass PCB results in 2016 ranged from 0.90 to 7.1 mg/kg, with a mean of 3.3 mg/kg wet weight and in 2018 ranged from 0.292 to 2.49 mg/kg, with a mean of 1.33 mg/kg

wet weight. In 2016, brown bullhead/white sucker PCB results ranged from non-detect (at a reporting limit of 0.05 mg/kg with half the reporting limit used for calculations for non-detect samples) to 0.29 mg/kg, with a mean of 0.069 mg/kg. The mean brown bullhead/white sucker PCB results rose in 2018 to 0.175 mg/kg wet weight with a range of 0.018 to 0.384 mg/kg. The reporting limit in 2018 was 0.0125 mg/kg. The levels of PCBs in the adult fish fillets remain above those allowable for the consumption of fish by humans. It should be noted that PCB fillet concentrations of 2 mg/kg or higher are considered "Do Not Eat" by the Great Lakes Fish Consumption Advisory Protocol (Anderson *et al*., 1993) and that the EPA ROD for the nearby Grasse River site selected a remediation goal (RG) of 0.05 mg/kg PCBs in fish fillet for the protection of human health and a RG of 0.01 mg/kg PCBs in fish for the protection of Mohawk health based on adult Tribal subsistence consumption rates.

Physical Integrity of Caps

A review of the 2017 physical integrity monitoring confirmed that the caps are intact with armor stone (identified as cobble in the field) in place at all the long-term monitoring locations, thereby satisfying the objective of the long-term monitoring program. These findings are consistent with the findings from the 2010 through 2014 monitoring events.

Benthic Community

In comparing the 2011, 2013, and 2017 benthic community data for the Site, the benthic metrics generally improved or increased from 2011 to 2013 and then stabilized or decreased slightly from 2013 to 2017. For instance, the average number of organisms at the Site increased from 73 in 2011 to 127 in 2013 and then decreased to 96 in 2017. Biomass (milligrams wet-weight) increased from 48 in 2011 to 57 in 2013 and then decreased to 53 in 2017. The average number of taxa increased from eight in 2011 to 12 in 2013 and decreased slightly to 11 in 2017. The diversity index increased from 2.1 in 2011 to 2.6 in 2013 and decreased slightly to 2.5 in 2017. In general, the benthic results for 2017 are better than those in 2011 and similar to or slightly lower than 2013. No invasive invertebrate species, such as zebra mussels, were identified in the 2017 benthic samples. Zebra mussels have only been found in the background samples during the long term monitoring.

Submerged Aquatic Vegetation

The results of the 2017 SAV survey were compared to the 2013 survey. Approximately 11,000 feet of Site transects were examined, with 38% being densely vegetated, 35% being moderately vegetated, 12% being sparsely vegetated, and 16% lacking vegetation. Compared to the results observed in 2013, this corresponds to no change in the length of densely vegetated areas, roughly a 5% increase of moderately vegetated areas, a 3% decrease of sparsely vegetated areas, and a 1% decrease of areas lacking vegetation; there was a slight net increase in the vegetation present along the Site transects in 2017.

Vegetation has recolonized most of the dredged areas, and the capped areas are generally being recolonized over time. In 2017, areas that were capped in 2009 typically had less vegetation than was observed during the 2017 site survey in uncapped areas of the site. The PCB cap area (contiguous cells) continues to have SAV growth occurring along the margins, encroaching toward

the middle, with some small isolated stands of SAV occurring on the center portions of the cap. It is believed that the lack of SAV at the Site is attributable to substrate type (rock/gravel; both cap and native material), light limitation (mostly a function of water depth), and shoreline wave action.

Sediment

In 2016, surface sediment samples were collected at 33 locations using a petite ponar grab sampler (see Appendix B, attached). Ten sampling locations were located within the capped cells. The remaining twenty-three samples were collected from dredged, but uncapped cells that in 2009 contained levels of PAHs between 10 and 20 milligrams per kilogram (mg/kg). It should be noted that three of the thirty-six targeted locations (C-88, C-89, and D-117/118) were abandoned and not sampled due to lack of recoverable materials (large cobble and rock present). The levels of PAHs in these cells are expected to naturally decrease over time and are sampled for confirmation. The general trend for the entire site shows a decline in contamination within the sediment. A data table is located in Appendix A.

Total PAH sample results for the capped areas ranged from not detected to 0.52 mg/kg. The total PAH results from the uncapped areas were all less than 10 mg/kg (range of 0.042 to 8.7 mg/kg), with the exception of two cells between 10 and 20 mg/kg (D-27 result was 15.7 mg/kg and D-116 result was 10.8 mg/kg) and two cells above 20 mg/kg (A-20 result was 26.6 mg/kg and C-7 result was 86.3 mg/kg).

Total PCB sample results for the capped areas were below 1 mg/kg (ranged from non-detect to 0.58 mg/kg), except D-126, which was slightly over 1 mg/kg (1.4 mg/kg). PCBs were not detected at four of the six sampled uncapped cells; the two sampled uncapped cells with detections were location A-20 (9.5 mg/kg) and location D-108 (2.4 mg/kg). These results were consistent with samples collected around location A-20 in 2013, which showed that the contamination in this area was very limited. Over time this area will be covered with clean sediment through natural processes. It will continue to be monitored.

TDBF sample results from the three capped locations ranged from non-detect to 25.0 nanograms per kilogram (ng/kg); the result from the one supplemental uncapped location (C-9) was 71.7 ng/kg.

Site Inspection

Due to health and safety considerations from the COVID-19 pandemic, an inspection of the Site was not conducted by the review team during the review period. An inspection by the review team will be scheduled when it is determined to be safe to do so. Being that the remedy is entirely subaqueous, the inability to do an inspection is not considered to have an impact on protectiveness.

V. TECHNICAL ASSESSMENT

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

There are three decision documents associated with the Site—a ROD, ROD amendment, and ESD. These documents collectively call for the removal or containment of contaminated sediments in the St. Lawrence River.

Approximately 20,200 pounds of PCBs were removed from the St. Lawrence River, representing a 98.6% reduction of PCBs within the remediation area.

In 1990, it was estimated that 21,211 pounds of PAHs were present within the sediments of the Site. As a result of 2002, 2003 and 2004 PAH sampling efforts, it was estimated that 747 pounds of PAHs remained within the sediments. This constitutes a 96% decrease in the amount of PAHs present in the sediments.

Despite extensive dredging of the St. Lawrence River, the cleanup goals of 1 mg/kg PCBs, 10 mg/kg PAHs, and 1 µg/kg TDBFs were not achievable in all areas. As a result, a 0.75-acre, 15 cell area, containing a range of PCB concentrations from 11.1 mg/kg to 120.5 mg/kg, was capped with the first layer of a three-layer cap to achieve the cleanup goal. The remaining exposed sediments average 0.8 mg/kg PCBs within the remaining 255 cells (21 acres), which is below the cleanup goal.

As was noted above, PCBs were used as an indicator parameter based on the assumption that the PCBs were collocated with the other chemicals of concern, PAHs and TDBFs. A review of post-dredging PAH sampling results, however, indicated that this assumption was not true for the PAHs, as PAHs were found in dredged cells that met the cleanup goals for PCBs and TDBFs. Specifically, 76 cells (6.08 acres) had post-dredging PAH concentrations above the cleanup goal of 10 mg/kg, 53 of these cells (4.24 acres) contained PAH levels ranging from 21.25 mg/kg to 248.9 mg/kg. Many of these cells were dredged numerous times.

Thirty-two of the 268 dredged cells (12%) were sampled for TDBFs. Thirty of the sampled cells met the cleanup goal of 1 mg/kg. The two remaining cells were located within the area that was capped due to the inability to meet the cleanup goals for PCBs.

To complete the remedial action, the 53 cells were capped in 2009. Twenty-three cells containing total PAHs between 10 mg/kg and 20 mg/kg were not capped because low molecular weight PAHs readily break down over a short period of time, bringing the total PAH level for these cells below 10 mg/kg. Monitoring of the PAH levels in these cells is discussed below.

The removal of contaminated sediments from the St. Lawrence River, in addition to the River's physical constraints, has greatly reduced direct dermal contact, ingestion, and inhalation exposures to these sediments and reduces the potential uptake of RMC site-related contaminants in sediment by aquatic and piscivorous receptors.

In summary, the dredging and capping have been completed and the remedy is functioning as intended by the decision documents. The remediated area continues to be monitored to ensure the stability of the caps and recovery of the fish, benthic community, submerged aquatic vegetation, and sediment. Periodic inspection of the caps, most recently in 2017, confirms that there are no weaknesses or issues with the physical integrity of the cap. Concentrations of PCBs and TDBFs in YOY, while slightly higher in 2018 than 2016, remain much lower than they were in 2010; however, PCB concentrations in adult fish remain above those allowable for human consumption. A review of the benthic community data in 2017 indicate a slight decrease from 2013 in metrics such as biodiversity and biomass, however the metrics are comparable to or better than results from 2011. Vegetation in both the dredged and capped areas has remained relatively stable with a slight net increase in vegetation from 2013 to 2017, and the remediated areas are generally recolonized. Sediment sampling in the capped locations indicates total PAH, total PCB, and TDBF results remain below cleanup goals with the exception of one cell that slightly exceeded for PCBs. Sediment sampling in the dredged areas indicate very limited areas of PAH and PCB exceedances which are expected to be covered with clean sediment over time via natural processes. Overall, the data reviewed indicate the dredging and capping have been effective.

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

Actions implemented under the ROD, ROD amendment and ESD have interrupted the exposure pathways identified in the Baseline Human Health Risk Assessment (BHHRA). The dredging and capping of the sediments have reduced the concentrations of PCBs, PAHs, and TDBFs in the river sediments and interrupted potential direct exposure to the Site Chemicals of Concern.

The following sections describe the actions at the Site, the effect of these actions on risks, and further evaluation that may be necessary.

St. Lawrence River. Based on the physical hazards, limited access, and currents within the St. Lawrence River, it is anticipated that swimming and wading into the St. Lawrence River at the Site in the dredged area is limited as discussed in the 1993 BHHRA. Additionally, the overall reduction in sediment concentrations via dredging, capping, and/or chemical degradation further reduces potential risks in the event that an individual recreates within this area. These pathways have not changed from the previous FYR.

Fish, Waterfowl and Snapping Turtle Consumption. NYSDOH advisories for fish and snapping turtles are reviewed and updated by NYSDOH on an ongoing basis. General advisories exist against consumption of Mergansers, which are the most heavily PCB contaminated waterfowl species. Links to NYSDOH advisories can be found in the Institutional Controls Summary within this FYR.

Concentration of PCBs and TDBFs in YOY decreased in 2016, rose slightly in 2018 and will continue to be monitored. However, PCB concentrations in adult fish remain above those

allowable for human consumption. The combination of reductions in the fish concentrations and the Fish Advisories issued by NYSDOH have interrupted potential exposures.[3]

Changes in Toxicity and Exposure Assumptions

PCBs: There have been no changes in the cancer toxicity values for PCBs since 1996 for the cancer assessment and 1993/1994 updates for the noncancer assessment. Currently, the Integrated Risk Information System (IRIS), EPA's consensus toxicity database, is reassessing the noncancer toxicity of PCBs. Updates in toxicity information for PCBs will be reevaluated in the next FYR.

PAHs: The cancer slope factor for benzo(a)pyrene was updated in 2017, but this change does not impact the protectiveness of the remedy since the cancer slope factor became less conservative.

TDBFs: TDBFs are evaluated based on Toxicity Equivalence Factors (TEFs) of dioxins. The non-cancer assessment for dioxin was completed in 2012. At the current time, the IRIS program is not reassessing the toxicity of TDBFs. EPA will continue to monitor any changes in the toxicity value for TDBFs or TEFs in the next FYR consistent with the Toxicity Hierarchy for Superfund sites.

The previous FYR indicated that the exposure assumptions, toxicity data, cleanup levels, and remedial action goals used at the time of the remedy are still protective. The conclusions reached in the 2016 FYR are still valid. The results presented in the long-term monitoring reports indicate that the remedy is functioning as intended, although it is too early to develop trends for the metrics being measured. Additional evaluation of the data will be presented in the next FYR.

In addition to the long-term monitoring to ensure the protectiveness of the remedy, additional information may be collected and utilized as part of a regional monitoring program to evaluate the impact that other contaminated sites located within the area might have on cleanup efforts at the RMC site.

The dredging and capping of the sediments to 1 mg/kg of PCBs, 10 mg/kg for PAHs, and 1 µg/kg for TBDFs as part of the remedial action have reduced potential exposures to PCBs, PAHs, and TDBFs. The monitoring of the caps show that they remain stable and effective. The fish advisories remain in place to limit potential exposures to fish from the St. Lawrence River. There have been no changes in toxicity information or exposure assumptions that call into question the remedy. Although RAOs were not specifically identified in the ROD, the implicit goals are considered valid.

Ecological Risk Assessment Evaluation. The previous FYR indicated that exposure assumptions, toxicity data, cleanup levels, and remedial action objectives from the remedy remain protective. The decision document along with the 2016, 2017, and 2018 long-term monitoring reports were reviewed as part of this evaluation. Long-term monitoring at this site included inspection of the physical condition of the cap, tissue residue analysis for YOY spottail shiners and adult smallmouth bass, brown bullhead, and white suckers, benthic community surveys, SAV monitoring, and sediment sampling. Based on these documents, the conclusions reached in the

[3] See http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/advice_on_eating_game.htm.

2016 FYR are still valid. The results presented in the long-term monitoring reports indicate that the remedy is functioning as intended, but elevated contaminant concentrations in YOY spottail shiners should be further considered in the next FYR to ensure that tissue concentrations are not trending in a positive direction.

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

At this time, there is no other information that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

There are no issues and recommendations that affect the protectiveness of the remedy.

OTHER FINDINGS

The following are suggestions that were identified during the FYR, but do not affect current or future protectiveness:

The results presented in the long-term monitoring reports indicate that the remedy is functioning as intended, but elevated contaminant concentrations in YOY spottail shiners should be further considered in the next FYR to ensure that tissue concentrations are not trending in a positive direction.

A site inspection could not be performed during the review period due to the ongoing COVID-19 pandemic. An inspection should be scheduled when it is determined to be safe to do so.

VII. PROTECTIVENESS STATEMENT

Table 4, below, presents the OU and Sitewide protectiveness statements.

Table 4: Protectiveness Statements

Protectiveness Statement(s)		
Operable Unit:	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy protects human health and the environment. The dredging and capping of contaminated sediments have been completed, removing ecological exposure and direct contact (*i.e.,* ingestion and dermal contact with contaminated sediments) exposures to the public. Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposure to contaminated fish.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy protects human health and the environment. The dredging and capping of contaminated sediments have been completed, removing ecological exposure and direct contact (*i.e.*, ingestion and dermal contact with contaminated sediments) exposures to the public. Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposure to contaminated fish.	

VIII. NEXT REVIEW

The next FYR report for the Reynolds Metals Superfund Site is required five years from the completion date of this review.

APPENDIX A – FIGURES

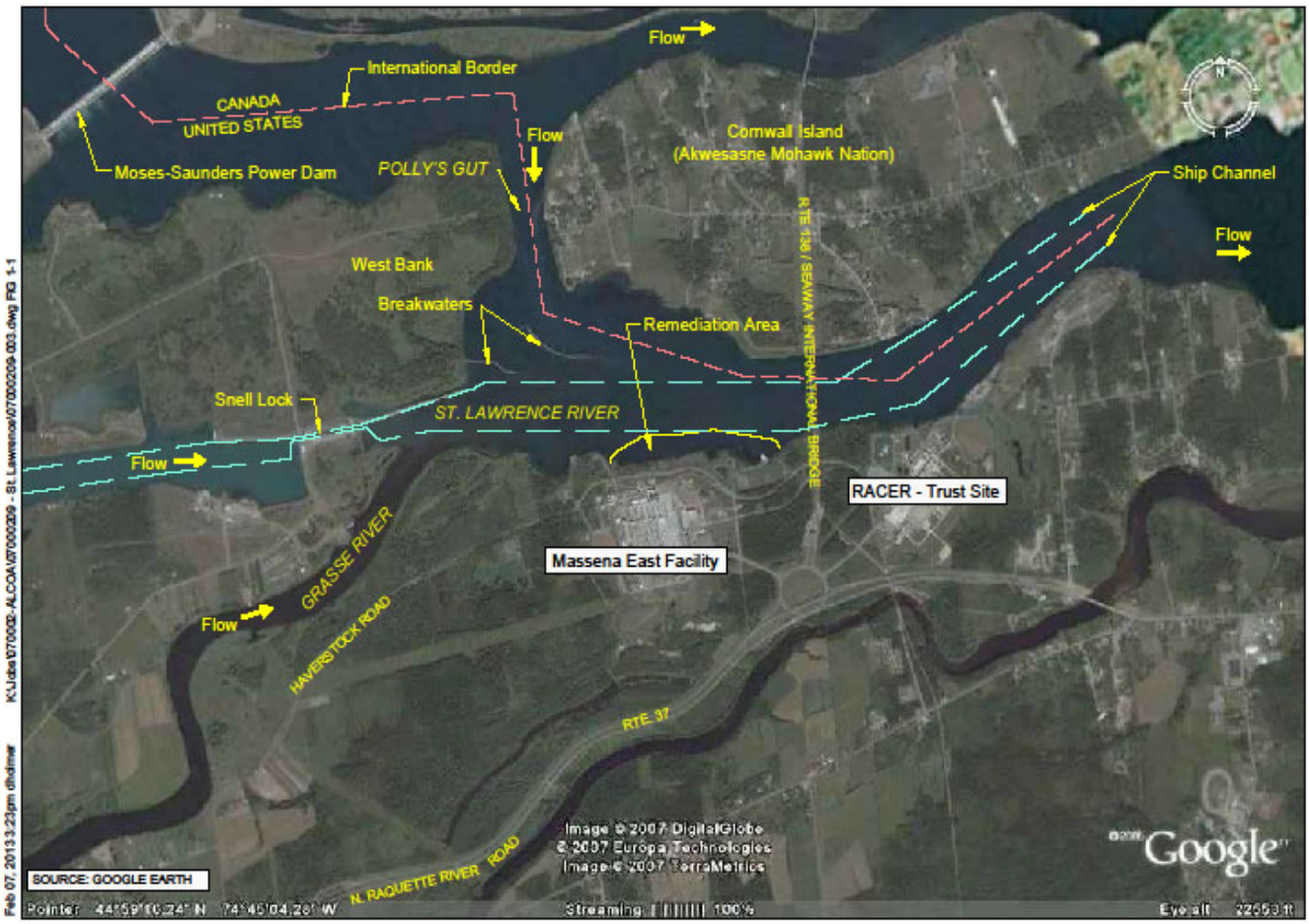

Figure 1-1
Site Overview Map
Long Term Monitoring Data Summary Report
St. Lawrence River Remediation Project

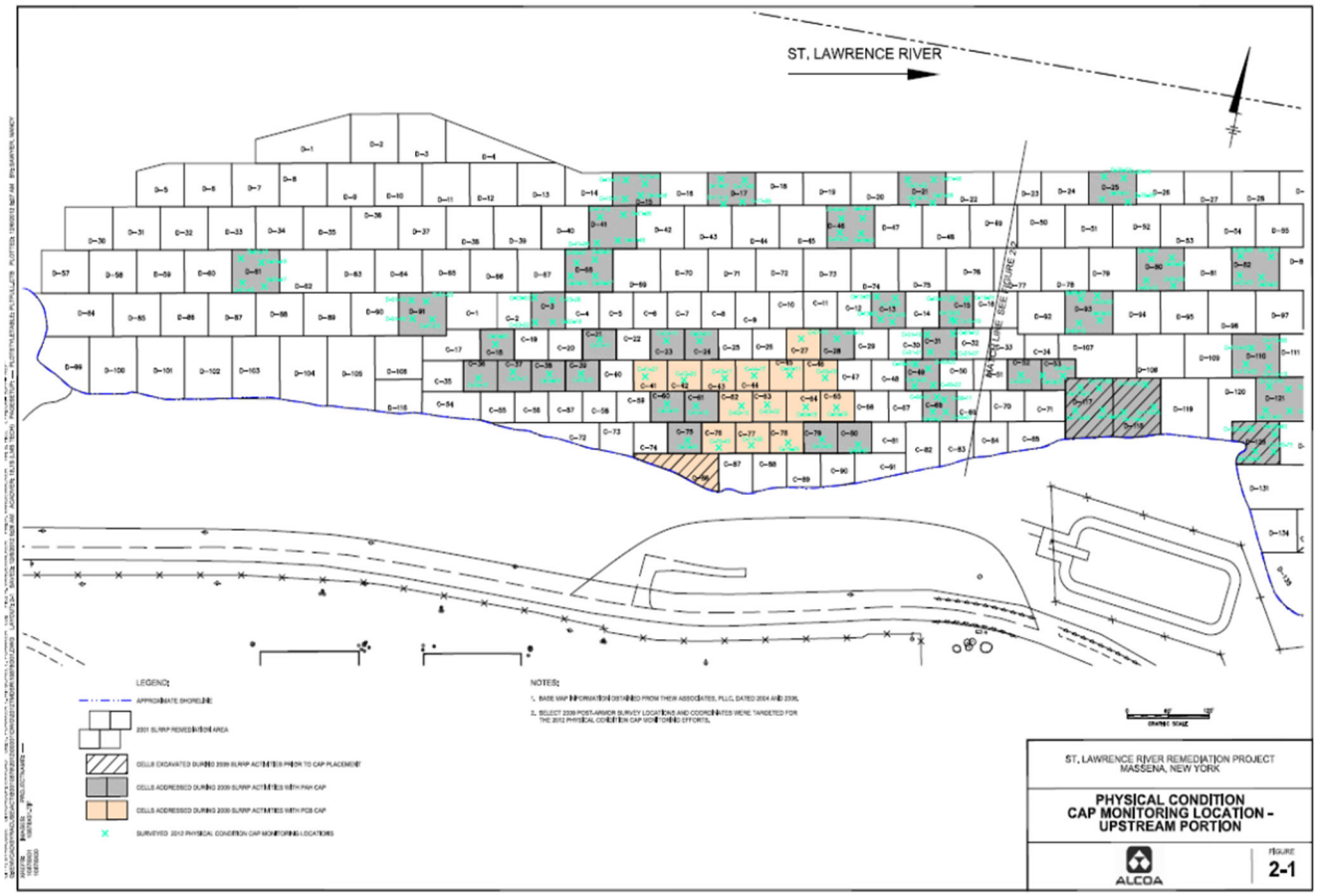
ST. LAWRENCE RIVER
MATCHLINE (SEE FIGURE 2-2)
LEGEND:
APPROXIMATE SHORELINE
2001 SLRRP REMEDIATION AREA
CELLS EXCAVATED DURING 2009 SLRRP ACTIVITIES PRIOR TO CAP PLACEMENT
CELLS ADDRESSED DURING 2009 SLRRP ACTIVITIES WITH PAH CAP
CELLS ADDRESSED DURING 2009 SLRRP ACTIVITIES WITH PCB CAP
SURVEYED 2012 PHYSICAL CONDITION CAP MONITORING LOCATIONS
NOTES:
1. BASE MAP INFORMATION OBTAINED FROM THEW ASSOCIATES, PLLC, DATED 2004 AND 2006.
2. SELECT 2009 POST-ARMOR SURVEY LOCATIONS AND COORDINATES WERE TARGETED FOR THE 2012 PHYSICAL CONDITION CAP MONITORING EFFORTS.
ST. LAWRENCE RIVER REMEDIATION PROJECT
MASSENA, NEW YORK
PHYSICAL CONDITION
CAP MONITORING LOCATION -
UPSTREAM PORTION
ALCOA
FIGURE
2-1

Figure 2 A

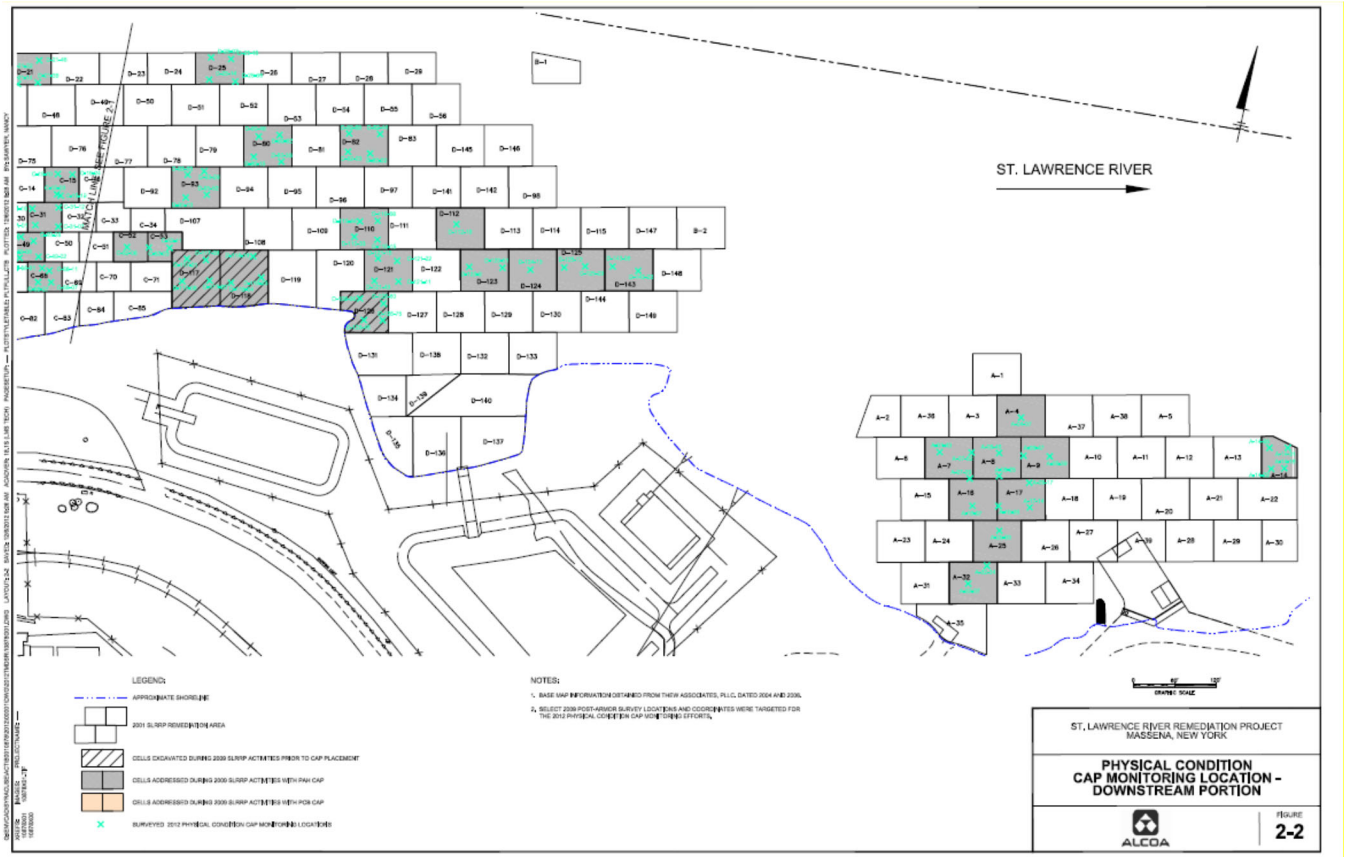
ST. LAWRENCE RIVER
LEGEND:
APPROXIMATE SHORELINE
2001 SLRRP REMEDIATION AREA
CELLS EXCAVATED DURING 2009 SLRRP ACTIVITIES PRIOR TO CAP PLACEMENT
CELLS ADDRESSED DURING 2009 SLRRP ACTIVITIES WITH PAH CAP
CELLS ADDRESSED DURING 2009 SLRRP ACTIVITIES WITH PCB CAP
SURVEYED 2012 PHYSICAL CONDITION CAP MONITORING LOCATIONS
NOTES:
1. BASE MAP INFORMATION OBTAINED FROM THEW ASSOCIATES, PLLC, DATED 2004 AND 2006.
2. SELECT 2009 POST-ARMOR SURVEY LOCATIONS AND COORDINATES WERE TARGETED FOR THE 2012 PHYSICAL CONDITION CAP MONITORING EFFORTS.
ST. LAWRENCE RIVER REMEDIATION PROJECT
MASSENA, NEW YORK
PHYSICAL CONDITION
CAP MONITORING LOCATION -
DOWNSTREAM PORTION
ALCOA
FIGURE
2-2

Figure 2B

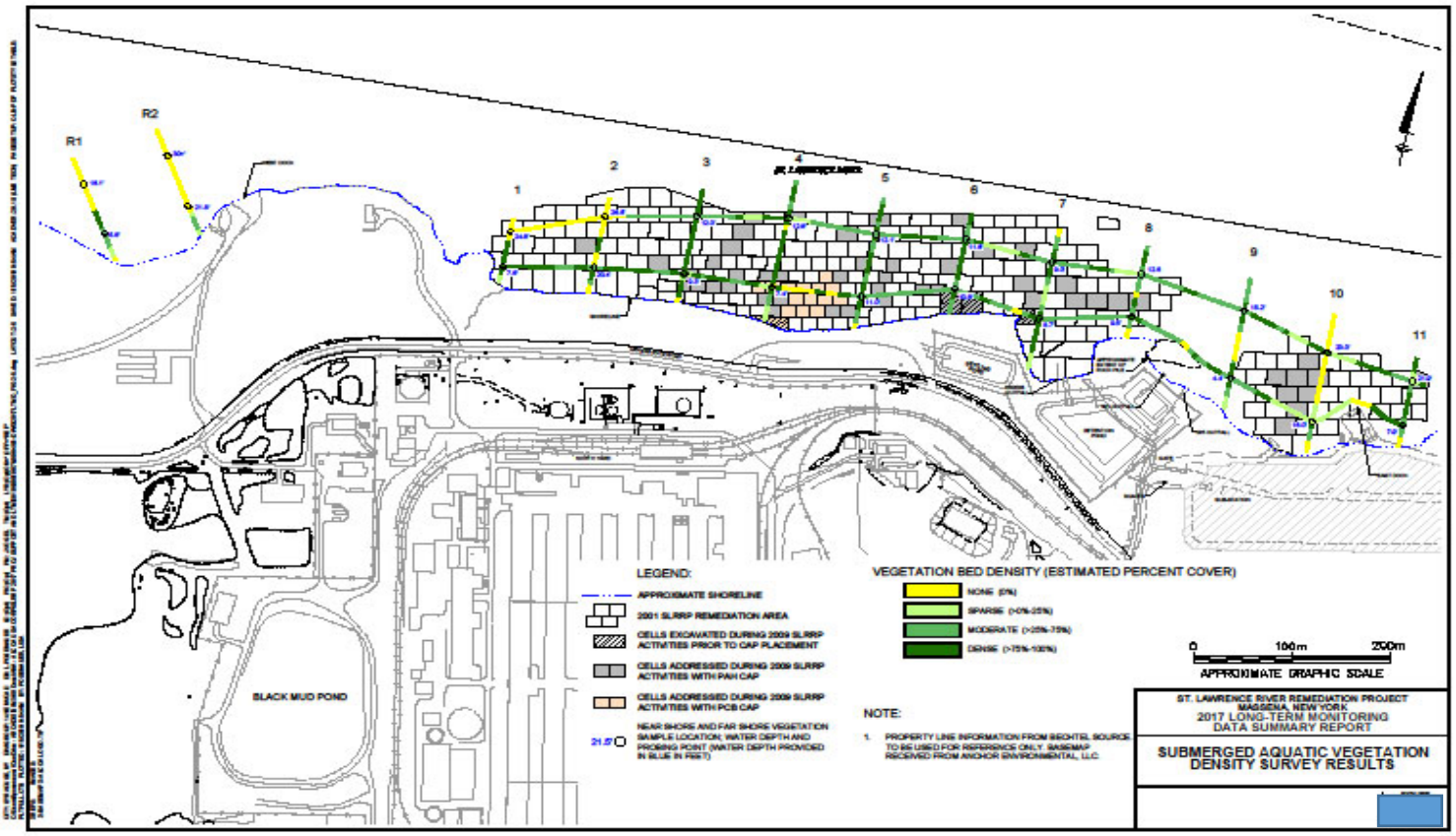
R1
R2
1
2
3
4
5
6
7
8
9
10
11
BLACK MUD POND
LEGEND:
APPROXIMATE SHORELINE
2001 SLRRP REMEDIATION AREA
CELLS EXCAVATED DURING 2009 SLRRP ACTIVITIES PRIOR TO CAP PLACEMENT
CELLS ADDRESSED DURING 2009 SLRRP ACTIVITIES WITH PAH CAP
CELLS ADDRESSED DURING 2009 SLRRP ACTIVITIES WITH PCB CAP
NEAR SHORE AND FAR SHORE VEGETATION SAMPLE LOCATION; WATER DEPTH AND PROBING POINT (WATER DEPTH PROVIDED IN BLUE IN FEET)
21.5'
VEGETATION BED DENSITY (ESTIMATED PERCENT COVER)
NONE (0%)
SPARSE (>0%-25%)
MODERATE (>25%-75%)
DENSE (>75%-100%)
0
100m
200m
APPROXIMATE GRAPHIC SCALE
NOTE:
1. PROPERTY LINE INFORMATION FROM BECHTEL SOURCE TO BE USED FOR REFERENCE ONLY. BASEMAP RECEIVED FROM ANCHOR ENVIRONMENTAL, LLC.
ST. LAWRENCE RIVER REMEDIATION PROJECT
MASSENA, NEW YORK
2017 LONG-TERM MONITORING
DATA SUMMARY REPORT
SUBMERGED AQUATIC VEGETATION
DENSITY SURVEY RESULTS

Figure 3

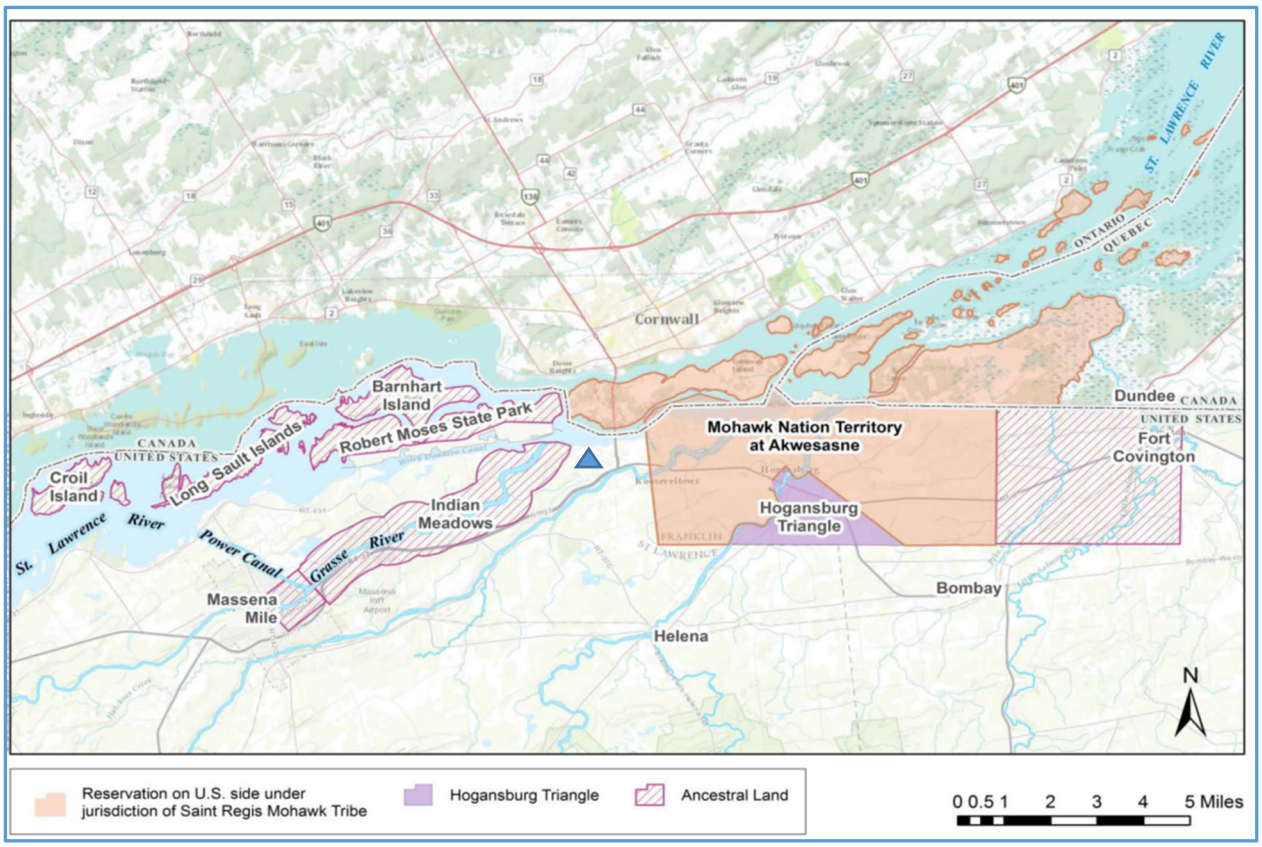

Figure 4 - Mohawk Nation Territory Map

Reynolds Metals Site =

Source: Image taken from Google Earth in August 2019.

Figure 5 – SRMT and MCA Intakes Map

= Reynolds Metals Site

= Intakes

APPENDIX B – TABLES

TABLE 1--SEDIMENT SAMPLING DATA										
Cell #	**2011 Total PAHs (mg/kg)**	**2013 Total PAHs (mg/kg)**	**2016 Total PAHs (mg/kg)**	***2011 PCBs (µg/g)***	***2013 PCBs (µg/g)***	***2016 PCBs (µg/g)***	***2011 TDBFs (ng/kg)***	***2013 TDBFs (ng/kg)***	***2016 TDBFs (ng/kg)***	***Capped Yes or No***
A-8	*0.15812*	*0.11515*	*0.0227*	*ND*	*0.405*	*ND*	*ND*	*--*	*--*	*Y*
A-25/32	*0.43293*	*0.31637*	*0.3698*	*ND*	*0.468*	*ND*	*--*	*ND*	*1.4*	*Y*
C-36/37	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*--*	*--*	*ND*	*Y*
C-45/63/64	*0.00482*	*0.04163*	*ND*	*0.0387*	*ND*	*ND*	*--*	*--*	*--*	*Y*
D-41*	*0.04561*	*0.11211*	*0.1413*	*57.39*	*ND*	*ND*	*--*	*--*	*--*	*Y*
D-46	*0.06756*	*0.02464*	*0.1199*	*ND*	*ND*	*0.576*	*ND*	*ND*	*25.0*	*Y*
D-82	*ND*	*0.04827*	*0.0825*	*ND*	*ND*	*ND*	*--*	*--*	*--*	*Y*
D-117/118	*0.04406*	*0.02676*	*NS*	*ND*	*ND*	*NS*	*--*	*--*	*--*	*Y*
D-124	*0.00866*	*0.05728*	*0.0281*	*ND*	*ND*	*ND*	*ND*	*ND*	*--*	*Y*
D-126	*3.2914*	*0.543*	*0.5167*	*0.2908*	*0.2382*	*1.358*	*--*	*--*	*--*	*Y*
A-3	*--*	*--*	*0.6243*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
A-10	*--*	*--*	*0.045*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
A-18	*--*	*--*	*0.042*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
A-19	*--*	*--*	*3.8711*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
A-20*	*6.41391*	*148.5073*	*29.619*	*2.537*	*42.2*	*9.537*	*--*	*--*	*--*	*N*
A-21	*--*	*--*	*8.033*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
A-22	*--*	*--*	*3.563*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
A-30	*--*	*--*	*8.709*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
C-7	*--*	*--*	*86.290*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
C-9	*10.73322*	*0.3001*	*0.1992*	*0.771*	*1.004*	*ND*	*--*	*--*	*71.7*	*N*
C-30	*--*	*--*	*0.2894*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
C-58	*--*	*--*	*0.772*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
C-88	*--*	*--*	*NS*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
C-89	*--*	*--*	*NS*	*--*	*--*	*--*	*--*	*--*	*--*	*N*

TABLE 1-- SEDIMENT SAMPLING DATA CONTINUED										
Cell #	**2011 Total PAHs (mg/kg)**	**2013 Total PAHs (mg/kg)**	**2016 Total PAHs (mg/kg)**	***2011 PCBs (µg/g)***	***2013 PCBs (µg/g)***	***2016 PCBs (µg/g)***	***2011 TDBFs (ng/kg)***	***2013 TDBFs (ng/kg)***	***2016 TDBFs (ng/kg)***	***Capped Yes or No***
D-27	*--*	*--*	*15.7447*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
D-36	*2.49973*	*0.097*	*0.6883*	*1.509*	*0.164J*	*ND*	*--*	*129*	*--*	*N*
D-59	*--*	*--*	*3.665*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
D-62	*0.73596*	*0.23398*	*0.3439*	*0.746*	*0.0904*	*ND*	*47.5*	*--*	*--*	*N*
D-85	*--*	*--*	*4.9932*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
D-96	*0.08145*	*0.87852*	*NA*	*ND*	*0.4178*	*ND*	*--*	*--*	*--*	*N*
D-102	*--*	*--*	*5.458*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
D-108*	*365.3*	*1.4987*	*5.5935*	*ND*	*0.716*	*2.369*	*--*	*--*	*--*	*N*
D-116	*--*	*--*	*10.8356*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
D-122	*--*	*--*	*3.1823*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
D-130	*--*	*--*	*0.9348*	*--*	*--*	*--*	*--*	*--*	*--*	*N*
D-142	*--*	*--*	*1.897*	*--*	*--*	*--*	*--*	*--*	*--*	*N*

1. *Sample locations are shown in Figures 2A and 2B.*
2. *ND = Non detect*
3. *NS = No sample*
4. *NA = Sample not analyzed due to lack of sample volume. Lab analyzed remaining material for TOC instead of PAHs*
5. *PAHs = Polyaromatic Hydrocarbons*
6. *PCBs = polychlorinated biphenyls*
7. *TDBFs = total dibenzofurans*
8. *Mg/kg = milligrams per kilogram*
9. µg/g = micrograms per gram
10. ng/kg = nanograms per kilogram
11. J = An estimated concentration
12. -- = not targeted for analysis

Note:

1. * - In 2011, Cell D-108 was resampled for PAHs. An additional four samples were taken at a 10-15 foot radius from the resample location. Center = 0.870 (mg/kg), North= 1.11, East=2.85, South= 0.205, West= 0.508
2. * - Also in 2011, Cell D-41 was resampled for PCBs. An additional four samples were taken at a 10-15 foot radius from the resample location. Center= ND, North= ND, East= ND, South= ND, West= ND
3. **- In 2013, Cell A-20 was resampled for PAHs and PCBs. An additional four samples were taken at a 10 to 15 foot radius from the resample location. PAHs (mg/kg) Center= 0.995, North= 1.277, East= 61.239, South=14.728, West = 3.258. PCBs (µg/g) Center= 0.364, North= 0.876, East =44.37, South= 18.55, and West = 3.258.

Table 2: Chronology of Site Events	
1958	RMC begins operations at the aluminum production plant
1987	RMC enters into an Administrative Order with NYSDEC to develop and implement a facility-wide remedial program.
1989	EPA issues a Unilateral Administrative Order requiring that RMC investigate and clean up contamination in the entire river system surrounding the facility.
1992	NYSDEC issues a ROD for the land-based portion of the facility.
1993	EPA issues a ROD to address the contamination in the sediments of the St. Lawrence River in the vicinity of the RMC
1995	NYSDEC issues a ROD amendment that modified the disposal requirements of the land-based portion of the remedy.
1998	EPA issues a ROD amendment that modified the disposal requirement of the river-based portion of the remedy.
2000	Alcoa merges with RMC
2000	Dredging and subaqueous (PCB) cap design reports completed and approved.
2001	Contaminated sediments are dredged from the St. Lawrence River in the vicinity of the RMC facility
2003	Alcoa collects additional shallow sediment samples from the River and analyzes them for PAHs
2004	Alcoa collects additional sediment sample cores from the River and analyzes them for PAHs
2005	EPA requests that Alcoa complete remedy at the RMC site.
2005	Alcoa submits a design work plan for a PAH cap.
2006	First Five-Year Review
2009	Alcoa completes the PCB cap over 15 cells, caps 50 cells with a PAH cap and an additional 3 nearshore cells with a PCB cap to complete the remedial action.

2010	Remedial Action Report Approved
2011	Second Five-Year Review
2016	Alcoa closes manufacturing facility
2016	Third Five Year Review

APPENDIX C – REFERENCE LIST

Documents, Data, and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	**Date**
Record of Decision for the Reynolds Metals Company site, Massena, NY, EPA	1993
Record of Decision Amendment for the Reynolds Metals Company site, Massena, NY, EPA	1998
Final Dredging Program Work Plan for the River Remediation Project at the RMC site, Massena, NY, Bechtel	2000
Final Dredging Project Design Report for the River Remediation Project at the RMC site, Massena, NY, Metcalf & Eddy	2000
Subaqueous Cap Design for the Remediation of the St. Lawrence River at the RMC site, Massena, NY, Bechtel	2000
Draft Interim Completion Report for the St. Lawrence River at the RMC site, Massena, NY, Metcalf & Eddy	2002
Supplemental PAH Sampling Results at the RMC site, Massena, NY, Bechtel	2003
Work Plan for the Completion of Remedial Action Activities at the RMC site, Massena, NY, Alcoa	2003
2004 PAH Sampling Results, Alcoa	2005
Design/Work Plan for the Installation of PAH Cap in the St. Lawrence River, prepared by Anchor Environmental, LLC for Alcoa	2005
Detailed Comparative Analysis of Alternatives for the St. Lawrence River, prepared by Anchor Environmental for Alcoa	2005
Technical Memorandum, Supplemental Information to the Detailed Comparative Analysis of Alternatives, St. Lawrence River Remediation Project, prepared by Anchor Environmental, LLC for Alcoa	2006
First Five Year Review for the Reynold Metals site, prepared by EPA	2006
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 ROD.	
Construction Completion Report for the St. Lawrence River Remediation Project, prepared by Anchor Environmental, LLC for Alcoa	2010
Second Five Year Review for the Reynolds Metals site, prepared by EPA	2011
Long-term Monitoring Data Summary Report, prepared by Anchor QEA, LLC and Arcadis for Alcoa	2014

Third Five Year Review for the Reynolds Metals site, prepared by EPA	2016
Long-term Monitoring Data Summary Report, prepared by Anchor QEA, LLC and Arcadis for Alcoa	2016
Long-term Monitoring Data Summary Report, prepared by Anchor QEA, LLC and Arcadis for Alcoa	2017
Long-term Monitoring Data Summary Report, prepared by Anchor QEA, LLC and Arcadis for Alcoa	2018

APPENDIX D— PHYSICAL CHARACTERISTICS, GEOLOGY/HYDROGEOLOGY, LAND USE, AND FACILITY RESPONSE ACTION

Physical Characteristics

The RMC site, a shallow shelf within the St. Lawrence River adjacent to the RMC facility, contains slow currents, fine-grained sediments, and dense beds of submerged aquatic vegetation (SAV). The shallow shelf was created in the late 1950's by dredge spoils from the south Cornwall Navigation Channel, within the St. Lawrence Seaway, that is located 300 to 800 feet offshore from the RMC facility. Dredge spoils have not been deposited in this section of the river since the initial dredging.

Site Geology/Hydrogeology

The St. Lawrence Seaway shipping channel runs adjacent to the remediation area. Currents in the main river channel are 8 feet per second or greater. This flow is deflected to the east by training dikes that protect the Seaway channel. There are a series of clockwise and counterclockwise eddies as the main current exits the training dikes. Currents within the shallow portions of the remediation area are generally stagnant. In general, the regional topography of the area is characterized by low, elongated ridges of glacial till that generally trend northeast-southwest. Broad, flat valleys between the ridges contain marshy areas and meandering streams that drain to the St. Lawrence, Raquette, and Grasse Rivers. Beneath the study area are approximately 100 feet of overburden materials, consisting primarily of glacial till and clay, overlying fractured carbonate bedrock. The sediments within the study area are also dominated by glacial tills, clays, and sandy depositional units.

Land and Resource Use

Land use in the area surrounding the RMC site consists of mixed residential and industrial uses with the Mohawk Territory of Akwesasne and Mohawk ancestral lands adjacent the site (Figure 4). Located directly north of the Reynolds Metals site is Kahwenoke, aka Cornwall Island. This area of the Mohawk Territory is predominantly residential with Mohawk businesses, schools, government buildings and agricultural/farm lands.

As noted in the 2010 census, approximately 3,288 individuals live on the Saint Regis Indian Reservation, located within 0.5 miles of the site. Saint Regis Mohawk Reservation residents do not traditionally participate in the US Census so the record of 3,288 individuals living on the reservation is considered low. The downtown area of Massena is located approximately eight miles west and upriver of the site. In the 2010 census, the population within the Town of Massena was approximately 10,883.

The recently shuttered RMC aluminum manufacturing facility is currently occupied by Coinmint, a cryptocurrency mining company, and is zoned industrial. It encompasses 1,600 acres, 112 of which were utilized by the facility. The property also contains a 170-acre tract of Class 2 regulated water wetlands. Local water bodies are used recreationally for swimming, wading, fishing, boating, camping, and picnicking. The Mohawk native population and recreational fisherman fish in the vicinity of the RMC site in both open water and ice cover. Local land-based and shoreline plants and wildlife have Mohawk cultural uses for ceremonies, medicines and food. However, direct land access to the site is limited by the steep nature of the shoreline. The River is also used as a public water supply and the Saint Regis Mohawk Tribe water intake is located about one and

a half miles downstream or east of the site, with the Mohawk Council of Akwesasne water intake slightly further downstream (Figure 5).

Facility Response Actions

The RMC facility was placed on the NYSDEC Registry of Inactive Hazardous Waste Sites in September 1987. RMC, under a Consent Order with NYSDEC, agreed to investigate the contamination at the facility; this investigation excluded the St. Lawrence River.

In January 1992, NYSDEC issued a Record of Decision (ROD) that called for a combination of excavation and treatment of areas highly contaminated with PCBs and other contaminants and consolidation and containment of other contaminated areas on the grounds of the facility. In March 1993, RMC and NYSDEC signed a Consent Order that required RMC to implement the selected remedy. In June 1995, NYSDEC issued a ROD amendment allowing on-site disposal of soils and sediments containing less than 50 milligrams per kilogram PCBs and requiring more highly contaminated soils and sediments to be disposed of off-site.