# Declaration for the Decision Document

## Site Name and Location

Reynolds Metals Company Site Study Area
Massena, St. Lawrence County, New York

## Statement of Basis and Purpose

This decision document presents the selected remedial action for the Reynolds Metals Company Site Study Area, in Massena, New York, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting the remedy for this Site.

The New York State Department of Environmental Conservation (NYSDEC) strongly suppports the proposed dredging of contaminated sediments from the river, agrees with EPA's cleanup levels for the Site, and agrees with and supports the concept of using the Black Mud Pond for the disposal of untreated sediments and treatment residuals. However, while the NYSDEC agrees with the cleanup numbers for the Site, they do not agree with the process by which they were obtained. In addition, the NYSDEC would encourage the use of lower treatment levels if it could be demonstrated that doing so would not add unreasonable costs to the project. Their letter is attached as Appendix 3.

The information supporting this remedial action decision is contained in the administrative record for this Site, the index of which is also attached to this document as Appendix 4.

## Assessment of the Site

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Decision Document, may present an imminent and substantial threat to public health, welfare, or the environment.

## Description of the Selected Remedy

This action or "operable unit" is the first and only operable unit planned by the U. S. Environmental Protection Agency for the Reynolds Metals Company Site Study Area and addresses the principal threat posed by contaminated sediments in this Area by utilizing a mixed treatment/containment remedy for these contaminated sediments.

The major components of the selected remedy include the following:

- Dredging and/or excavation of approximately 51,500 cubic yards of sediments with polychlorinated biphenyl (PCB) concentrations above 1 part per million (ppm), total polyaromatic hydrocarbon (PAH) concentrations above 10 ppm, and total dibenzofuran (TDBF) concentrations above 1 part per billion (ppb) from contaminated areas in the St. Lawrence River and from the associated riverbank;

- Treatment of approximately 14,500 cubic yards of dredged/excavated material with PCB concentrations above 25 ppm by thermal desorption. Untreated sediments (with PCB concentrations between 1 ppm and 25 ppm) and treatment residuals (which are expected to be non-hazardous and to have PCB concentrations below 10 ppm) will be disposed on-site, in the Black Mud Pond, and covered. The Black Mud Pond will be capped in conformance with the requirements of the January 22, 1992 New York State Record of Decision for the state lead Reynolds Metals Site, which encompasses the entire Reynolds facility. Contaminants condensed in the thermal desorption process will be transported off-site and burned at a commercial incinerator.

Declaration of Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and it satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as their principal element.

Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within five years, and every five years thereafter, after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

William J. Muszynski, P.E.
Acting Regional Administrator
U. S. Environmental Protection Agency

Date 9/27/93

DECISION SUMMARY

REYNOLDS METALS COMPANY SITE STUDY AREA

MASSENA, NEW YORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

NEW YORK

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Attachments

## Decision Summary for the Decision Document

### I. Site Name, Location, and Description

The Reynolds Metals Company (RMC) facility is an active aluminum production plant located on 1600 acres in the town of Massena in St. Lawrence County, New York. The RMC facility is bordered on the north by the Grasse and St. Lawrence Rivers, on the east by the New York Central Railroad, on the west by Haverstock Road (South Grasse River Road), and on the south by the Raquette River. The plant is located off Route 37 near the Massena-Cornwall International Bridge, directly upriver of the General Motors - Powertrain Division Plant (see Figure 1).

The Reynolds Metals Company Study Area Site ("the Site") includes that portion of the St. Lawrence, Grasse, and Raquette Rivers, any tributaries of those rivers and any wetlands which are between the International Bridge and the confluence of the Grasse and St. Lawrence Rivers and that portion of the Raquette River which is south of the confluence of the Grasse and St. Lawrence Rivers and south of the International Bridge. The Reynolds Study Area Site is depicted in Figure 1. In general, the Reynolds Study Area Site encompasses those surface waters, sediments, and wetlands which are adjacent to the Reynolds Metals Company facility in Massena, New York. The Reynolds Study Area is part of the St. Lawrence/Grasse River Site (site code 6-45-15) which was added to the New York State Registry of Inactive Hazardous Waste Sites on April 14, 1987. This Site was listed as a result of environmental impacts which occurred to the river system at and in the vicinity of the Aluminum Company of America (ALCOA), Reynolds Metals, and General Motors facilities.

Land use in the area surrounding the Site consists of mixed residential and industrial uses. The St. Regis Mohawk Indian Reservation, *Akwesasne*, is located within 0.5 miles of the RMC facility. Approximately 3,500 individuals live on the St. Regis Indian Reservation. The downtown area of Massena is located approximately eight miles west and upriver of the RMC facility. The 1980 population estimate for Massena was 14,856. In addition, the St. Lawrence River forms the border between the U.S. and Canada in this area.

Due to past contamination of the General Motors facility and in the surrounding river system, the General Motors-Powertrain Division plant has been designated as a federal Superfund Site. EPA is overseeing cleanup of the General Motors facility and surrounding river system. EPA is also overseeing the cleanup of the river system surrounding the ALCOA facility, which is approximately eight miles upriver from the RMC Site.

Major areas of contamination on the RMC facility include an unlined pit used for the disposal of carbon solids known as the Black Mud

Pond, a landfill, and the plant's North Yard. The New York State Department of Environmental Conservation (NYSDEC) is overseeing the cleanup of contamination on the RMC and ALCOA facilities.

The St. Lawrence River flows are partially controlled by the Moses-Saunders Power Dam, located approximately four miles upstream of the Site on the St. Lawrence River. In the vicinity of the Site, the St. Lawrence River is greater than 0.5 miles in width with depths exceeding 30 feet in some portions of the River. The section of the St. Lawrence River adjacent to the RMC facility is part of the St. Lawrence Seaway. In general, the Reynolds Study Area is comprised of a shallow shelf containing slow currents, fine-grained sediments, and dense beds of submergent aquatic vegetation. The shallow shelf was created in the late 1950s by dredge spoil from the south Cornwall Navigation Channel that is located 300 to 800 feet offshore from the RMC facility. No dredge spoil has been deposited in this section of the river since the initial dredging.

Local water bodies are used recreationally for swimming, wading, fishing, boating, camping, and picnicking. Two general groups, the Mohawk native population and recreational fisherman, fish in the vicinity of the Reynolds Study Area. However, direct land access to the Reynolds Study Area is limited by the steep nature of the shoreline.

A tract of regulated water wetlands (identified as No. RR-6 by NYSDEC) occur on the Reynolds' property. The wetland is approximately 170 acres in size and is a Class 2 wetland. It is one of the three largest wetlands in the town of Massena. NYSDEC is also overseeing the cleanup of contamination in these wetlands.

## II. Site History and Enforcement Activities

The RMC plant was constructed in 1958 for the production of aluminum from alumina (aluminum oxide). The main components of the plant include the reduction plant and supporting structures and facilities encompassing about 20.5 acres, the solid waste landfill (11.5 acres), and the Black Mud Pond (approximately 6 acres).

Aluminum is produced in individual pots lined with "potliner," which is composed of a mixture of carbon compounds and which acts as the cathode of the electrolytic cell. Potliner is fabricated in the carbon plant section of the plant where coal tar pitch, coke and other materials are blended and shaped to fit the pots. A heat transfer medium (HTM) system is used to maintain the pitch in a flowable and pumpable form. The HTM system no longer uses a polychlorinated biphenyl (PCB) oil.

As a result of production activities and years of continuous operations and expansion, various types of industrial waste, including hazardous waste, were generated, disposed of, and spread throughout the facility. Contaminated areas on the facility property are being investigated and remediated by RMC under the authority of Consent Orders with NYSDEC. Several areas on the

facility serve as potential sources of contamination to the Reynolds Study Area. These areas are described briefly below and are depicted in Figure 2.

Wastes from the plant's potliner recovery system were disposed of in the Black Mud Pond. The Black Mud Pond contains waste primarily composed of alumina (30-40%) and carbon (35-45%) with fluoride at 2-5%, cyanide at 61 parts per million (ppm), and PCBs at 3.4-8.1 ppm. These contaminants have been detected in groundwater near the pond. However, groundwater contamination appears to confined to a limited area downgradient of the pond. Shallow contaminated groundwater may be discharging to surface water pathways to the south and east of the pond.

The plant's Solid Waste Landfill and former Potliner Storage Area can be characterized as one contaminant source area, based on their proximity and similarity of contaminants and receptor zone of contaminants migrating from the area. The contamination detected in the waste, groundwater, leachate and surface water is characterized by elevated concentrations of cyanides (up to 300 ppm), fluorides (up to 8500 ppm), sulfates (up to 13,000 ppm), aluminum (up to 87,000 ppm) and polyaromatic hydrocarbons (PAHs) (up to 2,200 ppm). PCBs are also detected in both areas at concentrations as high as 690 ppm. Groundwater from these areas drains to wetlands RR-6, south of the Landfill area. A leachate collection system on the Landfill intercepts some, but not all, of the contaminated groundwater from the Landfill to the wetlands. Remediation of this wetland is being overseen by NYSDEC.

PCBs, polychlorinated dibenzofurans (PCDFs), and polychlorinated dibenzo-p-dioxins (PCDDs) are distributed in North Yard surficial soils. PCBs have been found in this area at concentrations as high as 89,000 ppm. PCDDs and PCDFs have been detected at levels of 9.92 parts per billion (ppb) and 9.35 ppb, respectively. PCBs, PCDFs, and PCDDs originate from the plant HTM system. North Yard groundwater contamination is characterized by local areas of elevated concentrations of aluminum, arsenic, cyanide, PCBs, and fluoride.

In addition to contamination throughout the facility, RMC also discharged contaminants to the St. Lawrence River through four outfalls - known as Outfalls 001, 002, 003, and 004. Three of these outfalls - Outfalls 001 and a combined Outfall 002 and 003 - are still in use. These outfalls are depicted in Figure 3 and served as the primary sources of contamination to the Site.

Discharges from Outfall 001 include water from the facility's waste water treatment system. Outfall 002 discharges contact cooling water and stormwater runoff from the facility. It carries the highest volume of water (averaging 2.5 million gallons per day) of all four of the outfalls. Prior to November 1989, the discharge from Outfall 002 traveled down an open ditch on the RMC property to enter the St. Lawrence River. After November 1989, this discharge was combined with that of Outfall 003. Outfall 003 carries treated

discharge from the facility sanitary treatment plant. Outfall 003 discharges to the St. Lawrence River through a submerged pipe located approximately 100 feet from the shore. Prior to June 1988, Outfall 004 carried intermittent runoff from northern areas of the plant. The runoff formerly discharged at Outfall 004 is now treated and used in plant operations.

The RMC facility and upland areas are listed on the NYSDEC Registry of Inactive Hazardous Waste Sites. In September 1987, RMC and NYSDEC signed a Consent Order, pursuant to which RMC agreed to investigate contamination at the RMC facility. However, this Order did not include an investigation of contamination in the river system surrounding the facility. In January 1992, NYSDEC issued a Record of Decision (ROD) which outlined its selected remedy for the RMC facility, excluding the river system. NYSDEC's selected remedy included 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 facility. In March, 1993, RMC and NYSDEC signed a Consent Order which required RMC to implement the remedy in the January 1992 ROD.

In January 1989, RMC completed an initial study of sediment contamination in the St. Lawrence River adjacent to its plant. In September 1989, EPA issued a Unilateral Administrative Order (EPA Index No. II CERCLA-90230), requiring that RMC investigate and clean up contamination in the river system surrounding the RMC facility. The river system has been termed the "Reynolds Study Area." In August 1991, RMC submitted a revised Additional River Sampling (ARS) Report which further characterized the nature and extent of contamination in the Reynolds Study Area. In March 1992, RMC submitted a draft Analysis of Alternatives (AA) Report which evaluated options for remediating contaminated sediments at the Site. In January 1993, RMC submitted a revised draft AA Report for the Reynolds Study Area.

## III. Highlights of Community Participation

The ARS and AA Reports and the Proposed Plan for the Reynolds Study Area Site were released to the public for comment on February 19, 1993. These documents were made available to the public in both the administrative record and in information repositories maintained at the EPA Docket Room in Region II, at the St. Regis Mohawk Tribal Offices, and at the Massena Public Library. The notice of availability for these two documents was published in the Massena Courier-Observer on February 19, 1993, in the People's Voice on February 22, 1993, and in the Indian Times on February 19, 1993. A public comment period on the documents was held from February 19, 1993 through April 21, 1993. The public comment period was extended once upon the request of officials from Environment Canada.

EPA held a public meeting regarding the Reynolds Study Area Site on March 9, 1993 at the Massena Town Hall. At this meeting, representatives from EPA answered questions about problems at the Site and the remedial alternatives under consideration. A response

to the comments received during this period is included in the Responsiveness Summary, which is part of this Decision Document. The Responsiveness Summary and Decision Document, along with the administrative record for the Reynolds Study Area Site, are available at the information repositories referenced above.

## IV. Scope and Role of Operable Unit or Response Action Within Site Strategy

This Decision Document addresses the first and only planned remedial action for the Reynolds Study Area Site. This action is intended to address the principal threats to human health and the environment posed by the contaminated sediments in the Reynolds Study Area. Remediation of the contaminated upland areas on the RMC facility is being overseen by NYSDEC.

## V. Summary of Site Characteristics

### Hydrodynamic Conditions

Prior to completion of the ARS, RMC conducted a study of flow conditions in the St. Lawrence River adjacent to its facility. The flow study, conducted in November 1989, supplemented previous flow studies done by RMC and its consultants. The flow study yielded the following general conclusions about the Reynolds Study Area Site which are depicted graphically in Figure 3. The main river current which enters the area adjacent to the RMC facility from Polly's Gut has velocities of 8 feet per second or greater. This flow is deflected to the east by training dikes which protect the Seaway channel. There are a series of clockwise and counterclockwise eddies as the main current exits the training dikes. These eddies are characterized by low velocity flow and migrate toward the shore in both upstream and downstream directions. There is an area in the vicinity of Outfalls 001 and 004 which exhibits some flow separation with predominantly upstream flow to the west of the outfalls and predominantly downstream flow to the east of the outfalls.

The overall result of these flow patterns is that water generally stagnates along the shoreline in the vicinity of Outfall 001. Because of this stagnation, sediments and particulate materials discharged into the River through the four outfalls generally remain close to shore. This pattern would be enhanced in summer months by extensive vegetation growth that would act to further slow currents in the shallow water near the shore.

### Contaminant Characteristics

As part of the ARS, sediment samples were collected from 47 locations in the St. Lawrence River and 17 locations in the Raquette River adjacent to the RMC facility. A total of 127 sediment samples were collected, 20 in the Raquette River and 107 in the St. Lawrence River. The results of the ARS sampling were generally consistent with the results from 67 sediment samples taken in 1988 by RMC

although the levels of contamination detected during the ARS were higher than those found in the 1988 study.

Based on sampling and analyses conducted during the ARS, there are several contaminants in Reynolds Study Area sediments including PCBs, PAHs, total dibenzofurans (TDBFs), fluoride, and cyanide. PCBs are the primary contaminant found in sediment samples in the Reynolds Study Area. Contaminants other than PCBs are generally found in a pattern similar to that of PCBs and will be remediated along with PCBs.

PCBs were found in 72 of the sediment samples taken from the St. Lawrence River. However no PCBs were found in background samples or in sediment samples from the Raquette River. Figures 4 - 6 show an approximation of the general distribution of PCBs at various depths in the Reynolds Study Area. Figures 7 - 10 show the distribution of PAHs, cyanides, fluorides, and TDBFs in the Reynolds Study Area. EPA estimates that there are approximately 51,500 cubic yards of sediment with PCB concentrations above 1 ppm, PAH concentrations above 10 ppm, and TDBF concentrations above 1 ppb.

The highest concentration of PCBs detected in sediments in the Reynolds Study Area was 1300 parts per million (ppm). All samples with PCB concentrations above 100 ppm are located within 500 feet of the RMC outfalls. Concentrations decrease away from the shoreline. PCBs were detected in some samples at a depth of 24 inches into the sediments and may extend below that depth at some locations. Sediment depths range from one foot to over 5 feet. PCBs were not detected in water samples taken by RMC from the St. Lawrence River. However, NYSDEC, using a more sensitive analytical technique than the one used by RMC, detected PCBs in surface water at levels up to 54 parts per trillion (ppt).

PCBs and other contaminants which are present in Reynolds Study Area sediments may migrate downstream or dissolve slowly into the River. In addition, PCBs in contaminated sediments can serve as a source of contamination for aquatic organisms and begin to bioaccumulate within the food chain. Therefore, one potential pathway of human exposure is human consumption of PCBs in the fatty tissue of fish and wildlife, as explained below.

## VI. Summary of Site Risks

### Human Health Risks

**Contaminant Identification and Exposure Assessment**

EPA conducted a baseline risk assessment to evaluate the potential risks to human health and the environment associated with the Site in its current state. The baseline risk assessment focused on the chemicals in Reynolds Study Area sediments which are likely to pose the most significant risks to human health and the environment. These "contaminants of concern" for the Reynolds Metals Company Study Area Site are listed in Table 1.

EPA's Baseline Risk Assessment identified several potential exposure pathways by which the public may be exposed to contaminant releases. The potential exposure routes which were identified in the baseline risk assessment for St. Lawrence River and Raquette River sediments include:

- dermal contact with contaminated sediments;
- ingestion of contaminated sediments;
- ingestion of fish caught from the St. Lawrence River;
- ingestion of surface water from the St. Lawrence River;
- inhalation of contaminants volatilized from surface water; and
- dermal contact with surface water during swimming.

Of these potential pathways of exposure, ingestion of surface water, inhalation of volatilized contaminants, and dermal contact with surface water were not evaluated quantitatively in the baseline risk assessment because available data indicated that the risks associated with these exposure pathways would be relatively minor compared to the other routes of exposure considered.

The baseline risk assessment evaluated both present and possible future exposures for recreational users and for subsistence fishermen. Potentially exposed populations include area residents and residents of the St. Regis Mohawk Reservation and Canadians who are downriver of the Site. Risks were calculated for small children and for adults. Exposure assumptions were based on reasonable maximum exposure scenarios. Tables 2 - 4 present the exposure assumptions used by EPA in its Baseline Risk Assessment.

**Toxicity Assessment**

Under current EPA guidelines, the likelihood of carcinogenic (cancer causing) and noncarcinogenic effects due to exposure to Site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive. Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual contaminants were summed separately to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor (CRAVE) for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer

slope factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied. SF values for Reynolds Study Area contaminants of concern are given in Table 5.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of milligrams/kilogram-day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur. RfDs for Reynolds Study Area contaminants of concern are given in Table 5.

**Human Health Risk Characterization**

Excess lifetime cancer risks for the Reynolds Study Area were determined by multiplying the intake levels with the SF (see Table 5) for each contaminant of concern. These risks are probabilities that are expressed in scientific notation (e.g., $1 \times 10^{-6}$). An excess lifetime cancer risk of $1 \times 10^{-6}$ indicates that as a plausible upper bound, an individual has an additional one in one million chance of developing cancer as a result of site-related exposure to contaminants over a 70-year lifetime under the specific exposure conditions presented in the Reynolds Study Area. Table 6 presents a summary of the carcinogenic risks posed by each exposure pathway developed for the Reynolds Study Area. The greatest carcinogenic risk values calculated for the Site are associated with the ingestion of fish caught in the St. Lawrence River. The only contaminants contributing to this value were PCBs.

For known or suspected carcinogens, EPA considers excess upper bound individual lifetime cancer risks of between $10^{-4}$ to $10^{-6}$ to be acceptable. This level indicates that an individual has not greater than a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the Site. As illustrated in Table 6, the risks associated with all exposure pathways associated with the St. Lawrence River are outside the range considered acceptable by EPA. The risks associated with ingestion of fish from the Raquette River were calculated and were found to be unacceptable. However, these calculations were based on fish caught near the mouth of the Raquette River, not in the

immediate vicinity of the Reynolds facility. These risks are assumed to be attributable to sources other than the Reynolds Study Area Site due to the low levels of contaminants detected in Raquette River sediments (< 1 ppm PCBs) and surface water (< 65 ppt PCBs) in the vicinity of the Reynolds facility.

The potential risks of noncarcinogenic effects of contaminants in a single medium are expressed as the hazard index (or the ratio of the intake level for a given medium to the RfD), given in Table 5, for each contaminant of concern. Table 7 presents a summary of the HIs posed by each exposure pathway. Again, the noncarcinogenic effects associated with ingestion of fish are generally greater than those associated with other exposure pathways.

A hazard index greater than 1 indicates that potential exists for noncarcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. As illustrated in Table 7, the noncarcinogenic effects associated with all exposure pathways associated with the St. Lawrence River are above 1. The noncarcinogenic effects associated with Raquette River pathways were below 1 due to the low levels of contaminants detected in Raquette River sediments and surface water.

It can be seen from Table 7 that the HI for noncarcinogenic effects from ingestion of fish from the St. Lawrence and Raquette Rivers is 70. Therefore, noncarcinogenic effects may occur from the exposure routes evaluated in the Risk Assessment. The noncarcinogenic risk was attributable to PCBs.

**Uncertainties**

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled. Uncertainty in the exposure assessment is related to the presence of potentially sensitive populations (fishermen and residents) in very close proximity to the Site. Additional uncertainties arise from estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such

exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the baseline risk assessment provides upper bound estimates of the risks to populations near the Site.

Potential site-specific sources of uncertainty for the Reynolds Study Area Site include the inherent variability associated with environmental sampling of biota, especially fish. For example, fish contaminant concentrations may vary depending on species, mobility, fat content, age, and feeding habits. The significant total number of samples in the Reynolds Study Area serves to reduce this source of uncertainty.

Environmental Risks

An ecological risk assessment was performed to determine the actual and/or potential effects of contaminants of concern on fish and other primarily aquatic wildlife in the Reynolds Study Area. A four-step process was utilized for assessing site-related ecological risks for a reasonable maximum exposure scenario: **Problem Formulation and Hazard Identification** - development of information characterizing habitats and potentially exposed species found in the Reynolds Study Area and identification of contaminants of concern and exposure pathways and receptors; **Exposure Assessment** - involves the estimation of actual and potential exposure point concentrations for selected indicator species; **Ecological Effects Assessment** - literature reviews, field studies, and toxicity tests linking contaminant concentrations to effects on indicator species; and **Risk Characterization** - measurement or estimation of both current and future adverse effects from exposure to contaminants in the Reynolds Study Area.

EPA identified several contaminants which were of concern from an ecological risk perspective and their respective animal receptors including PCBs, PAHs, aluminum, fluoride, and cyanide in aquatic macroinvertebrates, yellow perch, white sucker, least bittern, belted kingfisher, little brown bat, and mink. PCBs have been shown to have adverse effects on these receptors including reproductive impairment in certain birds and reproductive failure in mink.

Aquatic macroinvertebrates may take up contaminants from water which has contacted contaminated sediments. Aquatic macroinvertebrates are then consumed by fish, birds, and small mammals. Because PCBs remain in the fat cells of these animals, the concentrations of PCBs in these small animals increase over time. These small animals with increasingly higher PCB concentrations may then be eaten by larger animals.

The results of the ecological risk assessment indicate that the contaminated sediment and water in the St. Lawrence River in the Reynolds Study Area pose unacceptable risks to several species. These risks include reproductive effects to animals which bioaccumulate PCBs in their tissues. In addition, the concentrations of several contaminants, including aluminum and PAHs, are several times higher than federal and State ambient water quality criteria and federal sediment quality criteria and National Oceanic and Atmospheric Administration sediment guidelines which are based on protection of wildlife.

**Risk Summary**

Actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred alternative or one of the other active measures considered, may present an imminent and substantial threat to public health, welfare or the environment.

## VII. Description of Alternatives

**Sediment Cleanup Levels**

Based on the results of its risk assessment, EPA established cleanup levels for contaminated sediment in the Reynolds Study Area which are protective of human health and the environment. The cleanup levels are: PCBs - 1 ppm; PAHs - 10 ppm; TDBF - 1 ppb. Cleanup levels are the concentration of contaminants in sediment above which some remedial action will be taken (i.e., treatment or containment). These cleanup levels were based on ingestion of fish by local residents and represent sediment contaminant concentrations which would be associated with carcinogenic risks on the order of $10^{-4}$.

Cleanup to these levels will also remove the threat from other contaminants such as fluoride and cyanide. The 1 ppm PCB cleanup level is identical to that selected by EPA for contaminated sediment associated with the General Motors Site which is immediately downstream of the RMC facility. For the G.M. Site, EPA estimated that a 1 ppm PCB cleanup level in sediments is associated with a $10^{-4}$ (1 in 10,000) excess cancer risk to humans. For the RMC Study Area Site, EPA estimates that a 1 ppm PCB cleanup level in sediments is associated with an excess cancer risk to humans on the order of $10^{-4}$ (1 in 10,000). There is a variation in estimated residual cancer risks between the G.M. and RMC Study Area Sites due to uncertainties associated with estimating the effect of varying sediment PCB concentrations on area fish.

A rough approximation of the area which must be addressed to meet Site cleanup levels is given in Figure 11. There are approximately 51,500 cubic yards of sediment over a 27- acre area with PCB concentrations above 1 ppm, PAHs above 10 ppm, and TDBFs above 1 ppb. EPA considers such sediments to pose a principal threat to human health and the environment.

It should be noted that federal and New York State sediment quality criteria guidance indicate that PCB cleanup levels well below 1 ppm are required to achieve protection of the environment since PCBs pose a significant ecological risk. While EPA would prefer a lower cleanup level which would be associated with a $10^{-6}$ cancer risk, EPA has significant concerns as to the technical practicability of achieving a PCB cleanup level below 1 ppm in this area of the St. Lawrence River. In selecting the 1 ppm cleanup goal, EPA has balanced its desire for a very low cleanup level which will minimize residual risk with the constraints posed by the limitations of dredging as a means of removing sediment with the further intent of selecting treatment as a principal element over containment. EPA believes that a 1 ppm cleanup goal in the St. Lawrence River provides an acceptable measure of protection of human health.

**Description of Alternatives**

The AA Report evaluated in detail several alternatives for addressing the contamination in the St. Lawrence River in the Reynolds Study Area. These alternatives are described below. Construction times given include the time necessary to construct and implement the remedy but do not include the time required for design or contract award.

The remedial alternatives developed for the Site are consistent with EPA's 1990 "Guidance for Remedial Actions for Superfund Sites with PCB Contamination" (also referred to as the "PCB Guidance"). For instance, according to this guidance, soils with PCB concentrations in the 10 - 25 ppm range may be disposed on an industrial facility with minimal long-term management controls. Accordingly, EPA has evaluated an alternative for the RMC Site which includes disposal of sediments with PCB concentrations between 10 and 25 ppm in the Black Mud Pond, rather than in an engineered landfill (see Alternative G below). The PCB Guidance also recommends that soils with higher concentrations of PCBs be disposed on an industrial facility in an engineered containment system which may include a cover and liner system. Accordingly, EPA has evaluated alternatives which include disposal of untreated sediments (see Alternative D below) or treated sediments with PCB concentrations between 50 and 500 ppm in an engineered landfill (see Alternative I below). In addition, several of the other alternatives evaluated below (including Alternatives E, F, and J) include options for disposal in the Black Mud Pond or in an engineered landfill depending on whether the material is a hazardous waste. The alternatives are described in detail below.

Alternative A: No Action

Capital Cost: $ 0
O&M Cost: $ 0/year
Present Worth Cost: $ 0
Construction Time: None

The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) requires that the "no action" alternative be considered as a baseline for comparison with other alternatives. This action consists of allowing the 51,500 cubic yards of contaminated sediments with concentrations above the cleanup levels to remain in their present state. No actions would be taken to remove or contain contaminated sediments which currently pose a threat to human health and the environment.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative B: In-Situ Capping of Sediments

Capital Cost: $ 13.3 million
O&M Cost: $ 190,000/year
Present Worth Cost: $ 16.6 million
Construction Time: 3 years

This alternative involves leaving the 51,500 cubic yards of contaminated sediments in place and placing a multilayer cap consisting of fine-grained clean sand and a woven geotextile fabric over the sediments. The portion of the Site adjacent to the shoreline would then be armored to minimize erosion (see Figure 12). This alternative is designed to isolate and limit the transport of river sediments and is based on methods commonly used to reduce shoreline erosion.

Prior to construction, the Reynolds Study Area bathymetry would be refined and remapped. In addition, areas of dense vegetation and any areas containing boulders or debris would be identified and mapped. The geotextile fabric would be pieced together from sections delivered to the shoreline and each geofabric piece transported on a barge out to each area defined for sediment capping. Once lowered from the barge, the geotextile would be anchored with sand bags. The placement of the geotextile would be carefully controlled to minimize mudwaves and turbidity. Clean sand would then be spread in an approximate 1.5 foot layer over the geotextile using a diffuser.

Armoring material would then be placed in the shallow area adjacent to the shoreline which is exposed to wave action and boat wakes. The armoring system would be concrete revetment which consists of a water permeable fabric casing, which has been woven from high-

strength synthetic fibers and which would be laid by laborers and then filled with concrete. The total area of the cap would extend 10 to 20 percent beyond the contaminated area to maximize isolation of the contaminated sediment from the aquatic environment. Inspections and monitoring including depth sounding and water quality monitoring would be conducted during construction. After construction, a long-term physical, chemical, and biological performance monitoring program would be instituted to determine the cover's effectiveness in containing contaminated sediments. This alternative also provides for periodic maintenance of the cover and posting warning signs and restricting access from both on and offshore.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative D: Sediment Removal/Landfilling

Capital Cost: $ 33.4 million
O&M Cost: $ 28,000/year
Present Worth Cost: $ 33.9 million
Construction Time: 4 years

This alternative involves dredging sediment which is above Reynolds Study Area cleanup levels (approximately 51,500 cubic yards) from the St. Lawrence River adjacent to the RMC facility. The dredged sediment would then be pretreated and placed in an engineered landfill on the RMC facility.

Prior to dredging, silt curtains would be installed to minimize transport of contaminated sediment which may be suspended during the dredging process. Hydraulic dredges would be used to remove sediments. Oversized materials would be screened from the dredged sediments as the sediments are offloaded into scows and transported to the shoreline. Sediments would then be decanted and dewatered and placed, along with the previously screened oversized debris, into an on-site engineered landfill. Water removed from the sediments would be treated using methods including flocculation and chemical precipitation to remove solids, and sand bed filtration and activated carbon adsorption. All water that is removed from sediments would be discharged to the St. Lawrence River in compliance with the substantive requirements of the New York State Pollutant Discharge Elimination System (SPDES) which regulates surface water discharges in New York State.

Following completion of sediment placement in the landfill, the on-site landfill would be closed. Leachate from the landfill would be collected, treated, and discharged to the St. Lawrence River. Groundwater downgradient of the landfill would be monitored.

The major ARARs associated with this alternative include the applicable federal Toxic Substances Control Act (TSCA) and the relevant and appropriate federal and State Resource Conservation and Recovery Act (RCRA) regulations which govern the construction, closure, and monitoring of the on-site landfill. In addition, all discharges to the St. Lawrence River would be subject to applicable substantive SPDES requirements and all operations would be subject to New York State air quality standards.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed at least once every five years. If justified by the five year review, remedial actions may be implemented to remove or treat the wastes.

**Alternative E: Sediment Removal/Incineration/On-site Disposal in the Black Mud Pond or Landfilling**

Capital Cost: $ 52.8 million (with Black Mud Pond disposal)
$ 55.3 million (with landfill construction)
O&M Cost: $ 28,000/year
Present Worth Cost: $ 53.3 million (with Black Mud Pond disposal)
$ 55.8 million (with landfill construction)
Construction Time: 4 years

This alternative involves dredging sediments which are above Reynolds Study Area cleanup levels (approximately 51,500 cubic yards) from the St. Lawrence River adjacent to the RMC facility. The dredged sediment would then be pretreated to remove water, incinerated to destroy organic contaminants, and disposed of on-site in the Black Mud Pond.

Prior to dredging, silt curtains would be installed to minimize transport of contaminated sediment which may be resuspended during the dredging process. Hydraulic dredges would be used to remove sediments. Oversized materials would be screened from the dredged sediments as the sediments are offloaded into scows and transported to the shoreline. Sediments would then be decanted, dewatered, and incinerated on-site. The incinerator ash would have PCB levels at or below 2 ppm.

The ash would be tested using the RCRA Toxicity Characteristic Leaching Procedure (TCLP) test to determine if it is a RCRA hazardous waste. EPA has tested the sediments and does not expect that the ash from the incinerator would be a RCRA hazardous waste. If the ash was not a RCRA hazardous waste, it would be disposed of on-site in the Black Mud Pond along with the previously screened debris. If the ash was found to be a RCRA hazardous waste, it would either be treated to render it non-hazardous or it would be disposed, along with the previously screened oversized debris, in an engineered on-site landfill. Therefore, the costs of this alternative may vary, depending on whether construction of an engineered landfill is necessary.

Water removed from the sediments would be treated using methods including flocculation and chemical precipitation to remove solids, and sand bed filtration and activated carbon adsorption. All water that is removed from sediments or generated during the treatment process would be discharged to the St. Lawrence River in compliance with substantive SPDES requirements.

The major ARARs associated with this alternative include the applicable federal TSCA and the relevant and appropriate federal and State RCRA regulations which govern the operation and monitoring of the on-site incinerator and the construction, closure, and monitoring of the on-site landfill. In addition, air emissions from the incinerator would be monitored to ensure compliance with federal Clean Air Act regulations and New York State air quality standards and air emissions regulations. Discharges to the St. Lawrence River would be subject to applicable substantive SPDES requirements.

**Alternative F: Sediment Removal/Thermal Desorption/On-site Disposal in the Black Mud Pond or Landfilling**

Capital Cost: $ 43.7 million (with Black Mud Pond disposal)
$ 46.2 million (with landfill construction)
O&M Cost: $ 28,000/year
Present Worth Cost: $ 44.2 million (with Black Mud Pond disposal)
$ 46.7 million (with landfill construction)
Construction Time: 4 years

This alternative involves dredging sediments which are above Reynolds Study Area cleanup levels (approximately 51,500 cubic yards) from the St. Lawrence River adjacent to the RMC facility. The dredged sediment would then be pretreated to remove water, treated by thermal desorption to remove organic contaminants, and disposed of on-site.

Prior to dredging, silt curtains would be installed to minimize transport of contaminated sediment which may be suspended during the dredging process. Hydraulic dredges would be used to remove sediments. Oversized materials would be screened from the dredged sediments as the sediments are offloaded into scows and transported to the shoreline. Sediments would then be decanted, dewatered, and treated on-site. The sediment treatment process would consist of thermal desorption, an innovative technology which thermally extracts organic contaminants and subsequently condenses and recovers the distilled contaminants. The recovered contaminants would then be sent to an off-site location for incineration at a permitted commercial incinerator.

Based on the results of treatability testing, treated sediments would have PCB concentrations below 10 ppm. The treated sediments would be tested using the RCRA TCLP test to determine if they are a RCRA hazardous waste. EPA has tested the sediments and does not expect that the treated sediments would be a RCRA hazardous waste. If the treated sediments were not a RCRA hazardous waste, they would be disposed of on-site in the Black Mud Pond along with the

previously screened debris. If the treated sediments were found to be a RCRA hazardous waste, they would either be treated to render them non-hazardous or they would be disposed, along with the previously screened oversized debris, in an engineered on-site landfill. Therefore, the costs of this alternative may vary, depending on whether construction of an engineered landfill is necessary.

Water removed from the sediments would be treated using methods including flocculation and chemical precipitation to remove solids, and sand bed filtration and activated carbon adsorption. All water that is removed from sediments or generated during the treatment process would be discharged to the St. Lawrence River in compliance with substantive SPDES requirements.

The major ARARs associated with this alternative include the applicable federal TSCA and the relevant and appropriate federal and State RCRA regulations which govern the construction, closure, and monitoring of the on-site landfill. In addition, air emissions from the thermal desorption process would be monitored to ensure compliance with federal Clean Air Act regulations and New York State air quality standards and air emissions regulations. Discharges to the St. Lawrence River would be subject to applicable substantive SPDES requirements.

**Alternative G: Sediment Removal/Partial Thermal Desorption/Disposal in the Black Mud Pond**

Alternative G(A) - 25 ppm treatment level
Capital Cost: $ 34.8 million
O&M Cost: $ 28,000/year
Present Worth Cost: $ 35.1 million
Construction Time: 4 years

Alternative G(B) - 10 ppm treatment level
Capital Cost: $ 36.4 million
O&M Cost: $ 28,000/year
Present Worth Cost: $ 36.7 million
Construction Time: 4 years

This alternative is very similar to Alternative F above. However, under this alternative, only those more highly contaminated sediments would be treated by thermal desorption. As in Alternatives D - F, this alternative involves dredging sediments which are above Reynolds Study Area cleanup levels (approximately 51,500 cubic yards) from the St. Lawrence River adjacent to the RMC facility. The dredged sediment would then be pretreated to remove water. Sediment with PCB concentrations above the treatment level would be treated by thermal desorption to remove organic contaminants. Treated sediment and untreated sediment would then be disposed of on-site in the Black Mud Pond.

Under this alternative, EPA has evaluated two different treatment levels. Under Alternative G(A), only those sediments with PCB

concentrations above 25 ppm (approximately 14,500 cubic yards) would be treated by thermal desorption. The remaining 37,000 cubic yards of sediment with PCB concentrations at or below 25 ppm would be disposed of on-site without prior treatment. Under Alternative G(B), only those sediments with PCB concentrations above 10 ppm (approximately 19,700 cubic yards) would be treated by thermal desorption. The remaining 31,800 cubic yards of sediment would be disposed of on-site without prior treatment. The 10 ppm and 25 ppm PCB treatment levels evaluated represent levels which EPA generally considers acceptable for on-site disposal in an industrial area (see discussion on page 12). Per the EPA PCB Guidance, material with PCB concentrations in the 10 - 25 ppm range may generally be disposed of on an industrial facility with minimal long-term management.

Prior to dredging, silt curtains would be installed to minimize transport of contaminated sediment which may be suspended during the dredging process. Hydraulic dredges would be used to remove sediments. Oversized materials would be screened from the dredged sediments as the sediments are offloaded into scows and transported to the shoreline. Sediments would then be decanted, dewatered, and, for those sediments with PCB concentrations above the treatment level, treated on-site by thermal desorption. Condensed contaminants recovered during treatment would then be sent to an off-site location for incineration at a permitted commercial incinerator.

Based on the results of treatability testing, treated sediments would have PCB concentrations below 10 ppm. Treated and untreated sediments would be tested to ensure that they cannot be classified as a RCRA hazardous waste using the RCRA TCLP test. Treated sediments, along with untreated dewatered sediments, would be disposed of on-site in the Black Mud Pond and capped in conformance with the requirements of the January 22, 1992 New York State Record of Decision for the state lead Reynolds Metals Site.

Water removed from the sediments would be treated using methods including flocculation and chemical precipitation to remove solids, and sand bed filtration and activated carbon adsorption. All water that is removed from sediments or generated during the treatment process would be discharged to the St. Lawrence River in compliance with substantive SPDES requirements.

The major ARARs associated with this alternative include the applicable federal TSCA and the relevant and appropriate federal and State RCRA regulations which govern the disposal and monitoring of the sediments. In addition, air emissions from the thermal desorption process would be monitored to ensure compliance with federal Clean Air Act regulations and New York State air quality standards and air emissions regulations. Discharges to the St. Lawrence River would be subject to applicable substantive SPDES regulations.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be

reviewed at least once every five years. If justified by the five year review, remedial actions may be implemented to remove or treat the wastes.

**Alternative I: Sediment Removal/Partial Thermal Desorption/Landfilling**

Alternative I(A) - 500 ppm treatment level
Capital Cost: $ 35.3 million
O&M Cost: $ 28,000/year
Present Worth Cost: $ 35.8 million
Construction Time: 4 years

Alternative I(B) - 50 ppm treatment level
Capital Cost: $ 37.4 million
O&M Cost: $ 28,000/year
Present Worth Cost: $ 37.9 million
Construction Time: 4 years

This alternative is very similar to Alternative G above. However, under this alternative, only the most highly contaminated sediments would be treated by thermal desorption. As in Alternatives F and G, this alternative involves dredging sediments which are above Reynolds Study Area cleanup levels (approximately 51,500 cubic yards) from the St. Lawrence River adjacent to the RMC facility. The dredged sediment would then be pretreated to remove water and sediment with PCB concentrations above the treatment level would be treated by thermal desorption to remove organic contaminants. Treated sediment and untreated sediment would then be disposed of on-site.

Under this alternative, EPA has evaluated two different treatment levels. Under Alternative I(A), only those sediments with PCB concentrations above 500 ppm (approximately 2,300 cubic yards) would be treated by thermal desorption. The remaining 49,200 cubic yards of sediment with PCB concentrations below 500 ppm would be disposed of in an on-site landfill without prior treatment. Under Alternative I(B), only those sediments with PCB concentrations above 50 ppm (approximately 11,300 cubic yards) would be treated by thermal desorption. The remaining 39,700 cubic yards of sediment would be disposed of on-site without prior treatment. The 500 ppm and 50 ppm PCB treatment levels evaluated represent levels which EPA generally considers acceptable for on-site disposal in an industrial area (see discussion on page 12). Per the EPA PCB Guidance, material with PCB concentrations in the 50 - 500 ppm range may generally be disposed of on an industrial facility in an engineered containment system.

Prior to dredging, silt curtains would be installed to minimize transport of contaminated sediment which may be suspended during the dredging process. Hydraulic dredges would be used to remove sediments. Oversized materials would be screened from the dredged sediments as the sediments are offloaded into scows and transported to the shoreline. Sediments would then be decanted, dewatered, and,

for those sediments with PCB concentrations above the treatment level, treated on-site by thermal desorption. Condensed contaminants recovered during treatment would then be sent to an off-site location for incineration at a permitted commercial incinerator.

Based on the results of treatability testing, treated sediments would have PCB concentrations below 10 ppm. Treated and untreated sediments would be placed, along with the previously screened oversized debris and untreated sediments, into an on-site landfill.

Water removed from the sediments would be treated using methods including flocculation and chemical precipitation to remove solids, and sand bed filtration and activated carbon adsorption. All water that is removed from sediments or generated during the treatment process would be discharged to the St. Lawrence River in compliance with substantive SPDES requirements.

The major ARARs associated with this alternative include the applicable federal TSCA and the relevant and appropriate federal and State RCRA regulations which govern the construction, closure, and monitoring of the on-site landfill. In addition, air emissions from the thermal desorption process would be monitored to ensure compliance with federal Clean Air Act regulations and New York State air quality standards and air emissions regulations. Discharges to the St. Lawrence River would be subject to applicable substantive SPDES regulations.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed at least once every five years. If justified by the five year review, remedial actions may be implemented to remove or treat the wastes.

**Alternative J: Partial Sediment Removal/Thermal Desorption/On-site Disposal in the Black Mud Pond or Landfilling/In-Situ Capping**

Capital Cost: $ 17.1 million (with Black Mud Pond disposal)
$ 19.6 million (with landfill construction)
O&M Cost: $ 28,000/year
Present Worth Cost: $ 17.6 million (with Black Mud Pond disposal)
$ 23.2 million (with landfill construction)
Construction Time: 3 years

This alternative includes dredging approximately 2,300 cubic yards of contaminated sediment with PCB concentrations above 500 ppm from the St. Lawrence River adjacent to the RMC facility. The dredged sediment would then be pretreated to remove water and treated by thermal desorption to remove organic contaminants. Treated sediment would then be disposed of on-site. The remaining 49,200 cubic yards of contaminated sediment would be left in place and covered in the river with a multilayer cap.

Prior to dredging, silt curtains would be installed to minimize transport of contaminated sediment which may be resuspended during the dredging process. Hydraulic dredges would be used to remove sediments. Oversized materials would be screened from the dredged sediments as the sediments are offloaded into scows and transported to the shoreline. Sediments would then be decanted, dewatered, and treated on-site by thermal desorption. Condensed contaminants recovered during treatment would then be sent to an off-site location for incineration at a permitted commercial incinerator. Water removed from the sediments would be treated using methods including flocculation and chemical precipitation to remove solids, and sand bed filtration and activated carbon adsorption. All water that is removed from sediments or generated during the treatment process would be discharged to the St. Lawrence River in compliance with substantive SPDES requirements.

Based on the results of treatability testing, treated sediments would have PCB concentrations below 10 ppm. The treated sediments would be tested using the RCRA TCLP test to determine if they are a RCRA hazardous waste. EPA has tested the sediments and does not expect that the treated sediments will be a RCRA hazardous waste. If the treated sediments are not a RCRA hazardous waste, they will be disposed of on-site in the Black Mud Pond along with the previously screened debris. If the treated sediments are found to be a RCRA hazardous waste, they will either be treated to render them non-hazardous or they will be disposed, along with the previously screened oversized debris, in an engineered on-site landfill. Therefore, the costs of this alternative may vary, depending on whether construction of an engineered landfill is necessary.

As in Alternative B, the remaining 49,200 cubic yards of sediment would be left in place and a multilayer cap consisting of fine-grained clean sand and a woven geotextile fabric would be placed over the sediments. The capping system design, construction, and monitoring would be identical to that described in Alternative B. This alternative also provides for periodic maintenance of the cover and posting warning signs and restricting access from both on and offshore.

The major ARARs associated with this alternative include the applicable federal TSCA and the relevant and appropriate federal and State RCRA regulations which govern the construction, closure, and monitoring of the on-site landfill. In addition, air emissions from the thermal desorption process would be monitored to ensure compliance with federal Clean Air Act regulations and New York State air quality standards and air emissions regulations. Discharges to the St. Lawrence River would be subject to applicable substantive SPDES regulations.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed at least once every five years. If justified by the five

year review, remedial actions may be implemented to remove or treat the wastes.

## VIII. Summary of Comparative Analysis of Alternatives

In accordance with the National Contingency Plan (NCP), a detailed analysis of each alternative was performed. The purpose of the detailed analysis was to objectively assess the alternatives with respect to nine evaluation criteria that encompass statutory requirements and include other gauges of the overall feasibility and acceptability of remedial alternatives. The analysis was comprised of an individual assessment of the alternatives against each criterion and a comparative analysis designed to determine the relative performance of the alternatives and identify major trade-offs, that is, relative advantages and disadvantages, among them.

The nine evaluation criteria against which the alternatives were evaluated are as follows:

Threshold Criteria - The first two criteria must be satisfied in order for an alternative to be eligible for selection.

1. **Overall Protection of Human Health and the Environment** addresses whether a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with Applicable, or Relevant and Appropriate Requirements (ARARs)** is used to determine whether each alternative will meet all of its federal and state ARARs. When an ARAR is not met, the detailed analysis should discuss whether one of the six statutory waivers is appropriate.

Primary Balancing Criteria - The next five "primary balancing criteria" are to be used to weigh major trade-offs among the different hazardous waste management strategies.

3. **Long-term Effectiveness and Permanence** focuses on any residual risk remaining at the Site after the completion of the remedial action. This analysis includes consideration of the degree of threat posed by the hazardous substances remaining at the Site and the adequacy of any controls (for example, engineering and institutional) used to manage the hazardous substances remaining at the Site.

4. **Reduction of Toxicity, Mobility, or Volume Through Treatment** is the anticipated performance of the treatment technologies a particular remedy may employ.

5. **Short-term Effectiveness** addresses the effects of the alternative during the construction and implementation phase until the remedial response objectives are met.

6. **Implementability** addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation.

7. **Cost** includes estimated capital, and operation and maintenance costs, both translated to a present worth basis. The detailed analysis evaluates and compares the cost of the respective alternatives, but draws no conclusions as to the cost effectiveness of the alternatives. Cost effectiveness is determined in the remedy selection phase, when cost is considered along with the other balancing criteria.

Modifying Criteria - The final two criteria are regarded as "modifying criteria," and are to be taken into account after the above criteria have been evaluated. They are generally to be focused upon after public comment is received.

8. **State Acceptance** reflects the statutory requirement to provide for substantial and meaningful State and Tribal involvement.

9. **Community Acceptance** refers to the St. Regis Mohawk Tribe's and the community's comments on the remedial alternatives under consideration, along with the Proposed Plan. Comments received during the public comment period, and the EPA's responses to those comments, are summarized in the Responsiveness Summary which is attached to this ROD.

The following is a summary of the comparison of each alternative's strengths and weaknesses with respect to the nine evaluation criteria.

Overall Protection of Human Health and the Environment

With the exception of Alternative A, no action, each of the alternatives, if properly implemented, operated, and maintained, protects human health and the environment. Although the alternatives differ in the degree of protection they afford, all reduce excess carcinogenic health risks to humans to levels within the acceptable EPA range of $10^{-4}$ to $10^{-6}$. Each of the alternatives also differs in how they provide protection, either through treatment of contaminated sediments, containment of sediments, or a combination of both.

Since Alternative A, the no action alternative, is not protective, it will not be considered in the remainder of this analysis.

Compliance with ARARs

All action alternatives comply with ARARs. As noted in the section above, the major federal and State ARARs include portions of TSCA and RCRA and State solid and hazardous waste disposal regulations. In addition, State SPDES provisions and federal Clean Air Act regulations are also ARARs for several of the alternatives. There are no chemical-specific ARARs for sediments.

Any thermal desorber will involve the release of an air stream from which PCBs have been removed. Such an air stream must represent an acceptable risk for PCBs and products of incomplete combustion, if any combustion occurs in the thermal desorption process. Evaluation of risk and of the TSCA requirements for a 99.9999% mass emissions factor will be included in determining the operation of the thermal desorber. In addition, emissions from the desorber must meet federal and State ARARs.

Long-Term Effectiveness and Permanence

In general, the containment and capping alternatives (Alternatives B and D) provide a lesser degree of permanence in remediating contamination than treatment alternatives (Alternatives E, F, G, I, and J) which destroy contamination. Alternative B which allows contamination to remain in the river system is less permanent than Alternative D. Alternatives E and F, which include treatment of all contaminated sediment, best meet this criterion. The mixed treatment/containment alternatives (Alternatives G, I, and J) provide a higher degree of permanence than the containment alternatives (Alternatives B and D) through permanent destruction of contaminants in highly contaminated sediments.

Of the alternatives which include treatment of contaminated sediments (Alternatives E, F, G, I, and J), long-term effectiveness varies depending on the extent to which contaminants are permanently destroyed. Accordingly, Alternatives E and F which include treatment and destruction of contaminants in all dredged sediments are more effective than Alternatives G, I, and J which include partial treatment of contaminants in dredged sediments. Similarly, Alternative G which includes treatment of sediments with PCB concentrations above 25 ppm (Alternative G(A)) or 10 ppm (Alternative G(B)) is more effective than Alternatives I and J which include treatment of sediments with PCB concentrations above 500 ppm (Alternative I(A) and Alternative J) or 50 ppm (Alternative I(B)).

The proper implementation of all alternatives would result in acceptable residual cancer risks and noncarcinogenic effects, i.e., cancer risks between $10^{-4}$ and $10^{-6}$, and hazard indices below 1. However, the effectiveness of certain alternatives is dependent on specific technical constraints. For example, the long-term effectiveness of Alternative B (in-situ capping) depends on the success of efforts to accurately place the sediment cap and to repair or replace the cap if monitoring indicates that it is failing

to adequately isolate the sediments. Similarly, the effectiveness of Alternatives D, E, F, G, and I will depend on whether it is technically possible to dredge contaminated sediments completely such that all sediment cleanup levels are met.

Alternatives B and J, which include in-situ capping, would require the greatest degree of long-term monitoring and operation and maintenance. This is because, contrary to the other alternatives where contaminated sediments are removed from the river system, the contaminated sediments would be left in-place in the river system under Alternatives B and J. Monitoring and maintenance of contained underwater sediments is technically more difficult than monitoring treated or untreated sediments which are placed in an upland landfill. Because the sediments are submerged, the contained underwater sediments would require periodic inspections by divers. In addition, several rounds of sampling might be required to detect underwater containment cell leakage, since any leaking contamination would be diluted. Further, if underwater monitoring revealed that cap repairs were necessary, such repairs could likely only be undertaken in late spring or in summer.

In addition, the operation and maintenance requirements for Alternatives B and J pose the greatest uncertainties and technical difficulties. For example, the risk to human health and the environment is greatest if Alternatives B and J fail since contaminated sediments would reenter the river system and be available to contaminate fish and wildlife. Sediments contained in a landfill are more secure since a leak in the landfill cap or liner does not automatically result in sediments reentering the river system and contaminating fish and wildlife.

Reduction of Toxicity, Mobility, or Volume through Treatment

In general, all of the alternatives which include dredging and treatment best meet this criterion. Alternatives E and F, which include treatment of all 51,500 cubic yards of contaminated sediments with PCB concentrations above 1 ppm, would result in the greatest reduction of toxicity, mobility, and volume of all the alternatives. Alternative G which includes treatment of sediments with PCB concentrations above 25 ppm (Alternative G(A)) or 10 ppm (Alternative G(B)) is more effective in reducing contaminant toxicity, mobility, and volume than Alternatives I and J which includes treatment of sediments with PCB concentrations above 500 ppm (Alternative I(A) and Alternative J) or 50 ppm (Alternative I(B)).

Although capping and containment alternatives (Alternatives B and D) would reduce the mobility of contaminated material in sediment, no treatment would be performed. Incineration or thermal desorption of sediments (as in Alternatives E, F, G, I, and J) would reduce the mobility, toxicity, and volume of the contaminated material. Incineration produces an ash which must be disposed. Thermal desorption would produce a toxic extract which would be shipped off-site for incineration. Both thermal desorption and incineration

would result in the production of treated sediment residuals or ash which EPA does not anticipate will be hazardous.

Short-Term Effectiveness

In general, effective alternatives which can be implemented quickly with little risk to human health and the environment are favored under this criterion. Of the action alternatives evaluated, Alternative B (in-situ capping) would have the fewest short-term effects because sediment suspension would be minimized. Sediment suspension is a concern because any suspended contaminated sediment could redeposit in downstream areas. Alternatives which involve sediment dredging (Alternatives D, E, F, G, I, and J) include the use of extensive controls such as silt curtains to minimize sediment suspension and deposition in the River.

Sediment treatment alternatives (Alternatives E, F, G, I, and J) would reduce the potential for direct contact with contaminated sediment by permanently removing the source of contamination. Community and worker exposure would be minimized by the use of construction methods that minimize air emissions from treatment processes; also, protective equipment that minimizes workers' contact with the contaminated materials would be utilized. Air quality would be monitored during remediation.

Completion of remedial design for any selected remedy would take up to two years. The time required to implement each alternative is: 3 years for Alternative B; 4 years for Alternatives D, E, F, G, and I; and 3 years for Alternative J.

Implementability

All of the alternatives are implementable from an engineering standpoint. However, there are some inherent difficulties which make some alternatives more difficult to implement than others.

While the technology associated with Alternatives B and J (in-situ capping) has been generally used in lakes and harbors, the technical feasibility of ensuring the integrity of the cap, given the currents in the area adjacent to the RMC facility, remains questionable. If the integrity of the cap cannot be maintained in the future, additional cleanup activities, such as sediment dredging, would be required. In addition, because sediments would remain underwater, it may be technically difficult to monitor the effectiveness of the cap. If a cap failure went undetected, fish and wildlife would again be exposed to PCBs and other contaminants.

The greatest potential technical difficulty associated with the sediment removal alternatives (Alternatives D, E, F, G, I, and J) is the technical feasibility of dredging sediments sufficiently to achieve the cleanup goals for the Site. With the exception of the G.M. Site, to date, no environmental dredging program has had as its goal the removal of sediments to levels of 1 ppm PCBs. If dredging cannot achieve the 1 ppm PCB level, additional cleanup activities,

which could include sediment containment, would be required. For example, Alternative J includes a combination of dredging to remove some highly contaminated sediment and containment of the remaining sediment which is not dredged.

Incineration, a component of Alternative E, is the most proven and widely available technology for treating many contaminants. However, test burns would be required prior to implementation of incineration. Thermal desorption processes, included in Alternatives F, G, I, and J, while not as widely applied as incineration, have been used in full-scale sediment remediation. Landfilling is also a widely used, easily implementable, relatively easily monitored technology. Coordination with several agencies, including the St. Lawrence Seaway Development Corporation and the U.S. Corps of Engineers would be required prior to implementation of any alternative.

Cost

The costs associated with each alternative are presented in the descriptions of the alternatives given above. These costs are estimates and may change as a result of modifications made during design and/or construction.

The least expensive action alternative is Alternative B with a present worth cost of $ 16.6 million. Alternative J is the next least expensive with present worth costs ranging from $ 17.6 million to $ 23.2 million. Alternatives D, G and I have present worth costs which range from $ 33.9 million to $ 37.9 million. Alternative F has present worth costs which range from $ 44.2 million to $ 46.7 million. Alternative E is the most expensive alternative with present worth costs ranging from $ 53.3 million to $ 55.8 million.

State Acceptance

The NYSDEC strongly suppports the proposed dredging of contaminated sediments from the river, agrees with EPA's cleanup levels for the Site, and agrees with and supports the concept of using the Black Mud Pond for the disposal of untreated sediments and treatment residuals. However, while the NYSDEC agrees with the cleanup numbers for the Site, they do not agree with the process by which they were obtained. In addition, the NYSDEC would encourage the use of lower treatment levels if it could be demonstrated that doing so would not add unreasonable costs to the project.

Community Acceptance

Comments from the community submitted during the public comment period indicate that the community has varying opinions regarding remediation of the Reynolds Study Area. The St. Regis Mohawk Tribe expressed a desire for a cleanup plan which takes the contaminants out of the river system and permanently disposes of them. They prefer a 0.1 ppm PCB cleanup level for contaminated sediments and called for additional sampling in the Raquette River.

Comments received from the general public indicated that a majority supported Alternative G(B) with one modification: that sediments and treated residuals be disposed in an engineered landfill, rather than disposed of on-site with a soil cover. Comments from the Canadian government indicated that they believed a pilot-scale dredging study was essential prior to full-scale remedy implementation and requested that EPA consider additional containment measures other than a soil cover for sediments. However, comments received from area industries, including Reynolds, General Motors, and ALCOA, and from the Massena Industrial Development Corporation supported the increased use of in-place containment of sediments as part of EPA's selected remedy and questioned whether a 1 ppm PCB cleanup level is technically achievable. Comments are responded to in detail in the Responsiveness Summary which is an appendix to this document.

## IX. Selected Remedy

Based upon an evaluation of the various alternatives and comments received from the public, EPA has selected Alternative G(A), Sediment Removal/Partial Thermal Desorption/Disposal in the Black Mud Pond for remediation of the Reynolds Study Area Site. The major components of the selected remedy include:

- Dredging/Excavation of Contaminated Sediments

Sediments in the St. Lawrence River with PCB levels above 1 ppm, PAH levels above 10 ppm, and TDBF levels above 1 ppb will be dredged and/or excavated. The approximate area to be dredged is shown in Figure 11. EPA estimates that approximately 51,500 cubic yards of sediment will be removed from the Reynolds Study Area though the actual volume of sediment which exceeds the above criteria may prove to exceed or be less than that amount. All contaminated sediments in the area to be dredged will be removed given the technological limitations associated with dredging. In selecting the 1 ppm cleanup goal, EPA has balanced its desire for a very low cleanup level which will minimize residual risk with the constraints posed by dredging as a means of removing sediment from a riverine environment.

Prior to dredging, additional sediment and surface water sampling will be conducted to better delineate the extent of the area to be dredged and to serve as baseline monitoring data. The area to be sampled will include the upriver portion of the Reynolds Study Area and the area near the mouth of the Grasse River. Bathymetry in the Reynolds Study Area will be refined and remapped. In addition, areas of dense vegetation and any areas containing boulders or debris will be identified and mapped. The initial dredging program will be conducted in a manner which will identify site-specific information and operating parameters such as dredging rates and depths, sediment removal efficiencies, silt curtains and sheet piling effectiveness, sediment dewatering methods, and sediment suspension and settling characteristics. This information will be evaluated and used as appropriate in modifying operating procedures to improve the effectiveness of the removal program.

Silt curtains and, if deemed necessary during design, sheet piling will be installed on the river side of the areas to be dredged to provide a stilling basin for dredging operations and to minimize transport of contaminated sediment which may be resuspended during the dredging process. Sediments will generally be removed using hydraulic dredges but mechanical dredges may also be used when appropriate. Sediments near the shoreline may also be excavated using conventional excavation equipment. During dredging, sediments and surface water will be monitored to ensure that downstream transport of contaminated sediment is minimized. A contingency plan will be developed which describes measures to control and/or minimize the impacts of dredging. Measures to control the impacts of dredging could include, if approved by EPA, modification and/or suspension of dredging activities. Oversized materials will be screened from the dredged sediments as the sediments are transported to the shoreline. Dredged/excavated areas will be restored to their original grade either through the use of fill or, if determined to be appropriate by EPA during design, through natural sediment deposition.

- Partial Thermal Desorption of Sediments

Removed sediments will then be decanted and dewatered. Those sediments with PCB concentrations above 25 ppm (approximately 14,500 cubic yards) will then be treated on-site by thermal desorption. Based on the results of treatability testing, treated sediments will have PCB concentrations below 10 ppm. Condensed contaminants recovered during thermal desorption will be sent to an off-site location for incineration at a permitted commercial incinerator. Water removed from the sediments will be treated using methods including flocculation and chemical precipitation to remove solids, and sand bed filtration and activated carbon adsorption. All water that is removed from sediments or generated during the treatment process will be discharged to the St. Lawrence River in compliance with substantive SPDES requirements.

Emissions from the thermal desorption system will be controlled using venturi scrubbers and scrubber towers. Emissions will be monitored to ensure compliance with federal and State air quality and emissions requirements.

- Sediment On-site Disposal in the Black Mud Pond

Sediments will be tested using the RCRA TCLP to ensure that they cannot be classified as RCRA hazardous waste. If they are RCRA hazardous waste, additional treatment, such as solidification, may be required to render them non-hazardous. Treated sediments, along with approximately 37,000 cubic yards of untreated dewatered sediments with PCB concentrations between 1 and 25 ppm, and rinsed oversized material will be disposed of on-site in the Black Mud Pond. The Black Mud Pond will be capped, in compliance with the requirements of the New York State-Reynolds Consent Order, with a multilayer cap and monitored and maintained to ensure the integrity of the cap.

Prior to remediation, a floodplains assessment will be performed and a determination will be made as to the consistency of the remedial action with the New York State Coastal Zone Management Program. Some changes may be made to the remedy as a result of the remedial design and construction processes. If the changes are significant, for purposes of Section 300.435(c)(2) of the National Contingency Plan, then EPA will follow the appropriate procedures set forth in that regulatory provision. Monitoring of the St. Lawrence River sediments, water, and biota will be performed prior to, during, and after dredging operations.

The capital cost of the selected remedy is $ 34.8 million. Annual operation and maintenance costs are $ 28,000/year. The total present worth cost of the selected remedy is $ 35.1 million. A more detailed breakdown of estimated costs associated with the selected remedy is presented in Table 8.

## X. Statutory Determinations

### Protection of Human Health and the Environment

The selected remedy protects human health and the environment through the removal of contaminated sediments from the river system and the subsequent permanent treatment of highly contaminated sediments. Treated sediments and untreated sediments with low level contamination will be disposed of on-site. Cleaned oversized items which cannot be treated will also be disposed of on-site. Following implementation of the selected remedy, the excess cancer risk to adults will be on the order of $10^{-4}$, within the range considered acceptable by EPA. In addition, following implementation, hazard indices for non-carcinogens will be less than one.

### Compliance with Applicable or Relevant and Appropriate Requirements

A list of ARARs for the selected remedy is presented in Table 9. The selected remedy complies with these ARARs.

TSCA is the primary federal law which regulates the disposal of PCBs. A special allowance is made under 40 CFR §761.60(a)(5)(iii) of the TSCA regulations for dredged material disposal. For the reasons described in this document (see the discussions in Part VIII entitled "Long-term Effectiveness and Permanence", "Reduction of Toxicity, Mobility, or Volume through Treatment", and "Cost" and the discussion in the following section), EPA believes that the remedy selected herein is consistent with the TSCA requirements at 40 CFR §761.60(a)(5)(iii).

### Cost-Effectiveness

The selected remedy is cost-effective because it has been demonstrated to provide overall effectiveness proportional to its

costs. The present worth cost of the selected alternative, Alternative G(A), which includes a 25 ppm treatment threshold, is $ 35.1 million. The present worth cost of Alternative G(B), which includes a 10 ppm treatment threshold, is $ 36.7 million. The present worth cost of Alternative I(A), which incorporates a 500 ppm treatment threshold, is $ 35.8 million. The present worth cost of Alternative I(B), which incorporates a 50 ppm treatment threshold, is $ 37.9 million. Thus, EPA has selected the least expensive alternative which provides for permanent removal and treatment of the majority of the principal threat posed by contaminated sediments. In addition, a comparison of the costs of Alternatives G(A), I(A), and I(B) demonstrates that it is more expensive to construct a landfill for disposal of sediments with PCB concentrations between 25 and 500 ppm than it is to treat such sediments. Therefore, Alternative G(A) is more cost-effective than Alternative I.

The use of thermal desorption, rather than incineration, minimizes the cost of treatment. The 25 ppm treatment threshold results in permanent treatment of the majority of the PCB mass within the contaminated sediments and is consistent with EPA guidance and the State's cleanup plans for the upland portion of the Reynolds facility, while at the same time being less expensive than Alternative G(B), which includes a treatment level of 10 ppm. EPA's preference for use of the Black Mud Pond for disposal is also cost-effective since it will minimize the amount of fill needed in this area and it will consolidate material in one management area.

Utilization of Permanent Solutions and Alternative Treatment (or resource recovery) Technologies to the Maximum Extent Practicable (MEP)

The selected remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable. The selected remedy represents the best balance of tradeoffs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, and cost while also considering the statutory preference for treatment as a principal element and considering State, Tribe, and community acceptance.

The selected remedy offers a higher degree of permanence than in-situ containment alternatives. Because PCBs, PAHs, and TDBFs are highly persistent in the environment, removal and treatment provide the most effective way of assuring long-term protection. In addition, the treatment of the most highly contaminated sediments combined with on-site containment of untreated sediments and treatment residuals significantly reduces the total concentration of PCBs in the material which must be managed over the long-term. The use of thermal desorption combined with incineration of the condensed extract from the thermal desorption process will reduce the toxicity and mobility of contaminants. Although there are short-term impacts associated with the selected remedy, these will

be mitigated through the use of controls such as silt curtains and, if necessary, sheet piles.

EPA realizes that the implementability of the selected remedy has not been fully established. Therefore, the initial dredging program will be conducted in a manner which will identify site-specific information and operating parameters such as dredging rates and depths, sediment removal efficiencies, silt curtains and sheet piling effectiveness, sediment dewatering methods, and sediment suspension and settling characteristics. This information will be evaluated and used as appropriate in modifying operating procedures to improve the effectiveness of the removal program. Among the alternatives considered for the Site, the major tradeoffs that provided the basis for EPA's remedy selection were the fact that the selected remedy provides long-term effectiveness and permanence and reduces the toxicity of the principal threat material at the lowest cost while being consistent with the State's selected remedy for the upland portion of the Reynolds facility.

Preference for Treatment as a Principal Element

By removing and treating the contaminated sediments with PCB concentrations above 25 ppm, the selected remedy satisfies the statutory preference for remedies that employ treatment as a principal element. The selected remedy is consistent with Superfund program expectations that indicate that highly toxic, persistent wastes are a priority for treatment.

## XI. *Documentation of Significant Changes*

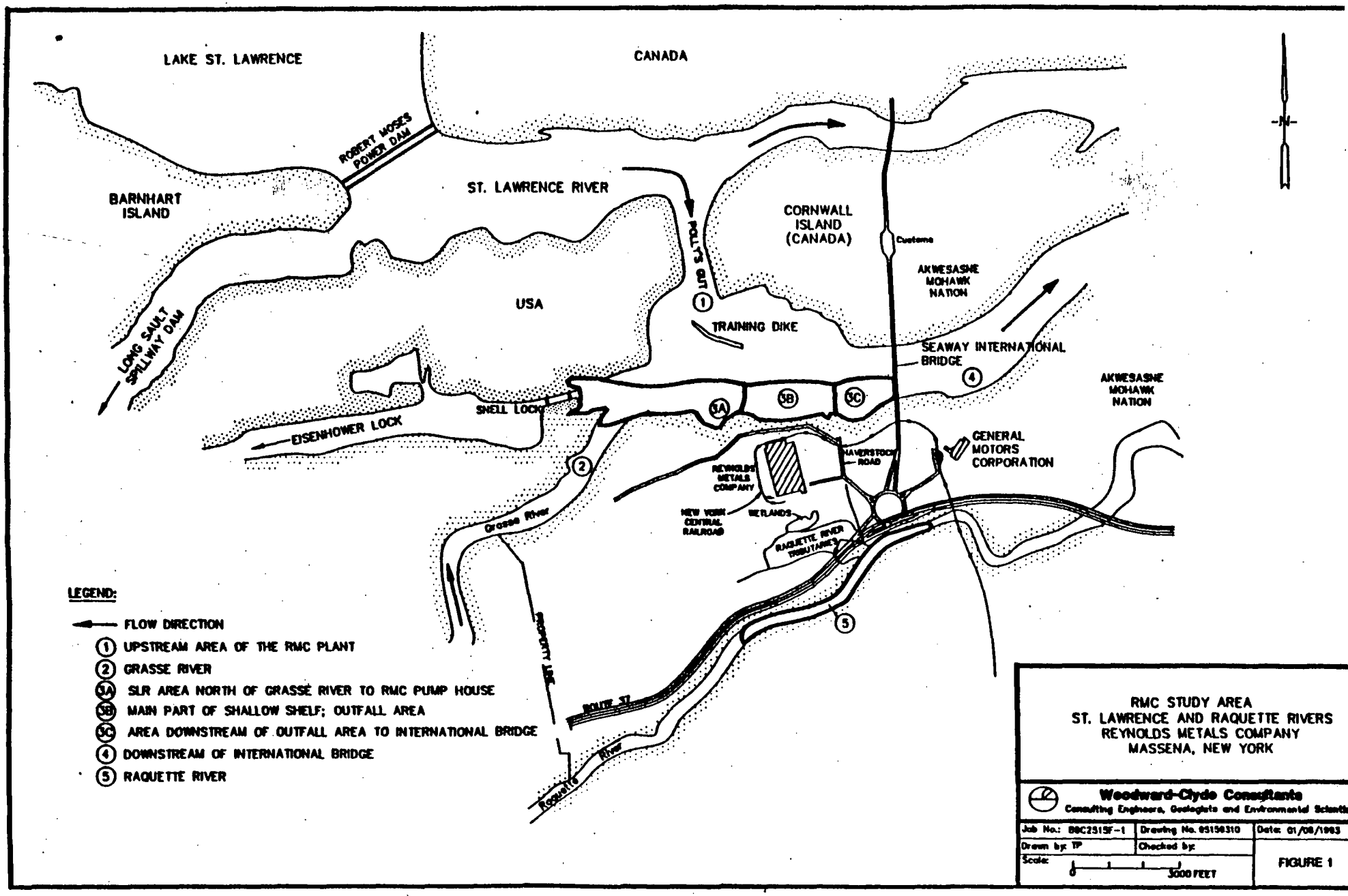
After reviewing comments received from the New York State Department of Environmental Conservation, EPA has determined that the Black Mud Pond would be a suitable location for disposal of treatment residuals and untreated sediment. Utilization of the Black Mud Pond as a disposal area would consolidate contaminants in one management unit while realizing cost savings due to eliminating construction, maintenance, and monitoring of a new disposal cell and substantially reducing the volume of fill needed for the Black Mud Pond before capping.

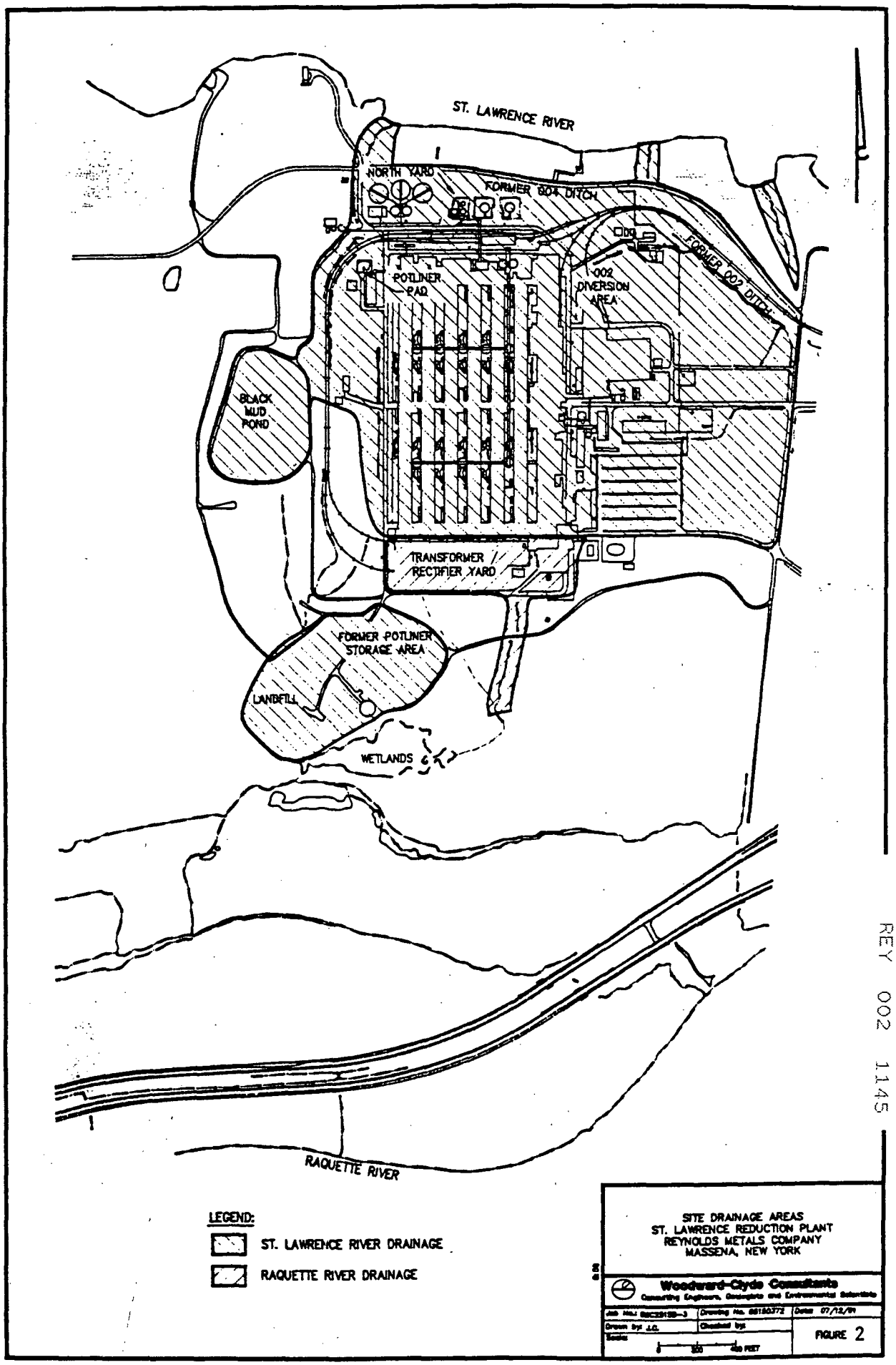
Originally, EPA, in its Proposed Plan, preferred Alternative G(B), sediment removal/partial thermal desorption/disposal with soil cover which incorporated a 10 ppm PCB treatment level. However, EPA has determined that a 25 ppm PCB treatment level is consistent with New York State's plans for remediating on-site contamination and that this change will lower remedial costs. However, although the treatment level is consistent, the process by which the number was obtained is not consistent with the State's process by which they obtained their cleanup and treatment numbers for the on-site contamination. This treatment level is consistent with EPA guidance which recommends a 10 - 25 ppm soil cleanup level for industrial sites as generally protective of human health and the environment.

In addition, material with PCB concentrations below 25 ppm could be placed in the Black Mud Pond since it would not contain concentrations significantly above material currently found in the Black Mud Pond. Accordingly, EPA has selected Alternative G(A), which incorporates a 25 ppm PCB treatment level and disposal in the Black Mud Pond, for remediation of the Reynolds Study Area sediments.

# APPENDIX 1

# FIGURES


LAKE ST. LAWRENCE
CANADA
ROBERT MOSES POWER DAM
BARNHART ISLAND
ST. LAWRENCE RIVER
CORNWALL ISLAND (CANADA)
Customs
AKWESASNE MOHAWK NATION
USA
LONG SAULT SPILLWAY DAM
POLL'S CUT
1
TRAINING DIKE
SEAWAY INTERNATIONAL BRIDGE
4
SNELL LOCK
EISENHOWER LOCK
3A
3B
3C
AKWESASNE MOHAWK NATION
GENERAL MOTORS CORPORATION
HAVERSTOCK ROAD
REYNOLDS METALS COMPANY
2
Grasse River
NEW YORK CENTRAL RAILROAD
WETLANDS
RAQUETTE RIVER TRIBUTARIES
5
PROPERTY LINE
ROUTE 37
Raquette River
LEGEND:
FLOW DIRECTION
1 UPSTREAM AREA OF THE RMC PLANT
2 GRASSE RIVER
3A SLR AREA NORTH OF GRASSE RIVER TO RMC PUMP HOUSE
3B MAIN PART OF SHALLOW SHELF; OUTFALL AREA
3C AREA DOWNSTREAM OF OUTFALL AREA TO INTERNATIONAL BRIDGE
4 DOWNSTREAM OF INTERNATIONAL BRIDGE
5 RAQUETTE RIVER
RMC STUDY AREA
ST. LAWRENCE AND RAQUETTE RIVERS
REYNOLDS METALS COMPANY
MASSENA, NEW YORK
Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 88C2515F-1
Drawing No. 05156310
Date: 01/08/1993
Drawn by: TP
Checked by:
Scale: 0 3000 FEET
FIGURE 1



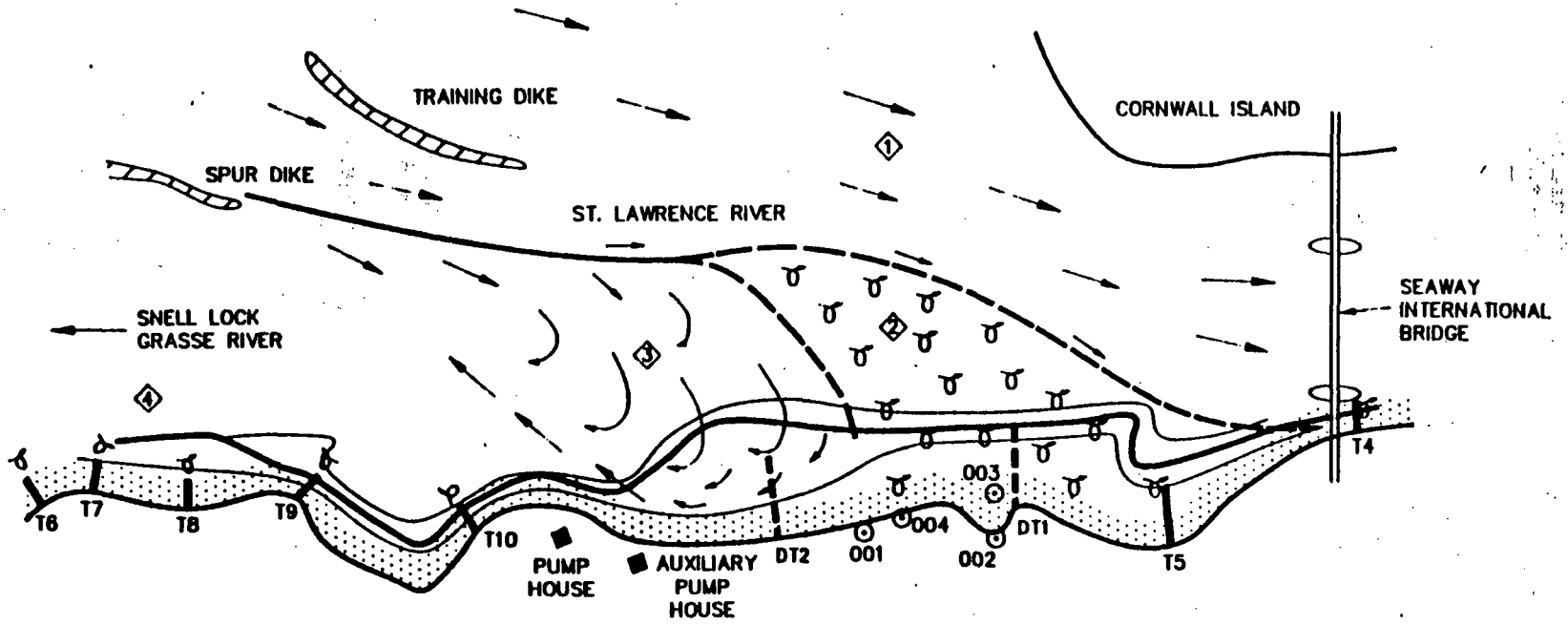

SITE DRAINAGE AREAS
ST. LAWRENCE REDUCTION PLANT
REYNOLDS METALS COMPANY
MASSENA, NEW YORK

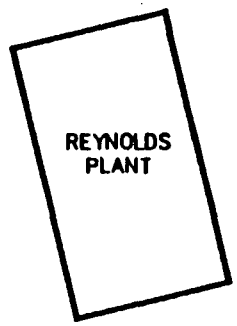
Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists

Job No.: 88C33130-3 | Drawing No.: 88180372 | Date: 07/12/89
Drawn by: J.C. | Checked by:
Scale: 0 200 400 FEET

FIGURE 2

REY 002 1145




LEGEND:

1988 STUDY

- OUTFALL LOCATION
- WATER DEPTH, 6 FEET
- WATER DEPTH, 12 FEET
- WATER DEPTH, 18 FEET
- MAIN RIVER FLOW–CORE CURRENT
- ZONE OF TURBULENCE
- REVERSE FLOW–COUNTER CURRENT
- ZONE OF LOW–VELOCITY TURBULENCE
- CURRENT METER AND DROGUE TRANSECTS
- 1989 DIVING TRANSECTS

SKETCH OF MAJOR FLOW ZONES
AND CIRCULATION PATTERNS
REYNOLDS METALS COMPANY
MASSENA, NEW YORK

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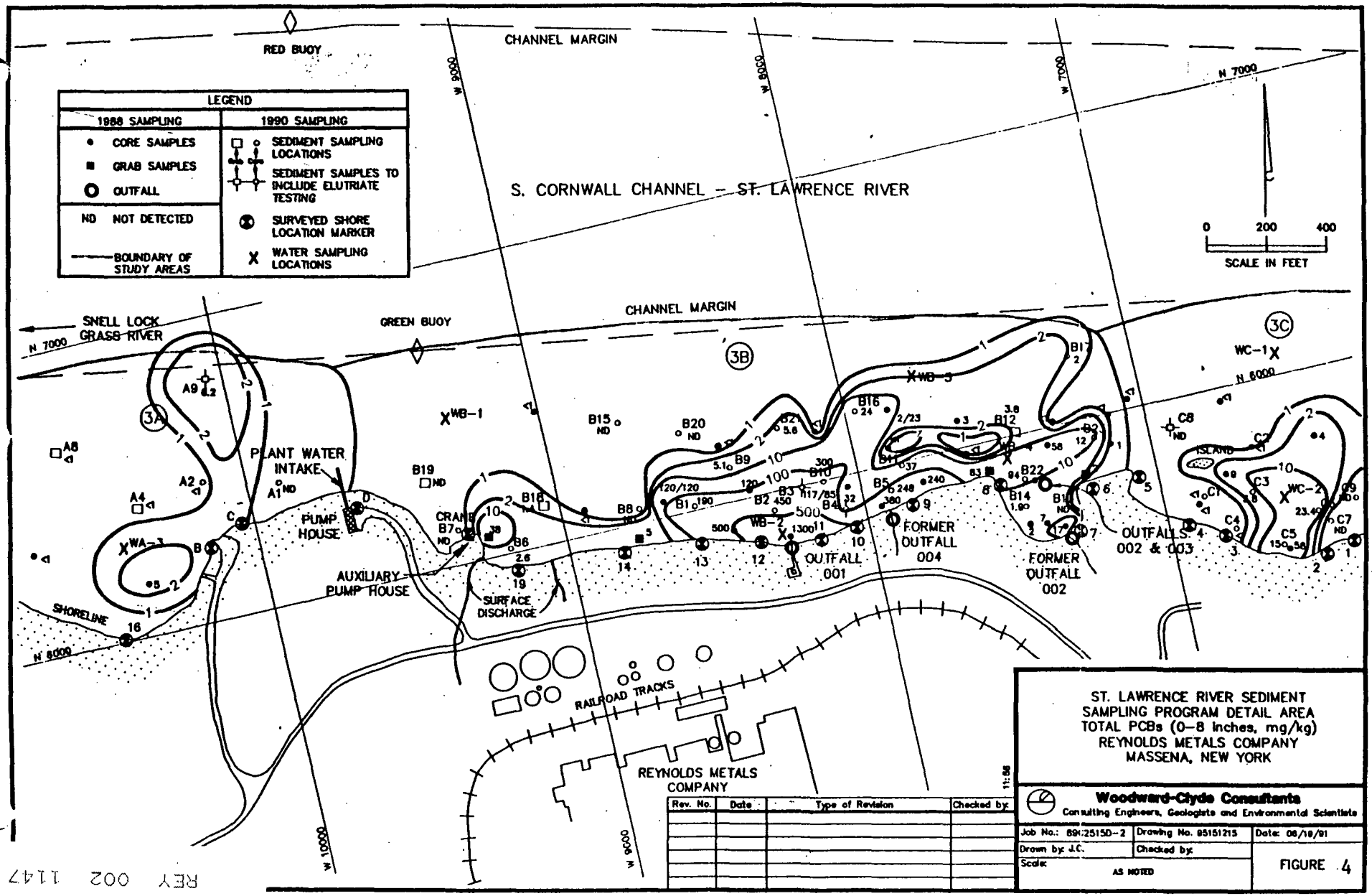
Consulting Engineers, Geologists and Environmental Scientists

| | | |
|---|---|---|
| Job No.: 89C25158-3 | Drawing No. 95150240 | Date: 01/08/1993 |
| Drawn by: TP | Checked by: | |
| Scale: NTS | | FIGURE 3 |

REV 002 1146




ST. LAWRENCE RIVER SEDIMENT SAMPLING PROGRAM DETAIL AREA
TOTAL PCBs (0–8 inches, mg/kg)
REYNOLDS METALS COMPANY
MASSENA, NEW YORK

| Rev. No. | Date | Type of Revision | Checked by: |
|---|---|---|---|
| | | | |

**Woodward-Clyde Consultants**
Consulting Engineers, Geologists and Environmental Scientists

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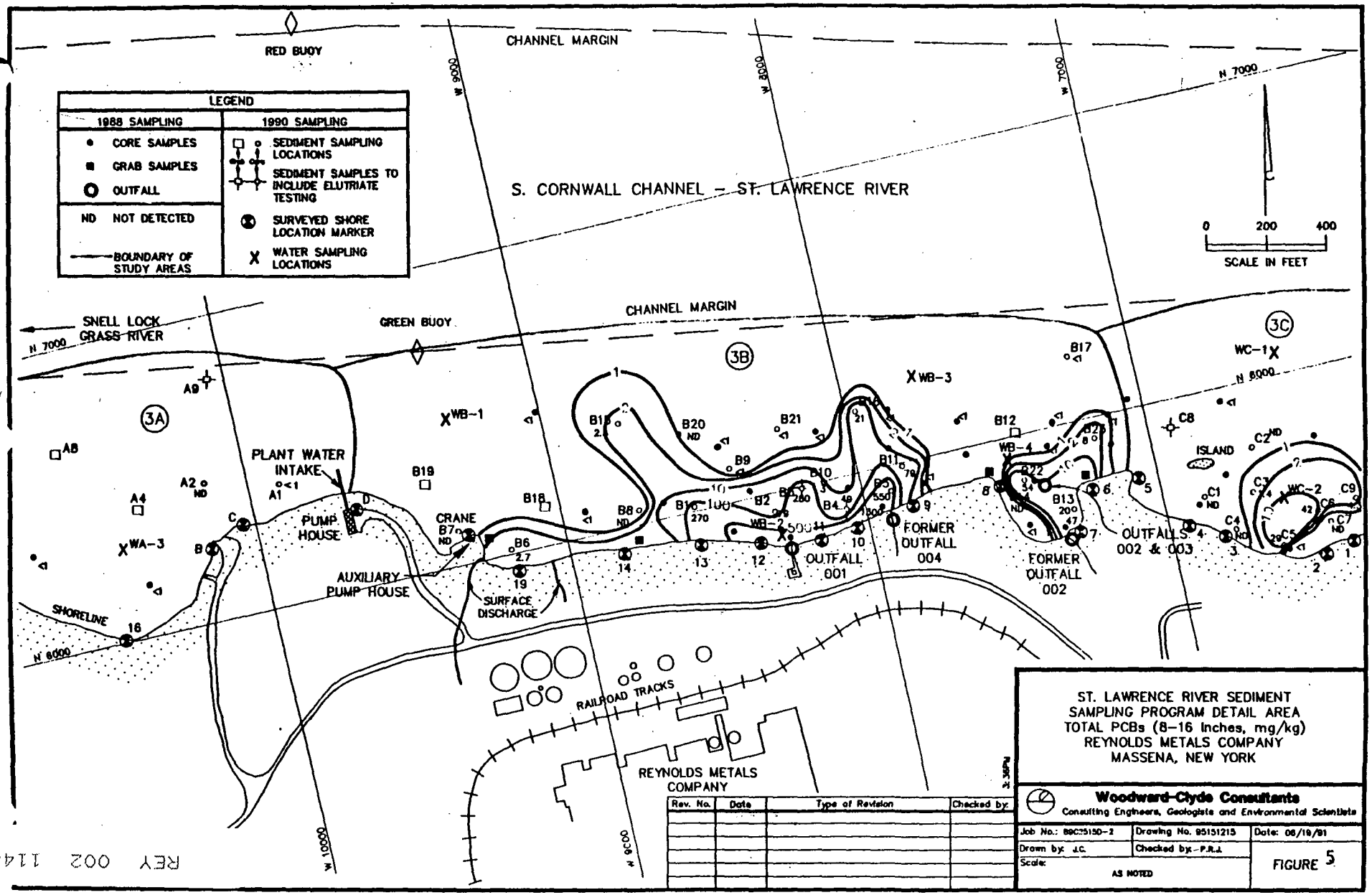
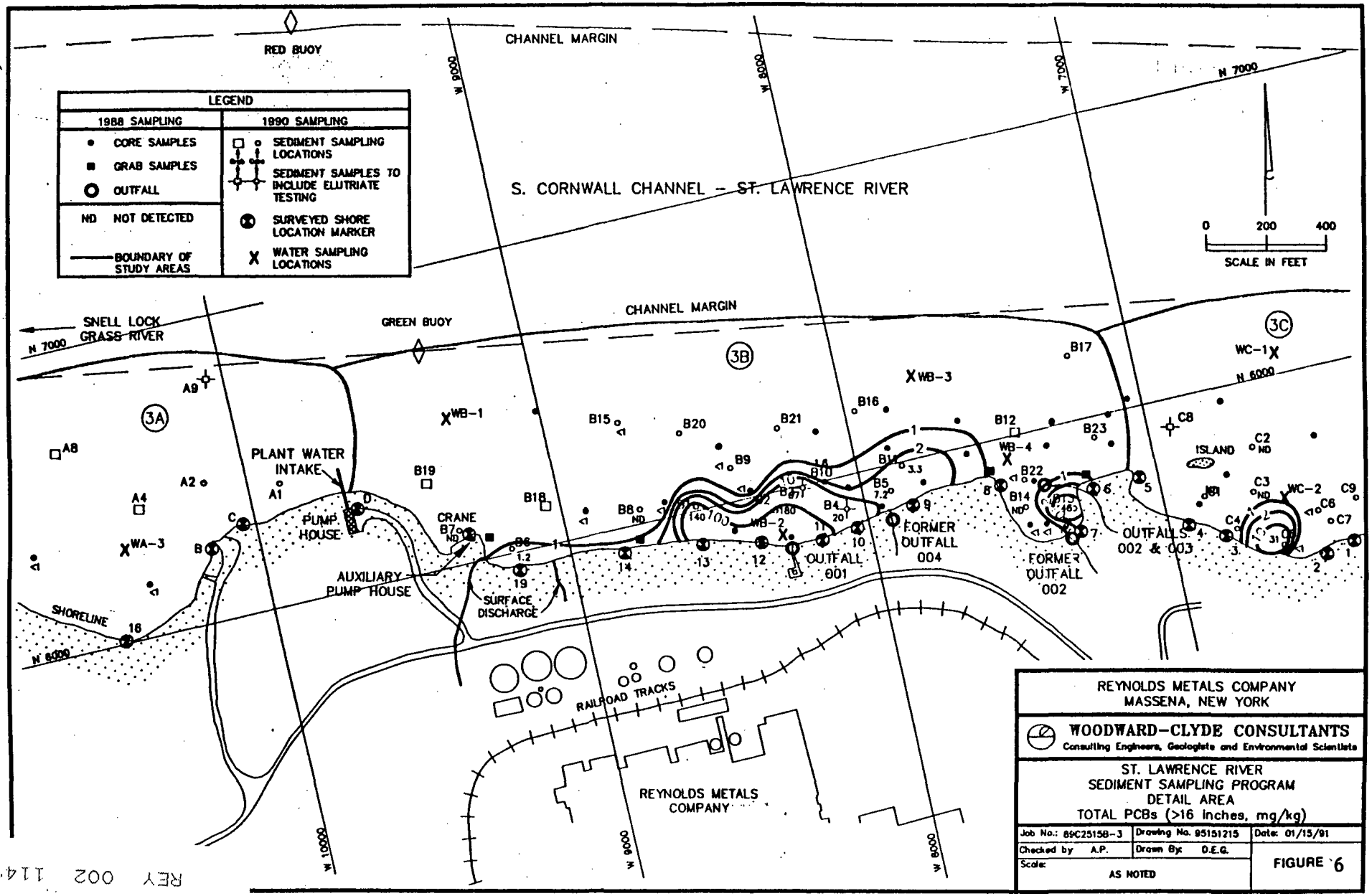
|---|---|---|
| Job No.: 89125150-2 | Drawing No. 85151215 | Date: 08/18/91 |
| Drawn by: J.C. | Checked by: | |
| Scale: AS NOTED | | FIGURE 4 |

REV 002 1147


LEGEND
1988 SAMPLING
CORE SAMPLES
GRAB SAMPLES
OUTFALL
ND NOT DETECTED
BOUNDARY OF STUDY AREAS
1990 SAMPLING
SEDIMENT SAMPLING LOCATIONS
SEDIMENT SAMPLES TO INCLUDE ELUTRIATE TESTING
SURVEYED SHORE LOCATION MARKER
WATER SAMPLING LOCATIONS
RED BUOY
CHANNEL MARGIN
S. CORNWALL CHANNEL – ST. LAWRENCE RIVER
SCALE IN FEET
SNELL LOCK
GRASS RIVER
GREEN BUOY
PLANT WATER INTAKE
PUMP HOUSE
AUXILIARY PUMP HOUSE
CRANE
SURFACE DISCHARGE
SHORELINE
RAILROAD TRACKS
REYNOLDS METALS COMPANY
OUTFALL 001
FORMER OUTFALL 004
FORMER OUTFALL 002
OUTFALLS 002 & 003
ISLAND
WB-1
WB-2
WB-3
WB-4
WA-3
WC-1
WC-2
3A
3B
3C
ST. LAWRENCE RIVER SEDIMENT SAMPLING PROGRAM DETAIL AREA
TOTAL PCBs (8–16 Inches, mg/kg)
REYNOLDS METALS COMPANY
MASSENA, NEW YORK
Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 89C7515D-2
Drawing No. 95151215
Date: 06/19/91
Drawn by: J.C.
Checked by: P.R.J.
Scale: AS NOTED
FIGURE 5
Rev. No. | Date | Type of Revision | Checked by:

REV 002 1148



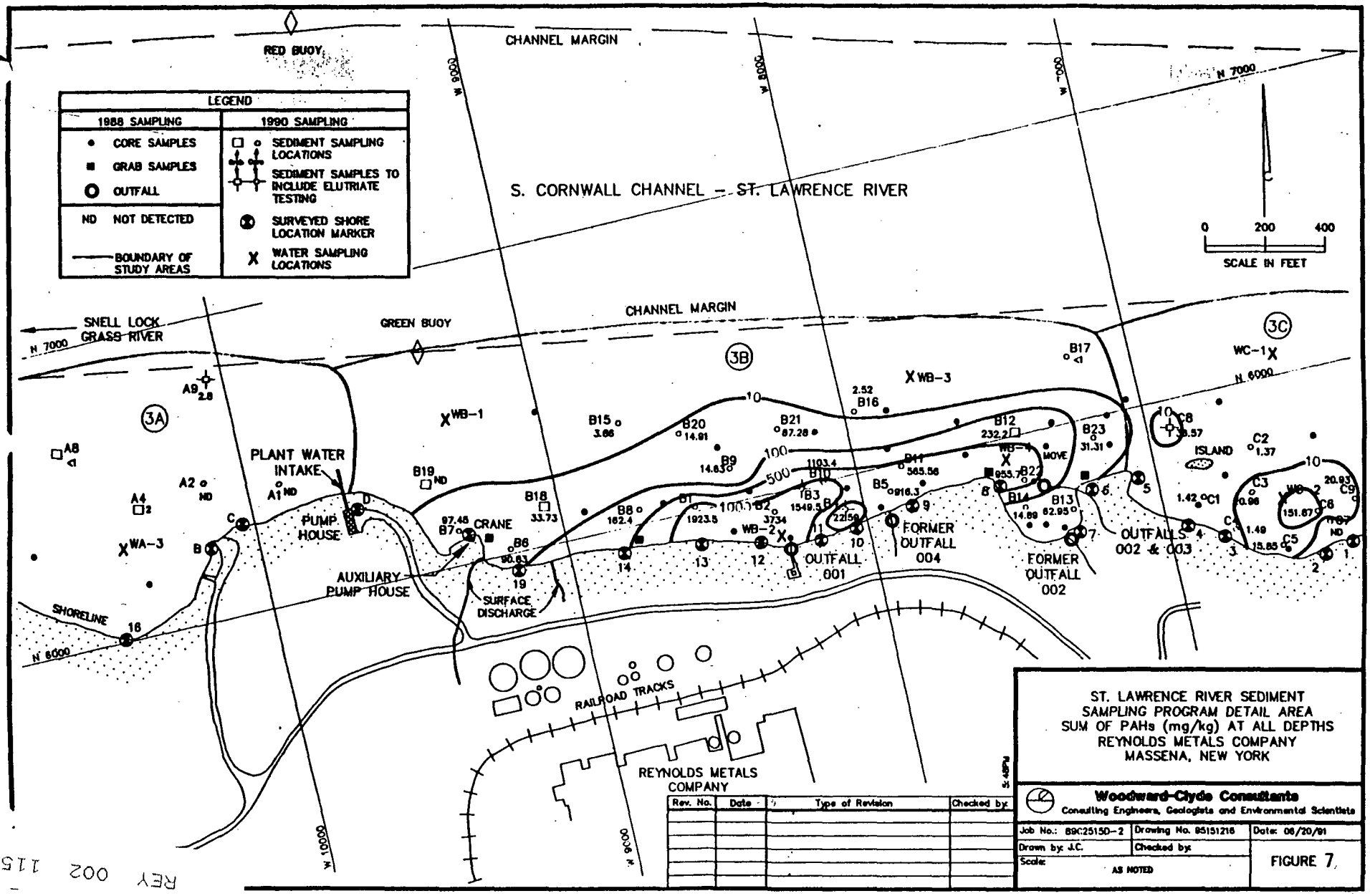

REYNOLDS METALS COMPANY
MASSENA, NEW YORK

**WOODWARD-CLYDE CONSULTANTS**
Consulting Engineers, Geologists and Environmental Scientists

ST. LAWRENCE RIVER
SEDIMENT SAMPLING PROGRAM
DETAIL AREA
TOTAL PCBs (>16 inches, mg/kg)

| | | |
|---|---|---|
| Job No.: 89C25158-3 | Drawing No. 95151215 | Date: 01/15/91 |
| Checked by A.P. | Drawn By D.E.G. | FIGURE 6 |
| Scale: AS NOTED | | |

REV 002 1149




ST. LAWRENCE RIVER SEDIMENT
SAMPLING PROGRAM DETAIL AREA
SUM OF PAHs (mg/kg) AT ALL DEPTHS
REYNOLDS METALS COMPANY
MASSENA, NEW YORK

| Rev. No. | Date | Type of Revision | Checked by |
|---|---|---|---|
| | | | |

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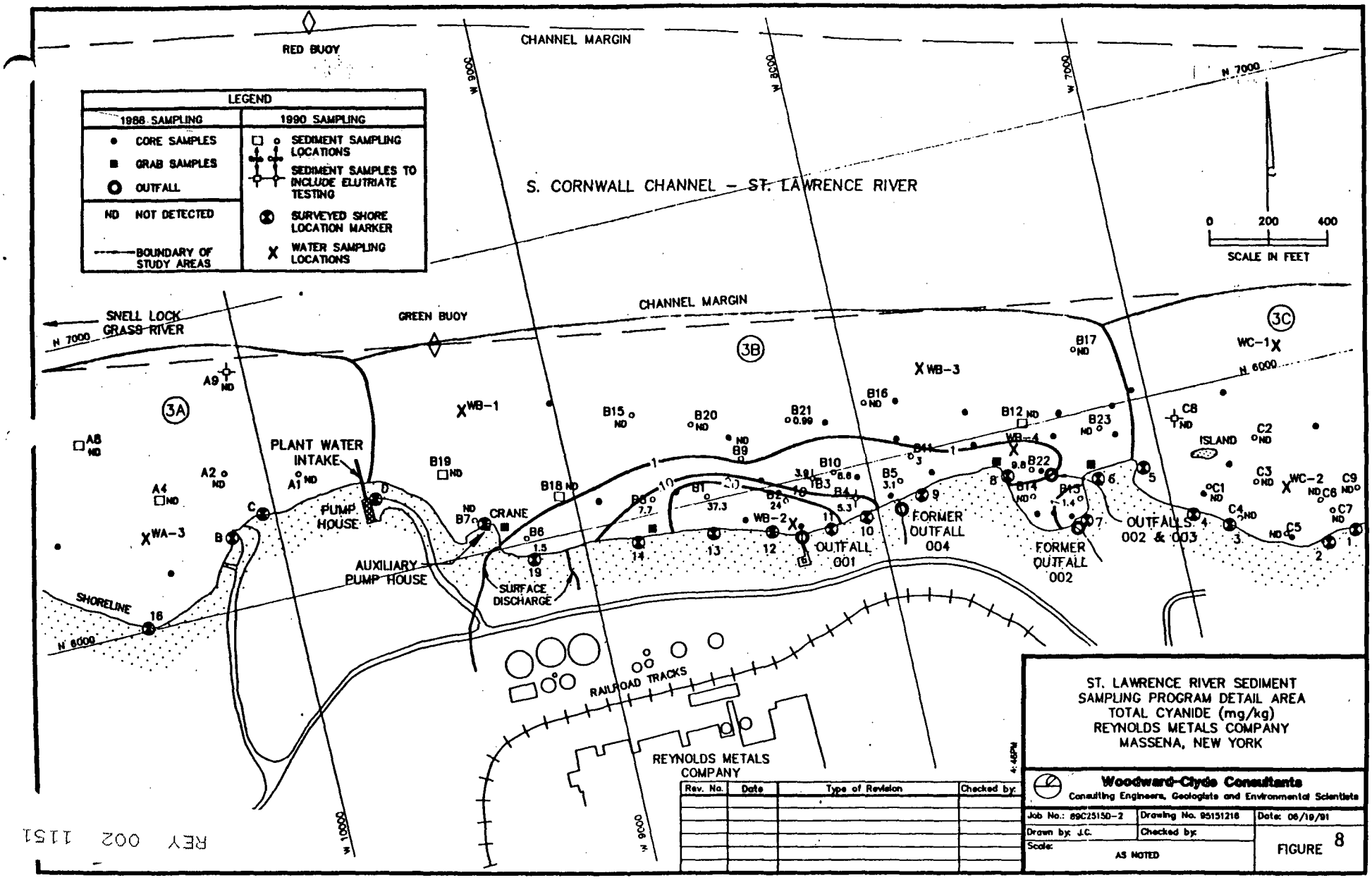
| | | |
|---|---|---|
| Job No.: 89C2515D-2 | Drawing No. 95151216 | Date: 06/20/91 |
| Drawn by: J.C. | Checked by: | |
| Scale: AS NOTED | | FIGURE 7 |

REV 002 1150




ST. LAWRENCE RIVER SEDIMENT
SAMPLING PROGRAM DETAIL AREA
TOTAL CYANIDE (mg/kg)
REYNOLDS METALS COMPANY
MASSENA, NEW YORK

| Rev. No. | Date | Type of Revision | Checked by: |
|---|---|---|---|
| | | | |

**Woodward-Clyde Consultants**
Consulting Engineers, Geologists and Environmental Scientists

| | | |
|---|---|---|
| Job No.: 89C25150-2 | Drawing No. 95151218 | Date: 06/19/91 |
| Drawn by: J.C. | Checked by: | FIGURE 8 |
| Scale: AS NOTED | | |

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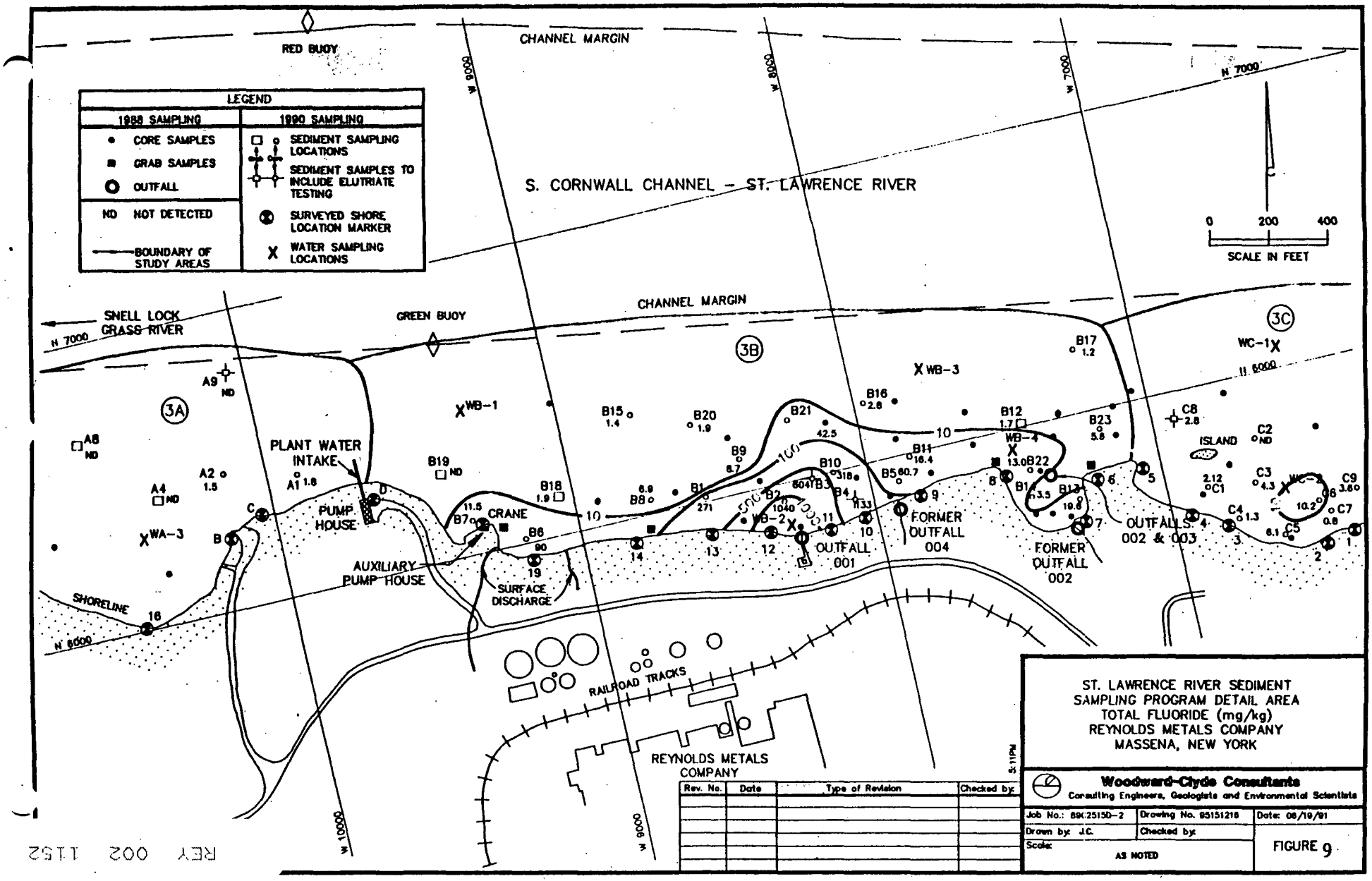


ST. LAWRENCE RIVER SEDIMENT
SAMPLING PROGRAM DETAIL AREA
TOTAL FLUORIDE (mg/kg)
REYNOLDS METALS COMPANY
MASSENA, NEW YORK

| Rev. No. | Date | Type of Revision | Checked by: |
|---|---|---|---|
| | | | |

**Woodward-Clyde Consultants**
Consulting Engineers, Geologists and Environmental Scientists

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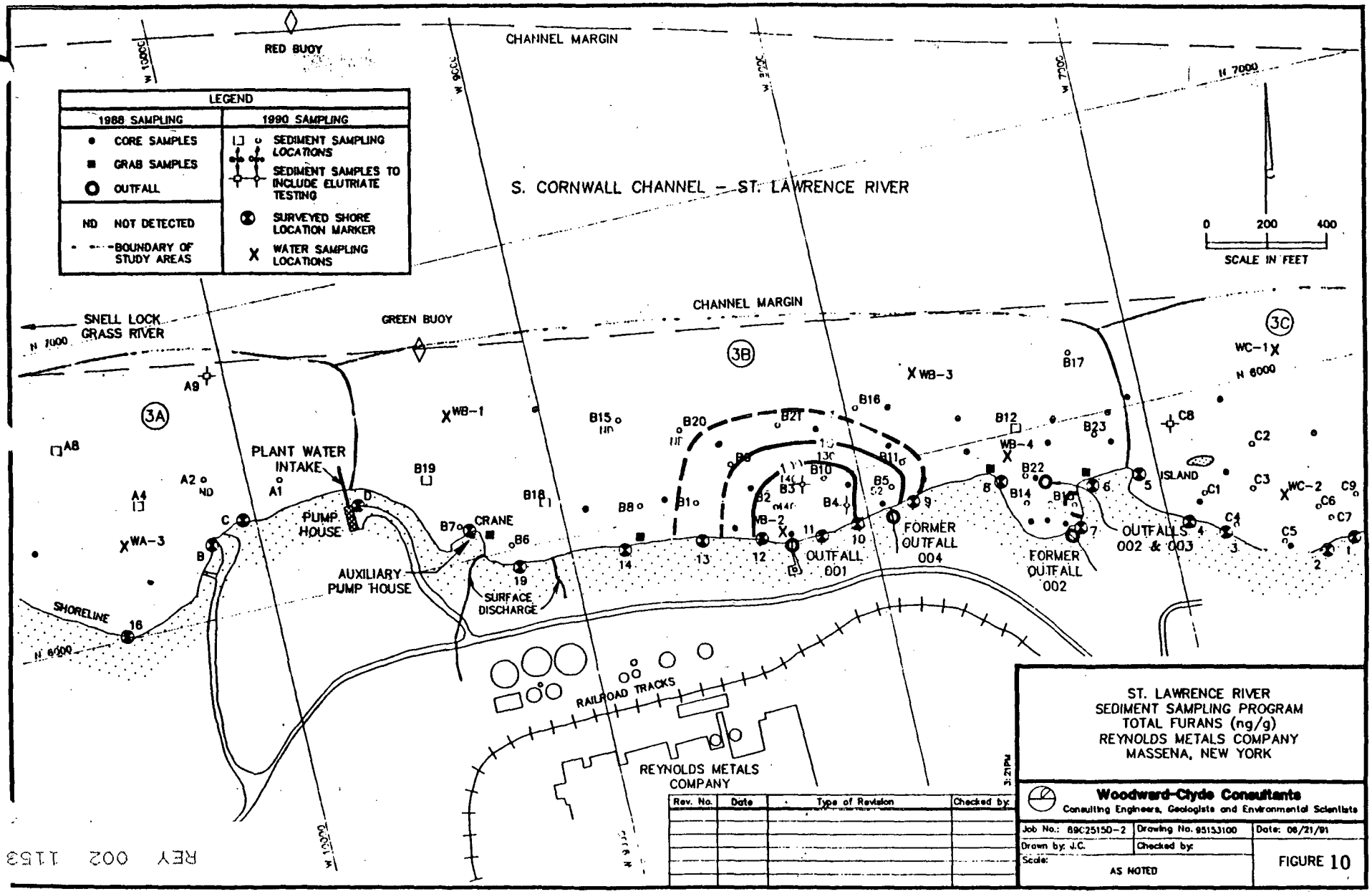
|---|---|---|
| Job No.: 89C2515D-2 | Drawing No. 85151218 | Date: 06/10/91 |
| Drawn by: J.C. | Checked by: | |
| Scale: AS NOTED | | FIGURE 9 |

REV 002 1152




| Rev. No. | Date | Type of Revision | Checked by: |
|---|---|---|---|
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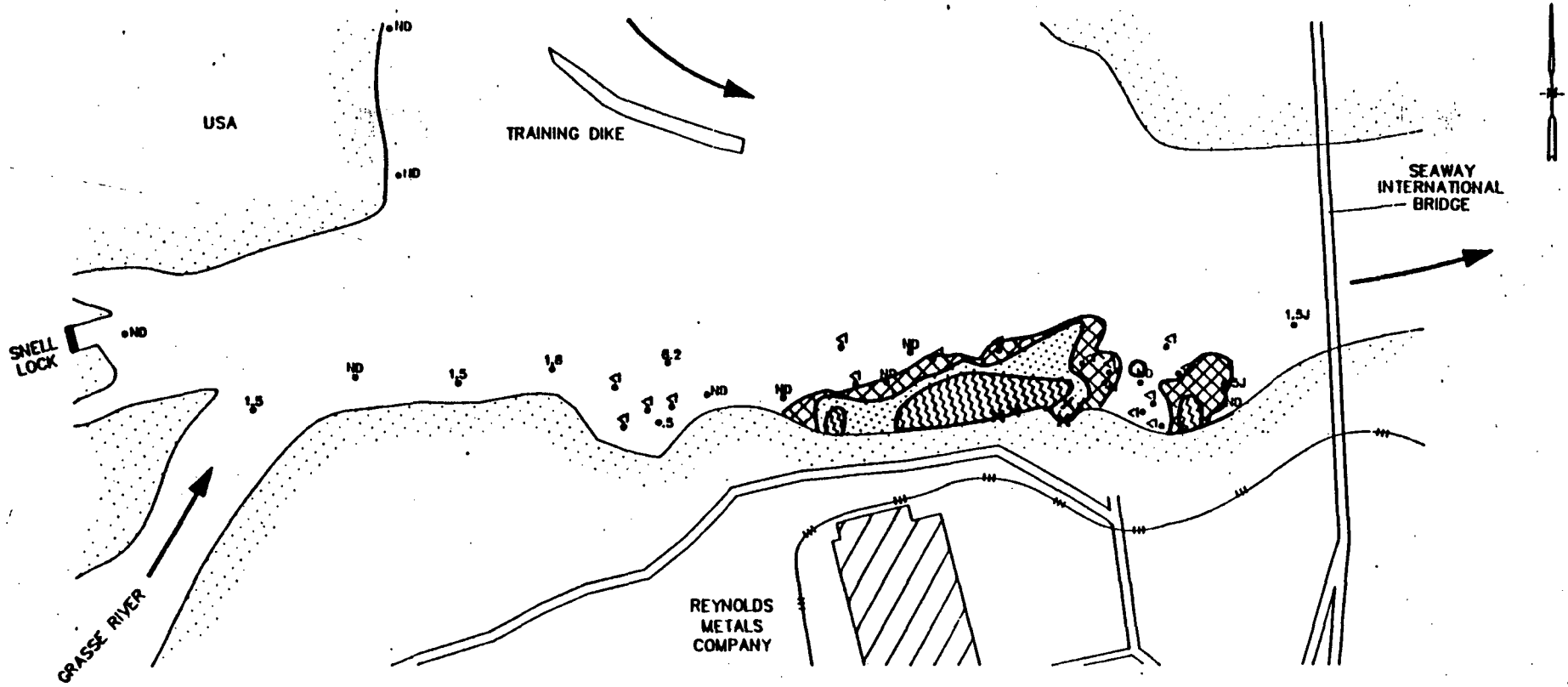
ST. LAWRENCE RIVER
SEDIMENT SAMPLING PROGRAM
TOTAL FURANS (ng/g)
REYNOLDS METALS COMPANY
MASSENA, NEW YORK

**Woodward-Clyde Consultants**
Consulting Engineers, Geologists and Environmental Scientists

| | | |
|---|---|---|
| Job No.: 89C25150-2 | Drawing No. 95153100 | Date: 06/21/91 |
| Drawn by: J.C. | Checked by: | |
| Scale: AS NOTED | | FIGURE 10 |

REV 002 1753



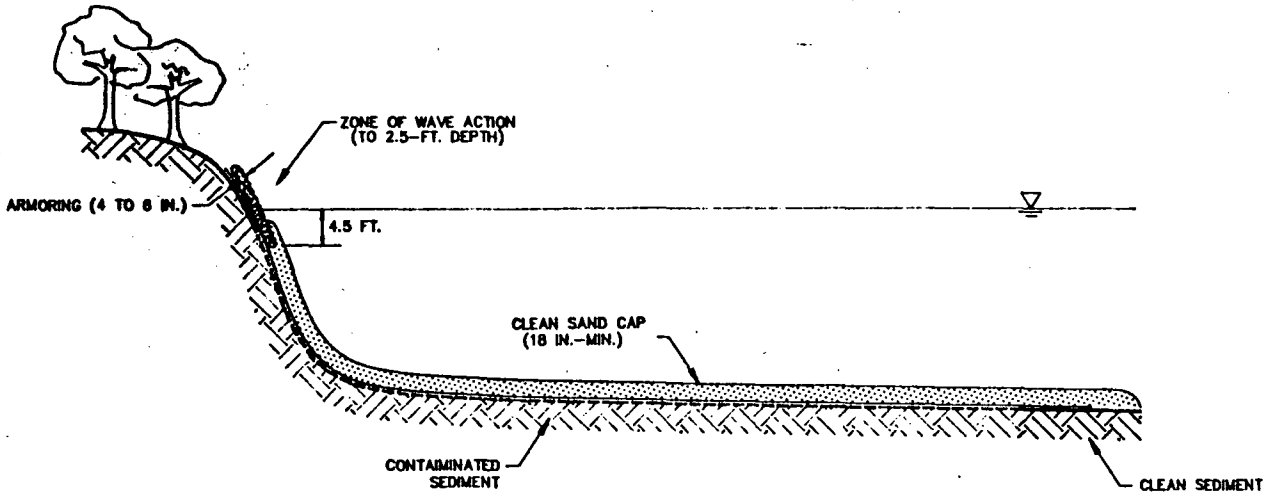

LEGEND:

- AREA OF PCB SEDIMENT CONTAMINATION
  - 1-2 ppm (OUTER BOUNDARY INCLUDES PAHs GREATER THAN 10ppm)
  - 2-5 ppm
  - >5 ppm
- RIVER FLOW DIRECTION
- INDIVIDUAL SAMPLE LOCATIONS, CONCENTRATIONS IN ppm, J=ESTIMATED CONCENTRATION
- OUTFALL LOCATION

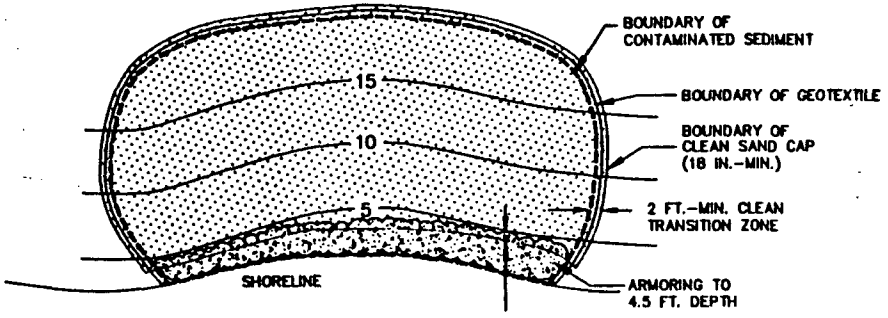
ST. LAWRENCE RIVER
DISTRIBUTION OF PCB SEDIMENT CONCENTRATIONS
REYNOLDS METALS COMPANY
MASSENA, NEW YORK

**Woodward-Clyde Consultants**
Consulting Engineers, Geologists and Environmental Scientists

| | | |
|---|---|---|
| Job No.: 86C2513F-1 | Drawing No. 85156540 | Date: 01/19/1993 |
| Drawn by: TP | Checked by: | FIGURE 11 |
| Scale: 0 800' | | |




**CROSS-SECTION**




**PLAN VIEW**

LEGEND:

- BOUNDARY OF CONTAMINATED SEDIMENT
- 5 — TYPICAL EXISTING BATHYMETRY CONTOURS
- GEOTEXTILE
- CLEAN SAND CAP
- ARMORING (REVETMENT MAT)

IN-SITU CAP SCHEMATIC
REYNOLDS METALS COMPANY
MASSENA, NEW YORK

| Rev. No. | Date | Type of Revision | Checked by: |
|---|---|---|---|
| | | | |

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| | | |
|---|---|---|
| Job No.: 89C2515F-1 | Drawing No. 95158360 | Date: 01/08/1993 |
| Drawn by: DEG | Checked by: | FIGURE 12 |
| Scale: NOT TO SCALE | | |

REV 002 1155

# APPENDIX 2

## TABLES

TABLE 1. REYNOLDS METAL STUDY AREA: CONTAMINANTS OF CONCERN

| Contaminants | Sediments | | Fish | |
|---|---|---|---|---|
| | St. Lawrence | Raquette | St. Lawrence | Raquette |
| SEMIVOLATILES | | | | |
| Acenaphthene | X | | | |
| Acenaphthylene | X | | | |
| Anthracene | X | | | |
| Benzo(a)anthracene | X | | | |
| Benzo(a)pyrene | X | | | |
| Benzo(b)fluoranthene | X | | | |
| Benzo(h)fluoranthene | X | | | |
| Benzo(g,h,i)perylene | X | | | |
| Chrysene | X | | | |
| Dibenzo(a,h)anthracene | X | | | |
| Dibenzofurans | X | | | |
| Fluoranthene | X | | | |
| Fluorene | X | | X | |
| Phenanthrene | X | | | |
| Pyrene | X | | | |
| CDDs/CDFs | X | | X | X |
| METALS | | | | |
| Aluminum | X | X | | |
| Fluoride | X | X | X | |
| Lead | X | X | | |
| Cyanide | X | X | X | |
| Mercury | X | X | X | X |
| PESTICIDES/PCBs* | | | | |
| Aroclor 1016 | X | | X | X |
| Aroclor 1221 | X | | X | |
| Aroclor 1248 | X | | X | |
| Aroclor 1254 | X | | X | X |
| Aroclor 1260 | X | | X | |
| Dieldrin | | | X | X |
| DDE | | | X | X |

*Risk Assessment evaluates total PCBs.

TABLE 2 EXPOSURE PATHWAY: INGESTION OF FISH BY MOHAWK NATION RESIDENTS FOR PRESENT AND FUTURE SCENARIOS

| Variable | Range | Midpoint | Value Used | Rationale | Reference |
|---|---|---|---|---|---|
| *Receptor Population* | | | | Mohawk Nation Residents | |
| *Body Weight (kg)* Resident | - | - | 70 | Per EPA guidance | EPA, 1989d EPA, 1989a |
| *Duration of Exposure (Years)* Resident | 1 - 70 | 35 | 70 | Based on known residence time of Mohawk Nation members | Jock, 1991 |
| *Exposure Frequency (Days/Year)* | 1-365 | 183 | 350 | Value used is specified in supplemental EPA guidance | EPA, 1991a |
| *Ingestion Rate (g/Day)* Resident | - | - | 132 | Per EPA guidance | EPA, 1989a |
| *Averaging Time (Days)* noncarcinogenic carcinogenic | 365 - 25550 | 12775 | 25550 | Range, midpoint and value used are based on exposure duration for noncarcinogens and lifetime for carcinogens | EPA, 1989a |

EPA, 1989a. Risk Assessment Guidance for Superfund, Volume I, EPA 540/1-89/002. Office of Emergency and Remedial Response. December 1989.
EPA, 1989d. Exposure Factors Handbook, EPA 600/8/-89/043. Exposure Assessment Group, Office of Health and Environmental Assessment. 1989.
EPA, 1991a. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors". OSWER Directive 9285.6-03. March 25, 1991.
Jock, 1991. St. Regis Mohawk Tribe Environmental Program, Personal communication with Naida Gavrelis, TRC Environmental Corporation.

TABLE . 3 EXPOSURE PATHWAY: DERMAL CONTACT WITH RIVER SEDIMENTS BY LOCAL RESIDENTS AND FISHERMEN FOR PRESENT AND FUTURE SCENARIOS

| Variable | Range | Midpoint | Value Used | Rationale | Reference |
|---|---|---|---|---|---|
| *Receptor Population* | | | | Local Residents | |
| *Body Weight (Kg)* | | | | | |
| Small Child (Age 1-6) | - | - | 15 | As specified in supplemental | EPA, 1991a |
| Adult | - | - | 70 | guidance | |
| *Duration of Exposure (Years)* | | | | | |
| Small Child | 1 - 6 | 3 | 6 | Based on known residence time | Jock, 1991 |
| Adult/Fisherman | 1 - 70 | 35 | 64 | of Mohawk Nation members | |
| *Exposure Frequency (Days/Year)* | | | | | |
| Small Child | 1 - 365 | 183 | 143 | Assume child spends 5 d/wk outdoors during summer and 3 d/wk during spring and fall (39 weeks total) | |
| Adult | 1 - 365 | 183 | 78 | Assume adult spends 2 d/wk outdoors during spring, summer, and fall (39 weeks total) | |
| Fisherman | 1 - 365 | 183 | 350 | Assumes fishing occurs daily year round. | Jock, 1992<br>EPA, 1991a |
| *Skin Surface Area Contacted (sq.cm)* | | | | | |
| Small Child | | | | | |
| Arms | - | - | 960 | 50th percentile values; assume | EPA, 1989a |
| Hands | - | - | 400 | ave. is represented by values | EPA, 1989d |
| Legs | - | - | 1800 | for ages 3-4 | |
| Feet | - | - | 520 | | |
| Total Area of These Limbs | - | - | 3680 | | |
| Adult/Fisherman | | | | | |
| Arms | - | - | 2300 | Values used are presented in | EPA, 1989a |
| Hands | - | - | 820 | RAGS, except for feet (EFH) | EPA, 1989d |
| Total Area of These Limbs | - | - | 3120 | | |
| *Soil Skin Adherence Factor (mg/sq. cm)* | 0.2 - 1.0 | 0.6 | 0.6 | Value used is midpoint of range | EPA, 1992b |

TABLE 3 EXPOSURE PATHWAY: DERMAL CONTACT WITH RIVER SEDIMENTS BY LOCAL RESIDENTS AND FISHERMEN FOR PRESENT AND FUTURE SCENARIOS (continued)

| Variable | Range | Midpoint | Value Used | Rationale | Reference |
|---|---|---|---|---|---|
| *Absorption Factor (Percent)* | | | | | |
| PCBs (Aroclor 1254) | 0.006 - 0.06 | 0.03 | 0.03 | Value used is midpoint of range given by EPA | EPA, 1992b |
| CDD/CDFs | 0.001 - 0.03 | 0.02 | 0.02 | | |
| *Averaging Time (Days)* | | | | | |
| Small Child | | | | | |
| noncarcinogenic | 365 - 2190 | 1095 | 2190 | Range, midpoint, and value used are based on exposure duration for noncarcinogens and lifetime for carcinogens | EPA, 1989a |
| carcinogenic | | | 25550 | | |
| Adult/Fisherman | | | | | |
| noncarcinogens | 365 - 25550 | 12775 | 23360 | | |
| carcinogens | | | 25550 | | |

EPA, 1989a. Risk Assessment Guidance for Superfund, Volume I, EPA 540/1-89/002. Office of Emergency and Remedial Response. December 1989.

EPA, 1989d. Exposure Factors Handbook, EPA 600/8-89/043. Exposure Assessment Group, Office of Health and Environmental Assessment. 1989.

EPA, 1991a. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors". OSWER Directive 9285.6-03. March 25, 1991.

EPA, 1992b. Dermal Exposure Assessment: Principles and Applications. Interim Report, EPA/600/8-91/011B. Office of Research and Development. January 1992.

Jock, 1991 and 1992. St. Regis Mohawk Tribe Environmental Programs. Personal communication with Naida Gavrelis and Scott Heim, TRC Environmental Corporation.

TABLE 4 EXPOSURE PATHWAY: INGESTION OF SEDIMENTS FROM THE RIVER BANKS BY LOCAL RESIDENTS AND FISHERMEN FOR PRESENT AND FUTURE SCENARIOS

| Variable | Range | Midpoint | Value Used | Rationale | Reference |
|---|---|---|---|---|---|
| *Receptor Population* | | | | Local Residents | |
| *Body Weight (kg)* | | | | | |
| Small Child (Age 1-6) | - | - | 15 | As specified in supplemental guidance | EPA, 1991a |
| Adult | - | - | 70 | | |
| *Duration of Exposure (Years)* | | | | | |
| Small Child | 1 - 6 | 3 | 6 | Total duration equals 70 year residence time | EPA, 1991a |
| Adult/Fisherman | 1 - 70 | 35 | 64 | | |
| *Exposure Frequency (Days/Year)* | | | | | |
| Small Child | 1 - 365 | 183 | 143 | Assumes 5 d/wk outdoors during summer and 3 d/wk during spring and fall (39 weeks total) | |
| Adult | 1 - 365 | 183 | 78 | Assume 2 d/wk outdoors during spring, summer, and fall (39 weeks total) | |
| Fisherman | 1 - 365 | 183 | 350 | Assumes fishing occurs daily year round | Jock, 1992<br>EPA, 1991a |
| *Ingestion Rate (mg/Day)* | | | | | |
| Child | - | - | 200 | Value used is specified in RAGS | EPA, 1989a |
| Adult | - | - | 100 | | |
| *Fraction Ingested from Contaminated Source (Unitless)* | - | - | 1 | Assume that all soil contacted is contaminated | EPA, 1989a |
| *Averaging Time (Days)* | | | | | |
| Child | | | | | |
| noncarcinogens | 365 - 2190 | 1095 | 2190 | Range, midpoint, and value used are based on exposure duration for noncarcinogens and lifetime for carcinogens | EPA, 1989a |
| carcinogens | | | 25550 | | |
| Adult/Fisherman | | | | | |
| noncarcinogens | 365 - 25550 | 12775 | 23360 | | |
| carcinogens | | | 25550 | | |

EPA, 1989a. Risk Assessment Guidance for Superfund, Volume I, EPA 540/1-89/002. Office of Emergency and Remedial Response. December 1989.

EPA, 1991a. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors". OSWER Directive 9285.6-03. March 25, 1991.

Jock, 1992. St. Regis Mohawk Tribe Environmental Programs. Personal Communication with Scott Heim, TRC Environmental Corporation.

| TABLE 5 TOXICITY VALUES FOR THE REYNOLDS SITE CONTAMINANTS | | | | | | |
|---|---|---|---|---|---|---|
| | CARCINOGENIC | | | | CHRONIC | |
| Chemical | Weight of Evidence Classification | | Oral Slope Factor (mg/kg/day)-1 | | Chronic Oral RfD (mg/kg/day) | |
| Acenaphthene | -- | a | | | 6.00E-02 | a |
| Acenaphthylene | D | a | | | | |
| Anthracene | D | a | | | 3.00E-01 | a |
| Benzo(a)anthracene | B2 | a | 7.30E-01 | d | | |
| Benzo(a)pyrene | B2 | a | 7.30E+00 | a | | |
| Benzo(b)fluoranthene | B2 | a | 7.30E-01 | d | | |
| Benzo(g,h,i)perylene | D | a | | | | |
| Benzo(k)fluoranthene | B2 | a | 7.30E-01 | d | | |
| Chrysene | B2 | a | 7.30E-02 | d | | |
| Dibenzofuran | D | a | | | 4.00E-03 | c |
| Dibenz(a,h)anthracene | B2 | a | 7.30E+00 | d | | |
| Fluoranthene | D | a | | | 4.00E-02 | a |
| Fluorene | D | a | | | 4.00E-02 | a |
| 2,3,7,8-Heptachlorodibenzodioxin | B2 | b | 1.60E+03 | e | | |
| 2,3,7,8-Heptachlorodibenzofuran | B2 | b | 1.60E+03 | e | | |
| 2,3,7,8-Hexachlorodibenzodioxin | B2 | b | 1.60E+04 | e | | |
| 2,3,7,8-Hexachlorodibenzofuran | B2 | b | 1.60E+04 | e | | |
| Octochlorodibenzodioxin | B2 | b | 1.60E+02 | e | | |
| Octochlorodibenzofuran | B2 | b | 1.60E+02 | e | | |
| 2,3,7,8-Pentachlorodibenzodioxin | B2 | b | 8.00E+04 | e | | |
| 1,2,3,7,8-Pentachlorodibenzofuran | B2 | b | 8.00E+03 | e | | |
| 2,3,4,7,8-Pentachlorodibenzofuran | B2 | b | 8.00E+04 | e | | |
| Phenanthrene | D | a | | | | |
| Pyrene | D | a | | | 3.00E-02 | a |
| 2,3,7,8-Tetrachlorodibenzodioxin | B2 | b | 1.60E+05 | b | | |
| 2,3,7,8-Tetrachlorodibenzofur- | B2 | b | 1.60E+04 | e | | |

| TABLE 5 (CONTINUED) | | | | | | |
|---|---|---|---|---|---|---|
| | CARCINOGENIC | | | | CHRONIC | |
| Chemical | Weight of Evidence Classification | | Oral Slope Factor (mg/kg/day)-1 | | Chronic Oral RfD (mg/kg/day) | |
| Aroclor - 1260 | B2 | a | 7.70E+00 | a | | |
| Aroclor - 1016 | | | | | 7.00E - 05 | c |
| Aluminum | D | d | | | 1.00E+00 | c |
| Cyanide | D | a | | | 2.00E-02 | a |
| Fluoride | -- | a | | | 6.00E-02 | a |
| Lead | B2 | a | | | | |
| Mercury | D | a | | | 3.00E-04 | b |

a. U.S. EPA, Integrated Risk Information System (IRIS), September 1, 1992.
b. U.S. EPA, Health Effects Assessment Summary Tables (HEAST), FY 1992.
c. Interim value from ECAO (see text for specific references).
d. Oral slope factor for B(a)P used for PAHs classified as B2 carcinogens with the following TEFs applied:

| | |
|---|---|
| Benzo(a)anthracene | 0.1 |
| Benzo(a)fluoranthene | 0.1 |
| Benzo(k)fluoranthene | 0.1 |
| Chrysene | 0.01 |
| Dibenz(a,h)anthracene | 1.0 |

e. Oral slope factor for 2,3,7,8-TCDD was used for other chlorinated dioxins/dibenzofurans with the following TEFs (EPA, 1989e) applied:

| | |
|---|---|
| 2,3,7,8-PeCDDs | 0.5 |
| 2,3,7,8-HxCDDs | 0.1 |
| 2,3,7,8-HpCDDs | 0.01 |
| OCDDs | 0.001 |
| 2,3,7,8-TCDFs | 0.1 |
| 2,3,7,8-PeCDFs | 0.5 |
| 1,2,3,7,8-PeCDFs | 0.05 |
| 2,3,7,8-HxCDFs | 0.1 |
| 2,3,7,8-HpCDFs | 0.01 |
| OCDFs | 0.001 |

TABLE 6. SUMMARY OF CARCINOGENIC RISK ESTIMATED FOR THE REYNOLDS SITE

| Scenario | Receptor | Present/Future | Total Risk |
|---|---|---|---|
| **FISH INGESTION** | | | |
| St. Lawrence River at RMC | Resident | P/F | $4x10^{-2}$* |
| St. Lawrence River - RMC Vicinity | Resident | P/F | $6x10^{-2}$* |
| Raquette River | Resident | P/F | $4x10^{-2}$* |
| **SEDIMENT** | | | |
| Ingestion - St. Lawrence River | Fisherman | P/F | $6x10^{-3}$* |
| Dermal Contact - St. Lawrence River | Fisherman | P/F | $3x10^{-3}$* |
| Ingestion - Raquette River | Fisherman | P/F | N/A |
| Ingestion - St. Lawrence River | Resident | P/F | $3x10^{-3}$* |
| Dermal Contact - St. Lawrence River | Resident | P/F | $1x10^{-3}$* |
| Ingestion - Raquette River | Resident | P/F | N/A |

*Exceeds $10^{-4}$ risk
N/A - Not applicable, no carcinogens detected

Site. However, dredging has been used effectively at another Superfund site in New Bedford Harbor, Massachusetts, to remove PCB-contaminated sediments from an estuary.

There are several factors which EPA believes will contribute to the effectiveness of dredging as a means of removing sediment from the St. Lawrence River. First, the area to be dredged is fairly shallow and is located adjacent to the shore of the St. Lawrence River. Second, the use of engineering controls such as sheet pile walls has been shown to substantially reduce sediment suspension. Third, the selection of the dredging technique (e.g., a hydraulic dredge), can be made with the goal of minimizing sediment suspension. Fourth, the public health and environmental impacts resulting from sediment dredging (which are of relatively short duration) are lower than the current long-term risks posed by the contaminated sediment. Finally, in the event that monitoring indicates that there are any downstream depositional areas which collect resuspended sediments, they can be dredged to remove those resuspended sediments. The iterative process of sampling, excavating and re-sampling is contemplated as an integral part of the remedial action.

The selected remedy is cost-effective because it has been demonstrated to provide overall effectiveness proportional to its costs. The present worth cost of the selected alternative, Alternative G(A), which includes a 25 ppm treatment threshold, is $ 35.1 million. The present worth cost of Alternative G(B), which includes a 10 ppm treatment threshold, is $ 36.7 million. The present worth cost of Alternative I(A), which incorporates a 500 ppm treatment threshold, is $ 35.8 million. The present worth cost of Alternative I(B), which incorporates a 50 ppm treatment threshold, is $ 37.9 million. Thus, EPA has selected the least expensive alternative which provides for permanent removal and treatment of the majority of the principal threat posed by contaminated sediments. In addition, a comparison of the costs of Alternatives G(A), I(A), and I(B) demonstrates that it is more expensive to construct a landfill for disposal of sediments with PCB concentrations between 25 and 500 ppm than it is to treat such sediments. Therefore, Alternative G(A) is more cost-effective than Alternative I.

The use of thermal desorption, rather than incineration, minimizes the cost of treatment. The 25 ppm treatment threshold results in permanent treatment of the majority of the PCB mass within the contaminated sediments and is consistent with EPA guidance and New York State's cleanup plans for the upland portion of the RMC facility, while at the same time being less expensive than Alternative G(B), which includes a treatment level of 10 ppm. EPA's preference for use of the Black Mud Pond for disposal is also cost-effective since it will minimize the amount of fill needed in this area and it will consolidate material in one management area.

Finally, EPA believes that none of the remedial alternatives considered in the Analysis of Alternatives (AA) report, including EPA's selected remedial alternative, pose unacceptable short-term risks to human health. All remedial alternatives, with the exception of the No Action alternative, involve some short-term suspension of contaminated sediments. The selected remedy includes the use of extensive controls such as silt curtains to minimize sediment suspension and migration. The selected remedy involves sediment treatment to reduce the potential for direct contact with contaminated sediment by permanently removing the source of contamination. Community and worker exposure will be minimized by the use of construction methods that minimize workers' contact with the contaminated materials. Air quality will be monitored during remediation.

**4.1.12 Comment:** A representative from RMC stated that EPA has underestimated the positive attributes of armoring (in-situ containment or cap) and RMC's ability to monitor the cap for its long-term performance.

**Response:** In-situ containment was considered by EPA. However, after carefully balancing the specific characteristics of the Site against the nine criteria as outlined in the NCP, EPA has determined that the long-term effectiveness and permanence afforded by the selected alternative offset any short-term risks posed by the selected alternative and the higher costs of the selected alternative. Although containment of contamination is less difficult than excavation or dredging and treatment of contamination, EPA prefers technologies in which treatment that permanently and significantly reduces the volume, toxicity or mobility of the PCBs is a principal element.

EPA has determined that dredging is an effective way of removing the volume of contaminated sediments in the river system based on limited previous experience at other Superfund sites and federal projects. In addition, although sediment containment with a graded cover would reduce the erosive force of the flowing river water and would limit movement of contaminants into the environment, its long-term effectiveness is dependent upon the adequacy and reliability of the sediment cover. Long-term monitoring and maintenance of contained sediments would be difficult to achieve because the cover is located underwater. Because the sediments are submerged, the contained underwater sediments would require periodic inspections by divers. In addition, several rounds of sampling might be required to detect underwater containment cell leakage, since any leaking contamination would be diluted. Further, if underwater monitoring revealed that cap repairs were necessary, such repairs could likely only be undertaken in late spring or in summer. Little information is available on the frequency with which maintenance would be needed or on the probability of cover failure. If the sediment cover fails, cancer risks on the order of $10^{-2}$ would be present immediately since contaminated sediments would reenter the river system, and be available to contaminate fish and wildlife. Sediment dredging, on the other hand, would permanently remove the long-term risks from contaminated sediments.

## 4.2 Risk Assessment

**4.2.1 Comment:** An interested citizen asked if EPA had developed a risk assessment for the combination of PCBs, PAHs, TDBFs, aluminum, and cyanide.

**Response:** EPA's risk assessment provides both chemical-specific and combined risks associated with these chemicals.

**4.2.2 Comment:** Representatives from RMC stated that site-specific issues need to be considered in evaluating appropriate cleanup levels for the Reynolds Study Area. Since the cleanup levels are to be risk-driven, the risk assessment should be specific to the RMC Site and not based on regional data.

**Response:** Where possible, site-specific assumptions were used in the evaluation of cleanup levels. Sediment concentrations evaluated were those in the Reynolds Study Area.

**4.2.3 Comment:** A representative from RMC stated that it is premature for EPA to propose a remedy before the risk assessment has been completed. In its draft form, the risk assessment has serious flaws in the assumptions used, the methods employed, and the conclusions reached.

**Response:** Generally, EPA issues all risk assessments, Additional River Study (ARS) reports, AA reports, and other investigative reports in draft form during the public comment period to allow for public comment on those documents as well as on the Proposed Plan. Although in draft form, the risk assessment was complete, and EPA did not anticipate any major changes. After reviewing comments made by RMC and the public which are summarized in this responsiveness summary, EPA has revised and finalized the draft risk assessment. The revisions to the risk assessment were minor.

## 4.3 Cleanup Levels

**4.3.1 Comment:** Representatives from the Akwesasne Task Force on the Environment, St. Regis Mohawk Tribe, Dr. Stone, and an interested citizen stated that EPA's cleanup level should be 0.1 ppm. They expressed the need to protect the food chain, particularly for the Mohawk community whose culture relies heavily on fishing and hunting. They also cited recent research that has revealed new information on the negative, non-carcinogenic health effects of PCBs; and the potential, cumulative health effects of exposure to multiple contaminants via multiple pathways of contamination.

**Response:** Based on the results of its risk assessment, EPA established cleanup levels for contaminated sediment in the Reynolds Study Area which are protective of human health and the environment. The cleanup levels are: PCBs - 1 ppm; PAHs - 10 ppm; and TDBF - 1 ppb. Cleanup levels are the concentration of contaminants in sediment above which some remedial action will be taken (i.e., treatment or containment). These cleanup levels were based on ingestion of fish by local residents and represent sediment contaminant concentrations which would be associated with carcinogenic risks on the order of $10^{-4}$.

Cleanup to these levels will also remove the threat from other contaminants such as fluoride and cyanide. The 1 ppm PCB cleanup level is identical to that selected by EPA for contaminated sediment associated with the G.M. Site which is immediately downstream of the RMC facility. For the G.M. Site, EPA estimated that a 1 ppm PCB cleanup level in sediments is associated with a $10^{-4}$ (1 in 10,000) excess cancer risk to humans. For the RMC Study Area Site, EPA estimates that a 1 ppm PCB cleanup level in sediments is associated with an excess cancer risk to humans on the order of $10^{-4}$ (1 in 10,000). There is a variation in estimated residual cancer risks between the G.M. and RMC Study Area Sites due to uncertainties associated with estimating the effect of varying sediment PCB concentrations on area fish.

A rough approximation of the area which must be addressed to meet Site cleanup levels is given in Figure 11 of the decision document. There are approximately 51,500 cubic yards of sediment over a 27- acre area with PCB concentrations above 1 ppm, PAHs above 10 ppm, and TDBFs above 1 ppb. EPA considers such sediments to pose a principal threat to human health and the environment.

It should be noted that federal and New York State sediment quality criteria guidance indicate that PCB cleanup levels well below 1 ppm are required to achieve protection of the environment since PCBs pose a significant ecological risk. While EPA would prefer a lower cleanup level which would be associated with a $10^{-6}$ cancer risk, EPA has significant concerns as to the technical practicability of achieving a PCB cleanup level below 1 ppm in this area of the St. Lawrence River. In selecting the 1 ppm cleanup goal, EPA has balanced its desire for a very low cleanup level which will minimize residual risk with the constraints posed by the limitations of dredging as a means of removing sediment with the further intent of selecting treatment as a principal element over containment. EPA believes that a 1 ppm cleanup goal in the St. Lawrence River provides an acceptable measure of protection of human health.

## 4.4 Cost

**4.4.1 Comment:** Representatives from RMC stated that EPA has not adequately balanced risk with cost as required by the NCP. Specifically, EPA has essentially doubled the cleanup cost by using a cleanup level that is based on a more stringent risk level than required by the NCP. In addition, EPA's recommended alternative is $ 13.5 million more expensive than the RMC option with little added benefit. Representatives from RMC cited EPA's Proposed Plan, which they believe indicates that EPA's proposed approach may require in-situ containment of the entire area after dredging, thereby duplicating remediation and increasing costs.

**Response:** Please see EPA's response to comment 4.1.11.

EPA is sensitive to RMC's concerns regarding duplication of remediation and increasing costs. Therefore, an initial dredging program will be conducted in a manner which will identify site-specific information and operating parameters such as dredging rates and depths, sediment removal efficiencies, silt curtains and sheet piling effectiveness, sediment dewatering methods, and sediment suspension and settling characteristics. This information will be evaluated and used as appropriate in modifying operating procedures to improve the effectiveness of the removal program.

## 4.5 Decision Process

**4.5.1 Comment:** An interested citizen commented that the cleanup decision should be made by the people most affected by the contamination.

**Response:** After consideration of all public comments received during the public comment period, EPA, in consultation with NYSDEC and the St. Regis Mohawk Tribe, made the final decision regarding the remedial alternative to be implemented at the Site. All public comments received during the public comment period were factored into EPA's final determination of the selected remedial alternative. EPA intends to continue its ongoing public involvement activities to solicit suggestions and comments throughout the remedial design and implementation.

TABLE . 7 SUMMARY OF NONCARCINOGENIC HAZARD INDICES (HI) ESTIMATED FOR THE REYNOLDS SITE

| Scenario | Receptor | Present/Future | Total Risk |
|---|---|---|---|
| **FISH INGESTION** | | | |
| St. Lawrence River at RMC | Resident | P/F | $7x10^{+1}$* |
| St. Lawrence River - RMC Vicinity | Resident | P/F | $1x10^{+2}$* |
| Raquette River | Resident | P/F | $7x10^{+1}$* |
| **SEDIMENT** | | | |
| Ingestion - St. Lawrence River | Fisherman | P/F | $5x10^{0}$* |
| Dermal Contact - St. Lawrence River | Fisherman | P/F | $3x10^{0}$* |
| Ingestion - Raquette River | Fisherman | P/F | $2x10^{-2}$ |
| Ingestion - St. Lawrence River | Resident | P/F | $2x10^{+1}$* |
| Dermal Contact - St. Lawrence River | Resident | P/F | $9x10^{0}$* |
| Ingestion - Raquette River | Resident | P/F | $9x10^{-2}$ |

*HI exceeds one (1)

## TABLE 8

## SUMMARY OF COSTS OF SELECTED REMEDY

| Component of Selected Remedy | Cost |
|---|---|
| Sampling | $ 200,000 |
| Mobilization/Demobilization | $ 1,200,000 |
| Site Preparation | $ 2,100,000 |
| Dredging/Dewatering/On-shore Loading | $ 15,900,000 |
| ATP Treatment | $ 2,900,000 |
| DIRECT COSTS | $ 22,300,000 |
| INDIRECT COSTS (30% of direct costs) | $ 6,700,000 |
| SUBTOTAL | $ 29,000,000 |
| CONTINGENCY (20% of subtotal) | $ 5,800,000 |
| TOTAL CAPITAL COSTS OF REMEDY | $ 34.8 million |
| O&M COSTS* | $ 28,000/year |
| O&M 30 YEAR PRESENT WORTH** | $ 250,000 |
| TOTAL PRESENT WORTH COSTS OF REMEDY | $ 35.1 million |

* O&M begins after completion of construction.

** Based on an assumed discount rate of 5%.

## TABLE 9

## MAJOR APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, AMONG OTHERS, ASSOCIATED WITH THE SELECTED REMEDY

**Chemical-Specific ARARs**

- Clean Air Act
  - National Primary and Secondary Ambient Air Quality Standards at 40 CFR Part 50
- New York State Requirements
  - Air quality standards at 6 NYCRR Part 257
  - Air emission regulations at 6 NYCRR Part 211
  - Water quality regulations for surface waters and groundwaters at 6 NYCRR Parts 700 - 705

**Action-Specific ARARs**

- Toxic Substances Control Act
  - PCB disposal requirements for disposal of dredged material generally found at 40 CFR 761.60(a)(5)
- Resource Conservation and Recovery Act
  - Capping and monitoring requirements generally found at 40 CFR 264.303 and 264.310
  - Groundwater monitoring requirements at 40 CFR 264 Subpart F
  - Generator requirements at 40 CFR 262
  - Transporter requirements at 40 CFR 263
- Clean Water Act
  - Best available technology and monitoring requirements at 40 CFR 122.44
  - Best management practices program at 40 CFR 125.100, 40 CFR 125.104, 40 CFR 136.1-136.4
- River and Harbors Act
  - Dredging requirements at 33 CFR 320-330

## TABLE 9 (cont.)

## MAJOR APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, AMONG OTHERS, ASSOCIATED WITH THE SELECTED REMEDY

- **New York State Requirements**
  - Solid waste management facility regulations at 6 NYCRR Part 360
  - Final status standards for hazardous waste facilities at 6 NYCRR Part 373, including standards for incinerators at 373-3.15 and standards for thermal treatment at 373-3.16
  - Implementation of National Permit Discharge Elimination System at 6 NYCRR 750-757
  - Process exhaust and/or ventilation system requirements at 6 NYCRR Part 212

**Location-Specific ARARs**

- Executive Orders 11988 and 11990
  - Floodplains management and protection of wetlands at 40 CFR 6.302 and 40 CFR 6, Appendix A
- Fish and Wildlife Coordination Act
  - Protection of endangered species and wildlife at 33 CFR Parts 320-330 and 40 CFR 6.302
- National Wildlife Historical Preservation Act
  - Preservation of historic properties at 36 CFR 65 and 36 CFR 800
- Endangered Species Act
  - Protection of endangered species at 50 CFR 200, 50 CFR 402
- Clean Water Act
  - Section 404 requirements for dredge spoil discharge at 40 CFR 230 and 33 CFR Parts 320-330
- Wild and Scenic Act
  - Protection of recreational river at 40 CFR 6.302(e)
- Coastal Zone Management Act

## TABLE 9 (cont.)

## MAJOR APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, AMONG OTHERS, ASSOCIATED WITH THE SELECTED REMEDY

- New York State Requirements
  - Endangered species requirements at 6 NYCRR 182
  - Coastal zone management policies at 1 NYCRR Part 600

**"To Be Considered" Requirements**

- St. Regis Mohawk Tribe Requirements
  - 0.1 ppm PCB sediment level
  - 5 ng/$m^3$ PCB air level
- Clean Water Act interim sediment quality criteria
- New York State sediment quality criteria
- Acceptable ambient levels of volatile organics in emissions from all sources in NYS Air Guide I

## APPENDIX 3

## STATE LETTER OF CONCURRENCE

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

-7010

SEP 27 1993

Thomas C. Jorling
Commissioner

Ms. Kathleen C. Callahan
Acting Deputy Regional Administrator
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, New York 10278

Dear Ms. Callahan:

The New York State Department of Environmental Conservation has reviewed the United States Environmental Protection Agency (USEPA) Draft Record of Decision (ROD) for the Reynolds Study Area for which Reynolds Metals is responsible for investigating and remediating, pursuant to the September 1989 USEPA Unilateral Administrative Order.

We strongly support the proposed dredging of contaminated sediments from the river and can agree with USEPA's cleanup levels for this site. We also agree with and support the concept of using the Black Mud Pond for the disposal of untreated sediments and treatment residuals

Regarding the document's reference to the on-site PCB treatment levels required by the New York State ROD, we believe that it is inappropriate to state that the 25 parts per million (ppm) level being considered by USEPA is consistent with that level required by New York State. While the numbers are the same, the processes followed to arrive at those values are not. The 25 ppm PCB soil treatment level selected by New York State was based on a cost analysis which compared projected remedial costs to the mass of PCBs which would be treated through the use of different treatment levels. USEPA does not appear to have conducted an analysis similar to the above. Therefore, the ROD language should be duly modified. As the Department has previously indicated, we do not accept USEPA's PCB Guidance Document since it is inconsistent with our approach to PCB remediation and, as indicated in the document, the guidance is optional for USEPA to follow. In accordance with the State's approach, we recommend that USEPA require Reynolds Metals to evaluate remedial design sampling results to determine the feasibility of treating sediments with PCB concentrations below 25 ppm. Based on the results of the evaluation, we would encourage the use of lower treatment levels if it could be demonstrated that doing so would not add unreasonable costs to the project.

While the Department can agree with USEPA's cleanup levels for this site, we strongly encourage Reynolds Metals to eliminate as much of the contamination as possible, while it is in the process of remediating the environs of this site and to pursue the lowest possible cleanup level that is feasible under existing conditions.

The USEPA should ensure that pilot testing of the thermal desorption unit is performed during remedial design to verify that the emissions from the treatment unit are acceptable.

Thank you for the opportunity to review this document.

Sincerely,

Ann Hill DeBarbieri
Deputy Commissioner
Office of Environmental Remediation

# APPENDIX 4

# ADMINISTRATIVE RECORD INDEX

Document Number: REY-001-0001 To 0084 Date: / /

Title: (Letter containing the Reynolds Metals site monthly reports for November 1989, - September 1990, November 1990, - May 1991, and July 1991, - June 1992)

Type: CORRESPONDENCE
Category: 2.0.0.0.0 Removal Response
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Lenney, Robert J.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Visnic, Christine: US EPA

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Document Number: REY-001-0519 To 0526 Parent: REY-001-0517 Date: / /

Title: Additional River Sampling Report Response to Comments

Type: OTHER
Category: 3.1.0.0.0 Sampling and Analysis Plan (SAP)
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-001-0897 To 0971 Parent: REY-001-0896 Date: / /

Title: APPENDIX C, Reynolds River Program Sediment Samples, APPENDIX D, Reynolds River Program Water Samples, APPENDIX E, Reynolds River Program Elutriate Samples (collected on various days during September 1990)

Type: DATA
Category: 3.2.0.0.0 Sampling and Analysis Data/Chain of Custody Forms
Author: none: none
Recipient: none: none

---

Document Number: REY-001-0975 To 1005 Parent: REY-001-0972 Date: / /

Title: St. Lawrence River Ecological Data Collection Plan - Reynolds Metals Co. Massena, New York

Type: PLAN
Category: 3.2.0.0.0 Sampling and Analysis Data/Chain of Custody Forms
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

Document Number: REY-002-0431 To 0440 Parent: REY-002-0429 Date: / /

Title: Enclosure #1 Sampling, Analysis and Monitoring Plan (SAMP) General Comments

Type: PLAN
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: none: US EPA
Recipient: none: none

---

Document Number: REY-002-0557 To 0615 Date: / / Confidential

Title: (Field Work Notebook for Reynolds Metals Company)

Type: FINANCIAL/TECHNICAL
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Dunn, Maria C.: Alliance Technologies Corporation
Recipient: none: none

---

Document Number: REY-002-0643 To 0646 Parent: REY-002-0642 Date: / /

Title: NYSDEC Review Comments on Draft Additional River Sampling Report, St. Lawrence River System dated January 24, 1991, Prepared for Reynolds Metals Company, Prepared by Woodward-Clyde Consultants

Type: PLAN
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: none: NY Dept of Environmental Conservation
Recipient: none: none

---

Document Number: REY-002-0647 To 0651 Parent: REY-002-0642 Date: / /

Title: NYSDEC Review Comments on Technical Memorandum Preliminary Analysis of Alternatives St. Lawrence River System dated January 24, 1991, Prepared for Reynolds Metals Company, Prepared by Woodward-Clyde Consultants

Type: PLAN
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: none: NY Dept of Environmental Conservation
Recipient: none: none

Document Number: REY-002-0654 To 0744 Parent: REY-002-0652 Date: / /

Title: Attachment A (Summary data packages for seventeen split samples collected in the St. Lawrence and Raquette Rivers)

Type: FINANCIAL/TECHNICAL
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: none: Versar
Recipient: none: none

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Document Number: REY-002-0745 To 0758 Parent: REY-002-0652 Date: / /

Title: Comparison of NYSDEC Sample Splits - Sampling, Analysis & Monitoring Plan, St. Lawrence - Grasse River Site, Site Code 6-45-015 Reynolds Metals 106 Order

Type: OTHER
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: none: none
Recipient: none: none

---

Document Number: REY-002-0789 To 0796 Parent: REY-002-0784 Date: / /

Title: Enclosure #1 Draft Additional River Sampling Report (ARS Report) General Comments

Type: PLAN
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Condition: DRAFT
Author: none: US EPA
Recipient: none: none

---

Document Number: REY-002-0797 To 0806 Parent: REY-002-0784 Date: / /

Title: Enclosure #2, Technical Memorandum, Preliminary Analysis of Alternatives - General Comments

Type: PLAN
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: none: US EPA
Recipient: none: none

Document Number: REY-002-0824 To 0830 Parent: REY-002-0822 Date: / /

Title: Enclosure Draft Ecological Data Collection Plan - General Comments

Type: OTHER
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: none: US EPA
Recipient: none: none

---

Document Number: REY-002-0881 To 0881 Date: / /

Title: St. Regis Mohawk Tribe PCB ARARs (Applicable or Relevant and Appropriate Requirements)

Type: OTHER
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: none: none
Recipient: none: none

---

Document Number: REY-002-1009 To 1032 Parent: REY-002-1007 Date: / /

Title: Draft Treatability Study Work Plan, General Comments

Type: PLAN
Category: 4.5.0.0.0 Feasibility Study Correspondence
Author: none: US EPA
Recipient: none: none

---

Document Number: REY-001-1139 To 1144 Parent: REY-001-1137 Date: / /

Title: Summary of Responses to Comments, Analysis of Alternatives Work Plan

Type: PLAN
Category: 3.3.0.0.0 Work Plan
Author: none: Woodward-Clyde Consultants
Recipient: none: none

Document Number: REY-002-0416 To 0416 Parent: REY-002-0411 Date: 03/17/89

Title: (Letter requesting a map delineating Reynolds Metals property lines and a drainage pattern map for the eastern side of the Reynolds Metals plant)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Jock, Ken: St. Regis Mohawk Tribe
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0441 To 0477 Parent: REY-002-0429 Date: 04/06/89

Title: Enclosure #4, SOP No. HW-6, Revision #6, CLP Organics Data Review and Preliminary Review

Type: PLAN
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Bevilacqua, Louis: none
Recipient: none: none

---

Document Number: REY-002-0478 To 0493 Parent: REY-002-0429 Date: 07/10/89

Title: Enclosure #5, CLP ( 2,3,7,8 TCDD ) Data Review, Revision 4

Type: PLAN
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Gerazounis, Stelios: none
Recipient: none: none

---

Document Number: REY-002-1039 To 1068 Date: 09/28/89

Title: Administrative Order In the Matter of Reynolds Metals Company - Respondent

Type: LEGAL DOCUMENT
Category: 7.3.0.0.0 Administrative Orders
Author: Muszynski, William J.: US EPA
Recipient: none: Reynolds Aluminum/Reynolds Metal Company
Attached: REY-002-1069

Document Number: REY-002-1089 To 1089 Parent: REY-002-1087 Date: 10/26/89

Title: (Attendance sheet of the October 26, 1989, Technical Meeting)

Type: OTHER
Category: 10.5.0.0.0 Documentation of Other Public Meetings
Author: various: various
Recipient: none: none

---

Document Number: REY-002-1069 To 1079 Parent: REY-002-1039 Date: 10/31/89

Title: (Letter expressing concern about the broad scope and clarity of the Administrative Order issued to Reynolds Metals Company)

Type: CORRESPONDENCE
Category: 7.3.0.0.0 Administrative Orders
Author: McKinnon, James E.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Corman, Bernice I.: US EPA

---

Document Number: REY-002-1087 To 1088 Date: 11/01/89

Title: (Letter summarizing an October 26, 1989, meeting, and forwarding the enclosed attendance sheet)

Type: CORRESPONDENCE
Category: 10.5.0.0.0 Documentation of Other Public Meetings
Author: Petersen, Carole: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Attached: REY-002-1089

---

Document Number: REY-001-1122 To 1124 Date: 11/02/89

Title: (Letter forwarding the enclosed Work Plan for collection of additional hydrodynamic data in the St. Lawrence and Raquette Rivers)

Type: CORRESPONDENCE
Category: 3.3.0.0.0 Work Plan
Author: Jacobson, Peter R.: Woodward-Clyde Consultants
Owens, Edward H.: Woodward-Clyde Consultants
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Attached: REY-001-1125

Document Number: REY-001-1125 To 1136 Parent: REY-001-1122 Date: 11/02/89

Title: Work Plan, River Hydrodynamic Data Collection, St. Lawrence River System

Type: PLAN
Category: 3.3.0.0.0 Work Plan
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

---

Document Number: REY-002-0402 To 0403 Date: 11/02/89

Title: (Letter responding to a November 1989, letter and serving to clarify agreements made in a joint meeting on October 26, 1989)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Petersen, Carole: US EPA

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Document Number: REY-002-0404 To 0406 Date: 11/09/89

Title: (Letter commenting on the River Hydrodynamic Data Collection Work Plan and listing what is to be addressed during the implementation of the Work Plan)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Petersen, Carole: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

---

Document Number: REY-002-0407 To 0408 Date: 11/09/89

Title: (Letter commenting on the River Hydrodynamic Data Collection Work Plan, St. Lawrence River System)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Visnic, Christine: US EPA

Document Number: REY-002-0409 To 0410 Date: 11/21/89

Title: (Letter responding to a November 2, 1989, letter regarding the proposed flow study for the Reynolds study area)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Petersen, Carole: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

---

Document Number: REY-002-0418 To 0428 Parent: REY-002-0417 Date: 12/01/89

Title: NYSDEC Review Comments on the Sampling, Analysis & Monitoring Plan, Additional River Sampling - St. Lawrence River System for Reynolds Metals Company - Massena, NY, dated December 1989

Type: OTHER
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: none: NY Dept of Environmental Conservation
Recipient: none: none

---

Document Number: REY-002-0411 To 0415 Date: 01/04/90

Title: (Letter commenting on "Reynolds Metals Company's Sampling, Analysis and Monitoring Plan for Additional River Studies, St. Lawrence River System, December, 1989")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Jock, Ken: St. Regis Mohawk Tribe
Recipient: Visnic, Christine: US EPA
Attached: REY-002-0416

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Document Number: REY-002-0417 To 0417 Date: 01/17/90

Title: (Letter forwarding the enclosed comments on the Sampling, Analysis and Monitoring Plan for Additional River Sampling at the St. Lawrence River System for Reynolds Metals Company - Massena, New York)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Visnic, Christine: US EPA
Attached: REY-002-0418

Document Number: REY-002-0494 To 0529 Parent: REY-002-0429 Date: 02/16/90

Title: Enclosure #6, SOP No. HW-2, Evaluation of Metals Data for the Contract Laboratory Program (CLP)

Type: PLAN
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Sheikh, Hanif: none
Recipient: none: none

---

Document Number: REY-001-1277 To 1431 Parent: REY-001-1275 Date: 03/01/90

Title: Volume I, Final Remedial Investigation Report, St. Lawrence Reduction Plant

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

---

Document Number: REY-002-0884 To 1006 Parent: REY-002-0882 Date: 03/01/90

Title: Preliminary Feasibility Study Report - St. Lawrence Reduction Plant

Type: REPORT
Category: 4.2.0.0.0 FS Reports
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

---

Document Number: REY-001-1275 To 1276 Date: 03/30/90

Title: (Letter forwarding the enclosed "Final Remedial Investigation Report," of tasks conducted at the St. Lawrence Reduction Plant)

Type: CORRESPONDENCE
Category: 3.4.0.0.0 RI Reports
Author: Crouse, George W.: Woodward-Clyde Consultants
Jacobson, Peter R.: Woodward-Clyde Consultants
Kramer, Mark M.: Woodward-Clyde Consultants
Recipient: Sweredoski, Derrell: NY Dept of Environmental Conservation
Attached: REY-001-1277

Document Number: REY-001-1432 To 1549 Date: 03/30/90

Title: Volume II, Final Remedial Investigation Report, St. Lawrence Reduction Plant, Appendices A through E

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-001-1550 To 1933 Date: 03/30/90

Title: Volume III, Final Remediation Investigation Report, St. Lawrence Reduction Plant, Appendix F

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0882 To 0883 Date: 03/30/90

Title: (Letter forwarding the enclosed "Preliminary Feasibility Study Report - St. Lawrence Reduction Plant")

Type: CORRESPONDENCE
Category: 4.2.0.0.0 FS Reports
Author: Crouse, George W.: Woodward-Clyde Consultants
Jacobson, Peter R.: Woodward-Clyde Consultants
Recipient: Sweredoski, Darrell: Reynolds Aluminum/Reynolds Metal Company
Attached: REY-002-0884

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Document Number: REY-002-0429 To 0430 Date: 04/20/90

Title: (Letter forwarding the enclosed comments on the "Sampling, Analysis and Monitoring Plan for Additional River Sampling at the Reynolds Metals Company Site")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Pavlou, George: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Attached: REY-002-0431 REY-002-0441 REY-002-0478 REY-002-0494

Document Number: REY-001-0085 To 0498 Date: 05/01/90

Title: Sampling, Analysis, and Monitoring Plan for Additional River Studies, St. Lawrence River System

Type: PLAN
Category: 3.1.0.0.0 Sampling and Analysis Plan (SAP)
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0530 To 0530 Date: 06/06/90

Title: (Letter authorizing the Reynolds Metals Company to proceed with an analysis of alternatives for the site and stating that a detailed work plan for conduct of an analysis of remedial alternatives will be submitted)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Pavlou, George: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0531 To 0534 Date: 06/15/90

Title: (Letter commenting on the "Sampling, Analysis and Monitoring Plan for Additional River Studies - St. Lawrence River System")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0543 To 0544 Parent: REY-002-0540 Date: 06/18/90

Title: (Letter forwarding the enclosed insurance certificate covering Woodward-Clyde Consultants for any site work at Reynolds' Massena facility)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Jacobson, Peter R.: Woodward-Clyde Consultants
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

Document Number: REY-001-0502 To 0516 Parent: REY-001-0499 Date: 07/01/90

Title: Summary of On-Site Environment Conditions, St. Lawrence Reduction Plant

Type: PLAN
Category: 3.1.0.0.0 Sampling and Analysis Plan (SAP)
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0535 To 0538 Date: 07/26/90

Title: (Letter forwarding the enclosed additional comments on Reynolds Metals Company's proposed Sampling, Analysis and Monitoring Plan)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Pavlou, George: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-001-0499 To 0501 Date: 07/27/90

Title: (Letter forwarding the enclosed "Summary of On-Site Environmental Conditions at the St. Lawrence Reduction Plant," which is a supplement to the May 23, 1990, revision)

Type: CORRESPONDENCE
Category: 3.1.0.0.0 Sampling and Analysis Plan (SAP)
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Attached: REY-001-0502

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Document Number: REY-002-0545 To 0548 Parent: REY-002-0540 Date: 08/02/90

Title: (Letter stating that Frank S. Waller, P.E., will be supervising and directing Woodward-Clyde Consultants on Reynolds' behalf for the St. Lawrence River Program and forwarding Mr. Waller's resume)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Jacobson, Peter R.: Woodward-Clyde Consultants
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

Document Number: REY-002-0549 To 0554 Parent: REY-002-0540 Date: 08/02/90

Title: (Letter forwarding the enclosed laboratory data to supplement the organic data for the distilled water used at Reynolds Metals Company's laboratory)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Jacobson, Peter R.: Woodward-Clyde Consultants
Kramer, Mark M.: Woodward-Clyde Consultants
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0539 To 0539 Date: 08/10/90

Title: (Letter commenting on Reynolds Metals Company's supplement to their revised Sampling, Analysis and Monitoring Plan dated July 27, 1990)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Jock, Ken: St. Regis Mohawk Tribe
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0540 To 0542 Date: 08/17/90

Title: (Letter acknowledging the receipt of approval of "Reynolds Metals Company's Sampling, Analysis and Monitoring Plan," notification of the anticipated start of field work, and also forwarding three letters)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Attached: REY-002-0543 REY-002-0545 REY-002-0549

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Document Number: REY-002-0555 To 0556 Date: 08/17/90

Title: (Letter conditionally approving the revised "Sampling, Analysis and Monitoring Plan - Additional River Sampling" and the supplement dated July 1990, and listing provisions)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Pavlou, George: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

Document Number: REY-002-0616 To 0616 Date: 09/07/90

Title: (Letter requesting additional information on the analytical methods presented in the revised "Sampling, Analysis and Monitoring Plan - Additional River Sampling," dated May 1990)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Carson, Lisa P.: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0617 To 0619 Date: 09/07/90

Title: (Letter commenting on the July 1990, "Work Plan for Analysis of Remedial Alternatives - St. Lawrence River System")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0621 To 0623 Parent: REY-002-0620 Date: 09/10/90

Title: (Letter forwarding the enclosed data from the MDL study performed for PCB analyses by EPA Method 608)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Flynn, Dennis W.: ENSECO
Recipient: Buetikofer, Clifford A.: Woodward-Clyde Consultants

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Document Number: REY-002-0620 To 0620 Date: 09/11/90

Title: (Letter forwarding the enclosed summary of the ENSECO MDL study of Method 608)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Attached: REY-002-0621

Document Number: REY-002-0624 To 0624 Date: 09/26/90

Title: (Letter commenting on the "Reynolds Metals Company Analysis of Alternatives Work Plan")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Jock, Ken: St. Regis Mohawk Tribe
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-001-1934 To 2057 Date: 10/25/90

Title: Field Oversight Summary Report, Part I, Additional River Sampling, Reynolds Metals Company, Massena, New York

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: Sullivan, Douglas: Alliance Technologies Corporation
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-001-1145 To 1205 Parent: REY-001-1137 Date: 11/01/90

Title: Work Plan for Analysis of Remedial Alternatives, St. Lawrence River System

Type: PLAN
Category: 3.3.0.0.0 Work Plan
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0625 To 0626 Date: 11/07/90

Title: (Letter confirming a discussion regarding the deadline for Reynolds Metals Company's submission of the "Draft Additional River Sampling Report" and the "Technical Memorandum on Alternatives Screening")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Pavlou, George: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

Document Number: REY-002-0627 To 0634 Date: 11/16/90

Title: (Letter forwarding the enclosed comments on the "Work Plan for Analysis of Remedial Alternatives - St. Lawrence River System for the Reynolds Metals Company Site")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Pavlou, George: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-001-1137 To 1138 Date: 12/03/90

Title: (Letter forwarding the enclosed "Work Plan for Analysis of Remedial Alternatives, St. Lawrence River System")

Type: CORRESPONDENCE
Category: 3.3.0.0.0 Work Plan
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Attached: REY-001-1139 REY-001-1145

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Document Number: REY-002-0635 To 0638 Date: 12/18/90

Title: (Letter commenting on the November 1990, "Work Plan for Analysis of Remedial Alternatives - St. Lawrence River System")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-001-0896 To 0896 Date: 12/21/90

Title: (Letter forwarding the enclosed validated data from the river program for the Reynolds Metals Company)

Type: CORRESPONDENCE
Category: 3.2.0.0.0 Sampling and Analysis Data/Chain of Custody Forms
Author: Buetikofer, Clifford A.: Woodward-Clyde Consultants
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Attached: REY-001-0897

Document Number: REY-002-0639 To 0641 Date: 03/11/91

Title: (Letter discussing the ecological data collection activities required by EPA regarding the Reynolds Metals Company site)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Pavlou, George: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0642 To 0642 Date: 03/12/91

Title: (Letter forwarding the enclosed comments on the "Draft Additional River Sampling Report and the Technical Memorandum - St. Lawrence River System")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA
Attached: REY-002-0643 REY-002-0647

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Document Number: REY-002-0759 To 0760 Date: 03/28/91

Title: (Letter discussing a March 11, 1991, letter requesting that a work plan for the collection of data, which will support an ecolgical risk assessment, be developed)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0652 To 0653 Date: 04/02/91

Title: (Letter forwarding the enclosed summary data packages for seventeen split samples obtained and analyzed as part of the "Sampling, Analysis and Monitoring Plan Field Investigation Program in the St. Lawrence and Raquette Rivers")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Momberger, George: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA
Reagan, Jim: US EPA
Attached: REY-002-0654 REY-002-0745

Document Number: REY-002-0761 To 0762 Date: 04/23/91

Title: (Letter forwarding the enclosed "Fish Data Analysis Interim Report")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Feinberg, Charles: Alliance Technologies Corporation
Recipient: Moyik, Cathy: US EPA
Attached: REY-002-0763

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Document Number: REY-002-0763 To 0776 Parent: REY-002-0761 Date: 04/23/91

Title: Fish Data Analysis Interim Report, Reynolds Metal Company, Massena, New York, Risk Assessment

Type: REPORT
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Gavrelis, Naida: Alliance Technologies Corporation
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0777 To 0778 Date: 06/03/91

Title: (Letter commenting on the "Ecological Data Collection Plan - St. Lawrence River - Reynolds Metals Plant - Massena, New York" and stating that it is inadequate for the purpose of collection of data for a human health Risk Assessment)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Laccetti, Geoff: NY Dept of Health
Recipient: Daigle, William: NY Dept of Environmental Conservation

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Document Number: REY-002-0779 To 0783 Date: 06/04/91

Title: (Letter commenting on the "Ecological Data Collection Plan - St. Lawrence River - Reynolds Metals Plant - Massena, New York")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA

Document Number: REY-002-0784 To 0785 Date: 06/07/91

Title: (Letter conditionally approving the revised "Work Plan for Analysis of Remedial Alternatives," dated November 1990)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Pavlou, George: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Attached: REY-002-0786 REY-002-0789 REY-002-0797

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Document Number: REY-002-0786 To 0788 Parent: REY-002-0784 Date: 06/07/91

Title: (Letter forwarding the enclosed comments on the "Draft Additional River Sampling Report" and the "Technical Memorandum, Preliminary Analysis of Alternatives")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Pavlou, George: US EPA

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Document Number: REY-002-0807 To 0810 Date: 06/25/91

Title: (Letter commenting on the "Ecological Data Collection Plan for the St. Lawrence River," dated April 1991)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Csulak, Frank G.: US Dept of Commerce
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0812 To 0815 Parent: REY-002-0811 Date: 06/27/91

Title: (Letter discussing the sampling and analysis of fish in the St. Lawrence River)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Stone, Ward B.: NY Dept of Environmental Conservation
Recipient: Jock, Ken: St. Regis Mohawk Tribe

Document Number: REY-002-0811 To 0811 Date: 07/03/91

Title: (Cover sheet forwarding a letter which underscores the need for sampling/analyses of fish in the Reynolds' 106 order study area near the shore along the St. Lawrence River)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: various: none
Attached: REY-002-0812

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Document Number: REY-002-0816 To 0817 Date: 07/09/91

Title: (Letter commenting on the "Ecological Data Collection Plan - St. Lawrence River - Reynolds Metals Plant - Massena, NY, April 26, 1991")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Kadlec, Michael: St. Regis Mohawk Tribe
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0818 To 0819 Date: 07/18/91

Title: (Letter identifying preliminary polychlorinated biphenyl (PCB) sediment cleanup and treatment goals for the Reynolds Metals Company site)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: McCabe, William: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0820 To 0821 Date: 07/25/91

Title: (Letter acknowledging receipt of a June 18, 1991, letter containing preliminary sediment clean-up goals and an agreement to the schedule of submittals)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Condition: MISSING ATTACHMENT
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA

Document Number: REY-002-0822 To 0823 Date: 08/02/91

Title: (Letter forwarding the enclosed comments on the April 26, 1991, "Draft Ecological Data Collection Plan, St. Lawrence River, Reynolds Metals Plant, Massena, New York")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: McCabe, William: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Attached: REY-002-0824

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Document Number: REY-001-0527 To 0895 Parent: REY-001-0517 Date: 08/13/91

Title: Revised Additional River Sampling Report, St. Lawrence Reduction Plant

Type: REPORT
Category: 3.1.0.0.0 Sampling and Analysis Plan (SAP)
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-001-0517 To 0518 Date: 08/14/91

Title: (Letter forwarding the enclosed "Revised Additional River Sampling Report, St. Lawrence Reduction Plant" and the "Additional River Sampling Report Response to Comments")

Type: CORRESPONDENCE
Category: 3.1.0.0.0 Sampling and Analysis Plan (SAP)
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Attached: REY-001-0519 REY-001-0527

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Document Number: REY-002-0831 To 0832 Date: 08/16/91

Title: (Letter responding to an August 2, 1991, letter commenting on the "Ecological Data Collection Plan, St. Lawrence River, Reynolds Metals Plant, Massena, New York")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA

Document Number: REY-002-0833 To 0834 Date: 08/20/91

Title: (Memo commenting on the "RMC 106 Order - Treatability Study Workplan for PCBs in River Sediments")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Kolak, Nick: NY Dept of Environmental Conservation
Recipient: Daigle, William: NY Dept of Environmental Conservation

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Document Number: REY-002-0835 To 0836 Date: 08/20/91

Title: (Memo discussing an August 20, 1991, telephone conversation with Mr. DeLisle of Reynolds Metals Company regarding an August 16, 1991, letter, which discussed the "Draft Ecological Data Collection Plan")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Carson, Lisa P.: US EPA
Recipient: file: US EPA

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Document Number: REY-002-0837 To 0839 Date: 08/27/91

Title: (Letter commenting on the August 7, 1991, "Workplan - Treatability Study - St. Lawrence River Sediments")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0840 To 0841 Date: 08/27/91

Title: (Letter commenting on Reynolds Metals' August 16, 1991, response to an EPA letter regarding the April 26, 1991, "Draft Ecological Data Collection Plan")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA

Document Number: REY-002-0842 To 0842 Date: 09/03/91

Title: (Memo discussing a September 3, 1991, telephone conversation with Reynolds Metals Company concerning the "Ecological Data Collection Plan" and its revision)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Carson, Lisa P.: US EPA
Recipient: file: US EPA

---

Document Number: REY-002-0843 To 0843 Date: 09/04/91

Title: (Letter forwarding the enclosed "Interim Report #2" regarding the preliminary PCB cleanup levels in sediment for the Reynolds Metals site)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Feinberg, Charles: Alliance Technologies Corporation
Recipient: Moyik, Cathy: US EPA
Attached: REY-002-0844

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Document Number: REY-002-0844 To 0861 Parent: REY-002-0843 Date: 09/04/91

Title: Interim Cleanup Levels, Interim Report #2 Risk Assessment Reynolds Metal Company

Type: REPORT
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Gavrelis, Naida: Alliance Technologies Corporation
Recipient: Carson, Lisa P.: US EPA

---

Document Number: REY-002-1082 To 1082 Parent: REY-002-1080 Date: 10/01/91

Title: Summary of Biological Tissue Collections, St. Lawrence and Raquette Rivers, Reynolds Metals Company, October 1991

Type: FINANCIAL/TECHNICAL
Category: 7.8.0.0.0 Enforcement Correspondence
Author: none: Woodward-Clyde Consultants
Recipient: none: US EPA

Document Number: REY-002-0862 To 0863 Date: 10/02/91

Title: (Letter commenting on the "St. Lawrence River Ecological Data Collection Plan - Reynolds Metal Co., Massena, NY")

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Jock, Ken: St. Regis Mohawk Tribe
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0864 To 0865 Date: 10/10/91

Title: (Letter commenting on the "St. Lawrence River Ecological Data Collection Plan - Reynolds Metals Company - Massena, New York," dated September 1991)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-0866 To 0868 Date: 10/10/91

Title: (Letter conditionally approving the revised "St. Lawrence River Ecological Data Collection Plan," dated September 1991, and listing modifications which are to be made to the Plan)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: McCabe, William: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

---

Document Number: REY-001-0972 To 0974 Date: 10/11/91

Title: (Letter forwarding the enclosed revised "Ecological Data Collection Plan for the St. Lawrence and Raquette Rivers")

Type: CORRESPONDENCE
Category: 3.2.0.0.0 Sampling and Analysis Data/Chain of Custody Forms
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Attached: REY-001-0975

Document Number: REY-002-1007 To 1008 Date: 10/11/91

Title: (Letter forwarding the enclosed comments on the August 7, 1991, "Draft Treatability Study, St. Lawrence River Sediments")

Type: CORRESPONDENCE
Category: 4.5.0.0.0 Feasibility Study Correspondence
Author: Petersen, Carole: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Attached: REY-002-1009

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Document Number: REY-001-1206 To 1207 Date: 10/17/91

Title: (Letter forwarding the enclosed revised "Treatability Study Work Plan for St. Lawrence River Sediments")

Type: CORRESPONDENCE
Category: 3.3.0.0.0 Work Plan
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Attached: REY-001-1208

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Document Number: REY-001-1208 To 1274 Parent: REY-001-1206 Date: 10/18/91

Title: Final Work Plan, Treatability Study, St. Lawrence River Sediment

Type: PLAN
Category: 3.3.0.0.0 Work Plan
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

---

Document Number: REY-002-1083 To 1084 Date: 10/21/91

Title: (Letter forwarding the enclosed revised Table 1 from the "St. Lawrence River Ecological Data Collection Plan for Reynolds Metals Company")

Type: CORRESPONDENCE
Category: 7.8.0.0.0 Enforcement Correspondence
Author: Jacobson, Peter R.: Woodward-Clyde Consultants
Mancini, Ceil: Woodward-Clyde Consultants
Recipient: Carson, Lisa P.: US EPA
Attached: REY-002-1085

Document Number: REY-002-1085 To 1086 Parent: REY-002-1083 Date: 10/21/91

Title: Table 1 Field Sampling Plan, Ecological Data Collection Plan, Reynolds Metals Company, Massena, New York

Type: PLAN
Category: 7.8.0.0.0 Enforcement Correspondence
Author: none: Woodward-Clyde Consultants
Recipient: none: none

---

Document Number: REY-002-1080 To 1081 Date: 11/01/91

Title: (Letter forwarding the enclosed summary table of the results of biological tissue collections performed in the St. Lawrence and Raquette Rivers from October 21, to November 1, 1991)

Type: CORRESPONDENCE
Category: 7.8.0.0.0 Enforcement Correspondence
Author: Jacobson, Peter R.: Woodward-Clyde Consultants
Mancini, Ceil: Woodward-Clyde Consultants
Recipient: Carson, Lisa P.: US EPA
Attached: REY-002-1082

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Document Number: REY-002-1033 To 1037 Date: 11/12/91

Title: (Letter commenting on the October 18, 1991, "Final Work Plan - Treatability Study - St. Lawrence River Sediment")

Type: CORRESPONDENCE
Category: 4.5.0.0.0 Feasibility Study Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA

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Document Number: REY-002-1038 To 1038 Date: 11/12/91

Title: (Letter approving the revised "Final Work Plan, Treatability Study, St. Lawrence River Sediments," dated October 18, 1991, and stating that it must be submitted to EPA by January 31, 1992)

Type: CORRESPONDENCE
Category: 4.5.0.0.0 Feasibility Study Correspondence
Author: Petersen, Carole: US EPA
Recipient: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company

Document Number: REY-001-1006 To 1007 Date: 02/07/92

Title: (Letter forwarding the enclosed "St. Lawrence and Raquette River Technical Data Summary Report")

Type: CORRESPONDENCE
Category: 3.2.0.0.0 Sampling and Analysis Data/Chain of Custody Forms
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Attached: REY-001-1008

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Document Number: REY-001-1008 To 1121 Parent: REY-001-1006 Date: 02/07/92

Title: St. Lawrence River and Raquette River Technical Data Summary Report, Reynolds Metals Company, Massena, New York

Type: REPORT
Category: 3.2.0.0.0 Sampling and Analysis Data/Chain of Custody Forms
Author: none: Woodward-Clyde Consultants
Recipient: none: US EPA
none: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0869 To 0869 Date: 02/07/92

Title: (Letter stating that effective March 1, 1992, the new Project Coordinator will be Robert J. Lenney)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: DeLisle, Dale A.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA

---

Document Number: REY-002-0871 To 0875 Parent: REY-002-0870 Date: 04/02/92

Title: (Letter discussing contaminated soils in the vicinity of the proposed 006 outfall ditch between Haverstock Road and the St. Lawrence River and forwarding the attached sample results)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Bence, David F.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Waite, Philip G.: NY Dept of Environmental Conservation

Document Number: REY-002-0870 To 0870 Date: 05/11/92

Title: (Letter forwarding the enclosed April 2, 1992, letter which indicates that soils in the vicinity of the Reynolds Metals site are contaminated with PCBs)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA
Attached: REY-002-0871

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Document Number: REY-002-0877 To 0880 Parent: REY-002-0876 Date: 05/19/92

Title: Telecopier Information (Cover sheet forwarding sample results from the 006 outfall construction area in the vicinity of the Reynolds Metals Company's shoreline)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Rence, Dave: Reynolds Aluminum/Reynolds Metal Company
Recipient: Waite, Philip G.: NY Dept of Environmental Conservation

---

Document Number: REY-002-0876 To 0876 Date: 05/26/92

Title: (Transmittal slip forwarding the additional sample data from the Reynolds Metals Company's shoreline area)

Type: CORRESPONDENCE
Category: 3.5.0.0.0 Remedial Investigation Correspondence
Author: Daigle, William: NY Dept of Environmental Conservation
Recipient: Carson, Lisa P.: US EPA
Attached: REY-002-0877

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Document Number: REY-002-0001 To 0001 Date: 01/18/93

Title: (Letter forwarding the enclosed revised report on the Analysis of Alternatives for the St. Lawrence Plant River Sediments regarding the Reynolds Metals site)

Type: CORRESPONDENCE
Category: 3.4.0.0.0 RI Reports
Author: Lenney, Robert J.: Reynolds Aluminum/Reynolds Metal Company
Recipient: Carson, Lisa P.: US EPA
Attached: REY-002-0002 REY-002-0003

Document Number: REY-002-0003 To 0401 Parent: REY-002-0001 Date: 01/22/93

Title: Final Report - Analysis of Alternatives, St. Lawrence River System

Type: REPORT
Category: 3.4.0.0.0 RI Reports
Author: none: Woodward-Clyde Consultants
Recipient: none: Reynolds Aluminum/Reynolds Metal Company

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Document Number: REY-002-0002 To 0002 Parent: REY-002-0001 Date: 01/22/93

Title: (Letter forwarding the enclosed revised report on the Analysis of Alternatives for the St. Lawrence River sediments regarding the Reynolds Metals site)

Type: CORRESPONDENCE
Category: 3.4.0.0.0 RI Reports
Author: Coad, Richard M.: Woodward-Clyde Consultants
Jacobson, Peter R.: Woodward-Clyde Consultants
Recipient: Lenney, Robert J.: Reynolds Aluminum/Reynolds Metal Company

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# APPENDIX 5

# RESPONSIVENESS SUMMARY

ARCS II EPA CONTRACT NO. 68-W8-0124
EPA WORK ASSIGNMENT NO. 023-2P4D
ICF TECHNOLOGY INCORPORATED

# FINAL

# RESPONSIVENESS SUMMARY
# REYNOLDS METALS COMPANY SITE STUDY AREA
# MASSENA, ST. LAWRENCE COUNTY, NEW YORK

## SEPTEMBER 1993

**NOTICE**

**The preparation of this document has been funded by the United States Environmental Protection Agency (EPA) under the Alternative Remedial Contracting Strategy (ARCS) II Contract Number 68-W8-0124 to ICF Technology Incorporated (ICF).**

## TABLE OF CONTENTS

## 1.0 INTRODUCTION

As part of its public participation responsibilities, the U.S. Environmental Protection Agency (EPA) held a public comment period from February 19 through April 21, 1993 for interested citizens to comment on EPA's Proposed Plan for the Reynolds Metals Company Site Study Area (also referenced in this document as the Site) in Massena, St. Lawrence County, New York. Although originally scheduled to end on March 22, EPA extended the public comment period an additional 30 days to April 21 at the request of several citizens.

The Reynolds Study Area and EPA's Proposed Plan focus on contamination in the river system surrounding the Reynolds Metals Company (RMC) facility. The Proposed Plan did not address the cleanup plan for the RMC facility and upland areas, which is being administered by the New York State Department of Environmental Conservation (NYSDEC). The Proposed Plan identified EPA's preferred alternative for remediating contaminated sediments in the river system surrounding the RMC facility.

EPA held a public meeting on March 9, 1993, at the Massena Town Hall in Massena, New York. During the meeting, representatives from EPA answered questions and received verbal and written comments on EPA's Proposed Plan and the other remedial alternatives under consideration.

In addition to comments received at the public meeting, EPA received written comments throughout the public comment period regarding its Proposed Plan. EPA's responses to significant comments received during the public comment period are included in this Responsiveness Summary which is appended to, and a part of, the decision document for the Site. All comments summarized in this document were factored into EPA's final determination of a remedial alternative for cleaning up the Site. EPA's selected remedy for the Site is described in the summary of the decision document.

This Responsiveness Summary is organized into the following sections.

**2.0 RESPONSIVENESS SUMMARY OVERVIEW.** This section briefly describes the RMC Site and activities conducted to date by EPA and RMC relative to the Superfund process, and outlines EPA's selected remedial alternative.

**3.0 BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS.** This section provides a brief history of community interest and concerns regarding the Site.

**4.0 SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED FROM THE LOCAL COMMUNITY AND EPA's RESPONSES TO THESE COMMENTS.** This section summarizes both verbal and written comments submitted to EPA by the local community during the public comment period and provides EPA's responses to these comments. "Local community" means those individuals who have identified themselves as living in the immediate vicinity of the Site and are potentially threatened from a health or environmental standpoint.

**5.0 COMPREHENSIVE SUMMARY OF SIGNIFICANT LEGAL AND TECHNICAL COMMENTS AND EPA's RESPONSES TO THESE COMMENTS.** This section summarizes other verbal and written comments submitted to EPA during the public comment period and provides EPA's responses to these comments. It is comprised of specific legal and technical questions and, where necessary, elaborates with technical detail on answers covered in Section 4.0.

## APPENDICES

There are four appendices attached to this document. They are as follows:

APPENDIX A: Proposed Plan

APPENDIX B: Public Notices that were printed in the Courier-Observer, Indian Times, and People's Voice newspapers to announce the public meeting and extension of the public comment period.

APPENDIX C: Sign-in sheets of participants at the March 9, 1993 public meeting.

APPENDIX D: Written comments received by EPA during the public comment period and summarized in Sections 4.0 and 5.0 of this Responsiveness Summary. EPA's responses to the written comments are also included in Sections 4.0 and 5.0 of this Responsiveness Summary.

## 2.0 RESPONSIVENESS SUMMARY OVERVIEW

### 2.1 Site Description

The RMC facility is an active aluminum production plant located on 1600 acres in Massena, St. Lawrence County, New York. The facility is located off Route 37, near the Massena-Cornwall International Bridge, directly upriver of the General Motors (G.M.)-Powertrain Division plant. The St. Regis Mohawk Indian Reservation, *Akwesasne*, is located about two miles downstream of the RMC facility. (Please refer to the Proposed Plan, Page 3, Figure 1, which is attached as Appendix A).

The RMC plant was constructed in 1958 for the production of aluminum from alumina. As a result of production activities and years of continuous operations and expansion, various types of industrial wastes including hazardous waste were generated, disposed, and spread throughout the facility. Major areas of contamination on the facility include an unlined pit known as the Black Mud Pond which was used for the disposal of carbon solids, a landfill, and the plant's North Yard. The RMC facility and upland areas are on the NYSDEC Registry of Class 2 Inactive Hazardous Waste Sites. In January 1992, NYSDEC issued a Record of Decision which outlined its cleanup plans for the RMC facility. NYSDEC's selected remedy included a combination of excavation and treatment of areas highly contaminated with polychlorinated biphenyls (PCBs)[1], and consolidation and containment of other contaminated areas on the facility. NYSDEC is overseeing the cleanup of contamination on the RMC facility, including contamination associated with the aluminum production facility. EPA's Proposed Plan and subsequent decision document do not focus on the cleanup plan for the RMC facility and upland areas.

In addition to contamination throughout the facility, RMC also discharged contaminants to the St. Lawrence River through four permitted outfalls. The outfalls discharged treated wastewater, contact cooling water, and stormwater runoff. As a result of these outfalls, contamination is also found in the river system surrounding the RMC facility. EPA is the lead agency for overseeing the cleanup of contamination in the river system surrounding the RMC facility.

The river system surrounding the RMC facility has been termed the "Reynolds Study Area" and includes that portion of the St. Lawrence, Grasse and Raquette Rivers, any tributaries of those rivers, and any wetlands which are between the International Bridge and the confluence of the Grasse and St. Lawrence Rivers. It also includes the portion of the Raquette River which is south of the confluence of the Grasse and St. Lawrence Rivers and south of the International Bridge.

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[1]PCBs are a group of toxic chemicals used for a variety of purposes including electrical applications, adhesives, hydraulic fluids and caulking compounds. PCBs are persistent in the environment because they are very stable, non-reactive and highly heat resistant. Chronic exposure to PCBs is believed to cause liver damage. It is also known to bioaccumulate in fatty tissues. PCB use and sale was banned in 1976 with the passage of the Toxic Substances Control Act.

PCBs were the primary contaminant found in sediment samples in the Reynolds Study Area. PCB oils were used by RMC as a heat transfer medium; RMC no longer uses PCB oils in its heat transfer medium system. Other contaminants detected in the St. Lawrence River sediments adjacent to the RMC facility include: polyaromatic hydrocarbons (PAHs), total dibenzofurans (TDBFs), aluminum, cyanide, and fluoride. EPA estimates that there are roughly 51,500 cubic yards of sediment with PCB concentrations above 1 part per million (ppm), PAH concentrations above 10 ppm, and TDBFs above 1 part per billion (ppb).

## 2.2 Summary of Remedial Alternatives Presented in the Proposed Plan

Based on the results of its risk assessment, EPA established cleanup levels for contaminated sediment in the Reynolds Study Area which are protective of human health and the environment. The cleanup levels are: PCBs - 1 ppm; PAHs - 10 ppm; and TDBF - 1 ppb. Cleanup to these levels will also remove the threat from other contaminants such as aluminum, cyanide and fluoride. It is EPA's intention that all three cleanup levels be met unless they are shown to be technically impracticable to achieve.

The following is a list of the remedial alternatives evaluated within the AA report and Proposed Plan. The alternative which was identified as EPA's preferred alternative in the February 1993 Proposed Plan is highlighted. Additional information on these alternatives can be found in the Proposed Plan, attached as Appendix A.

Alternative A: No Action

Alternative B: In-situ capping of sediments

Alternative D: Sediment removal and disposal in an on-site landfill

Alternative E: Sediment removal, on-site incineration, and disposal in an on-site landfill

Alternative F: Sediment removal, thermal desorption treatment, and disposal in an on-site landfill

Alternative G: Sediment removal, thermal desorption treatment of the majority of the contaminated sediment, and on-site disposal with cover

Option A: Thermal desorption treatment of material above 25 ppm
Option B: Thermal desorption treatment of material above 10 ppm

Alternative I: Sediment removal, thermal desorption treatment of the most contaminated sediments, and on-site landfilling of the less contaminated sediments and treated material

Option A: Thermal desorption treatment of material above 500 ppm
Option B: Thermal desorption treatment of material above 50 ppm

Alternative J: Partial removal of the most contaminated sediments, thermal desorption treatment, on-site landfilling of treated material, and in-situ capping of remaining sediment

## 2.3 Summary of EPA's Selected Remedial Alternative

The major components of EPA's selected remedy include:

- Dredging and/or excavation of approximately 51,500 cubic yards of sediments and sediments near the shoreline with PCB concentrations above 1 ppm, total PAH concentrations above 10 ppm, and total TDBF concentrations above 1 ppb from contaminated areas in the St. Lawrence River and from the associated riverbank;

- Treatment of approximately 14,500 cubic yards of dredged/excavated material with PCB concentrations above 25 ppm by thermal desorption. Untreated sediments (with PCB concentrations between 1 ppm and 25 ppm) and treatment residuals (which are expected to be non-hazardous and to have PCB concentrations below 10 ppm) will be disposed on-site, in the Black Mud Pond, and covered. The Black Mud Pond will be capped in conformance with the requirements of the January 22, 1992 New York State Record of Decision for the state lead Reynolds Metals Site, which encompasses the entire RMC facility. Contaminants condensed in the thermal desorption process will be transported off-site and burned at a commercial incinerator.

For more information regarding the EPA's selected remedy or the thermal desorption technology, please see EPA's decision document for the Reynolds Metals Study Area.

## 3.0 BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Historically, there has been a high level of community interest in all three Massena area sites--ALCOA, G.M., and RMC--and in contamination of the St. Lawrence River. The public first became aware of contamination in the St. Lawrence River in the early 1970s, when tests conducted by the Canadian government revealed measurable levels of PCBs in fish taken from the river. A number of supplemental studies have been conducted by various United States and Canadian regulatory agencies to determine the nature and extent of contamination and their points of origin.

In addition to ALCOA, G.M., RMC, and the state and local governments, at least four major interest groups have been involved in the Superfund cleanup process for these sites. These organizations include the St. Regis Mohawk Tribe, located directly downriver from the plants; regional environmentalists; groups in the Massena area concerned with maintaining a viable local economy; and Canadian agencies and citizens. The community most directly affected by contamination on and around the plants and in the St. Lawrence River is the St. Regis Mohawk Tribe Reservation, *Akwesasne*. The St. Regis Mohawk Tribe Reservation is adjacent to the G.M. Site and downriver from the ALCOA and RMC facilities. Reservation lands are located on both the United States and Canadian sides of the St. Lawrence River. There are approximately 3,500 residents on the United States side of the Reservation, and approximately 4,000 residents on the Canadian side of the Reservation. Concern for the health of their environment is very keen among the Mohawk people, whose lifestyle relies heavily on farming, fishing, hunting and trapping.

Because of the high level of interest in these sites, EPA has been conducting an ongoing community relations program in the Massena, New York area during investigation of the sites, and will continue the community relations program during cleanup of the sites. The program includes both formal and informal meetings with local officials, members of the St. Regis Mohawk Tribe, New York State representatives, Canadian officials and citizens, community and environmental groups, and other interested citizens. EPA has also provided a Technical Assistance Grant (TAG) to the Akwesasne Task Force on the Environment (members of the St. Regis Mohawk Tribe) to assist them in their efforts to fully participate in the Superfund decision-making process.

As part of its community relations program, in November 1988, EPA conducted a workshop in the Massena area on the various technologies available to remediate PCB-contaminated soils, sludges, and groundwater. EPA also prepared and distributed 11 fact sheets to describe the various alternatives that could be considered to remediate PCB-contaminated media at the sites.

Recently, EPA conducted site-specific community relations activities for the Reynolds Study Area. Following completion of the ARS and AA Reports, EPA, in February 1993, released its Proposed Plan for cleaning up contamination of the river system surrounding the RMC facility. This document, along with the ARS and AA Reports, were made available to the public through the information repositories maintained at EPA Region II's office in New York City, at the Massena Public Library, and at the St. Regis Mohawk Tribe Health Services Building. The Proposed Plan was also mailed to approximately 250 citizens on the Massena Area Mailing List.

The notice of availability of these documents was published in the Courier-Observer and Indian Times newspapers on February 19, 1993, and in the People's Voice[2] newspaper on February 22, 1993. A public comment period was held from February 19 through April 21, 1993. Although originally scheduled to end on March 22, EPA extended the public comment period an additional 30 days to April 21 at the request of several interested citizens. A second public notice announcing extension of the public comment period was published in the Courier-Observer and Indian Times newspapers on March 5, 1993, and in the People's Voice newspaper on March 8, 1993. Copies of the public notices are attached as Appendix B.

A public meeting was held on March 9, 1993. During the meeting, representatives from EPA answered questions and received comments on EPA's Proposed Plan and the other remedial alternatives under consideration. A transcript of the public meeting is available in the information repositories referenced above. The sign-in sheets from the public meeting are attached as Appendix C.

Copies of the written comment received during the public comment period are attached as Appendix D. Responses to comments received during the public comment period are included in this Responsiveness Summary, which is part of EPA's decision document. The Responsiveness Summary and decision document, along with the Administrative Record for the Site, are available at the information repositories referenced above.

[2] Indian Times and People's Voice are weekly newspapers affiliated with the St. Regis Mohawk Tribe.

## 4.0 SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED FROM THE LOCAL COMMUNITY AND EPA's RESPONSES TO THESE COMMENTS

The public comment period on the Proposed Plan for the RMC Site was held from February 19 to April 21, 1993. Questions and comments received during this time are summarized below. Section 4.0 summarizes both verbal and written comments submitted to EPA by the local community during the public comment period and provides EPA's responses to these comments. Section 5.0 is comprised of specific legal and technical questions submitted to EPA during the public comment period and, where necessary, elaborates with technical detail on answers covered in Section 4.0. All written comments received during the public comment period and summarized in Section 4.0 and 5.0 of this Responsiveness Summary are attached as Appendix D.

Comments in Section 4.0 are organized into the following relevant topics:

4.1 Remedial Alternative Preferences
4.2 Risk Assessment
4.3 Cleanup Levels
4.4 Cost
4.5 Decision Process
4.6 Other

### 4.1 Remedial Alternative Preferences

**4.1.1 Comment:** A representative from St. Lawrence County asked if thermal desorption would volatilize contaminants other than PCBs, such as aluminum, cyanide and fluoride.

**Response:** Thermal desorption will remove organic compounds, such as PCBs, PAHs and TDBFs, from the sediments, but will not remove the inorganic compounds, such as aluminum, cyanide and fluoride. However, the levels of inorganic contaminants detected in sediments are not high enough to require separate treatment. EPA's baseline risk assessment determined that the levels of aluminum, cyanide and fluoride did not pose a significant threat to human health when compared to the risks posed by PCBs, PAHs, and TDBFs. Treated sediment and the remaining untreated material will be disposed on-site in the Black Mud Pond.

**4.1.2 Comment:** Representatives from the Akwesasne Task Force on the Environment, St. Regis Mohawk Tribe, several interested citizens, and Dr. Ward Stone, NYSDEC Wildlife Pathologist, support EPA's proposal to dredge contaminated sediments from the St. Lawrence River and treat them using thermal desorption.

**Response:** No response necessary.

**4.1.3 Comment:** Representatives from the Akwesasne Task Force on the Environment, the St. Regis Mohawk Tribe, Dr. Stone and an interested citizen recommend that EPA select

Alternative F, which involves sediment removal, thermal desorption treatment of contaminated material, and disposal in an on-site landfill. Thermal desorption will not treat the inorganic materials such as cyanide and fluoride; therefore, the material stored on the RMC facility would only be partially treated. Since the partially treated material would still contain potentially hazardous inorganic compounds, they recommend that it be stored in a lined landfill on the RMC facility. They referenced the need for a long-term, more permanent remedy.

**Response:** In response to a suggestion by NYSDEC, EPA is now requiring that untreated sediments (with PCB concentrations between 1 ppm and 25 ppm) and treatment residuals (which are expected to be non-hazardous and to have PCB concentrations below 10 ppm) will be disposed on-site, in the Black Mud Pond, and covered. NYSDEC's Record of Decision for the RMC facility calls for capping and groundwater monitoring of the Black Mud Pond. The inorganic contaminants found in the St. Lawrence River sediments are similar to those in the Black Mud Pond. Utilizing the Black Mud Pond will consolidate similar contaminants into one area while realizing cost savings related to eliminating construction, maintenance and monitoring of a new disposal area, and substantially reducing the volume of fill material needed for the Black Mud Pond.

The treated sediments will be tested using the Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leachate Procedure (TCLP) test to determine if they are a RCRA hazardous waste. EPA has tested the sediments and does not expect that the treated sediments will be a RCRA hazardous waste. If the treated sediments are not a RCRA hazardous waste, they will be disposed on-site in the Black Mud Pond along with the previously screened debris. If the treated sediments are found to be a RCRA hazardous waste, they will either be treated to render them non-hazardous or they will be disposed, along with the previously screened oversized debris, in an engineered on-site landfill.

**4.1.4 Comment:** Representatives from RMC and Dr. Stone recommend that EPA's comprehensive plan to clean up contamination in the St. Lawrence River system attributable to the three major industrial facilities located in Massena, New York, begin at the most upstream facility and proceed downstream. This will prevent any potential for upstream contaminants to recontaminate cleaned areas.

**Response:** EPA agrees in principle and notes that the cleanup of the ALCOA facility is currently proceeding under the authority of a federal Unilateral Administrative Order and a State Consent Order, while the cleanup of the G.M. facility is proceeding under the authority of two federal Unilateral Administrative Orders. Currently, investigation of the river system and adjacent wetlands surrounding the ALCOA facility is being conducted to determine the appropriate remediation plans for that facility. Remedial alternatives have been selected for the G.M. Site, which is currently in the remedial design phase of cleanup. EPA's objective is to coordinate the cleanup efforts at the RMC Site with the cleanup of the other Massena area facilities to the extent possible. To that end, EPA will utilize a phased approach that will begin with dredging PCB hotspots, or areas with the highest PCB contamination, at each facility. At present, EPA plans that first phase dredging activities will commence at all three facilities in summer 1994.

**4.1.5 Comment:** An interested citizen commented that incineration should not be used to treat the contaminated sediments. Rather, the contaminated sediments should be stored in a cement "mausoleum" on the RMC property and monitored regularly.

**Response:** EPA believes that high level contamination in the St. Lawrence River should be treated to reduce PCB concentrations, rather than contained on the RMC facility without prior treatment because this material represents the principal threat at the Site. However, EPA recognizes that there may be impacts associated with on-site incineration and that the public is very concerned about the use of on-site incineration. EPA has chosen thermal desorption treatment, not on-site incineration, to treat all sediments with PCB concentrations above 25 ppm (approximately 14,500 cubic yards). Untreated sediments (with PCB concentrations between 1 ppm and 25 ppm) and treatment residuals (which are expected to be non-hazardous and to have PCB concentrations below 10 ppm) will be disposed on-site, in the Black Mud Pond, and covered. The selected remedy will result in permanent removal of contaminated sediment from the St. Lawrence River system and provide for treatment of the majority of the PCB mass in the contaminated sediments.

**4.1.6 Comment:** An interested citizen asked how EPA will control the river flow during dredging, and whether or not EPA will monitor the river after dredging to see if any of the contaminated sediments migrated downriver.

**Response:** EPA will not control the flow of the river during dredging. Rather, EPA will use available technologies to control the sediments in the vicinity of the dredging and to prevent migration of sediments during dredging. EPA's selected remedy includes development of a dredging monitoring plan that will include sampling activities to measure the environmental impacts of dredging. It will also include a contingency plan which will describe measures to control and/or minimize the impacts of dredging on the environment.

During dredging, EPA will monitor the river using techniques as turbidity analysis to determine if there is any increase of sediment suspension during dredging. If monitoring shows a significant increase in sediment suspension, then EPA will discontinue dredging and reevaluate that option. In addition, in the event that monitoring indicates that there are any downstream depositional areas which collect resuspended sediment, those areas can be dredged to remove the resuspended sediments. The iterative process of sampling, excavating, and re-sampling is contemplated as an integral part of the remedial action.

**4.1.7 Comment:** An interested citizen asked whether, if RMC builds the thermal desorption plant, G.M. and ALCOA would also be able to use it for their cleanup programs.

**Response:** The three industries have been and will continue to work together on cleaning up the contamination problems to the greatest extent possible. However, cleanup of contamination will depend on the specific characteristics of each site. For example, RMC has already conducted small scale pilot tests on the thermal desorption technology *ATP* and has had positive results. G.M. will be pilot testing technologies other than ATP at its site. The investigation of the ALCOA site has not reached the stage where a remedial technology has been selected. EPA will not require that the companies use identical technologies.

**4.1.8 Comment:** Mr. Stone stated that some areas of contamination outlined by EPA in its Proposed Plan may not be accurate. He stated that the area in the vicinity of Discharge 002 may have much higher PCB levels than reported by EPA, requiring much more sediment to be removed than proposed by EPA.

**Response:** EPA's Proposed Plan provided a rough approximation of the area which must be addressed to meet Site cleanup levels. Prior to dredging, additional sediment and surface water sampling will be conducted to better delineate the extent of the area to be dredged and to serve as baseline monitoring data. Sediments with PCB concentrations above 1 ppm, total PAH concentrations above 10 ppm, and total TDBF concentrations above 1 ppb will be dredged unless it proves technically impracticable to do so.

**4.1.9 Comment:** An interested citizen asked if EPA used a safety factor to determine the cleanup areas for PCBs, PAHs and TDBFs.

**Response:** EPA did not use a safety factor. Rather, EPA mapped the areas where PCBs, PAHs and TBDFs were found in order to determine the area of contamination to be removed.

**4.1.10 Comment:** Representatives from RMC stated that site-specific issues need to be considered in evaluating the appropriate remedial alternative for the Reynolds Study Area. The technologies that are appropriate for the Reynolds Study Area may be different than for other areas along the river due to the characteristics of the river bottom and the hydrodynamics of the St. Lawrence River in the vicinity of the RMC facility.

**Response:** After careful consideration of RMC's site-specific characteristics, EPA evaluated and balanced each remedial alternative according to the nine criteria set forth in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (300.430 {e}{9}{iii}). In addition, EPA also evaluated its selected remedy for consistency with EPA's 1990 "Guidance for Remedial Actions for Superfund Sites with PCB Contamination" (also referred to as the "PCB Guidance"). EPA recognizes that every Superfund site is different (different physical characteristics, contaminants, pathways of exposure, media); thus, EPA evaluates and selects an appropriate remedial alternative for each site on a site-by-site basis in light of available guidance and regulations.

**4.1.11 Comment:** A representative from RMC expressed concern with EPA's selection of a remedy that has a low possibility of success, is extremely expensive, and has the highest short-term risks associated with any of the alternatives.

**Response:** EPA does not agree that its selected remedy has a low possibility of success. Treatability studies indicate that thermal desorption will effectively treat contaminated sediments from the Reynolds Study Area. EPA's selected remedy is implementable from an engineering standpoint.

EPA acknowledges that the greatest potential difficulty associated with its selected remedy is the technical feasibility of dredging sediments sufficiently to achieve the cleanup goals for the

**4.5.2 Comment:** An interested citizen stated that there should be methods for adjusting the selected remedy in the future if it proves faulty or if there are unforeseen risks to human health and the environment years from now.

**Response:** Because EPA's selected remedial alternative would result in contaminants remaining on-site above health-based levels, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) as amended, requires that the Site be reviewed at least once every five years. If justified by the review, additional response actions may be implemented to remove or treat the wastes, if necessary, to protect human health and the environment.

**4.5.3 Comment:** An interested citizen asked if EPA and NYSDEC will coordinate and agree upon cleanup standards and procedures before ordering RMC to do the cleanup work.

**Response:** EPA has coordinated with NYSDEC on the cleanup goals for the RMC facility, upland areas, and adjacent river sediments. EPA's 1989 Order to RMC includes performance of the cleanup alternative selected by EPA.

**4.6 Other**

**4.6.1 Comment:** A representative from the St. Regis Mohawk Tribe and several interested citizens stated that RMC, along with the other industries in the area, have contributed to the destruction of the Mohawk lifestyle and negative impacts on the Mohawk economy and health. The Mohawk community has gone from a diet of fish, wildlife and game to a supermarket-type diet, which has resulted in an increase in diabetes in their community. The Mohawk economy has changed from physical occupations such as fishing and agriculture, to inactive occupations such as retail and gambling. The decrease in activity may be contributing to the rising diabetes level in the community as well. The negative impacts on the Mohawk community and increasing diabetes levels need to be evaluated.

**Response:** EPA notes the concerns about recent changes in the diet and economy of the Mohawk people. At present, due to contamination, there are fishing advisories in effect for the St. Lawrence River in the Massena area. While the Superfund law does not directly address these issues, it does so indirectly by requiring remediation of contaminated areas. The goal of EPA's remedial efforts in the Massena area is to restore contaminated sediment hotspots and, thus, to ultimately restore the river environment to allow unrestricted fishing in the St. Lawrence River.

**4.6.2 Comment:** An interested citizen asked whether tests were conducted for dioxin, given the presence of TDBFs at the Site.

**Response:** Tests were conducted for dioxin in sediments in the Reynolds Study Area. Investigations conducted at the Site included analyses of eight sediment samples from the St. Lawrence River. Dioxin was not detected in any of the samples.

**4.6.3 Comment:** A representative from Save Our River stated that if the Bombay-Brasher-Helena area is allowed to be strip-mined of clay for the Superfund site landfills and the St. Lawrence County landfills, it will destroy the groundwater table for the St. Regis and St. Lawrence Rivers.

**Response:** EPA is not requiring that a clay-lined landfill be constructed as part of its remedy for the Reynolds Study Area.

**4.6.4 Comment:** Mr. Stone stated that if the Mohawks are truly a sovereign nation, then they should have control over their waters and the St. Lawrence River, and their Applicable or Relevant and Appropriate Requirements (ARARs) should be followed.

**Response:** The St. Regis Mohawk Tribe has identified cleanup standards which are applicable to remedial actions which will be conducted on the St. Regis Mohawk Reservation as part of the G.M. Site remediation. Since contaminants found within the RMC Site do not fall within the boundaries of the St. Regis Mohawk Reservation, the Tribal cleanup standards do not apply. At the RMC Site, the Tribal cleanup standards are "To Be Considered" Requirements (see Table 9 of the decision document). However, the St. Regis Mohawk Tribe was consulted during development of EPA's Proposed Plan and selected remedy, and will continue to play a meaningful role during all phases of the decision-making process at the RMC Site.

**4.6.5 Comment:** Several interested citizens commented on the negative health and environmental impacts of PCBs.

**Response:** EPA's awareness of the negative health and environmental impacts of PCBs has led it to select an aggressive remedial approach and cleanup goal that will be protective of human health and the environment.

## 5.0 COMPREHENSIVE SUMMARY OF SIGNIFICANT LEGAL AND TECHNICAL COMMENTS AND EPA's RESPONSES TO THESE COMMENTS

As mentioned earlier, Section 5.0 is comprised of specific legal and technical questions submitted to EPA during the public comment period and, where necessary, elaborates with technical detail on answers covered in Section 4.0. All written comments received during the public comment period and summarized here are attached as Appendix D.

Comments from the following citizens and/organizations are summarized below:

5.1 Public Petition
5.2 Reynolds Metals Company
5.3 St. Regis Mohawk Tribe
5.4 New York State Department of Environmental Conservation
5.5 Canadian Review Panel
5.6 Cornwall Environmental Resource Center
5.7 Massena Industrial Development Corporation
5.8 Aluminum Company of America
5.9 General Motors Corporation

### 5.1 Petition

One hundred and thirty five (135) citizens mailed EPA the following petition: "As a resident of the St. Lawrence River Valley, I endorse the EPA's proposed plan for the remediation of the Reynolds Metals Study Area. I urge the implementation of Alternative G(B): the removal of all sediments with PCB contamination over 1 ppm; the use of thermal extraction rather than incineration; and the treatment level of 10 ppm rather than 25, 50 or 500 ppm. The only change I would support would be the use of a lined, rather than unlined, landfill to prevent any contamination of surrounding surface or ground waters from untreated sediments or treated residuals."

**Response:** Please see EPA's response to comment 4.1.3.

## 5.2 Reynolds Metals Company (RMC)

The comments summarized in this section were received from RMC.

**5.2.1 Comment:** RMC states that EPA has not chosen a defined remedial alternative in its Proposed Plan. It appears that EPA is proposing to dredge to the extent feasible and then implement some other remedial alternative. The criteria for EPA's preferred alternative have not been defined, and EPA's preferred alternative may actually be comprised of two separate remediations (Alternative G(B) plus in-situ containment). Not only is this questionable engineering judgement, but it also represents a risk management decision that is contrary to EPA's mandate to reduce environmental and human health risks.

Moreover, only when pilot scale dredging is performed can EPA determine how much, if any, dredging is consistent with the requirements of CERCLA. The technology would need to be demonstrated as feasible prior to initiating any plans for full scale implementation.

Therefore, RMC recommends Alternative J: Partial Sediment Removal/Thermal Desorption/Landfilling/In-Situ Capping, an approach that requires the methods to be demonstrated as feasible prior to initiating the remediation.

**Response:** EPA has selected a carefully defined remedial alternative for the Site. EPA's selected alternative involves dredgingand treatment of dredged/excavated material with PCB concentrations above 25 ppm by thermal desorption. Untreated sediments (with PCB concentrations between 1 ppm and 25 ppm) and treatment residuals (which are expected to be non-hazardous and to have PCB concentrations below 10 ppm) will be disposed on-site, in the Black Mud Pond, and covered.

There are several factors which EPA believes will contribute to the effectiveness of dredging as a means of removing sediment from the St. Lawrence River. First, the area to be dredged is fairly shallow and is located adjacent to the shore of the St. Lawrence River. Second, the use of engineering controls such as sheet pile walls has been shown to substantially reduce sediment suspension. Third, the selection of the dredging technique (e.g., a hydraulic dredge), can be made with the goal of minimizing sediment suspension. Fourth, the public health and environmental impacts resulting from sediment dredging (which are of relatively short duration) are lower than the current long-term risks posed by the contaminated sediment. Finally, in the event that monitoring indicates that there are any downstream depositional areas which collect resuspended sediments, they can be dredged to remove those resuspended sediments. The iterative process of sampling, excavating and re-sampling is contemplated as an integral part of the remedial action.

Dredging has been used effectively at another Superfund site in New Bedford Harbor, Massachusetts, to remove PCB-contaminated sediments from an estuary. EPA is sensitive to RMC's concerns regarding duplication of remediation and increasing costs. Therefore, an initial dredging program will be conducted in a manner which will identify site-specific information and operating parameters such as dredging rates and depths, sediment removal efficiencies, silt curtains and sheet piling effectiveness, sediment dewatering methods, and sediment suspension and settling characteristics. This information will be evaluated and used

as appropriate in modifying operating procedures to improve the effectiveness of the removal program.

**5.2.2 Comment:** RMC believes that EPA has issued its Proposed Plan prematurely, without the benefit of a finalized Risk Assessment. The draft risk assessment is inconsistent with the risk assessment prepared for the adjacent G.M. Site.

**Response:** Please see EPA's response to comment 4.2.3.

EPA has compared the approach used to prepare the draft risk assessments for the G.M. and RMC Sites. In general, the approaches are comparable. However, both rely on site-specific information.

**5.2.3 Comment:** RMC's primary concern with the Human Health Assessment (HHA) portion of the draft risk assessment is the reasonableness of assumptions and information used in estimating exposures. First, the report states that NYSDEC fish sampling data was used in the risk assessment even though the data were not validated. Second, many of the highly conservative assumptions used in the HHA are attributed to a personal communication--K. Jock (1991). There is no way to verify the context, understanding, accuracy or appropriateness of the communicated information because this information is not contained in publicly-available documents.

Third, the toxicity assessment portion of the HHA was essentially nonexistent which is inconsistent with EPA Guidance. Furthermore, EPA improperly characterized risks and selected inappropriate cleanup levels by using highly conservative toxicity values based on outdated EPA Guidance. The HHA uses the Aroclor 1260 carcinogenic slope factor for all PCB mixtures, when there is considerable evidence that the lower chlorinated mixtures exhibit much lower carcinogenic potential, if they are carcinogenic at all.

Fourth, the exposure assessment overstates the risks. The HHA suggests with no justification that "sediments may become more exposed" in the future. Office os Solid Waste and Emergency Response (OSWER) directives for risk assessment indicate that future uses or risks should only be evaluated if there is a reasonable likelihood they will occur. The assumptions used for sediment exposure in children, adults, and fishermen are very extreme and unjustified.

**Response:** The two most common results of the data validation process are the rejection of certain non-detects and the changing of blank contaminants to non-detects. If non-detects are dropped out, the mean concentration may increase slightly. If blank contaminants are eliminated, mean concentrations of a given contaminant would decrease. The risk assessment recognizes these uncertainties related to defining the true extent of biota contamination.

Many of the exposure assumptions used in the risk assessment were based on communications with Mr. Jock. The risk assessment report explicitly refers to interviews conducted with Mr. Jock and summarizes the pertinent information provided by Mr. Jock in a

publicly available document (the risk assessment report itself). Risk assessors are encouraged to obtain site-specific inputs whenever possible. Professional judgement pertaining to the reliability and credibility of the interviewee is used and a comparison to similar sites is made before final exposures parameters are selected. This type of research and consensus was performed for the Reynolds Risk Assessment.

The toxicity section of the HHA is fully consistent with EPA guidance. Toxicity values are presented in Table 4-7 of the HHA. Per EPA risk assessment guidance, EPA's Integrated Risk Information System (IRIS) was the preferred source of toxicity values; otherwise, EPA's Health Effects Assessment Summary Tables (HEAST) or EPA's Environmental Criteria and Assessment Office (ECAO) were consulted for toxicity information. Section 4.3 of the HHA also includes two tables outlining potential carcinogenic and noncarcinogenic effects associated with contaminants of concern. In addition, Appendix D of the risk assessment includes toxicity profiles for all RMC contaminants of concern. The toxicity profiles include information on the chemicals' use; chemical and physical properties; fate and transport; pharmacokinetics; carcinogenic effects; noncarcinogenic effects (e.g., systemic effects, teratogenic and other developmental effects, and mutagenic effects); ecotoxicity; and applicable standards, criteria and guidelines.

The uncertainties associated with the use of the currently available slope factor for PCBs are recognized in the Reynolds Risk Assessment. EPA also recognizes that PCB congeners may vary as to their potency in producing biological effects and that there is some evidence that mixtures containing more highly chlorinated biphenyls are more potent inducers of hepatocellular carcinoma in rats than mixtures containing less chlorine by weight (IRIS, 1993/Kimbrough, 1987 and Schaeffer et al., 1984). However, EPA has not currently adopted guidance which evaluates the toxic equivalents for various PCB congeners. In addition, EPA is currently reviewing but has not adopted the cross species scaling factor for carcinogenic risk assessment (daily amount administered per unit of body mass raised to the 3/4 power, i.e., $mg/kg^{3/4}$ (day) (EPA, 1992)). The risk assessment was prepared in accordance with the most current EPA Superfund guidance and IRIS which assumes Aroclor 1260 is representative of all PCB mixtures. IRIS toxicity values are based on the consensus of various EPA Work Groups. These Work Groups are continually reviewing toxicity information as it becomes available and updating toxicity values to minimize uncertainties associated with the estimation of risks to human health.

The assumptions used for sediment exposure are considered conservative but realistic. If current land use changes children and adults may have access to the contaminated sediments in the vicinity of the RMC Site.

**5.2.4 Comment:** RMC states that the use of National Oceanic and Atmospheric Administration (NOAA) values as criteria for the evaluation of contaminant concentrations in sediments is inappropriate. RMC points out that these values are derived from field samples containing mixtures of contaminants, and that they are explicitly not intended as regulatory guidelines. RMC believes that these guidelines result in an overstatement of risk, and that they are not truly applicable since they are primarily based on marine and estuarine studies.

**Response:** The Ecological Risk Assessment (ERA) evaluation of sediments has been revised to include a comparison of organic non-ionic contaminants with sediment criteria derived through the equilibrium partitioning approach. NOAA sediment guidelines were still used to assess inorganic contaminants. For organic contaminants lacking adequate effects data, sediment effects level reported by Tetra Tech (1986) were used. These effect levels appear to be roughly comparable to sediment criteria derived through the equilibrium partitioning approach (i.e., sediment samples that exceeded Tetra Tech effect concentrations also exceeded criteria derived from the equilibrium partitioning approach).

**5.2.5 Comment:** RMC objects to the use of data on background levels of metals in soils in the eastern United States as sediment ecological risk criteria. RMC states that the chemical differences between terrestrial soils and sediments and the biological differences between terrestrial and aquatic biota make a direct comparison inappropriate.

**Response:** The ERA has used typical surficial soil concentrations for several inorganic contaminants lacking sediment guidelines (e.g., aluminum, fluoride, selenium, vanadium) to initially screen potential sediment contaminants of concern. These levels were used since background sediment concentrations and effect levels were not available for inorganics. The table and discussion regarding sediment concentrations and potential risk clearly indicate that although a variety of contaminants are driving risk, total PCBs, PAHs, and TDBF are the primary contaminants of concern. It is also evident that concentrations of aluminum, fluoride, selenium, and vanadium are not anticipated to result in significant risk to ecological receptors.

**5.2.6 Comment:** RMC is concerned that the Proposed Plan does not adequately address ecological impacts associated with dredging.

**Response:** The baseline risk assessment does not address risks associated with various remedial alternatives; therefore, ecological impacts associated with dredging have not been formally evaluated. However, long-term impacts associated with leaving sediment contaminants (particularly PCBs) in place are expected to be greater than temporary impacts associated with dredging.

**5.2.7 Comment:** RMC believes that the ERA is not entirely consistent with EPA guidance. Specifically, the problem formulation step of the study does not include a conceptual site model (CSM), which describes how a source (or stressor) might affect potential receptors.

**Response:** The guidance listed, "Framework for Ecological Risk Assessment" (EPA, 1992) although containing useful information, is not a mandatory document for conducting ecological risk assessments. The ERA is consistent with previous ecological risk assessments conducted by EPA Region II. Presenting a conceptual site model will not alter the results of the ERA.

**5.2.8 Comment:** RMC states that some of the conclusions in the ecological risk assessment may be inappropriate because they are based on an index intended to evaluate organic pollution rather than inorganic contamination.

**Response:** Although the Hilsenhoff Biotic Index (HBI) has currently only been evaluated for organic pollutants, it may also be applicable for additional pollutants. In any event, conclusions of the ERA regarding impacts to the benthic community would not change if the HBI were not used in the risk assessment. Evidence of benthic community impairment also included hyperdominance by pollution tolerant taxa, imbalance in composition of functional feeding groups, and reductions in benthic invertebrate diversity and taxa richness. It is important to note that the primary contaminant of concern at the Site is an organic contaminant, PCBs.

**5.2.9 Comment:** RMC notes that references for many assumptions were not well documented. Specific examples include the basis for assuming a three percent lipid content in the white sucker fish and the bioconcentration factor criterion for contaminants of concern (COCs) of 300.

**Response:** The percent lipid content of the white sucker was not measured; therefore, an assumed three percent lipid content was selected based on professional judgement. COCs were selected based on frequency of detection, comparison with background concentrations, and relative toxicity. The selection of COCs based on bioconcentration potential was not included as a criteria in the draft final ERA.

**5.2.10 Comment:** RMC disagrees with some of the ERA methodology. In particular, RMC states that adding individual surface water risk indices which did not exceed criteria led to misleading total risk indices, and that geometric means rather than arithmetic means should have been used to calculate exposure concentrations.

**Response:** Due to the uncertainty associated with chemical interactions and effects on aquatic receptors, it was conservatively assumed that risk from various contaminants may be cumulative for aquatic receptor species. Although individual contaminants may not pose a risk by themselves, interaction with other related contaminants may result in adverse impacts. Geometric means were used in evaluating exposure concentrations.

**5.2.11 Comment:** RMC commented that the characterization of risk to fish is poor. In addition, little mention is made of the fact that fish are mobile. RMC points out that birds and fish are not likely to feed in the vicinity of the most contaminated area 100 percent of time. RMC states that an unrealistic conversion factor was used to evaluate body concentration of PCBs in fish.

**Response:** Information regarding contaminant body burden concentrations within fish and associated adverse effects are sparse in the scientific literature. However, the ERA indicated that the potential for risk to fisheries has been clearly identified.

In addition, although fish may move in and out of contaminated portion of the Reynolds Study Area, the fact that risk was evaluated based on detected fish tissue concentrations confirms that fish are exposed to PCB contamination within the study area.

Data regarding home ranges of the selected indicator species within the Reynolds Study Area were unavailable. Therefore, it was assumed that the indicator species foraged entirely within the Reynolds Study Area. Due to the large size of the Reynolds Study Area, it is conceivable that this area could provide all foraging requirements for the selected indicator species.

EPA believes that the conversion factor is realistic. In addition, using the conversion factor suggested by Sloan (NYSDEC) also results in a fish whole body concentration much greater than recommended for the protection of piscivorous wildlife. The conclusion is the same: existing PCB concentrations in fish present a significant risk to piscivorous ecological receptors.

**5.2.12 Comment:** RMC is concerned that high background contaminant concentrations in environmental media and prey items were not considered in the ERA.

**Response:** PCB concentrations were modeled within prey items that inhabit the Reynolds Study Area. Risk from elevated "background" concentrations was not the objective of the ERA and is therefore not quantified in the ERA.

**5.2.13 Comment:** RMC expressed concern that toxicity data for the Little Brown Bat is extrapolated from other species.

**Response:** An objective of an ERA is to evaluate risks to a variety of different feeding guilds and trophic levels, not just to those species where toxicity data may be available. Unfortunately, toxicity data for most wildlife species is currently unavailable. Therefore, extrapolation from other species (usually laboratory species) becomes necessary.

**5.2.14 Comment:** RMC expressed concern that limited data on environmental media were used.

**Response:** All available information was used to characterize risk within the ERA. Due to a variety of factors (including time and cost), risk assessments are often based on limited sample data.

**5.2.15 Comment:** RMC claims that fish whole body rather than fillet data should have been used in the ecological assessment. RMC suggests that a more rigorous study be conducted to formulate more specific conclusions regarding fish contamination.

**Response:** Fish whole body concentrations of PCBs from spot tail shiners were used to assess risk to piscivorous avian species (king fisher and bittern). Fillet data was converted to whole body concentrations to assess risk to the mink since whole body data regarding PCB

concentrations were unavailable. Using an alternative conversion factor suggested by Sloan (NYSDEC) also results in elevated whole body PCB concentrations that present a risk to piscivorous mammals. It is unlikely that additional studies would affect the conclusions of the ERA that existing fish PCB concentrations present a risk to piscivorous wildlife.

**5.2.16 Comment:** RMC states that the limitations and uncertainties associated with the exposure and risk assessments are not expressed except in the Limitations Section. These limitations include the limited amount of data, the conservative estimates of exposure to birds and fish, and the extrapolations from other species.

**Response:** The ERA is consistent with previous risk assessments conducted by EPA. Uncertainties associated with the risk assessment are discussed in the Risk Characterization portion of the ERA.

**5.2.17 Comment:** EPA's cleanup levels are inconsistent with actual risk levels at the Site. RMC's risk assessment demonstrates that a more realistic risk-based cleanup level should be in the range of up to three orders of magnitude greater than EPA's.

In addition, the Proposed Plan indicates that proper implementation of all alternatives would result in acceptable risks. Therefore, EPA's selected remedy amounts to a higher cost for no extra safety. EPA has not properly examined cost versus benefit in choosing the remedial alternative. If EPA's $10^{-4}$ risk level is accurate, it would correspond to a 10 ppm cleanup level. The estimated volume of sediments above 10 ppm would be significantly less than the volume above EPA's proposed cleanup criteria of 1 ppm, which equates to a significant reduction in remediation costs.

**Response:** The 1 x $10^{-5}$ cancer risk discussed on page 8, paragraph 1 of the Proposed Plan, was calculated based on assumed ingestion of contaminated sediments by fishermen. In response to this comment, EPA has re-evaluated the site cleanup levels based on the most likely scenario for contaminant exposure, which is based on ingestion of contaminated fish by local residents. Under this scenario and based on reasonable worst-case assumptions, a 1 ppm PCB level in sediments would equate to a cancer risk on the order of $10^{-4}$.

The 1 ppm PCB cleanup level is identical to that selected by EPA for contaminated sediment associated with the G.M. Site which is immediately downstream of the RMC facility. For the G.M. Site, EPA estimated that a 1 ppm PCB cleanup level in sediments is associated with a $10^{-4}$ (1 in 10,000) excess cancer risk to humans. For the RMC Study Area Site, EPA estimates that a 1 ppm PCB cleanup level in sediments is associated with an excess cancer risk to humans on the order of $10^{-4}$ (1 in 10,000). There is a variation in estimated residual cancer risks between the G.M. and RMC Study Area Sites due to uncertainties associated with estimating the effect of varying sediment PCB concentrations on area fish.

It should be noted that federal and New York State sediment quality criteria guidance indicate that PCB cleanup levels well below 1 ppm are required to achieve protection of the environment since PCBs pose a significant ecological risk. While EPA would prefer a lower cleanup level which would be associated with a $10^{-6}$ cancer risk, EPA has significant

concerns as to the technical practicability of achieving a PCB cleanup level below 1 ppm in this area of the St. Lawrence River. In selecting the 1 ppm cleanup goal, EPA has balanced its desire for a very low cleanup level which will minimize residual risk with the constraints posed by the limitations of dredging as a means of removing sediment with the further intent of selecting treatment as a principal element over containment. EPA believes that a 1 ppm cleanup goal in the St. Lawrence River provides an acceptable measure of protection of human health.

**5.2.18 Comment:** RMC opposes the 10 ppm PCB treatment level for dredged contaminated sediments. Since dredged materials would be managed on-site, EPA's 10 ppm PCB treatment level is inconsistent and excessive when compared to the on-site waste management approach outlined in NYSDEC's Record of Decision, which requires a 25 ppm PCB treatment level for North Yard soils.

In addition, EPA's 10 ppm PCB treatment level is overly conservative with respect to the Toxic Substances Control Act (TSCA) ARAR, which requires that PCB-contaminated sediments greater than 50 ppm be either incinerated, disposed of in a chemical waste landfill, or disposed of by another EPA approved method. Sediments with greater than 500 ppm PCBs may have to be treated, but disposal in a landfill may be approved by the EPA Regional Administrator.

Treatment of sediments with greater than 500 ppm PCBs is consistent with the approach presented for Alternative J. Treatment of sediments with less than 500 ppm is not cost effective and would not result in real risk reductions.

**Response:** EPA has determined that a 25 ppm PCB treatment level is consistent with the State's on-site waste management approach. Accordingly, EPA's selected remedy for the Reynolds Study Area includes a 25 ppm PCB treatment level, rather than the 10 ppm level in its Proposed Plan.

However, EPA does not agree that a 500 ppm PCB treatment level is appropriate for dredged contaminated sediments. Contaminated sediments represent the principal threat in the Reynolds Study Area. In accordance with CERCLA and the NCP, generally EPA's goal is to permanently treat principal threats whenever possible. EPA generally uses containment for less contaminated material. Accordingly, EPA has determined that a 25 ppm PCB treatment threshold results in treatment of the most highly contaminated sediments. In addition, EPA has determined that sediments with PCB concentrations below 25 ppm may be disposed of with a minimum of long-term maintenance.

The selected remedy is cost-effective because it has been demonstrated to provide overall effectiveness proportional to its costs. The present worth cost of the selected alternative, Alternative G(A), which includes a 25 ppm treatment threshold, is $ 35.1 million. The present worth cost of Alternative G(B), which includes a 10 ppm treatment threshold, is $ 36.7 million. The present worth cost of Alternative I(A), which incorporates a 500 ppm treatment threshold, is $ 35.8 million. The present worth cost of Alternative I(B), which incorporates a 50 ppm treatment threshold, is $ 37.9 million. Thus, EPA has selected the least expensive alternative which provides for permanent removal and treatment of the majority of the principal threat

posed by contaminated sediments. In addition, a comparison of the costs of Alternatives G(A), I(A), and I(B) demonstrates that it is more expensive to construct a landfill for disposal of sediments with PCB concentrations between 25 and 500 ppm than it is to treat such sediments. Therefore, Alternative G(A) is more cost-effective than Alternative I.

**5.2.19 Comment:** The Proposed Plan does not adequately characterize the problems associated with dredging with regard to the NCP-specified criteria of short-term effectiveness and implementability. Dredging poses significant short-term risks due to suspension and migration of contaminated sediments. Silt curtains are not effective in preventing redeposition at the point of dredging, and their ability to control suspension and migration of sediments is questionable. EPA's proposed remedy would result in the greatest short-term impacts, whereas alternatives requiring less dredging (Alternative J) would have less short-term impacts. In addition, the current in the Reynolds Study Area may carry the resuspended sediment towards the center of the river, where higher currents would carry and redeposit the contaminants downstream.

Furthermore, EPA's recommended cleanup level of 1 ppm is not likely to be achievable using available dredging technology, even with multiple passes. Irregularities of the river bed (e.g., variable slopes, thick vegetation, and boulders) will severely impact the ability of dredging equipment to meet the remedial goals. For this reason, Alternative J, which incorporates a combination of dredging to 500 ppm and containment of the other areas, is more implementable.

**Response:** Please see EPA's response to comment 4.4.1.

After carefully balancing the specific characteristics of the Site against the nine criteria as outlined in the NCP, EPA has determined that the long-term effectiveness and permanence afforded by the selected alternative off-set any short-term risks posed by the selected alternative and the higher costs of the selected remedy. EPA recognizes that there may be some difficulties associated with the suspension of contaminants during dredging. However, dredging has been used effectively at another Superfund site in New Bedford Harbor, Massachusetts, to remove PCB-contaminated sediments from an estuary.

There are several factors which EPA believes will contribute to the effectiveness of dredging as a means of removing sediment with PCB concentrations above 1 ppm from this area of the St. Lawrence River. First, the area to be dredged is fairly shallow and is located adjacent to the shore of the St. Lawrence River. Second, the use of engineering controls such as sheet pile walls has been shown to substantially reduce sediment suspension. Third, the selection of the dredging technique (e.g., a hydraulic dredge), can be made with the goal of minimizing sediment suspension. Fourth, the public health and environmental impacts resulting from sediment dredging (which are of relatively short duration) are lower than the current long-term risks posed by the contaminated sediment. Finally, in the event that monitoring indicates that there are any downstream depositional areas which collect resuspended sediments, they can be dredged to remove those resuspended sediments. The iterative process of sampling, excavating and re-sampling is contemplated as an integral part of the remedial action.

**5.2.20 Comment:** RMC opposes EPA's method of evaluation in the Proposed Plan. To ensure an appropriate balance of costs and risk reductions, EPA should have given greater consideration to other alternatives (beyond Alternative J) involving combinations of dredging and in-situ containment. In addition, the Proposed Plan does not indicate the uncertainties of the sediment volume estimates, which were obtained from the AA report. Also, EPA has biased the costs for its preferred alternative to the low side by issuing its preferred alternative without inclusion of a landfill, despite the fact that all other alternatives with some treatment include a landfill. Finally, since ATP is a proprietary process, the Proposed Plan should refer to the generic process name "thermal desorption" instead.

**Response:** EPA's selected alternative does not involve a combination of dredging and containment. EPA's selected alternative involves dredging and treatment of dredged/excavated material with PCB concentrations above 25 ppm by thermal desorption. Untreated sediments (with PCB concentrations between 1 ppm and 25 ppm) and treatment residuals (which are expected to be non-hazardous and to have PCB concentrations below 10 ppm) will be disposed on-site, in the Black Mud Pond, and covered. EPA's selected remedy provides for permanent removal and treatment of contaminated sediments. However, in its Proposed Plan, EPA recognized the potential difficulties of dredging to 1 ppm, and allowed for contingency cleanup activities, such as in-situ containment, in the event that the cleanup levels cannot be achieved. Although containment of contamination is less difficult than excavation or dredging and treatment of contamination, EPA prefers technologies in which treatment that permanently and significantly reduces the volume, toxicity or mobility of the PCBs is a principal element. Further, there are questions as to the long-term reliability of in-situ containment at this site.

Regarding the volume estimates in its Proposed Plan, EPA presented a rough approximation of the area which must be addressed to meet these cleanup goals. Prior to dredging, additional sediment and surface water sampling will be conducted to better delineate the extent of the area to be dredged and to serve as baseline monitoring data.

EPA did not bias the costs for its selected alternative. All of the alternatives involving thermal desorption treatment to 25 ppm PCBs, including EPA's selected alternative, allowed for disposal of treated materials with a soil cover, unless tested and found hazardous, in which case EPA included costs for an engineered landfill. The remedial alternatives developed for the Site are consistent with EPA's PCB Guidance. For instance, according to this guidance, soils with PCB concentrations in the 10 to 25 ppm range may be disposed on an industrial facility with minimal long-term management controls. Accordingly, EPA has evaluated an alternative for the RMC Site which includes disposal of sediments with PCB concentrations between 10 and 25 ppm in the Black Mud Pond, rather than in an engineered landfill (Alternative G). The PCB Guidance also recommends that soils with higher concentrations of PCBs be disposed at an industrial facility in an engineered containment system which may include a cover and liner system. Accordingly, EPA has evaluated alternatives which include disposal of untreated sediments (Alternative D) or treated sediments with PCB concentrations between 50 and 500 ppm in an engineered landfill (Alternative I). In addition, several of the other alternatives evaluated (including Alternatives E, F, and J) include options for disposal in the Black Mud Pond or in an engineered landfill depending on whether the material is a hazardous waste.

Finally, EPA acknowledges that ATP is a proprietary process whose generic process name is thermal desorption. However, EPA took its information directly from the AA report, which was prepared by RMC. EPA notes the comment and acknowledges that the thermal desorption system to be used at the Site may not be limited to ATP.

**5.2.21 Comment:** In-situ containment presents a lower overall short-term risk to humans and the environment compared to dredging, and provides equivalent long-term protection. RMC cites prior in-situ containment successes for PCBs around the country; the U.S. Army Corp of Engineers' extensive work evaluating in-situ containment; and the conservative containment design proposed by RMC. Mass transfer models show that the time for the contaminants to migrate to the surface of the containment material would take hundreds and perhaps thousands of years, during which time the containment material would facilitate natural biodegradation of PCBs. State of the art geotechnical materials and techniques, such as concrete revetment and geotextile material and webbing, would ensure the isolation of the contaminated sediments from the river environment.

Implementation of in-situ containment would include an extensive, long-term monitoring program to ensure the integrity of the containment material. RMC notes EPA's concern in the Proposed Plan that monitoring of in-situ containment would be more difficult than monitoring in upland areas. The Proposed Plan disregards the fact that sophisticated subaqueous monitoring capabilities are available.

**Response:** Please see EPA's response to comment 4.1.12.

**5.2.22 Comment:** Alternative J fulfills the requirements of the NCP better than EPA's proposed alternative, which may be technically infeasible, have greater adverse short-term impacts, take longer to implement, and cost more without being proportionally more effective. As stated in the Proposed Plan, Alternative J would be protective of human health and the environment; comply with ARARs; provide a higher degree of permanence than the strictly containment alternatives; reduce toxicity, mobility and volume of the contaminated sediments; have less short-term impacts; and is more implementable than EPA's proposed alternative.

**Response:** EPA recognizes that several of the remedial alternatives evaluated pose fewer short-term risks than the remedial alternative selected by EPA. After carefully balancing the specific characteristics of the Site against the nine criteria as outlined in the NCP, EPA has determined that the long-term effectiveness, permanence, and protectiveness of public health and the environment afforded by the selected alternative offset any short-term risks posed by the selected alternative.

**5.2.23 Comment:** Based on the hydrodynamic data collected to date, the contamination detected in the mouth of the Grasse River is not attributable to the RMC plant. Similarly, it is likely that sediment contamination detected between the Grasse River and the RMC outfall area is not attributable to RMC. The Proposed Plan calls for additional sampling in these upriver areas to determine if dredging is necessary. While these areas were included in the Reynolds Study Area, they should not be included in the proposed area of RMC remediation.

**Response:** EPA's remedial strategy in the Massena area was developed with the goal of achieving a comprehensive remediation of areas of the St. Lawrence, Grasse, and Raquette Rivers which were affected by contamination from the ALCOA, G.M. and RMC facilities. To this end, EPA, in its Unilateral Administrative Orders, defined areas, known as the ALCOA and Reynolds Study Areas, which were to be investigated and, if necessary, remediated by each industry.

EPA does not agree that the hydrodynamic data collected to date demonstrates conclusively that any contamination in the mouth of the Grasse River and between the Grasse River and the RMC outfall is not attributable to RMC. Therefore, prior to dredging, additional sediment and surface water sampling will be conducted to better delineate the extent of the area to be dredged and to serve as baseline monitoring data.

**5.2.24 Comment**: RMC claims that the EPA slope factor for PCBs used by TRC Environmental Corporation (contractor to EPA for the risk assessment) to estimate carcinogenic risk significantly overestimates the upper-bound risks associated with exposure to PCBs. RMC states that EPA's calculation of this slope factor does not incorporate current toxicological information regarding the tumorigenic potency of different PCB mixtures (Aroclors). In addition, RMC states that the model and scaling factor used to extrapolate between animal studies and potential human effects are inappropriately applied for PCBs. RMC suggests the use of alternative slope factors, including an alternative slope factor for the predominant Aroclor in river sediments, Aroclor 1242, of 0.2 kg-day/mg, more than 38 times lower than the slope factor used in the draft risk assessment.

**Response:** The uncertainties associated with the use of the currently available slope factor for PCBs are recognized in the risk assessment. EPA also recognizes that PCB congeners may vary as to their potency in producing biological effects and that there is some evidence that mixtures containing more highly chlorinated biphenyls are more potent inducers of hepatocellular carcinoma in rats than mixtures containing less chlorine by weight (IRIS, 1993/Kimbrough, 1987 and Schaeffer et al., 1984). However, EPA has not currently adopted guidance which evaluates the toxic equivalents for various PCB congeners. In addition, EPA is currently reviewing but has not adopted the cross species scaling factor for carcinogenic risk assessment (daily amount administered per unit of body mass raised to the 3/4 power, i.e., $mg/kg^{3/4}$ (day) (EPA, 1992)). The risk assessment was prepared in accordance with the most current EPA Superfund guidance and IRIS which assumes Aroclor 1260 is representative of all PCB mixtures. IRIS toxicity values are based on the consensus of various EPA Work Groups. These Work Groups are continually reviewing toxicity information as it becomes available and updating toxicity values to minimize uncertainties associated with the estimation of risks to human health.

If carcinogenic risks were recalculated using the proposed slope factors, risks associated with sediment exposures would still be greater than $10^{-4}$ ($4.1 \times 10^{-4}$) for PCBs. While the difference between the TRC risk estimates and this recalculated value is nearly one order of magnitude, risks associated with PCB contaminated fish show a lesser degree of difference when applying the RMC proposed slope factors. The predominant Aroclors in fish (Yellow Perch) collected by RMC in the study area are 1254 and 1260. Therefore, carcinogenic risk estimates would only be reduced by approximately two to four times with the application of

the proposed slope factors.

**5.2.25 Comment:** RMC claims that the exposure assumptions in the draft human risk assessment are unreasonably conservative and result in an overestimation of risk. These assumptions include a lifetime (70-year) exposure duration and an exposure frequency of 39 weeks per year for residents and 50 weeks per year for fishermen. RMC states that most householders in the United States do not reside at the same location for an entire lifetime, and that due to the cold climate in the study area, most people would not be exposed to sediment contamination for as long as 39 weeks per year. In addition, RMC commented that the rates of ingestion of contaminated sediment and fish tissue were greatly overestimated. RMC recommends a sediment ingestion rate of 59 mg/day and 43 mg/day for children and adults, respectively, as compared to the values of 200 mg/day and 100 mg/day used in the risk assessment. Lastly, RMC claims that dermal contact exposure assumptions related to sediment exposures are also overestimated.

**Response:** In determining exposure parameters utilized in a risk assessment, EPA strives to obtain site-specific data instead of relying on standard default values. Representatives of the St. Regis Mohawk Tribe were interviewed to learn about fishing habits on the St. Lawrence and Raquette Rivers in the vicinity of RMC. These interviews revealed that some families continue the traditional consumption of locally caught fish as their primary diet and that Mohawk fishermen fish year round.

No site-specific data were available pertaining to fish ingestion rates; therefore, the EPA default value for subsistence exposures was used (i.e., 132 grams/day) (EPA, 1989a). This value assumes that fish consumption would be approximately equivalent to the average consumption of red meat; fish consumption might be expected to be even higher if one assumes fish is consumed at levels equal to the combined average of red meat, poultry, and fish/shellfish (i.e., 180 grams/day) (EPA, 1989b). In addition, since the development of the RMC risk assessment, the results of a 1992 New York State Department of Health (NYSDOH) survey of fish consumption by Mohawk women have been released. The NYSDOH study indicates a fish ingestion rate of 200 grams/day (NYSDOH, 1992).

The assumption that the local population resides in the same location for 70 years also is a site-specific value obtained through interviews with the Mohawk Tribe; it is not unlikely for members of the Mohawk Tribe to remain on the reservation for a lifetime according to Mr. Jock, St. Regis Mohawk Tribe Environmental Program.

Sediment exposure rates are conservative but considered realistic. EPA recognized that fishermen arms and hands may not be exposed during the colder months of the year, due to the use of protective clothing. However, exposure may increase during warmer months since greater areas of bare skin may be exposed (e.g., torso and legs). Therefore, assuming sediment exposure to arms and hands year round is not considered an overestimate of risk. The seasonal differences in exposures are assumed to balance using this assumption.

The values used are upper bound values for soil and dust ingestion. However, in the absence of currently EPA-approved values for sediment ingestion, the standard default values

of 200 mg/kg (child) and 100 mg/kg (adult) were used. Note that risk values would decrease by less than an order of magnitude using the RMC's suggested ingestion rate.

**5.2.26 Comment:** Since individual sample data were not provided in the baseline risk assessment report, RMC questions whether appropriate statistical methods were used to calculate media concentrations of contaminants. Specifically, RMC questions the assumption that the data were distributed log normally.

**Response:** Normality tests were performed by TRC to determine the distribution of the data. Data evaluated were selected based on sample size and detection frequency within a sample group. TRC analyzed sediment data in the study area (Aroclor 1242, chrysene, and benzo(6) fluoranthene) and preferred fish species in the Reynolds Study Area (PCBs). The normality tests reveal that the data are distributed log normally.

**5.2.27 Comment:** RMC states that the baseline risk assessment does not include an adequate quantitative analysis of uncertainty. RMC suggests the use of a quantitative method such as the Monte Carlo simulation to provide more meaningful information regarding potential risk. RMC reports that for sediment ingestion by fishermen, such a simulation results in lifetime cancer risk values considerably lower than those calculated from the reasonable maximum exposure (RME) in the baseline risk assessment.

**Response:** EPA currently requires the incorporation of a central tendency analysis in the uncertainty analysis of a risk assessment. Risk assessors are requested to calculate risks for the pathway generating the greatest risk using average (50th percentile) parameters (e.g., ingestion rates, exposure duration). This exercise was performed as part of the Reynolds risk assessment. Nearly an order of magnitude difference in carcinogenic risks and a three-fold difference in total noncarcinogenic Hazard Indices were observed. The Monte Carlo simulation proposed and presented by RMC provides a risk probability distribution which presents additional information. However, unless site-specific conditions warrant such an approach, generally EPA has not adopted the Monte Carlo approach for Superfund risk assessments.

**5.2.28 Comment:** RMC reports a number of inconsistencies among reported data and ambiguously presented material in the baseline risk assessment. Concerns include minor discrepancies between text and appendix tables and confusion pertaining to the fish samples utilized in the quantitative risk assessment.

**Response:** Necessary changes were incorporated into the Final Risk Assessment to address RMC's concerns.

## 5.3 St. Regis Mohawk Tribe

The comments summarized in this section were received from the St. Regis Mohawk Tribe Environment Division.

**5.3.1 Comment:** The PCB cleanup level of 1 ppm will not adequately protect human health or the environment due to risks from residual contamination.

**Response:** Please see EPA's response to comment 4.3.1.

**5.3.2 Comment:** EPA's investigation collected only 13 samples from an approximately 2000 x 400 foot stretch of the Raquette River. This number of samples is inadequate to provide the basis of a remedial decision. The samples were taken in or near the main current area, rather than from bends or banks that accumulate PCB-contaminated sediments. In addition, the detection of PCBs well above detection limits in surface water sample W5-1 should be viewed as evidence of potential contamination rather than a "false positive" or "anomaly." Therefore, the Tribe recommends additional sampling of the Raquette River system, including samples from: the river; any areas of obvious sediment accumulation; sediments at the mouths of both tributaries; and supplemental fish sampling.

**Response:** Of the 17 sediment samples and three water samples taken in the Raquette River, only one, water sample W5-1, showed PCB contamination (2.3 ppb). Location W5-1 is a background station located upstream of the two tributaries that enter the Raquette River from the RMC Site. Therefore, this reported concentration is believed to be a laboratory false positive. However, in responding to this comment, RMC is currently collecting additional biota data from the Raquette River.

Samples taken in the Raquette River were from areas agreed upon by the Tribe during the work planning process. Sediment sampling in the Raquette River included samples taken adjacent to both banks of the river and in depositional areas.

**5.3.3 Comment:** Noting that thermal desorption may be ineffective on cyanide and heavy metal removal, the Tribe states that EPA's plans for disposal of treated sediments and the necessity for a landfill will depend on the residual sediment contamination levels following treatment.

**Response:** Please see EPA's response to comment 4.1.3.

**5.3.4 Comment:** Contamination upstream of the Site should be studied further. Upstream detections may have originated from RMC, due to a substantial westward current along the south shore from RMC towards the Snell Lock. PCB levels were detected in water samples at the most western drainage ditch to the St. Lawrence River. Further investigation should extend to the cove at outfalls 002/003, given the disparity between the sediment contaminant levels reported by RMC and the higher levels found by the NYSDEC Wildlife Pathology

Laboratory.

**Response:** EPA's selected remedy provides for additional sampling to better delineate the extent of the area to be dredged. Such sampling will include the upriver portion of the Reynolds Study Area, especially in reach 3A in the vicinity of sample A9 and near the mouth of the Grasse River, to determine whether dredging is warranted in these areas.

**5.3.5 Comment:** The contamination extending northeast to the channel off Survey Marker #9 (Figure 9, WCC 1991) may indicate a reason to sample bottom sediments in the channel itself downstream of this area.

**Response:** Previous hydrodynamic studies indicate that the amount of sediment in the channel is extremely limited. Further, data indicate that PCB concentrations decrease rapidly away from the RMC outfalls.

**5.3.6 Comment:** It is unclear how EPA derived the volume of sediments above 1 ppm PCBs in the Reynolds Study Area. There appears to be a discrepancy between the ARS report, which estimates a volume of 74,000 cubic yards, and the Proposed Plan, which estimates a volume of 51,000 cubic yards. EPA may be scaling down the amount of contaminated sediments to be dredged without looking at the risks to the environment.

**Response:** The sediment volume estimates were modified in the AA report. EPA believes that the volume of contaminated sediments was inflated, resulting in an overly conservative and expensive estimate of remediation costs. In modifying the sediment volume estimates, EPA instructed RMC to exclude sediment from the area adjacent to sampling point A9, pending the results of additional sampling. EPA's selected remedy provides for additional sampling in the upriver portion of the Reynolds Study Area, especially in reach 3A in the vicinity of sample A9 and near the mouth of the Grasse River, to determine whether dredging is warranted in these areas.

## 5.4 New York State Department of Environmental Conservation (NYSDEC)

The comments summarized below were received from NYSDEC.

**5.4.1 Comment:** While NYSDEC accepts EPA's proposed cleanup level of 1 ppm PCBs, NYSDEC encourages RMC to eliminate as much residual contamination as possible by pursuing the lowest cleanup level that is feasible under existing conditions. This is in RMC's best interest since the State will pursue monetary damages against RMC and others for natural resources damages resulting from residual risks after remediation.

**Response:** No response necessary.

**5.4.2 Comment:** EPA's disposal alternative for treatment residuals and untreated sediments is inadequate given the significant concentrations of metals, at levels which exceed NYSDEC soil cleanup standards, that would remain following treatment. The disposal area would need additional containment controls, such as a liner and enhanced cap.

NYSDEC suggests that EPA utilize the Black Mud Pond on the RMC facility for disposal of treated residuals and untreated sediments. NYSDEC's Record of Decision called for capping and groundwater monitoring of the Black Mud Pond. There may be adequate volume available to accommodate the treated residuals and untreated sediments for use as fill in order to bring the Black Mud Pond up to proper grade for effective capping. The Black Mud Pond inorganic contaminants are similar to those found in the St. Lawrence River sediments. Utilizing Black Mud Pond would consolidate similar contaminants into one area while realizing cost savings related to eliminating construction, maintenance and monitoring of a new disposal area, and substantially reducing the volume of fill material needed for the Black Mud Pond.

**Response:** EPA agrees. Please see EPA's response to comment 4.1.3.

**5.4.3 Comment:** EPA's decision for sediment treatment is based on the level of PCBs, PAHs and TDBFs. However, the sediments may contain other Site contaminants which would qualify the material as hazardous. NYSDEC suggests that untreated sediments be tested for hazardous waste characteristics and evaluated as to whether they constitute listed hazardous wastes.

**Response:** Untreated sediments (i.e., sediments in their current state) were tested during the ARS and were determined to be non-hazardous. These materials will be tested again prior to disposal. However, based on the results of ARS testing, EPA does not anticipate that they will be hazardous.

**5.4.4 Comment:** NYSDEC recommends that sheet piling be installed around the dredging area to improve the effectiveness of the silt curtains in minimizing sediment suspension during dredging. EPA requires such controls at the nearby G.M. Site.

**Response:** During remedial design, EPA will consider the installation of sheet piling as well as other techniques to control migration of resuspended sediments during dredging.

**5.4.5 Comment:** The Proposed Plan should state that all water removed from sediments or generated during the treatment process will be discharged to the St. Lawrence River in compliance with the terms of RMC's State Pollution Discharge Elimination System (SPDES) permit and any other binding requirements between Reynolds and New York State.

**Response:** As stated in the decision document, all water that is removed from sediments or generated during the treatment process would be discharged to the St. Lawrence River in compliance with substantive SPDES requirements.

## 5.5 Canadian Review Panel (Comprised of Environment Canada, Health and Welfare Canada and the Ontario Ministry of Environment and Energy)

The comments summarized below were received from the Canadian Review Panel.

**5.5.1 Comment:** The ARS underestimated the extent and degree of contamination in the St. Lawrence River. Specifically, the high analytical detection limits and the lack of information on both biological uptake and distribution of other contaminants (PAHs, TDBF, aluminum, cyanide, and fluoride) were noted. The assumption that the distribution patterns for all contaminants are the same is not adequately supported in the background documents. In addition, contaminants other than PCBs may not be removed adequately using EPA's proposed alternative. There is a risk of water column contamination with cyanide, aluminum and fluoride during remediation. More elutriate testing is needed to evaluate the threat of aluminum and cyanide, which exceeded guidelines.

Finally, the evaluation of sediment quality in the Raquette River may be inaccurate because the sampling was conducted in zones prone to erosion rather than depositional zones.

**Response:** EPA mapped the areas where PCBs, PAHs and TDBFs were found in order to determine the area of contamination to be removed. EPA's decision for remediation of the Reynolds Study Area is based on sampling data taken during the ARS, and on knowledge of RMC's past disposal practices in that area. EPA believes that it has sufficient information upon which to base its remedial decision for the Reynolds Study Area. EPA agrees that more elutriate testing is needed to evaluate the threat of aluminum and cyanide.

With regard to the Raquette River, please see EPA's response to comment 5.3.2.

**5.5.2 Comment:** The review panel supports EPA's proposed cleanup level of 1 ppm PCBs. The dredging zones should be well delineated before initiation of dredging because the dredging operation will mix contaminated and non-contaminated sediment, thereby reducing the concentrations. Cleanup strategies should include removal of other contaminants (e.g., PAHs, metals) to below guideline levels.

**Response:** Prior to dredging, additional sediment and surface water sampling will be conducted to better delineate the extent of the area to be dredged and to serve as baseline monitoring data. In regard to EPA's cleanup strategy, based on the results of its risk assessment, EPA has established cleanup levels for contaminated sediment in the Reynolds Study Area which are protective of human health and the environment. The cleanup levels for PCBs, PAHs, and TDBFs will also remove the threat from other contaminants such as cyanide and fluoride since these contaminants are found within the area that is planned for remediation.

**5.5.3 Comment:** The review panel expressed concern about the potential for suspension and downstream transport of contaminated sediment during dredging, and questioned the reliability of silt curtains to prevent transport of water-borne contaminants, dissolved metals, and fine particles. The review panel recommends that a pilot scale dredging project be implemented, and a contingency plan put in place, prior to full-scale dredging. Canadian input to the contingency plan is requested. The review panel also recommends that other technologies (e.g., modified bucket dredge) be investigated as they may prove to cause less sediment suspension than the mudcat and cutter head dredges proposed in the AA report.

The AA report proposal that the remaining sediments (PCB sediments less than 500 ppm) will be left in place and capped with a sand layer (18 inches thick) may provide inadequate chemical isolation, and should be thicker.

**Response:** After carefully balancing the specific characteristics of the Site against the nine criteria as outlined in the NCP, EPA has determined that the long-term effectiveness and permanence afforded by the selected alternative off-set any short-term risks posed by the selected alternative and the higher costs of the selected remedy. EPA recognizes that there may be some difficulties associated with the suspension of contaminants during dredging. However, dredging has been used effectively at another Superfund site in New Bedford Harbor, Massachusetts, to remove PCB-contaminated sediments from an estuary.

EPA is sensitive to concerns regarding the implementation of dredging. Therefore, an initial dredging program will be conducted in a manner which will identify site-specific information and operating parameters such as dredging rates and depths, sediment removal efficiencies, silt curtains and sheet piling effectiveness, sediment dewatering methods, and sediment suspension and settling characteristics. This information will be evaluated and used as appropriate in modifying operating procedures to improve the effectiveness of the removal program.

There are several factors which EPA believes will contribute to the effectiveness of dredging as a means of removing sediment from the St. Lawrence River. First, the area to be dredged is fairly shallow and is located adjacent to the shore of the St. Lawrence River. Second, the use of engineering controls such as sheet pile walls has been shown to substantially reduce sediment suspension. Third, the selection of the dredging technique (e.g., a hydraulic dredge), can be made with the goal of minimizing sediment suspension. Fourth, the public health and environmental impacts resulting from sediment dredging (which are of relatively short duration) are likely to be lower than the current risks posed by the contaminated sediment. Finally, in the event that monitoring indicates that there are any downstream depositional areas which collect resuspended sediments, they can be dredged to remove those resuspended sediments. The iterative process of sampling, excavating and re-sampling is contemplated as an integral part of the remedial action.

In regards to the thickness of the in-situ containment material: the proposal in the AA report was developed by RMC's consultant and represents RMC's proposal, not EPA's. EPA's selected alternative does not include in-situ containment. In-situ containment would only be considered if technical constraints make it impracticable to dredge the sediments sufficiently to achieve the Site's cleanup levels.

Canadian input will be sought during design of the dredging monitoring program.

**5.5.4 Comment:** Since thermal desorption treatment will not remove inorganics and has not been evaluated for TDBFs, the review panel recommends that soil washing or some form of volume reduction be considered as a preliminary treatment step. The review panel also requests more information on the commercial incinerator that will be used.

**Response:** Thermal desorption will remove organic compounds, such as PCBs, PAHs and TDBFs, from the sediments, but will not remove the inorganic compounds, such as aluminum, cyanide and fluoride. Treated sediment and the remaining untreated sediments will be disposed in the Black Mud Pond on the RMC facility. EPA does not anticipate that the treated sediments will be hazardous waste.

In addition, contaminants condensed in the thermal desorption process would be transported off-site and burned at a commercial incinerator. Information regarding the location and type of commercial incinerator will be developed during remedial design.

**5.5.5 Comment:** The review panel recommends additional measures for the disposal of treatment residuals and untreated sediments, such as a leachate collection system and regular monitoring program. Treated sediments should be tested for residual contaminants.

**Response:** Please see EPA's response to comment 4.1.3.

**5.5.6 Comment:** The review panel recommends implementation of a monitoring plan that allows for continuous monitoring during dredging, stringent controls, minimization of dredge material losses and suspension at the dredge site. Implementation of health and safety plans that would decrease the short-term risks to downstream users of the river are also recommended.

Environment Canada would require monitoring of emissions from the thermal desorption system for organics, conventionals (e.g., metals), and proper operation (e.g., temperature, oxygen). The review panel prefers that ambient air monitoring be conducted at the perimeter of the excavation/treatment site for the same parameters. The review panel also requests the opportunity to review and comment on the thermal desorption permit application to ensure that there are adequate monitoring programs and emissions controls in place.

The review panel recommends continuous monitoring (at least every three months) and regular maintenance of the disposal area.

**Response:** EPA employs stringent environmental controls when implementing remediation at Superfund sites. EPA's selected remedy includes development of a dredging monitoring plan to provide for sampling during dredging in order to measure any environmental impacts. It will also include a contingency plan which will describe measures to control and/or minimize the impacts of dredging on the environment. During dredging, EPA will monitor the river, using such techniques as turbidity analysis, to determine if there is any increase of sediment

suspension. If monitoring shows an increase in sediment suspension, then EPA will discontinue dredging and reevaluate that option. In addition, in the event that monitoring indicates that there are any downstream depositional areas which collect resuspended sediment, those areas can be dredged to remove the resuspended sediment. The iterative process of sampling, excavation, and resampling is contemplated as an integral part of the remedial action.

Emissions from the thermal desorption system will comply with all federal and State air emissions requirements. In addition, groundwater downgradient of the disposal area (Black Mud Pond) will be monitored and the cover will be maintained. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

The Canadian government is not afforded the same rights as States in the Superfund process. However, EPA has sought Canadian government input in the Superfund process for this Site in the past and is committed to seeking Canadian input on monitoring of remedial actions in the future.

## 5.6 Cornwall Environmental Resource Center (CERC)

The comments summarized in this section were received from CERC.

**5.6.1 Comment:** CERC finds the EPA excess cancer risk to Canadians of 1 in 100,000 to be totally unacceptable. U.S. health risk calculations and standards indicate that more than 25 Canadians will continue to face excess carcinogenic risk resulting from inadequate EPA cleanup levels.

**Response:** The NCP mandates EPA to establish cleanup goals that are consistent with risk estimates between $10^{-4}$ and $10^{-6}$.

**5.6.2 Comment:** CERC expressed concern about the concentrations of PCBs, PAHs, and aluminum in both the surface water and sediments near the RMC facility. The contamination in the Reynolds Study Area provides justification for a thorough examination of contamination in Canadian aquatic areas.

**Response:** EPA's intention in developing its remedial plans in the Massena area is to address hotspots of contamination in the St. Lawrence River adjacent to the outfalls of the major Massena industries. EPA does not intend to perform a detailed investigation of Canadian waters in part because contaminants may be entering the system from sources other than the Massena industries.

**5.6.3 Comment:** CERC recommends that all cleanup levels be consistent and uniform rather than contaminant-specific.

**Response:** Based on its risk assessment, EPA has established cleanup levels for contaminated sediment in the Reynolds Study Area which are protective of human health and the environment. The cleanup levels (e.g., 1 ppm for PCBs, 10 ppm for PAHs, and 1 ppb for TDBFs) are based on the toxicity of each contaminant.

**5.6.4 Comment:** Canadian ARARs were not sought prior to development of EPA's Proposed Plan. CERC requests that all further actions related to EPA's Proposed Plan be discontinued until such time as Canadian ARARs have been taken into consideration.

**Response:** EPA recognizes the potential impacts of the Site on Canadian citizens and has, within the constraints of the Superfund regulations, endeavored to involve all interested Canadian citizens and local officials, as well as their U.S. counterparts and members of the Mohawk nation, in its decision-making process. However, the Canadian government is not afforded the same rights as States in the Superfund process. However, EPA has sought Canadian government input in the Superfund process for this Site in the past and is committed to seeking Canadian input on monitoring of remedial actions in the future.

**5.6.5 Comment:** EPA's preferred alternative is unacceptable since it does not provide for the full protection of the Canadian people or the Canadian environment. EPA's preferred alternative only provides for partial treatment. The preferred alternative fails to provide adequate storage for the remaining contaminated residues since it only allows for a vegetated soil cover. When combined with the stored contaminants from the Black Mud Pond and North Yard, these would constitute a major ongoing environmental threat to the Canadian people and environment.

CERC prefers a modified version of Alternative F, which includes treatment of sediments containing levels higher than 1 ppm, and storage of materials below 1 ppm in earthquake proof vaults.

**Response:** Please see EPA's response to comment 4.1.3.

EPA notes that the Black Mud Pond will be capped in conformance with the requirements of the January 22, 1992 New York State Record of Decision.

**5.6.6 Comment:** No consideration has been given to the potential for seismic disturbances in this geographic location. In the past year (1992), there were two such disturbances having epicenters in the St. Lawrence River directly in front of the RMC facility. Any remaining sediments should be vaulted in a manner similar to that of the adjacent ALCOA facility.

**Response:** Under the Uniform Building Codes, the area around the St. Lawrence Seaway is classified as being in a Level III earthquake zone. Earthquakes in a Level III zone are described as causing potential major structural damage. As a result, any structure, including the Black Mud Pond cap, will be designed for earthquake loading. For example, design of any containment structure may include soil compaction to lessen the potential impacts of an earthquake.

In the event of an earthquake or other such catastrophe, EPA or NYSDEC will evaluate the containment system at the Site to determine whether it has been affected. If the containment system has been affected, RMC will repair it. It should be noted that surface structures, such as caps or covers, can be visually monitored following an earthquake and easily repaired.

**5.6.7 Comment:** CERC expressed concerns with potential suspension and migration of contaminants into the Canadian aquatic environment during dredging, and suggested building a coffer dam around the impaired area prior to commencing work.

**Response:** Please see EPA's responses to comments 4.1.6 and 5.4.4.

**5.6.8 Comment:** EPA, in its second from last paragraph in the Proposed Plan, has set the scene for possible avoidance of its responsibilities to complete the sediment cleanup in accordance with its prescribed plan.

**Response:** EPA's intention in the Proposed Plan was to acknowledge that there are potential problems associated with dredging this area of the St. Lawrence River. Therefore, an initial dredging program will be conducted in a manner which will identify site-specific information and operating parameters such as dredging rates and depths, sediment removal efficiencies, silt curtains and sheet piling effectiveness, sediment dewatering methods, and sediment suspension and settling characteristics. This information will be evaluated and used as appropriate in modifying operating procedures to improve the effectiveness of the removal program.

**5.6.9 Comment:** It is CERC's belief that EPA has avoided selecting a remedy of full clean-up due to the higher cost. CERC's position is that dollar costs must be secondary to the needs of the human health and environmental stability.

**Response:** The NCP requires that EPA balance all of the remedial alternatives evaluated in the AA according to the nine criteria defined in the NCP, including balancing overall effectiveness to cost to ensure that the remedy is cost effective.

The selected remedy is cost-effective because it has been demonstrated to provide overall effectiveness proportional to its costs. The present worth cost of the selected alternative, Alternative G(A), which includes a 25 ppm treatment threshold, is $ 35.1 million. The present worth cost of Alternative G(B), which includes a 10 ppm treatment threshold, is $ 36.7 million. The present worth cost of Alternative I(A), which incorporates a 500 ppm treatment threshold, is $ 35.8 million. The present worth cost of Alternative I(B), which incorporates a 50 ppm treatment threshold, is $ 37.9 million. Thus, EPA has selected the least expensive alternative which provides for permanent removal and treatment of the majority of the principal threat posed by contaminated sediments. In addition, a comparison of the costs of Alternatives G(A), I(A), and I(B) demonstrates that it is more expensive to construct a landfill for disposal of sediments with PCB concentrations between 25 and 500 ppm than it is to treat such sediments. Therefore, Alternative G(A) is more cost-effective than Alternative I.

## 5.7 Massena Industrial Development Corporation (MIDC)

The comments summarized below were received from the MIDC.

**5.7.1 Comment:** EPA's Proposed Plan should be put on hold until the public has had a chance to review the draft risk assessment.

**Response:** Please see EPA's response to comment 4.2.3.

**5.7.2 Comment:** MIDC requested answers to the following specific questions about the draft risk assessment, and/or a copy of the draft risk assessment:

a. Does it take into account recent and current PCB toxicity research?
b. What exposure durations and frequencies are used?
c. Does it suggest children and adults will ingest sediments? If so, how much?
d. Does it suggest that all fish consumed come only from the site in question, or from the general area?
e. Is the assessment site-specific or based on regional data?

**Response:**

a. The risk assessment, in accordance with current EPA risk guidance, applies toxicological data provided in IRIS.

b. A fisherman is assumed to be exposed to sediments 350 days per year over the course of a lifetime. A local resident's exposure to sediments is assumed to be 143 and 78 days per year respectively for a child and an adult. Residents are assumed to live in the study area vicinity for 70 years. Mohawk Nation residents are assumed to ingest fish daily over a lifetime.

c. The risk assessment assumes the incidental ingestion of sediments during recreational activities along the river bank. EPA's default values for incidental soil ingestion of 200 mg/kg and 100 mg/kg for children and adults, respectively, are used as estimates of sediment ingestion.

d. The risk assessment evaluated two scenarios: less mobile fish that would be expected to be limited to the study area and more mobile fish who might be caught throughout the area along the St. Lawrence and Raquette Rivers.

e. Site-specific parameters were considered where possible. As mentioned above, fish species not expected to migrate from the Reynolds Study Area were sampled and evaluated in the risk assessment. The sediment evaluation was based solely on Reynold's Study Area data. NYSDEC fish data from several locations in the St. Lawrence, Raquette, and Grasse Rivers were used to provide a broader estimate of fish ingestion risks associated with PCB contamination in the St. Lawrence River basin.

**5.7.3 Comment:** MIDC opposes dredging of the St. Lawrence River based on: the high short-term risks of dredging; the natural, in-situ biodegradation characteristics of PCBs; and the higher costs involved with the combination of dredging and in-situ containment in the event that dredging alone does not remove sediments to the 1 ppm PCB level. MIDC supports RMC's suggested approach of dredging and treating sediments above 500 ppm PCBs and in-situ containment of the lower residuals. MIDC believes that RMC can monitor the in-situ containment material over the long term, and that the RMC plan would have the fewest short-term effects.

**Response:** Please see EPA's responses to comments 4.4.1 and 5.2.19.

**5.7.4 Comment:** MIDC comments that if the sediments can be contained while protecting human health and the environment (if indeed human health and the environment are truly at risk), then RMC should not be required to experiment with a new and unproven costly alternative. Although EPA states that its preferred alternative is one of the least expensive alternatives which results in permanent removal, it could become the most expensive if dredging does not attain the cleanup levels and in-situ containment is required.

**Response:** Please see EPA's response to comment 4.1.12.

**5.7.5 Comment:** EPA's proposed remedy is far more expensive than RMC's suggested approach, which achieves the same risk reduction as EPA's. MIDC questions how EPA can balance risk and cost when the risk assessment is not in final form. EPA has doubled the cleanup costs by requiring cleanup levels that are significantly lower than at other similar CERCLA sites.

**Response:** Please see EPA's responses to comments 4.2.3 and 4.4.1.

**5.7.6 Comment:** MIDC recommends that cleanup begin at the most upstream facility, and proceed downstream. This will prevent any potential for upstream contaminants to recontaminate cleaned areas.

**Response:** Please see EPA's response to comment 4.1.4.

**5.7.7 Comment:** It appears that EPA's proposed remedy, given its high cost and stringent standards, does not consider the local economy, and particularly the economic benefits that Reynolds Metals Company brings to the Massena area.

**Response:** Please see EPA's response to comment 4.4.1.

**5.7.8 Comment:** MIDC encourages EPA to reevaluate its disposal and remediation regulations for PCBs. PCBs may have fewer health effects than originally thought. MIDC cites recent criticism over the validity of using the results of animal studies to classify PCBs,

and the limitations in applying the results of animal studies to humans. Clinical research on past worker exposure to PCBs, which showed only minor dermatological effects, was noted. If no adverse effects have been found in groups of workers who have been in direct contact with concentrated PCBs, then it is unclear how EPA justifies the expense of remediating a chemical in such minute quantities. Furthermore, EPA has lumped all PCBs in the same risk class as 1260 PCBs (a probable carcinogen), even though there is no scientific evidence that PCB molecules with less chlorine content than the 1260s pose risk to human health or the environment. EPA may be regulating remediation of PCB deposits and sources that pose no harm to human health and the environment, at an enormous cost to U.S. corporations and the public.

**Response:** Please see EPA's responses to comments 5.2.3 and 5.2.24.

## 5.8 Aluminum Company of America (ALCOA)

The comments summarized below were received from ALCOA.

**5.8.1 Comment:** A PCB cleanup goal of 1 ppm is not likely to be technically achievable with dredging. Problems associated with sediment suspension, physical limitations of dredging, and irregularities of the river bed (e.g., boulders), are noted. Dredging activities at other sites (e.g., New Bedford Harbor, Sheboygan River, Shiawasse River, Willametter River, and Dwamish Waterway) have resulted in highly variable final residual PCB concentrations that generally averaged between 10 to 50 ppm PCBs. If EPA believes armoring after dredging may be required, it should have been included in the AA report. ALCOA recommends implementation of a field scale remedial program to determine the technical limitations of dredging at the Reynolds Study Area prior to a final remedial decision.

**Response:** Please see EPA's responses to comments 4.1.11, 5.2.1, 5.2.19 and 5.5.3.

**5.8.2 Comment:** A PCB cleanup goal of 1 ppm is unjustifiably stringent given that the risks associated with the Site appear to be significantly overstated.

**Response:** Please see EPA's response to comment 5.2.17.

**5.8.3 Comment:** The Eastern U.S. soil background survey data that were used in the draft risk assessment are not appropriate for extrapolation to sediments.

**Response:** Please see EPA's response to comment 5.2.5.

**5.8.4 Comment:** ALCOA questions whether EPA followed the NCP in producing the draft risk assessment. It is unclear whether the draft risk assessment was done in a timely manner, consistent with EPA guidance documents.

**Response:** Please see EPA's response to comment 4.2.3.

**5.8.5 Comment:** It is unclear whether EPA has appropriately balanced the potential risks of dredging with the potential benefits. Since silt containment systems are not 100% effective, especially in areas with currents greater than 2 feet/second, there is the problem of sediment suspension. In addition, extensive dredging would destroy the existing sediment habitat and eliminate benthic organisms which are an essential component of the ecosystem.

**Response:** EPA recognizes that several of the remedial alternatives evaluated pose fewer short-term risks than the remedial alternative selected by EPA. After carefully balancing the specific characteristics of the Site according the nine criteria as outlined in the NCP, EPA has determined that the long-term effectiveness, permanence, and protectiveness of public health and the environment afforded by the selected alternatives offset any short-term risks posed

by the selected alternative.

Because the areas to be dredged are primarily depositional in nature, EPA believes that sediment habitat and benthic organisms placement will occur naturally following the completion of dredging. The dredged area will be monitored following the completion of dredging. If habitat restoration and/or benthic repopulation are necessary, they may be required based on the results of monitoring data.

**5.8.6 Comment:** Armoring could provide an effective alternative which meets CERCLA evaluation criteria at a significantly lower cost than removal alternatives. In its Proposed Plan, EPA indicates that armoring may be required regardless of the alternative selected, which is likely given the cleanup goals. However, the costs for such armoring should be included in the AA report for the alternatives which consider removal because this cost consideration would affect the current analysis. ALCOA notes that in-situ containment and anaerobic biodegradation of PCBs in sediment, as observed in the Upper Hudson River (New York), Silver Lake (Pittsfield, Massachusetts), Waukegan Harbor (Illinois), Sheboygan River (Wisconsin) and the Acushnet River (New Bedford, MA), could provide for a permanent solution at the Site.

**Response:** Please see EPA's response to comment 4.1.12.

**5.8.7 Comment:** If sediment is removed, treatment should not be required. Treatment of PCB-contaminated sediments is not required to meet ARARs or current regulatory requirements, including TSCA.

If EPA requires treatment at the Site, the treatment goals are unnecessarily stringent. The treatment residuals should not have to be less than concentrations similar to other material being disposed at the RMC facility (i.e., less than 10 ppm). In addition, it would not be cost effective, or result in significant risk reduction, to treat material slightly greater than 10 ppm to under 10 ppm (e.g., 13 ppm treated to 8 ppm). Although thermal desorption shows promise, EPA should allow RMC to select a treatment technology through evaluation and competitive bidding.

Finally, EPA should reevaluate Alternative D because it is significantly more cost effective and could be equally protective as any alternative using thermal desorption.

**Response:** The treatment levels specified in the decision document were selected by EPA to ensure protection of human health and the environment. The remedial alternatives developed for the Site are consistent with EPA's PCB Guidance. For instance, according to this guidance, soils with PCB concentrations in the 10 to 25 ppm range may be disposed on an industrial facility with minimal long-term management controls. Accordingly, EPA has evaluated an alternative for the RMC Site which includes disposal of sediments with PCB concentrations between 10 and 25 ppm in the Black Mud Pond, rather than in an engineered landfill (Alternative G). The PCB Guidance also recommends that soils with higher concentrations of PCBs be disposed on an industrial facility in an engineered containment system which may include a cover and liner system. Accordingly, EPA has evaluated

alternatives which include disposal of untreated sediments (Alternative D) or treated sediments with PCB concentrations between 50 and 500 ppm in an engineered landfill (Alternative I). In addition, several of the other alternatives evaluated (including Alternatives E, F, and J) include options for disposal in the Black Mud Pond or in an engineered landfill depending on whether the material is a hazardous waste.

In its Proposed Plan, EPA discussed the proprietary process "ATP" whose generic name is thermal desorption. However, EPA took its information directly from the AA report, which was prepared by RMC. The thermal desorption system to be used at the Site may not be limited to ATP.

**5.8.8 Comment:** EPA should have considered additional combination alternatives that include removing and disposing material at an achievable PCB cleanup level (i.e., 25, 50 or 500 ppm) and armoring of other select sediment areas. This and Alternative J could provide an optimum balance among the nine criteria.

**Response:** Please see EPA's responses to comments 5.2.19 and 5.2.20.

**5.8.9 Comment:** It is unnecessary to link the ALCOA, G.M. and RMC sediment areas of concern in a coordinated cleanup effort because there are unique ecosystems associated with each of the areas. Linking the areas will also make it difficult from a community acceptance perspective to develop cleanup plans for the Grasse and Raquette Rivers differently than for the St. Lawrence River.

**Response:** EPA's selected alternatives and cleanup objectives are site-specific to accommodate varying site conditions. However, EPA's objective is to coordinate the dredging activities at the RMC Site with the dredging activities of the other Massena area facilities to the greatest extent possible. To that end, EPA will utilize a phased approach that will begin with dredging PCB hotspots, or areas with the highest PCB contamination at the most upstream facility and proceed downstream.

**5.8.10 Comment:** Many of the highly conservative assumptions used in the HHA are attributed to a personal communication--K. Jock (1991). Further information must be provided to justify the appropriateness of the information and assumptions utilized.

**Response:** Please see EPA's response to comment 5.2.3.

**5.8.11 Comment:** ALCOA questions the relatively small cost difference ($0.9 million) between Alternative I, removing sediment above 10 ppm PCBs with treatment of materials greater than 500 ppm, and Alternative G, removing and treating materials greater than 10 ppm, when there is such a significant difference in volume.

**Response:** Alternative I includes costs for construction of an engineered hazardous waste landfill cell while Alternative G includes costs for on-site disposal in an unlined area with a soil cover. The difference in the degree of long-term management required under each alternative is based on the PCB concentration in the material to be contained (10 ppm versus 500 ppm).

**5.8.12 Comment:** If the volume of sediment (both depth and areal extent) to be removed should expand significantly on the basis of additional sampling, then it would increase costs and, in turn, change the AA. In-situ containment costs, on the other hand, would not be affected by sediment depth, only areal extent.

**Response:** Costs in the Proposed Plan and decision document may vary based on information gathered during remedial design and remedial action. EPA's estimates are considered to be + 50% and - 30% of actual final remediation costs.

**5.8.13 Comment:** ALCOA questions the inconsistency with materials management for EPA's proposed alternative–Alternative G–which is the only remedial option that does not include the construction of an engineered containment facility which meets hazardous waste requirements.

**Response:** The remedial alternatives developed for the Site are consistent with EPA's PCB Guidance. For instance, according to this guidance, soils with PCB concentrations in the 10 to 25 ppm range may be disposed on an industrial facility with minimal long-term management controls. Accordingly, EPA has evaluated an alternative for the RMC Site which includes disposal of sediments with PCB concentrations between 10 and 25 ppm in the Black Mud Pond, rather than in an engineered landfill (Alternative G). The PCB Guidance also recommends that soils with higher concentrations of PCBs be disposed on an industrial facility in an engineered containment system which may include a cover and liner system. Accordingly, EPA has evaluated alternatives which include disposal of untreated sediments (Alternative D) or treated sediments with PCB concentrations between 50 and 500 ppm in an engineered landfill (Alternative I). In addition, several of the other alternatives evaluated (including Alternatives E, F, and J) include options for disposal in the Black Mud Pond or in an engineered landfill depending on whether the material is a hazardous waste.

**5.8.14 Comment:** EPA's concerns about the feasibility of ensuring the integrity of in-situ containment material due to the river currents in the area adjacent to the RMC facility are unwarranted. The ARS showed slow-current characteristics in this area, which could be similar to those found in a harbor or lake.

**Response:** EPA has determined that dredging is an effective way of removing the volume of contaminated sediments in the river system based on limited previous experience at other Superfund sites and federal projects. In addition, dredging of sediments is a permanent remedy, which allows treatment to reduce toxicity, mobility, and volume of PCBs.

In addition, although sediment containment with a graded cover would reduce the erosive force of the flowing river water and would limit movement of contaminants into the

environment, its long-term effectiveness is dependent upon the adequacy and reliability of the sediment cover. Long-term monitoring and maintenance of contained sediments would be difficult to achieve because the cover is located underwater. Because the sediments are submerged, the contained underwater sediments would require periodic inspections by divers. In addition, several rounds of sampling might be required to detect underwater containment cell leakage, since any leaking contamination would be diluted. Further, if underwater monitoring revealed that cap repairs were necessary, such repairs could likely only be undertaken in late spring or in summer. Little information is available on the frequency with which maintenance would be needed or on the probability of cover failure. If the sediment cover fails, risks on the order of $10^{-2}$ would be present immediately since contaminated sediments would reenter the river system and be available to contaminate fish and wildlife. Sediment dredging, on the other hand, would permanently remove the long-term risks from contaminated sediments.

Although containment of contamination is less difficult than excavation or dredging and treatment of contamination, EPA prefers technologies in which treatment that permanently and significantly reduces the volume, toxicity or mobility of the PCBs is a principal element.

**5.8.15 Comment:** ALCOA questions whether the $190,000/year operation and maintenance cost of Alternative B includes operation and maintenance costs beyond the five year review.

**Response:** In addition to costs for the five year review, the estimate includes operation and maintenance costs for 30 years.

**5.8.16 Comment:** There appears to be an inconsistency between Alternative E, where incinerator ash would be required to have PCB levels at or below 2 ppm, and the other alternatives, which would require treatment to 10 ppm only.

**Response:** TSCA guidance generally requires that incinerators treat solids to levels below 2 ppm PCBs.

**5.8.17 Comment:** The additional sampling proposed for the upriver portion of the Reynolds Study Area is not necessary since existing data indicate that PCB concentrations in this area are 1 ppm.

**Response:** EPA's selected remedy provides for additional sampling in the upriver portion of the Reynolds Study Area, especially in reach 3A in the vicinity of sample A9 and near the mouth of the Grasse River, to determine whether dredging is warranted in these areas. Additional sampling is warranted in these areas since PCBs were detected in isolated samples from these areas at concentrations as high as 6.2 ppm.

**5.8.18 Comment:** EPA should clarify that the data obtained by NYSDEC that exhibits low levels of PCBs in three water samples was obtained by an unapproved analytical method, rendering the data irrelevant.

**Response:** The method used by NYSDEC in analyzing its water samples is identical to that required for SPDES analyses by NYSDEC. While this is not the method routinely used by EPA in its PCB water analyses, the data obtained through such analyses are by no means irrelevant.

**5.8.19 Comment:** ALCOA claims that the exposure assumptions in the draft human risk assessment are unreasonably conservative and result in an overestimation of risk. These assumptions include a lifetime (70-year) exposure duration and an exposure frequency of 39 weeks per year for residents and 50 weeks per year for fishermen. ALCOA also claims that dermal contact exposure assumptions related to sediment exposures are also overestimated.

**Response:** Please see EPA's response to comment 5.2.25.

## 5.9 General Motors (G.M.)

The comments summarized below were received from G.M..

**5.9.1 Comment:** EPA's selection of a 1.0 PCB cleanup criterion for sediments of the St. Lawrence River is unnecessarily stringent. Cleanup levels need to reflect site-specific data, as analyzed through appropriate risk assessment techniques. G.M. believes that inappropriate and ultraconservative exposure scenarios, and inappropriate PCB toxicity factors were used. The costs of attempting to meet EPA's proposed cleanup levels will be extremely disproportionate to the benefits achieved.

**Response:** Please see EPA's response to comment 5.2.17.

**5.9.2 Comment:** There is no evidence available to indicate that removal of sediments to a 1.0 ppm PCB cleanup level is technically feasible. EPA should either define the basis of evidence, or should adopt a cleanup level which is believed to be achievable based on experience at similar sites. EPA should explain how it will determine whether the selected 1 ppm cleanup level for sediment remediation is achievable or is technically impracticable.

G.M. recommends implementation of a pilot dredging program to determine a technically feasible cleanup level.

**Response:** Please see EPA's responses to comments 4.1.11 and 5.5.3.

**5.9.3 Comment:** Since EPA considers in-place armoring (containment) of sediments an acceptable post-removal approach (following dredging), its use should be considered for broader application in lieu of dredging. A containment approach alone should be selected since it can provide short and long-term protection to human health and the environment and reduces the short-term risks associated with sediment suspension and migration. In addition, armoring will enhance natural degradation of PCBs, resulting in reduced potential toxicity. Proper design of the containment and monitoring systems would eliminate or greatly reduce EPA's concern with the operation and maintenance issues and provide a cost-effective remedial program.

**Response:** Please see EPA's response to comment 4.1.12.

**5.9.4 Comment:** Since physical site conditions vary from site to site, remedial approaches and cleanup objectives should be based on site-specific considerations. The programs developed from these site-specific analyses should be coordinated to provide technical control and resource coordination.

**Response:** After careful consideration of RMC's site-specific characteristics, EPA evaluated and balanced each remedial alternative according to the nine criteria set forth in the NCP. In addition, EPA also evaluated its selected remedy for consistency with the PCB Guidance.

EPA recognizes that every Superfund site is different (different physical characteristics, contaminants, pathways of exposure, media); thus, EPA evaluates and selects an appropriate remedial alternative for each site on a site-by-site basis in light of available guidance and regulations.

EPA's objective is to coordinate the cleanup efforts at the RMC Site with the cleanup of the other Massena area facilities to the greatest extent possible. To that end, EPA will utilize a phased approach that will begin with dredging PCB hotspots, or areas with the highest PCB contamination, at the most upstream facility and proceed downstream.

**5.9.5 Comment:** If sediment removal is required, then only the higher concentrations of PCBs (e.g., 500 ppm or higher) should be treated, consistent with the EPA's PCB Guidance. Lower levels of PCBs do not warrant aggressive and costly treatment and can be appropriately contained at the RMC facility. G.M. notes the effective containment of similar materials at other sites. The more treatment activities that EPA requires, the more chance for accidents and breakdowns in the treatment system. Furthermore, total remedial costs will be extremely sensitive to changes in the identified volume of sediments over 10 ppm, rendering the entire remedy cost-ineffective under the NCP.

**Response:** Please see EPA's response to comment 5.2.18.

**5.9.6 Comment:** EPA's Proposed Plan should be based on a complete and final risk assessment. The Proposed Plan should be withdrawn until the risk assessment is finalized.

**Response:** Please see EPA's response to comment 4.2.3.