


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION II

DATE: DEC 17 2008

SUBJECT: Explanation of Significant Differences for the Reynolds Metals Company Superfund Site

FROM: Doug Garbarini, Chief   
New York Remediation Branch

TO: Walter E. Mugdan, Director  
Emergency and Remedial Response Division

Attached is an Explanation of Significant Differences (ESD) for the Reynolds Metals Company Superfund site (Site).

The 1993 Record of Decision for the Site called for, in part, the dredging of contaminated sediments from the St. Lawrence River and consideration of other remedial actions, such as capping, if dredging alone could not attain sediment cleanup goals. While more than 90% of the targeted sediments were removed successfully from the river, cleanup goals for polychlorinated biphenyls and polycyclic aromatic hydrocarbons (PAH) were not achieved at every location. Therefore, the U.S. Environmental Protection Agency (EPA), in consultation with the New York State Department of Environmental Conservation (NYSDEC) and the St. Regis Mohawk Tribe (SRMT), has determined that the portions of the Site that did not achieve the cleanup objectives will be capped to ensure that the remedy is protective of human health and the environment.

In addition, the sediments in a number of locations have post-construction total PAH concentrations between 10 milligrams per kilogram (mg/kg) (the cleanup goal) and 20 mg/kg, the majority of which fall closer to the lower end of this range. Total PAHs are comprised of the sum of 17 different varieties of PAHs, one third of which are classified as "low molecular weight" PAHs. Since scientists have determined that low molecular weight PAHs (such as those that comprise a portion of the total PAHs present at the site) readily break down over a relatively short period of time, it is anticipated that these sediments have already or will likely achieve the cleanup goal of 10 mg/kg total PAHs by the time the capping commences. Therefore, these areas will not be capped.

The attached ESD will authorize the noted modifications to the remedy.

Letters from NYSDEC and SRMT concurring with the ESD are attached.

Please indicate your approval of the ESD by signing below.


If you have any questions related to the ESD, please call me at extension 4288.

Attachments

Approved:



Walter E. Mugdan, Director  
Emergency and Remedial Response Division

  
Date





## Explanation of Significant Differences

# REYNOLDS METALS COMPANY SITE

Village of Massena  
St. Lawrence County, New York

EPA, Region 2

December 2008

### INTRODUCTION

Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan require an explanation if, after the selection of a remedial action plan, a component of the action differs in any significant respect from the original action. Any such significant difference, and the reasons for such changes, must be published in an Explanation of Significant Differences (ESD).

The remedy for the Reynolds Metals Company (RMC) site (Site) calls for, in part, the dredging of contaminated sediments from the St. Lawrence River and consideration of other remedial actions, such as capping, if dredging alone cannot attain sediment cleanup goals. While more than 90% of the targeted sediments were removed successfully from the river, cleanup goals were not achieved at every location. Therefore, the U.S. Environmental Protection Agency (EPA), in consultation with the New York State Department of Environmental Conservation (NYSDEC) and the St. Regis Mohawk Tribe (SRMT), has determined that the portions of the Site that did not achieve the cleanup objectives will be capped to ensure that the remedy is protective of human health and the environment (Figure 1). These areas contain total polyaromatic hydrocarbon (PAH) levels in excess of 20 milligrams per kilogram (mg/kg).

Following the dredging, the sediments in a number of locations were found to have total PAH concentrations between 10 mg/kg (the cleanup goal) and 20 mg/kg, the majority of which fall closer to the lower end of this range. Total PAHs are comprised of the sum of 17 different varieties of PAHs, one third of which are classified as "low molecular weight" PAHs. Since scientists have determined that low molecular weight PAHs (such as those that comprise a portion of the total PAHs present at the Site) readily break down over a relatively short period of time, it is anticipated that

these sediments have already or will likely achieve the cleanup goal of 10 mg/kg total PAHs in the near term. Therefore, these cells, which contained PAH levels between 10 and 20 mg/kg when last sampled, will not be capped.

This ESD, which serves to document what further actions will be undertaken at the Site, will become part of the Administrative Record file for the Site. The Administrative Record for the remedial decisions related to the Site is available for public review at the following locations:

Massena Public Library  
41 Glenn Street  
Massena, NY 13662

Hours: Mon. & Fri., 9:30 A.M. - 5:00 P.M.; Tues.-  
Thurs., 9:30 A.M. - 9:00 P.M.

St. Regis Mohawk Tribe - Environmental Division  
449 Frogtown Road  
Akwesasne, NY 13655

Hours: 8:00 A.M. - 4:00 P.M. (call 518-358-5937)

U.S. Environmental Protection Agency  
290 Broadway, 18<sup>th</sup> Floor  
New York, NY 10007-1866  
(212) 637-3263

Hours: Monday - Friday, 9:00 A.M. - 5:00 P.M.

### SUMMARY OF SITE HISTORY, CONTAMINATION PROBLEMS, AND SELECTED REMEDY

The Site, which includes the RMC facility, an active aluminum production plant, is located on the St. Lawrence River, approximately 8 miles east of the Village of Massena, St. Lawrence County, New York. The Site also encompasses a portion of the St. Lawrence River adjacent to the St. Lawrence Seaway shipping channel and bordering the RMC facility.

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.

The RMC facility was placed on the NYSDEC Registry of Inactive Hazardous Waste Sites in September 1987.

In January 1989, RMC completed an initial study of sediment contamination in the St. Lawrence River adjacent to the RMC facility. 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, which 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 length of the St. Lawrence River and extending 450 feet out from the shoreline were contaminated with polychlorinated biphenyls (PCBs), PAHs, and total dibenzofurans (TDBFs) from discharges from the RMC facility. These contaminated sediments presented both a potential human health and ecological risk.

EPA issued a Record of Decision (ROD) for the Site in September 1993. The major components of the remedy included:

- Dredging of St. Lawrence River sediments and associated riverbank areas which contain greater than 1 mg/kg PCBs, greater than 10 mg/kg total PAHs, and greater than 1 microgram per kilogram 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 with the treated dredged sediments in Black Mud Pond, a disposal pit located on the grounds of the RMC facility, prior to capping of the on-Site Industrial Landfill, in conformance with a January 1992 NYSDEC ROD.

A ROD amendment was issued by EPA in September 1998. The major components of the ROD Amendment included:

- 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; and
- Consolidation of all dredged sediments with concentrations of PCBs less than 50 mg/kg in the on-Site Industrial Landfill, and capping in conformance with NYSDEC's ROD (Black Mud Pond was capped in 1996 and was no longer available).

In addition, the ROD Amendment stated that if after implementation of the sediment dredging project, it is determined that technological limitations preclude the attainment of the cleanup goals, then other remedial actions, such as capping, may be performed to assure attainment of the cleanup goals.

During the design process, the remediation area was divided into 268 dredge cells, with an average cell size of approximately 0.08 acres.

In 2000, RMC (which was purchased by Alcoa Inc. that year) completed the remedial design for the dredging project and a design for a subaqueous cap, should it become necessary, to ensure that the remedy is protective of human health and the environment.

In April 2001, Alcoa's contractor constructed a containment system consisting of 3,829 feet of interlocking steel sheet pile panels which completely enclosed the area to be dredged. 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 re-dredging. Subsequent re-dredging activities removed an additional 22,390 cy of sediment. In total, an estimated 85,655 cy of contaminated sediments, which equals a total mass of approximately 20,200 pounds of PCBs, were removed from the St. Lawrence River. A total of 69,000 cy of sediment with PCB concentrations less than 50 mg/kg were stabilized with Portland cement and disposed of in the industrial landfill at the facility. The remaining 16,655 cy of sediment were shipped to Chemical Waste Management in Model City, New York, an approved hazardous waste facility, for disposal.

The ROD called for the dredging of all sediment within the Site which contained contaminant levels in excess of 1 mg/kg of PCBs, 10 mg/kg of total PAHs and 1 µg/kg of TDBFs. Post-dredging sampling results indicated that 12 closely grouped cells out of 268 total cells (less than 5%) did not meet the cleanup goal for PCBs even though these cells underwent numerous dredge passes. Given the number of dredge passes already completed in this area, the limited time left in



the 2001 construction season (due to the impending onset of winter and the need to move the dredging equipment through the locks prior to closure of the St. Lawrence Seaway), and the hard river bottom and rock encountered in many cells, EPA has determined that it is unlikely that additional dredging would be able to achieve the PCB cleanup goals set in the ROD in these limited areas. Therefore, EPA has decided to cap these 12 cells, plus three cells within the total footprint of the cap. Since there was insufficient time remaining in the 2001 construction season to install all three layers of the multi-layer cap (*i.e.*, a 6-inch gravel layer, 12-inch sand layer, and 6-inch armor layer), a gravel layer at a thickness of 12 inches was installed just prior to demobilization.

Post-dredging sampling of each dredged cell utilized PCBs as an indicator compound to ensure sediment cleanup goals were achieved, since it was presumed that the PCBs, PAHs, and TDBFs were collocated similar to the upland soil sample results from the facility. Post-dredging sampling 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). These two cells are located within the footprint of the PCB cap and will also be capped. Post-dredging sample results from 96 cells showed that numerous cells had levels of PAHs above the 10 mg/kg cleanup goal, indicating that the PAHs were not as collocated with the PCBs and the TDBFs as previously assumed. As a result of these findings, the completion of the PCB cap was postponed until the extent of the PAH contaminated sediments could be characterized more fully. Based upon the results of additional sediment sampling conducted in 2002, 2003, 2004, and 2006, EPA concluded that seventy-six of the 268 cells contained PAH levels above the cleanup goal of 10 mg/kg.

#### DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR THOSE DIFFERENCES

The dredging of St Lawrence River contaminated sediments was highly successful, as a 98.6% reduction in PCB mass was achieved (corresponding to a Site-wide residual average of 0.8 mg/kg PCBs). While sampling results indicated that over 90% of the PAHs had been removed and the majority of the cells were below the 10 mg/kg cleanup goal for total PAHs, exceedances in some cells led to additional sampling. The results of this sampling demonstrated that PCB and PAH contamination is not as collocated as was previously assumed<sup>1</sup> and that PAH cleanup goals were

not achieved in every cell.

Due to the end of the dredging season and technical limitations (the hard river bottom and rock encountered), the cleanup goals were not achieved for every cell. Furthermore, while additional dredging might remove some more contamination, it is likely that limited capping would still be necessary. Although some of the PAH contamination was believed to consist of previously unremediated sediments, more was believed to be residual contamination. While additional dredging would likely remove more contaminated sediments and PAH mass, 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.

Based upon PAH samples collected 2 to 6 years ago, 76 cells are above the cleanup level of 10 mg/kg for total PAHs. Fifty-three of these cells have total PAHs above 20 mg/kg and the remaining 23 cells have Total PAH concentrations between 10 mg/kg and 20 mg/kg (the majority of which had a concentration of 13 mg/kg or less). Scientists have determined that low molecular weight PAHs readily break down over a relatively short period of time (approximately three years)<sup>2</sup>. Approximately one-third of the 17 varieties of PAHs analyzed for at the Site are comprised of low molecular weight PAHs. Since it is anticipated that the sediments in the 23 cells have already or will likely achieve the cleanup goal of 10 mg/kg Total PAHs by the time the capping commences (presumably in 2009), these cells will not require supplemental remediation.

#### Capping

A cluster of 15 cells, 12 of which contain PCBs above 1 mg/kg, will be capped. This will complete the interim cap that was installed in 2001. The cap for the 1.9-acre PCB-contaminated area will consist of a 2-inch minimum gravel layer, 12-inch sand layer, and 6-inch armor<sup>3</sup> layer. One shoreline cell, part of the cluster of

collocated, the additional sampling conducted between 2002 and 2006 showed that the disparity was more widespread than initially found in 2001. It should be noted that had this been known during the design phase, the design depth for dredging may have resulted in a deeper dredge cut in some cells and a greater removal of contamination.

<sup>2</sup> Mackay, D., W.Y. Shiu, and K.C. Ma, 1992, *Illustrated Handbook of Physical-Chemical Properties and Environmental Fate for Organic Chemicals*.

<sup>3</sup> This armor layer is comprised of stone averaging three inches in diameter. The size of stone required is determined by calculating the water and ice forces the armor layer will be subjected to throughout the year.

<sup>1</sup>Although the upland PCBs and PAHs were proven to be



15 cells, which has elevated PCBs, will be excavated as much as is technically feasible using land-based equipment prior to capping in order to maintain the original bathymetry.

In addition, 50 cells (some of which are adjacent to each other) which contain total PAH levels above 20 mg/kg will be capped. A series of caps for the PAH-contaminated cells, covering a total of 3.5 acres, will consist of a 6-inch sand layer topped by a 6-inch armor layer. An additional three shoreline cells which have elevated levels of PAHs will be excavated as much as is technically feasible using land-based equipment with the intent of reaching the PAH cleanup goal of 10 mg/Kg. These shallow area cells will then be capped (if cleanup goals are not met) with clean sediment to the original bathymetry.

At the completion of the capping, 6 inches of substrate will be placed over the armor layer at every capped cell located outside the nearshore boundary<sup>4</sup>. The material will fill in the spaces between the armor stone and provide a base for SAV to root and benthic organisms to colonize. While a two-foot habitat layer is preferred for aquatic habitat restoration, in this case, wakes from large vessels in the adjacent shipping channel, storms and ice flows would likely cause much of the habitat layer to be lost, especially if it extended into the water column above the original bathymetry. A 6-inch layer of sediment-like substrate is expected to facilitate the reestablishment of the SAV and benthic communities. In addition, a small volume of substrate material will be placed within the nearshore areas to fill in spaces between the armor stone.

The above-described work will be conducted in accordance with 6 NYCRR Part 608 (Regulation on the use and protection of waters).

Since contaminants will remain beneath the caps, long-term monitoring will be required at this Site. In addition to monitoring the physical condition of the capped cells, fish, benthic community, sediment, and SAV monitoring will be conducted.

While the above-described ecological monitoring will initially be conducted for the Site, it is anticipated that this monitoring will eventually be coordinated with the long-term monitoring that will be performed in conjunction with the nearby General Motors (Central Foundry Division) and Alcoa Grasse River Superfund sites.

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<sup>4</sup> The nearshore boundary is the shallow river area with a water depth between 0 and 2.5 feet. Conditions in this area are not conducive to Submerged Aquatic Vegetation (SAV) growth due to wave action.

### *Institutional Controls*

EPA is also relying on New York State Department of Health (NYSDOH) fish advisories which are in place for the entire St. Lawrence River to prevent or limit exposure to contaminated fish.

### **SUPPORT AGENCY COMMENTS**

NYSDEC and the SRMT support the change to the remedy.

### **AFFIRMATION OF STATUTORY DETERMINATIONS**

Considering the new information that has been developed and the change that has been made to the selected remedy, EPA and NYSDEC believe that the remedy remains protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. In addition, the modified remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

### **FIVE-YEAR 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 needs to be reviewed no less often than every five years. A five-year review was conducted in April 2006. EPA will conduct another five-year review on or before April 2011.

### **PUBLIC PARTICIPATION ACTIVITIES**

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. Should there be any questions regarding this ESD or the Site, please contact:

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FIGURE 1