Five-Year Review Report
Reynolds Metals Company Site
St. Lawrence County
Town of Massena, New York

Prepared by:

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

February 2011

Table of Contents

FIGURE

TABLES

Acronyms Used in this Document	
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIC	Community Involvement Coordinator
CY	Cubic yards
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
μg/kg	Micrograms per kilogram
mg/kg	Milligram per kilogram
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PRP	Potentially Responsible Party
RMC	Reynolds Metals Company
ROD	Record of Decision
RPM	Remedial Project Manager
TDBFs	Total Dibenzofurans

EXECUTIVE SUMMARY

This is the second five-year review for the Reynolds Metals Company site, located in the Town of Massena, St. Lawrence County, New York. The selected remedies have been fully implemented. Monitoring and maintenance associated with the remedies are ongoing. The Environmental Protection Agency believes that the selected remedies protect public health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name *(from WasteLAN)*: Reynolds Metals Company site		
EPA ID *(from WasteLAN)*: NYD002245967		
Region: 2	**State:** NY	**City/County:** Town of Massena/St. Lawrence County

SITE STATUS	
NPL Status: ☐ Final ☐ Deleted ■ Other (specify) Not on NPL	
Remediation Status (choose all that apply): ☐ Under Construction ☐ Operating ■Complete	
Multiple OUs? ☐ YES ■ NO	**Construction completion date:** 10/09
Are portions of the site in use or suitable for reuse? ☐ YES ☐ NO ■ N/A	

REVIEW STATUS	
Lead agency: ■ EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author name: Pamela Tames	
Author title: Remedial Project Manager	**Author affiliation:** EPA
Review period: 04/05/2006 - 2/1/2011	
Date(s) of site inspection: 10/27/10	
Type of review: ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ■ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion ☐ Policy ☐ Statutory	
Review number: ☐ 1 (first) ■ 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction at OU #1 ☐ Actual RA Start at OU # ☐ Construction Completion ■ Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date *(from WasteLAN)*: 04/05/2006	
Due date ***(five years after triggering action date)***: 04/05/2011	
Does the report include recommendation(s) and follow-up action(s)? ☐ yes ■ no **Acres in use or suitable for use:** **restricted:** N/A **unrestricted:** N/A	

Five-Year Review Summary Form (continued)

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

A St. Lawrence River biota sampling plan should be developed in conjunction with the Trustees and appropriate government agencies and coordinated with monitoring at the adjacent Superfund sites (Grasse River Aluminum Company of America site and General Motors site).

A cap monitoring and maintenance plan should be developed.

New York State requires annual certifications that remedy-related maintenance is being performed. Annually, Alcoa, the potentially responsible party, will need to certify that the subaqueous cap maintenance is being performed.

Protectiveness Statement

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. The implemented remedy for the site is fully protective.

I. Introduction

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

A five-year review is required at the RMC site because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

The trigger for this five-year review is the previous five-year review dated April 5, 2006.

II. Site Chronology

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

III. Background

Site Location

The RMC facility, an active 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 Motors Liquidation Company. St. Regis Mohawk Tribal lands, known as Akwesasne, are located to the east, and Route 37 and the Grasse River are situated to the west.

The RMC 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). Figure 1 identifies the RMC site's location.

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 submergent aquatic vegetation. The shallow shelf was created in the late 1950's by dredge spoil 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 eight 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. Approximately 9,000 individuals live on the St. Regis Indian Reservation, located within 0.5 mile of the site. The downtown area of Massena is located approximately eight miles west and upriver of the site. In 2009, the population within the Town of Massena was approximately 10,500.

The RMC facility is an active manufacturing facility and is zoned industrial. It encompasses 1,600 acres, 112 of which are utilized by the facility. The property also contains a 170-acre tract of Class 2 regulated 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. However, direct land access to the site is limited by the steep nature of the shoreline.

History of Contamination

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 located approximately 100 feet from the shore. Outfall 004 carried intermittent runoff from northern areas of the plant.

Initial Response

The RMC facility was placed on the New York State Department of Environmental Conservation (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. It should be noted that 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 polychlorinated biphenyls (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 remedy in the ROD. In June 1995, NYSDEC issued a ROD amendment allowing on-site disposal of soils and sediments containing less than 50 milligrams per kilogram (mg/kg) PCBs and requiring more highly contaminated soils and sediments to be disposed of off-site.

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 PCBs, polycyclic aromatic hydrocarbons (PAHs), and total dibenzofurans (TDBFs) from discharges from the facility, and that the contaminated sediments presented both a potential human health and ecological risk. The human health pathways of concern were dermal contact with contaminated sediments, ingestion of contaminated sediments, and ingestion of contaminated fish.

In March 1992, RMC submitted a draft Analysis of Alternatives Report that evaluated options for remediating the contaminated sediments. In January 1993, RMC submitted a revised report.

IV. Remedial Actions

Remedy Selection

EPA issued a ROD for the site in September 1993. The major components of the remedy include[1]:

---

[1] Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information, standards, and risk-based levels established in the risk assessment. The following remedial action objectives for the site were identified in the ROD: 1) prevent human and biota contact with contaminated sediments; 2) reduce and/or prevent human ingestion of fish caught from

- Dredge St. Lawrence River sediments that contain greater than1 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 their 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 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.

Remedy 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 a total of 268 dredge cells, with an average cell size of approximately 0.08 acre. 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[2] positioning systems and continued

---

the St. Lawrence River; and 3) reduce short-term impacts to surface water and air expected as a result of remedial activities.

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

through mid- October 2001. Of the 30 acres in the remediation area, 21.8 were dredged. After the first pass dredging which removed an estimated 63,265 cubic yards of sediment, post-dredging sampling indicated that 134 cells required redredging. Several cells required numerous rounds of redredging. The redredging activities removed an additional 22,390 cubic yards (CY) of sediment. A total mass of approximately 20,200 pounds of PCBs were removed from the St. Lawrence River[3].

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 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.

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. Since 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 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. See Figure 2 for a cell diagram.

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).

An Explanation of Significant Differences (ESD) that documented changes to the 1993 ROD and the 1998 ROD amendment was issued in December 2008. The ESD concluded that capping the

---

[3] 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.

remaining contaminated cells was the proper way to complete the remedial action at the site. There was a concern 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. It was also determined that 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.

During the 2009 construction season, the PCB cap was completed. The PCB cap for the 0.75-acre area included 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 in order to maintain the original bathymetry. In addition, 50 cells that contain total PAH levels above 20 mg/kg were capped with a 6-inch sand layer followed by a 6-inch armor layer. Pre-construction sampling of an additional three shoreline cells which had elevated levels of PAHs were also shown to have elevated levels of PCBs and were capped with a PCB-style cap rather than a PAH-style cap following excavation. The excavation prior to capping was performed in order to maintain the original bathymetry at the shoreline. 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. This layer is expected 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.

Remedial Action Reports for the dredging and capping remedial actions were approved on October 18, 2010.

Institutional Controls Implementation and Other Measures

The ROD, as modified by the ROD amendment and ESD, did not call for institutional controls.

The ESD incorporated the New York State Fish advisory, posted for the entire St. Lawrence River to prevent or limit exposure to contaminated fish, into the remedy. The site effluent discharged via the adjacent outfalls is currently managed with a discharge permit. The first five-year review suggested that warning signs might be needed to protect the integrity of the subaqueous cap from anchors. It was, however, determined that warning signs would not be necessary, since the loose stones which make up the armor layer would self-seal and refill any holes left behind when anchors were used within the capped areas.

System Operations/Operation and Maintenance/Monitoring

To maintain the integrity and effectiveness of the subaqueous caps, monitoring the caps for erosion and making repairs as necessary are required annually. Although a cap maintenance plan for the site has not been finalized, the subaqueous sediment caps were inspected in the spring of 2010 with an underwater video camera. Inspections indicated that the caps needed no repairs. Young-of-year pumpkinseed fish were monitored for PCBs during the spring of 2010. Additional monitoring and inspections will continue.

The maintenance and monitoring costs are approximately $125,000 on an annual basis.

V. Progress Since The Last Five-year Review Report

The first five-year review for this site, which was approved on April 5, 2006, noted that a determination needed to be made whether to dredge and/or cap the cells containing PAH contamination above the cleanup goals and then the selected course of action subsequently implemented. The five-year review determined that the remedy for the site would be fully protective once the remaining remedial measures called for in the ROD, as amended, were in place.

An ESD was issued in December 2008, which concluded that capping the remaining contaminated cells was the appropriate way to complete the remedial action at the site. It was also determined that 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.

The dredging and capping of the contaminated sediments were completed in 2009. The remediated area is currently being monitored to ensure the stability of the cap and recovery of the fish, benthic community, submerged aquatic vegetation, and sediment, although a current monitoring report was not available for this five-year review.

VI. Five-Year Review Process

Administrative Components

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

Document Review

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

Community Involvement

The EPA Community Involvement Coordinator (CIC) for the RMC site, Michael Basile, published a notice in the *Massena Daily Courier-Observer* on October 12, 2010, notifying the community of the initiation of the five-year review process. The notice indicated that EPA would be conducting a five-year review of the site to ensure that it is protective of public health and the environment and that the implemented components of the remedy are functioning as designed. It was also indicated that once the five-year review is completed, the results would be

made available in the local site repository. In addition, the notice included the addresses and telephone numbers for the RPM and CIC for questions related to the five-year review process or the RMC site.

Data Review

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 did not hold true for PAHs. Elevated PAHs were found in dredged cells that met the cleanup goals for PCBs and TDBFs. Seventy-six cells (6.08 acres) remained above the cleanup goal of 10 mg/kg for PAHs, fifty-three (4.24 acres) of which contained PAH levels ranging from 21.25 mg/kg to 248.9 mg/kg. Many of these cells were dredged numerous times (these cells met the cleanup goal of 1 mg/kg for PCBs). To complete the remedial action, the 53 cells were capped. Twenty-three cells containing total PAHs between 10 mg/kg and 20 mg/kg were not capped since it was determined that the low molecular weight PAHs would readily break down over a short period of time bringing the total PAH level for these cells below 10 mg/kg. Monitoring will be performed as part of the Operation & Maintenance activities to confirm that the total PAH level of these cells has dropped to below the 10 mg/kg action level.

Site Inspection

The need for ongoing five-years reviews stems from the presence of subaqueous, contaminated sediments. A site inspection was conducted as part of this five-year review on October 26, 2010. Pamela Tames and Charles Nace of EPA and Bruce Cook and Dan Casey of Alcoa participated in the site inspection.

Interviews

No interviews were conducted for this review.

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

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

Institutional Controls Verification

As was noted above, the ROD, as modified by the ROD amendment and ESD, did not call for institutional controls. Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposure to contaminated fish. The 2010-2011 New York State Fish Advisory for the St. Lawrence Seaway can be found at http://www.health.state.ny.us/environmental/outdoors/fish/docs/fish.pdf.

VII. Technical Assessment

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

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

Approximately 20,200 pounds of PCBs have been 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 RMC site. As a result of the 2002, 2003 and 2004 PAH sampling efforts, it was estimated that 747 pounds of PAHs remain within the sediments. This constitutes a 96% decrease in the amount of PAHs present in the sediments.

Thirty-two of the 268 dredged cells (twelve percent) 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.

The removal of contaminated sediments from the St. Lawrence River, in addition to the river's physical constraints, has prevented 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.

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.

The remedial action activities in the remaining cells containing elevated levels of PAHs above the cleanup goal have been fully implemented. Fifty-three cells (4.24 acres) with elevated levels of PAHs were capped. Based on the physical hazards, limited access, and currents within the St. Lawrence River in the dredged area, it is anticipated that swimming and wading in the river in this area is unlikely. Additionally, the overall reduction in sediment concentrations within this area has reduced potential risks in the unlikely event of an individual recreating there.

In summary, the dredging and capping have been completed and the remedy is functioning as intended by the decision documents. The remediated area is currently being monitored to ensure the stability of the cap and recovery of the fish, benthic community, submerged aquatic vegetation, and sediment, although a current monitoring report was not available for this five-year review. Discussions with representatives from Alcoa indicate that based on preliminary data since the cap was installed, the cap appears to be functioning as intended.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Human Health Risk

Since the ROD and ROD amendment were signed, there have been a number of actions at the site that have interrupted the exposure pathways, as described above. These actions have reduced the concentrations of PCBs, PAHs, and TDBFs in the river sediments and interrupted potential direct exposure to contaminants. 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 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 risk assessment. Additionally, the overall reduction in sediment concentrations will further reduce potential risks in the event that an individual recreates within this area.

The ROD identified remedial goals of 1 mg/kg for PCBs and 10 mg/kg for PAHs, and 1 µg/kg for TDBFs. Based on the current exposure assumptions and toxicity information, these values are protective of children and adults based on age-specific exposure assumptions that include 350 days/year for 70 years.

Fish, Waterfowl and Snapping Turtle Consumption

At the current time, the New York State Department of Health (NYSDOH) continues to issue fish consumption advisories for the St. Lawrence River (whole river). The advisories (2010/2011) include recommendations to "eat none" for American eel, channel catfish, lake trout over 25 inches long, carp, and brown trout over 20 inches long. The advisories are based on PCBs, mirex, and dioxin contamination in fish. The recommendation to "eat no more than one meal per month" of white perch, white sucker, rainbow trout, smaller lake trout, smaller brown trout, coho salmon over 25 inches long, and chinook salmon is based on PCB, mirex, and dioxin contamination.

Women under 50 years of age and children under the age of 15 years are advised to not eat any fish species from the St. Lawrence River. The advisories will remain in place and the recommendation will be re-evaluated by NYSDOH during the development of the annual future advisories.

Women of childbearing age, infants, and children under the age of 15 years should avoid eating snapping turtles or soups made with their meat based on PCB contamination. General advisories exist against consumption of Mergansers, which are the most heavily PCB-contaminated waterfowl species.

Source: NYSDOH 2010-2011 Chemicals in Sportfish and Game, 2010-2011 Health Advisories available at: http://www.health.state.ny.us/environmental/outdoors/fish/docs/fish.pdf

Changes in Toxicity and Exposure Assumptions

The 1990 PCB guidance entitled *A Guide on Remedial Actions at Superfund Sites with PCB Contamination* (OSWER Directive 9355.4-01 FS) that identifies consideration in the development, evaluation, and selection of remedial actions at Superfund sites with PCB contamination has not been updated. Since the site ROD was issued, EPA reassessed the cancer toxicity of PCBs and this reanalysis resulted in a reduction of the PCB cancer slope factor from 7.7 mg/kg-day^{-1} to 2 mg/kg-day^{-1} for fish ingestion, sediment and soil ingestion, dust or aerosol inhalation, and dermal exposure (see www.epa.gov/iris chemical file for PCBs). The externally peer-reviewed report was issued in September 1996 and, subsequently, an Integrated Risk Information System (IRIS) Chemical file for PCBs was developed and is now available at www.epa.gov/iris. In addition, new guidance was developed in the late 1990s and finalized in 2002 that provides methodologies for assessing dermal exposures to PCBs and other chemicals. The resulting impacts of these changes in toxicity and exposure assessment resulted in the determination that the original cleanup goals for PCBs are protective.

The noncancer toxicity values for Aroclor 1016 and Aroclor 1254 are also available in the IRIS system (www.epa.gov/iris). These toxicity values have not been modified since they were originally entered into the system on January 1, 1993 and October 1, 1994, respectively. In 1993, when the Risk Assessment was developed, the Reference Dose for Aroclor 1016 was used. In addition, the Reference Dose for Aroclor 1254 was developed in 1993, but would not modify the remediation goals. The toxicity values of 1 mg/kg and 10 mg/kg are consistent with the noncancer toxicity values.

The cancer slope factor for benzo(a)pyrene of 7.3 mg/kg-day^{-1} was established in IRIS in 1993 and remains the current toxicity value. At the current time, EPA through the IRIS process, is re-evaluating the toxicity of this chemical and the next five-year review will need to consider the revised toxicity values.

Vapor Intrusion

An evaluation of vapor intrusion is not appropriate within the St. Lawrence River.

Ecological Risk

Based on the previous five-year review, the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy are still protective. This information was reviewed for this five-year review and the conclusions from the 2006 five-year review are still valid. Sediment removal in combination with capping reduces the potential uptake of sediment contaminants in aquatic organisms in the river and reduces or eliminates the exposure to ecological receptors in the river and in those that utilize the river.

Long-term monitoring will continue to be conducted to evaluate the stability of the caps, the chemical concentration in young-of-year fish and sediment, the benthic community structure, and recovery of the submerged aquatic vegetation. 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 effectiveness of remedies from other contaminated sites that are located within the area.

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

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

Institutional Controls Verification

As was noted above, the ROD, as modified by the ROD amendment and ESD, did not call for institutional controls. Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposure to contaminated fish. The New York State fish advisory is located at http://www.health.state.ny.us/environmental/outdoors/fish/docs/fish.pdf.

Technical Assessment Summary

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

- The three-layer cap placed over the PCB-contaminated sediments is intact over 15 cells;
- Fifty-three cells (4.24 acres), characterized by range in total PAH concentrations ranging from 21.3 mg/kg to 284.9 mg/kg and were remediated with a sand and armor layer cap followed by placement of a habitat layer;
- Twenty-three cells are characterized by total PAH concentrations between 10 mg/kg and 20 mg/kg with most cells below 13 mg/kg. The lower molecular weight PAHs in these cells are expected to readily break down over a short period of time bringing their total PAH levels to below the action level of 10 mg/kg and;
- Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposures to contaminated fish. The contaminated sediments have been addressed and post-remediation monitoring is regularly scheduled in order to assess the protectiveness of the remedy.

VIII. Issues, Recommendations, and Follow-Up Actions

There are no recommendations or follow-up actions stemming from this five-year review.

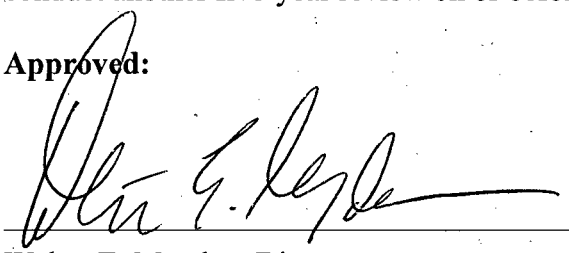
IX. Protectiveness Statement

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. The implemented remedy for the site is fully protective.

X. Next Review

Since hazardous substances, pollutants or contaminants remain at the site which do not allow for unlimited use or unrestricted exposure, in accordance with 40 CFR 300.430 (f) (4) (ii), the remedial action for the site shall be reviewed no less often than every five years. EPA will conduct another five-year review on or before February 2016.

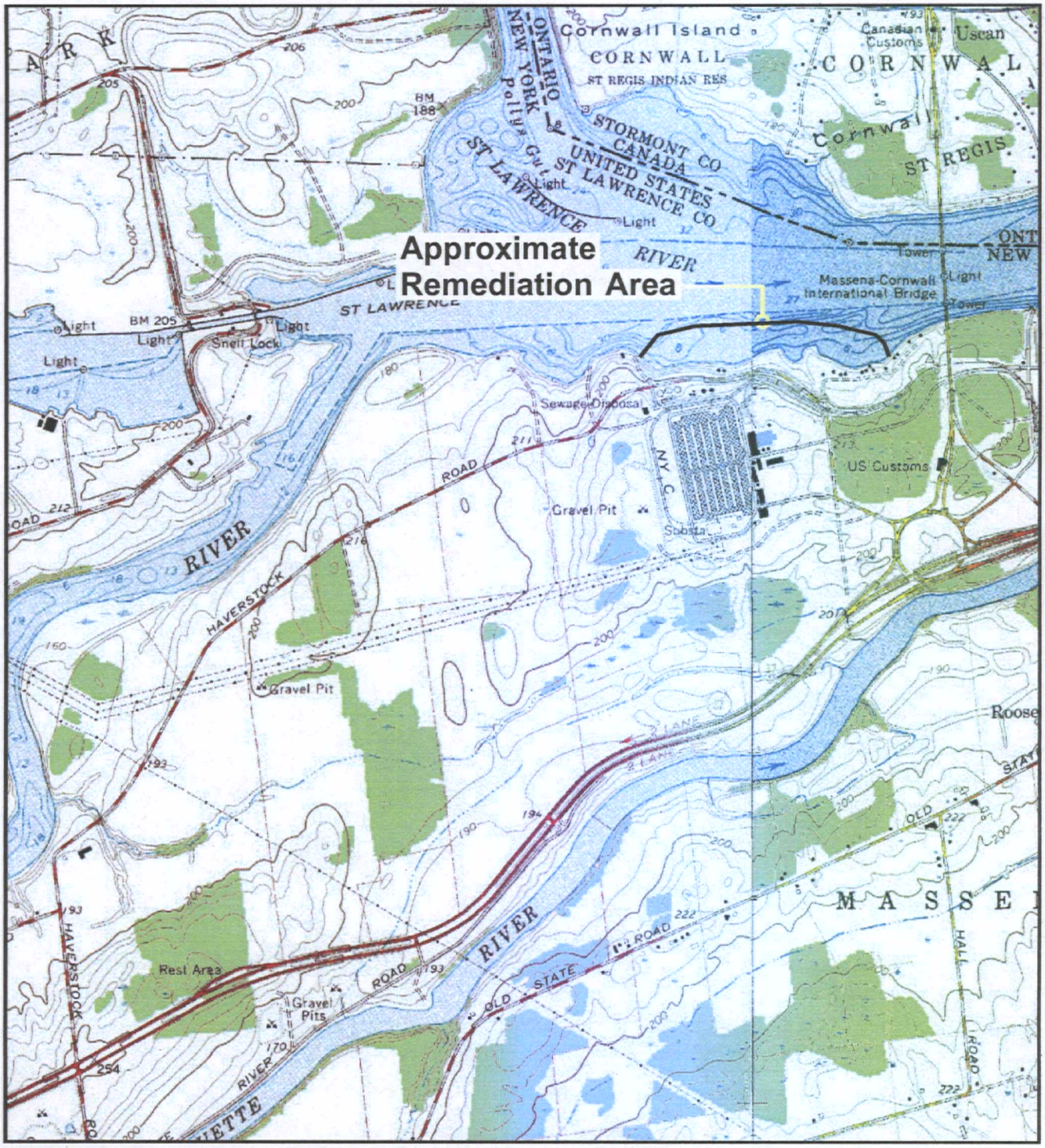
Approved:



2/14/2011

Walter E. Mugdan, Director — Date

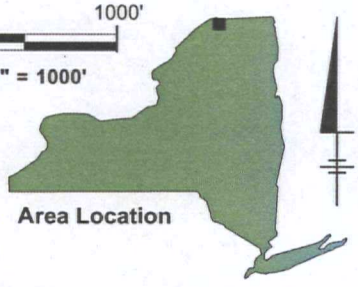
Emergency and Remedial Response Division



REFERENCE: BASE MAP SOURCE USGS 7.5 MIN TOPO QUADS., HOGANSBURG, NY-ONT-QUE, 1964, PHOTOREVISED, 1987 AND RAQUETTE RIVER, NY-ONT. 1964.

1000' 0 1000'

Approximate Scale: 1" = 1000'



ST. LAWRENCE RIVER
MASSENA, NEW YORK

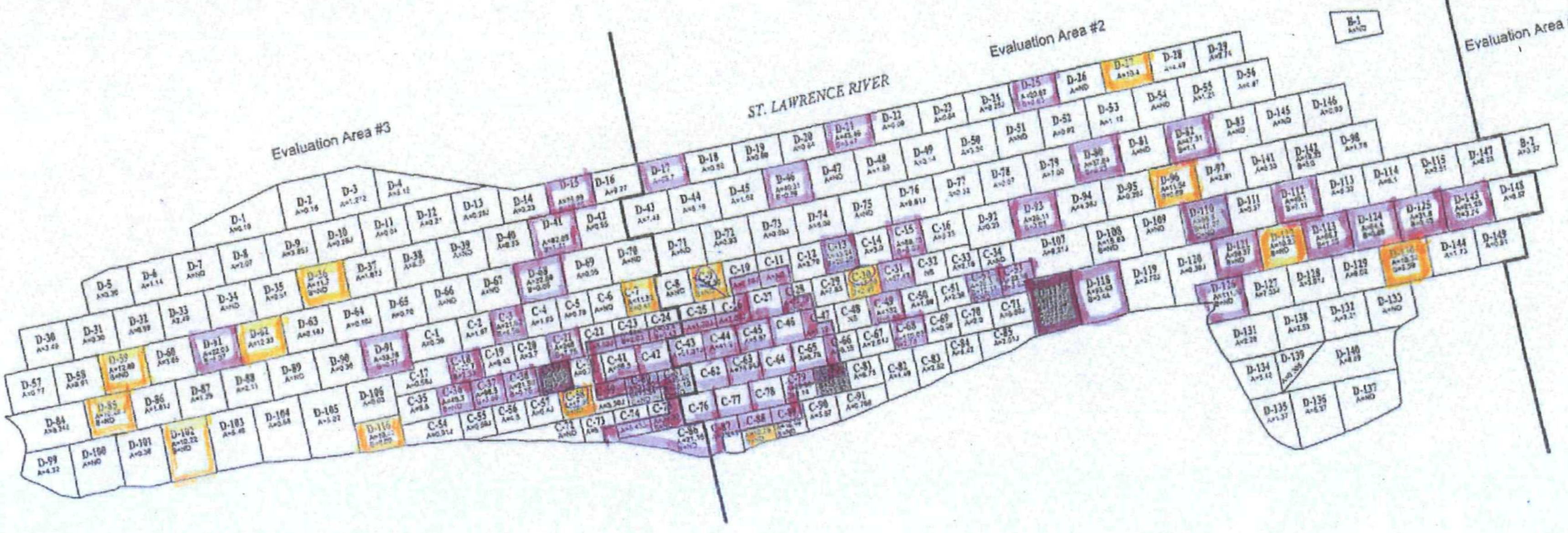
ST. LAWRENCE RIVER
2008 PROJECT AREA - LOCATION MAP

ALCOA

FIGURE
1

07/24/08 SYR-141-DJH
B0010842/0000/00001/CDR/10842N01.CDR

cells to be capped — cells with 10ppm to 20ppm PAHs — cells w/ PAHs > 15ppm



Legend

Interim Cap Area

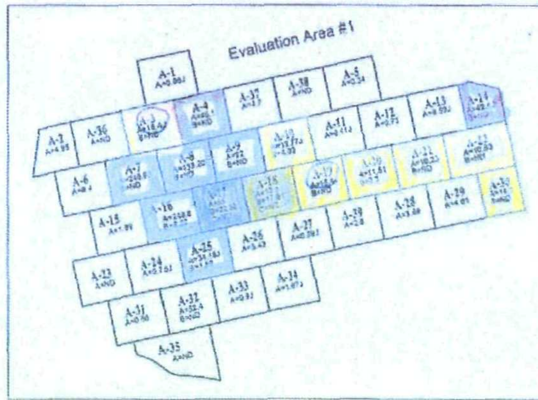
Most recent total PAH results listed below cell ID
PAH Action Level=10 ppm

Key	Sample Depth
A	0 to 8 in.
B	8 to 16 in.
C	16 to 24 in.
D	24 to 30 in.

- Total PAH < 10 ppm
- Total PAH > = 10 ppm at a depth from 0 to 8 in.
- Total PAH > = 10 ppm at a depth from 0 to 16 in.
- Total PAH > = 10 ppm at a depth from 0 to 24 in.

- Total PAH Sample Results 2004 Sample Data Inclusive
- Total PAH Sample Results 2006 Sample Data
- ND — Not Detected
- NS — No Sample Recovered After Multiple Attempts
- J — Estimated Value, Some Concentrations Below Reporting Limit

Notes:
1. Survey data is referenced horizontally to NAD83 and projected on the New York State Plane (east zone) and vertically to NGVD29 (ft.).
2. 10 ppm represents ROD-based action level for PAHs (EPA 1993).
3. 2004 PAH Sampling Results (Bechtel 2004)



ANCHOR ENVIRONMENTAL, L.L.C.

Figure 2a
Post-Dredge Total PAH Results (10 ppm)
St. Lawrence River

Table 1: Chronology of Site Events	
1958	Reynolds Metals Company (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 modifies the disposal requirements of the land-based portion of the remedy.
1998	EPA issues a ROD amendment that modifies 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 the remedy at the RMC site.
2005	Alcoa submits a design work plan for a PAH cap.
2009	Alcoa completes the PCB cap over 15 cells, caps 50 cells with a PAH cap and an additional three nearshore cells with a PCB cap to complete the remedial action.

Table 2: Annual Maintenance and Monitoring Costs	
Activity	**Cost per Year**
Total Estimated Cost	$125,000

Table 3: 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
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

Table 4: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls	
Comment	**Suggestion**
Now that the Reynolds Metals Company site remediation has been completed, St. Lawrence River ecological data are needed.	A St. Lawrence River biota sampling plan should be developed in conjunction with the Trustees and appropriate government agencies and coordinated with monitoring at the adjacent Superfund sites (Alcoa Grasse River site and General Motors site).
Although specific monitoring activities have been approved, a cap monitoring and maintenance plan for the site has not been finalized.	The cap monitoring and maintenance plan should be finalized.
New York State requires annual certification that remedy-related maintenance is being performed.	Annually, Alcoa, the potentially responsible party, will need to certify that the subaqueous cap maintenance is being performed.