DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: Reynolds Metals Co.
Facility Address: Massena, NY 13662
Facility EPA ID #: NYD002245967

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination? **(Note: This determination addresses contaminated media regulated under New York State's Inactive Hazardous Waste Disposal Site Remedial Program.)**

   X If yes - check here and continue with #2 below.

   ___ If no - re-evaluate existing data, or

   ___ if data are not available skip to #6 and check the "IN" status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved) to track changes in the quality of the environment. The two EI developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	x			(see below)
Air (indoors)[2]		x		
Surface Soil (e.g., <2 ft)	x			(see below)
Surface Water	x			(see below)
Sediment	x			(see below)
Subsurf. Soil (e.g., >2 ft)	x			(see below)
Air (outdoors)		x		

___ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

___ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Background

The Reynolds Metals Company (RMC) owns and operates an aluminum reduction plant in the Town of Massena, St. Lawrence County, New York. The plant is located off Route 37 near the Massena-Cornwall International Bridge (Fig. 1). The Plant was constructed in 1958 for the production of aluminum from alumina (aluminum oxide). The facility occupies about 7 percent or 112 acres of the total plant property owned by RMC. The main components of the plant include the reduction plant and any pertinent structures and facilities encompassing about 20.5 acres, the industrial waste landfill, (11.5 acres) and the Black Mud Lagoon (6 acres).

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[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2]Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

As a result of production activities and years of continuous operation and expansion, various types of industrial waste, including hazardous waste, were generated, disposed and spread throughout the facility. In September 1987, RMC entered into a Remedial Investigation/Feasibility Study (RI/FS) Consent Order with the Department (index no. A6-0119-87-08) to develop and implement a facility wide remedial program.

Previous Investigations

Numerous site wide investigations of the RMC facility have been performed prior to and in conjunction with the RI/FS consent order. The following is a list of reports on file that detail the findings of those investigations:

Report Title	Date
Preliminary Investigation of the RMC Black Mud Lagoon, Phase I Summary Report	12/83
Preliminary Investigation of RMC Landfill, Phase I Summary Report	9/84
Subsurface Exploration and Permeability Test Report, Industrial Landfill	3/85
Preliminary Report, Evaluation of Pond Leakage, RMC	7/85
Hydrogeologic Assessment for the Proposed Black Mud Pond	11/85
Preliminary Risk Assessment, RMC	2/25/88
PCB Source Identification at RMC	7/29/88
Annual Report - 1988 Environmental Activities	9/23/88
Interim Remediation Report	1/19/89
Report on PCB Source Identification Assessment	2/20/89
Landfill Underdrain, and BMP Terrain Conductivity Report	6/30/89
Period 3 PCB Source Assessment Report	9/12/89
Risk Analysis Report (Rev. 2)	11/5/90

The following is a summary of the disposal, storage and spill areas identified as “areas of concern” and environmental findings concerning each area ***prior to remediation***.

A. Landfill and Former Potliner Storage Area (OU1)

The landfill is located in the southwest corner of the facility. The 11.5 acre landfill was in operation from 1957 until June 1990, and during that time received solid waste, industrial waste, construction and demolition debris, spent potlining waste, and PCB contaminated sewage sludge. PCB contaminated capacitors may also be buried in the landfill.

In 1984, work was performed at the landfill which included the installation of a partial leachate collection system, a 350,000 gallon storage tank to collect and hold leachate and surface water, and surface water controls and vegetative cover on portions of the banks on the perimeter of the landfill.

The landfill contains approximately 158,000 cubic yards of waste and approximately 89,000 cubic yards of contaminated soils beneath the waste. Landfill boring analyses have revealed the presence of PAH compounds including anthracene (150 ppm), benzo(a)anthracene (1,000 ppm), benzo(a)pyrene (1,100 ppm), benzo(b)fluoranthene (2,100 ppm), benzo(g,h,i)perylene (430 ppm), benzo(k)fluoranthene (1,000 ppm), chrysene (1,700 ppm), dibenzofuran (15 ppm), fluoranthene (2,200 ppm), pyrene (1,900 ppm), PCBs (0.39 - 690 ppm), fluoride (8500 ppm), phenols (21 ppm), sulfate (13, 000 ppm) and Total cyanide (300 ppm). Metals analysis has shown aluminum (87,000 ppm), arsenic (110 ppm), beryllium (11 ppm), cobalt (23 ppm), iron (330,000 ppm), manganese (4,500 ppm), sodium (59,000 ppm), and vanadium (970'ppm).

The northern portion of the landfill is underlain by approximately 5 to 10 feet of brown glacial till, which is underlain by gray glacial till with an average permeability estimated at 1 x 10E-6. The average groundwater velocities have been estimated at 0.8 feet/year. The southern portion of the site is underlain by a gray clay unit whose thickness varies from a few feet to 20 feet. Gray glacial till is present beneath the clay unit. Groundwater beneath the landfill generally flows to the south to discharge to the wetlands. An upward vertical gradient exists in the shallow groundwater flow system beneath the landfill.

Beryllium (13.7 ppb), cyanide (21,700 ppb), fluoride (220 ppm), iron (87,200 ppb), magnesium (80,300 ppb), manganese (3,090 ppb), PCBs (13.3 ppb), phenols (66 ppb), and sulfate (600 ppm) have been documented in the shallow groundwater in exceedance of New York State Groundwater Quality Standards or Guidance Values.

B. <u>Black Mud Pond (OU2)</u>

The Black Mud Pond (BMP) was constructed in 1973 in an unlined borrow pit on the west side of the plant. Its purpose was to hold settling carbon solids (black mud) produced as a by product of the air emissions control system and cryolite recovery plant. Approximately 6 acres in size, the BMP has an approximate volume of 20 million gallons and an estimated 165,660 cubic yards of black mud which in underlain by approximately 22,090 cubic yards of contaminated soils. The BMP operated from 1973 to June 1990.

Black mud is a residue from the processing of spent potliners (federal waste code K088) for-cryolite recovery. Black mud waste is primarily composed of alumina (30-40%) and carbon (35- 45%) with fluoride at 2-5%, cyanide at 61 ppm, and PCBs generally below 8 ppm. Other constituents making up the remaining 15% of the total waste mass of the material include aluminum, calcium, iron, magnesium, sodium,

sulfate, PAHs, other metals, and other inorganics. A waste characterization of the black mud liquor has shown elevated levels of aluminum, arsenic, sodium, and vanadium. The liquor also contains detectable levels of barium, calcium, copper, lead, nickel, potassium, and zinc. PCBs have also been found in the liquor up to levels of 2.8 ppb. PAH compounds include benzo(b)fluoranthene, chrysene, fluoranthene, and pyrene.

The Black Mud Pond is situated on a ridge in the western portion of the plant. In general, the ridge is composed of gray glacial till. However, in some areas adjacent to the Pond, additional geologic units are present above the till. In these areas, the gray till is generally overlain, from top to bottom, by several feet of fill material, a few feet of sandy winnowed till and a few feet of brown glacial till. The till unit has an average permeability estimated at 1 x 10E-6 cm/sec. The groundwater velocities in this till unit have been estimated to be on the average of 3 feet/year. The gray till is underlain by dolomite bedrock which is thought to be present at a depth of approximately 100 feet.

Depth to groundwater in the vicinity of the Pond generally varies from a few feet to 15 feet. A surface water divide between the St. Lawrence River and the Raquette River crosses the ridge on which the Pond is located. Based on available data, flow in the shallow groundwater flow system is radial in nature. Due to the Pond's location on the ridge, a downward vertical gradient exists in the groundwater flow system underlying the area.

The Black Mud Pond groundwater data has shown cyanide, fluoride, iron, magnesium, manganese, PCBS, phenols, and sulfate in exceedance of New York State Groundwater Quality Standards or Guidance Values.

C. North Yard (OU3)

The North Yard area is the location of the Heat Transfer Medium (HTM) system which is used to maintain the temperature and fluidity of the coal tar pitch for anode and cathode manufacturing. Historically the HTM was an oil containing PCBs and through leaks and spills over the life of the system, high levels of PCBs had accumulated in the soils of the North Yard. The HTM system was retrofitted with non-PCB oils in the early 1980's.

Approximately 400 soil samples have been collected in the North Yard to define the horizontal extent of PCB, polychlorinated dibenzofurans (PCDF) and dibenzo-p-dioxins (PCDD) contamination. In addition, 27 soil samples were taken to define the vertical extent of PCB contamination. Soils are contaminated with PCBs at levels up to 89,000 ppm. Dioxin and dibenzofurans have also been shown to exist in the North yard at levels of 9.92 ppb and 9.35 ppb, respectively.

All raw materials needed for the operation of the reduction plant and the shipment of finished products enter and leave through the North

Yard area. In addition to the HTM system and the Pitch Pump House being located in the North Yard, other plant facilities in the area include: the Unloading Shed for receiving alumina, coke, soda ash and fluoride, Pitch Storage Tanks and the Truck Unloading Dock. Any remedial action within the North Yard area will need to consider impacts to the every day operations. North of the Pitch Pump House, the North Yard area is immediately underlain by approximately 2 to 4 feet of fill (reworked till). The fill material is underlain by several feet of brown till, which overlies the gray till unit. South of the Pitch Pump House, the North Yard area was built in "cut" into the glacial till and no extra fill material was needed.

Depth to groundwater in the area varies from approximately 2 to 15 feet. North of the Pitch Pump House, shallow groundwater flows to the north to discharge to the St. Lawrence River. Shallow groundwater flow conditions south of the Pitch Pump House are much more complex due to the existence of backfilled utility trenches and french drains in this area. Based on measured groundwater levels, it is clear that groundwater flow conditions in this area are affected by the presence of these structures. However, the extent to which the trenches and drains influence groundwater flow is not known at this time. Average groundwater velocities in the North Yard utility trenches have been estimated at 2900 feet/year. Average permeability of the fill material in the North Yard has been found to be approximately 1.4 x l0E-1 cm/sec. The underlying till average permeability has been found to be approximately 5 x 10E-4 cm/sec.

Shallow groundwater in the North Yard has been shown to contain arsenic (140 ppb), cyanide (3.920 ppm), fluoride (56.3 ppb), iron (27. 700 ppm), magnesium (157,000 ppm), manganese (1.060 ppm), phenols (5.4 ppb), and sulfate 2,140 ppm). PCBs have also been detected at levels in exceedance of New York State Groundwater Standards or Guidance Values.

D. Wetlands (OU4)

The wetlands area of concern is located south and east of the landfill area. Prior to construction of the 1984 controls at the landfill (described above), groundwater and surface water discharged directly to the wetlands from the landfill. In addition, sediments contaminated with high concentrations of PCBs from the Rectifier Yard migrated into the wetlands. As a result, approximately 10 acres of wetlands immediately south of the landfill have been impacted by surface water, groundwater and sediment contamination, as well as other areas of the wetlands downstream of the landfill and east of the landfill, south of the Rectifier Yard Ditch.

The Wetlands sediments have elevated levels of aluminum, arsenic, iron, magnesium, sodium, vanadium, cyanide, fluoride, sulfate and phenols in relation to background. PCBs at levels up to 19 ppm have also been documented. In the Final Remedial Investigation Report, it was estimated that approximately 7,520 cubic yards of sediments in the Wetlands contain PCB contamination at concentrations of 1.0 ppm or

greater. After further evaluation of the extent of contaminated sediments, a revised estimate was presented in the Revised Final Feasibility Study (FS). It is now estimated that 5,153 cubic yards of contaminated sediments are located in the Wetlands drainageways and that 11,132 cubic yards of contaminated sediments are located in the open water area of the "impacted" portion of the Wetlands. Therefore, the total estimated volume of sediments in the Wetlands containing PCBs at 1.0 ppm or greater is now estimated at 16,295 cubic yards.

The "impacted" portion of the Wetlands is defined in the FS as a 10.1 acre area immediately adjacent to the south side of the Landfill/Former Potliner Storage Area. However, additional PCB sampling in the Wetlands performed by the NYSDEC in 1988 has shown that the PCB contamination extends south to the NYS Route 37 median where concentrations as high as 14.1 ppm PCBs were documented. This additional area was not addressed in the FS. The Raquette River sediment was also sampled under provisions of a USEPA Order on Consent and no PCBs were detected.

The Wetlands surface water samples have shown levels of PCBs (2-6 ppb), chrysene(19 ppb), fluoride (54 ppm) and bis(2-ethylhexyl)phthalate (17 ppb) above background.

Subsurface geologic conditions beneath the Wetlands are similar to those beneath the southern portion of the Landfill and Former Potliner storage area which exhibits an average permeability estimated at 1 x 10E-6 and average groundwater velocities of an estimated 0.8 feet/year, except in the thicker clay unit located beneath the Wetlands which should exhibit lower permeability.

The Wetlands is a groundwater discharge area for the southern portion of the RMC facility and therefore contaminants are not likely to leave the area via the groundwater. Drainage from the Wetlands flows south via two intermittent streams, through drainage culverts under NYS Highway Route 37, into the Raquette River.

E. Potliner Pad (OU5)

The Potliner Pad is a concrete surface structure located adjacent to the crusher building on the northwest side of the plant. Historically the potliner pad was used to store spent potliner materials (K088 waste).

Sediment sample results, from samples collected from the drainage pathway located west and north of the Pad, have shown elevated levels of aluminum (72,000 ppm), arsenic (46 ppm), beryllium (11 ppm), cobalt (10 ppm), cyanide (30 ppm), fluoride (2700 ppm), PCBs (6.6 ppm), sodium (24,000 ppm), sulfate (350 ppm), and vanadium (66 ppm) in comparison to background. It is estimated that there is approximately 295 cubic yards of sediment contaminated with low level PCBS (concentrations between 1 ppm and 10 ppm) and approximately 3,141 cubic yards of contaminated soils within the Potliner Pad vicinity.

The Potliner Pad is underlain by fill material (reworked till) whose thickness generally increases to the north. The fill thickness in the immediate site vicinity varies from approximately 2 to 5 feet. The fill is underlain by a brown till which overlies gray glacial till.

Depth to groundwater in this area is approximately 5 to 10 feet. Groundwater in the vicinity of the site flows to the northeast toward the St. Lawrence River. As with the other areas of concern, the permeability of the deeper brown and gray till is much less relative to the shallow fill. A backfilled drainageway which extends from the site area to the St. Lawrence River, may behave as a preferential migration pathway for contaminated groundwater.

Shallow groundwater in the Potliner Pad area has shown levels of arsenic (38 ppb), beryllium (25.3 ppb), cyanide (52,600 ppb), fluoride (374 ppm), iron 278,000), magnesium (275,000 ppb), manganese (197 ppb), PCBs (0.10 ppb), phenols (0.19 ppb), and sulfate (1690 ppm) in exceedance of New York State Groundwater Quality Standards and Guidance Values.

F. Miscellaneous Areas (OU6)

The areas of concern identified as the Miscellaneous Areas include the following sites around the RMC facility: Rectifier Yard, Soil Stock Pile, West Ditch Outfall, 002 Diversion Area, North of Haverstock Road, and 004 Outfall. These areas of PCB contamination are relatively small and localized, and brief descriptions are presented below.

Rectifier Yard - The rectifier yard is located adjacent to the south side of the plant. The area consists of step-down transformers, rectifiers and power lines. Surface water is drained from the rectifier yard by a network of catch basins that discharge to the south into the wetlands. Soils in the rectifier yard are contaminated with PCBs between 2.2 ppm to 7.1 ppm. Surface sediment samples found in the drainageway south of the rectifier yard showed levels of PCBs up to 2300 ppm and up to 3200 ppm at a depth of 1 foot below the ground surface. There is approximately 4,330 cubic yards of contaminated sediments with levels of PCBS greater than 1 ppm. It is assumed that the subsurface geologic conditions are similar to those present beneath the Landfill and Former Potliner Storage Area. Groundwater in this area is believed to flow to the south or southeast to discharge to the wetland.

Soil Stock Pile - The soil stockpile was located southwest of the Black Mud Pond. It consisted of materials which were excavated during the construction activities at the RMC facility. This area of concern contains approximately 2,700 cubic yards of material containing less than 10 ppm PCBS. It is assumed that hydrogeologic conditions are similar to those described for the Black Mud Pond.

West Ditch Outfall - A portion of the west ditch, between Haverstock Road and the Potliner Pad had been previously remediated by excavating PCB contaminated soils. However the downstream outfall portion of the

ditch, north of Haverstock Road, had not been addressed. It is this area that was considered a Miscellaneous Area. A portion of the West Ditch, between Haverstock Road and the Potliner Pad, was previously remediated by excavation of soils contaminated with PCBS. However, the downstream outfall portion of the ditch, north of Haverstock Road, was not addressed during the IRM work. It is this outfall section of the West Ditch that is being considered as a Miscellaneous Area. Past sediment sampling along the shoreline of the St. Lawrence River adjacent to this outfall had shown low levels of PCB contamination (less than 10 ppm).

Area North of Haverstock Road - This area is directly north of the fuel oil containment areas of the North Yard. It is believed that PCB contamination of the area north of Haverstock Road resulted from contaminated soils being transported across the road by storm water runoff and snow melt, from the north slope of the fuel oil containment berms of the North Yard. It is believed that the PCB contamination in the area north of Haverstock Road resulted from contaminated soils, transported across the road by rain water runoff and snow melt, from the north slope of the fuel oil containment areas of the North Yard. Previous sampling in this area indicated PCB contamination levels in the soils ranged from 4.2 ppm to 1,800 ppm (at a depth of 2 feet).

Outfall 004 - The outfall ditch portion of the SPDES permitted 004 outfall system is located north of Haverstock Road and east of the North Yard. In the past the outfall discharge runoff from the fuel oil containment areas in the North Yard. Additional sampling in the previously remediated 004 outfall ditch (March 1991) revealed elevated PCB levels in the ditch sediments (up to 1.48 ppm) that require action. It is believed that the PCB contaminated sediments originated from the same area as the PCB contaminated soils located north of Haverstock Road.

002 Diversion Area - In the past, surface water flow in the vicinity of sewage treatment plant flowed eastward along a creek bed south of the railroad tracks, crossing underneath the tracks and Haverstock Road then discharging into the St. Lawrence River. Interim Remedial Measure construction in 1989 diverted this direct point discharge into a retention basin located northeast of the East Cast House. It is in this area near the retention pond that additional PCB contamination was found. As part of the 002 diversion project completed in 1989, soil was excavated in the vicinity of the retention basin to enable the installation of the Outfall 002 drainage pipeline. During the work, confirmatory soil samples were taken to verify PCB levels in the soils to be left in place. PCB contamination was confirmed in two areas where sampling results showed PCB levels of over 10 ppm and over 50 ppm respectively.

G. St. Lawrence River Sediments

PCB contaminated river sediments have been identified in the St. Lawrence River near the facility's wastewater and stormwater discharge points. Analysis of fush and wildlife in the area revealed high levels of PCB contamination. The USEPA has issued a unilateral Order to RMC and the neighboring ALCOA and General Motors facilities for investigation and remediation of impacted portions of the St. Lawrence and Grasse Rivers. At RMC, the remedial design reflects installation of sheet piling around the impacted area and dredging of contaminated sediments.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	no	no	no	no			no
~~Air (indoors)~~	___	___	___				
Soil (surface; <2 ft)	no	no	no	no	no	no	no
Surface Water	no	no			no	no	no
Sediment	no	no			no	no	no
Soil (subsurface, >2 ft)				no			no
~~Air (outdoors)~~	___	___	___	___	___		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media - Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

__X__ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

___ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

___ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Pre-Remediation

In January 1992, the DEC issued a Record of Decision (ROD) for the remediation of the six areas operable units at RMC. Before the remedial

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish)

actions specified in the ROD were completed, an evaluation was conducted to identify the potential public health impacts associated with migration of contaminants from the site. Several human exposure routes were identified that had the potential to impact public health. The primary exposure route of concern was the human consumption of biota that have bioaccumulated contaminants from the areas of contamination, particularly in off-site water bodies. Contaminants, primarily PCBS, have been found in consumable fish in the St. Lawrence River, which has received contaminants through plant outfalls and surface water run off. The New York State Department of Health (NYSDOH) issued a special fish consumption advisory several years ago for the St. Lawrence River for fish potentially containing PCBs at elevated levels.

Other potential exposure routes from this site addressed by the ROD included on-site workers coming into contact with, ingesting, or breathing site contaminants, and off-site residents and/or sportsman coming into contact with, ingesting, or breathing contaminated soils, sediments, or surface water.

Previous Interim Remedial Measures (IRMs)

During the field investigations, a number of conditions were encountered that either required immediate attention or could be remediated without any further studies. To address such situations, several interim remedial measures (IRMs) were implemented as described below:

Disposal Area	IRM Description
Outfall 002 Diversion	Outfall 002 previously consisted of surface water flow along a creek bed located in the vicinity of the sewage treatment plant. In 1989, this flow was diverted to a piped system, which collects all cooling waters that formerly discharged to Outfall 002, and most of the surface water run-off from the east side of the plant, and now flows to a retention basin. Effluent then discharges to a mechanical oil skimmer and into a pre-existing pipe which previously carried the outfall 003 discharge to the St. Lawrence River.
002 Outfall Ditch	The Outfall 002 Ditch is located in the northeast portion of the RMC plant site. Approximately 1,200 feet of the ditch was excavated in 1990, and approximately 2,876 cubic yards of PCB-contaminated material (>10 ppm) was removed and disposed of.

Disposal Area	IRM Description
Outfall 004	Outfall 004 provided a discharge point for drainage from the fuel oil containment areas in the North Yard. The outfall consisted of a drainage ditch at the toe of the fuel oil containment berms, a culvert under the road and a ditch flowing to the St. Lawrence River. In 1988 the ditches were excavated to remove PCB contaminated materials to a level of below 10 ppm. The underlying soils were capped with gravel and asphalt and a portion of the ditch was relocated to the east of its original position. The use of this outfall has been discontinued, and run off from the diked areas is currently pumped to the sewage treatment plant for treatment.
North Yard	IRMs in the North Yard have included the covering of contaminated soils and limiting access to contaminated areas. Also included was rerouting of the storm drainage and french drain flow to the North Yard treatment system consisting of granulated activated carbon. This treatment system was installed in 1991.
West Ditch	The IRM consisted of excavating PCB contaminated sediments to levels less than 10 ppm and covering the ditch with a new access road to a new on-site fume control system overflow tank.
Other Interim Remedial Measures	RMC undertook decontamination of structural surfaces in the Pitch Pump House in 1989. Also in 1989 and early 1990, the floor of the oil storage shed was replaced and the structure decontaminated.

Remediation

In March 1993, the DEC executed a Remedial Design/Remedial Action (RD/RA) Consent Order (index no. A6-0291-92-12) for the design and construction of the remedial program at the RMC site.

The DEC determined that many of the remedial action objectives identified are best achieved through excavation of contaminated wastes, sediment, and soils. For those remedies that included excavation, the following cleanup goals were established:

Organic Contaminant	Cleanup Goal (ppm)
Benzo(b)fluoranthene	0.330
Benzo(k)fluoranthene	0.330
Chrysene	0.330
Fluoranthene	19.0
Pyrene	6.5
PCBs (wetlands)	0.1

Organic Contaminant	Cleanup Goal (ppm)
PCBs (areas outside groundwater management units)	1.0
PCBs (areas within groundwater management units)	10.0
Dibenzo-p-dioxins (PCDD)	0.0005
2,3,7,8-TCDD	0.0005

Site-wide remedial action commenced in 1994 and, as of October 1996, remediation at all areas of concern has been completed, with the exception of the landfill (OU1). While a new leachate collection system and long term monitoring wells have been installed, the final landfill cap and leachate collection system monitoring piezometers have not yet been installed. The final cap along with the piezometers will be completed after RMC completes the St. Lawrence River dredging remediation project being implemented under provisions of the USEPA Order on Consent. A description of the remedial actions is summarized below:

A. Landfill and Former Potliner Storage Area (OU1)

A new and upgraded groundwater and leachate recovery system was installed, which was keyed into highly impermeable material below the landfill. All collected leachate and groundwater is being treated at the North Yard water treatment system. Low level contaminated soils from the wetlands, potliner storage pad and the miscellaneous areas were consolidated in the landfill, and a long term groundwater and surface water monitoring program has been implemented. Once the dredging project is completed (by the end of 2001), a hazardous waste landfill cap will be installed over the entire area to contain the waste in-place and reduce infiltration of precipitation and subsequent leachate generation.

B. Black Mud Pond (OU2)

All wastes within the Black Mud Pond, and the soils beneath contaminated by the wastes, were dewatered and capped in-place. The cap conformed with the requirements for an approved hazardous waste disposal facility. As part of the remedial design, additional borings were drilled through the site to precisely define the thickness of the waste and vertical extent of soil contamination, and monitoring wells were installed in the underlying soils. Following capping, groundwater levels have been measured monthly to monitor the effectiveness of the capping. If the monitoring data indicate to the Department that the water table has not been lowered below the contaminated soil and waste as a result of the capping, the installation and operation of a perimeter groundwater collection trench system will be required and the collected groundwater will be treated in the North Yard water treatment system. A long term groundwater and surface water monitoring program has been implemented.

C. North Yard (OU3)

The original ROD required soils in the North Yard and other areas of the facility contaminated with PCBs at concentrations of 25 ppm or greater undergo on-site treatment prior to on-site land disposal. Soils in the North Yard contaminated with PCBs at levels of 25 ppm or greater were to be excavated for on-site treatment. Soils remaining that were contaminated with PCBs at levels between 10 ppm but less than 25 ppm were to be capped with a multi-layered asphalt cap. The ROD specified incineration as the chosen treatment technology but allowed RMC to evaluate other technologies including solvent extraction and thermal desorption.

During the period after the Department signed the ROD, disposal fees at secure landfills permitted to accept hazardous waste dropped significantly. As a result, RMC requested that the Department amend the ROD to eliminate on-site treatment, and instead allow for off-site disposal of contaminated soils at concentrations of PCBs of 50 ppm or greater. Excavated soils containing less than 50 ppm PCBs would be consolidated in the on-site industrial landfill and capped in accordance with NYSDEC and United States Environmental Protection Agency (USEPA) requirements for hazardous waste landfills. To support that request, RMC presented to the NYSDEC a document entitled Request for Modification of Record of Decision, Reynolds Metals Company St. Lawrence Reduction Plant, Massena, New York dated January 1995. The Department issued an amendment to the ROD in June 1995.

Included as part of the ROD amendment was a design change relating to the excavation of contaminated soils in the North Yard. The design change allowed RMC to establish a predefined horizontal limit of excavation that minimized disruption of plant operations in this area. Soils within that horizontal limit were excavated to a depth predetermined by existing and additional soil borings and sampling. Further excavation was performed where preferential pathways for vertical contaminant migration were identified.

Changes to the remediation methods minimized disruption to the North Yard operations by reducing the surface area affected by excavation work while not significantly reducing the volume of waste removed. Most of the difference occurred in the southern part of the North Yard where groundwater controls were currently in use and have the most potential to be effective. Impacts to plant operations from excavation work in this area were minimized by establishing a predefined horizontal limit of excavation based on a surface soil PCB concentration of 100 ppm. All soil at depth, contaminated with PCBs at levels 25 ppm or above, were removed as determined by soil borings and sampling. The design change reduced the overall area to be excavated in the southern part of the North Yard by approximately 1.0 acre. The excavation in this area was backfilled with a “flowable fill” (low strength concrete), and capped with a composite cap consisting of a geomembrane, a drainage layer and select stone cover.

In the northern part of the North Yard, where remediation did not impact daily operations, the design change increased the area currently required to be excavated under the ROD by removing all soils contaminated with PCBs at levels of 10 ppm or greater. As a result, the total area of North Yard excavation increased from an estimated 4.6 acres to 4.9 acres.

All other areas where post-remedial PCB contamination in the soil equals or exceeded 10 ppm were capped with a low permeability concrete pavement. Groundwater in the north yard is collected for treatment in the north yard water treatment system, and a long term groundwater and surface water monitoring program has been implemented. Final remediation in the North Yard will be undertaken upon plant closure.

D. Wetlands (OU4)

Remediation included dewatering of the currently identified impacted area of the wetlands and excavating the soils and sediments in that area and adjacent drainage ways. The excavated material was placed in the landfill for management as described under the Landfill Former Potliner Storage Area. Restoration and/or mitigation of the wetlands destroyed or impacted as a result of RMC's activities was the subject of further study to determine the scope of applicable alternatives. As a result of that study it was determined that a combination of restoration of the impacted areas along with additional wetlands creation in a separate area of the RMC property would be the preferred alternative for remediation of the wetlands. RMC has implemented plans for a wetlands creation site located west of the BMP.

E. Potliner Pad (OU5)

All contaminated soils and sediments at the potliner storage pad and adjacent drainage ditches were excavated to achieve cleanup goals and disposed of in the on-site landfill. Once excavation was complete in the ditches, they were backfilled with crushed stone. The excavated area surrounding the potliner storage pad was backfilled and paved and the pad rehabilitated. A long term groundwater and surface water monitoring program has been implemented.

F. Miscellaneous Areas (OU6)

Remedial action of the miscellaneous areas entailed excavation of soils and sediments with PCB concentrations exceeding the cleanup goals established for these areas. The excavated areas were backfilled, graded and seeded. A long term surface water monitoring program has been implemented.

G. St. Lawrence River Sediments

Pursuant to the USEPA Unilateral Order issued to the RMC, the dredging project to remove PCB contaminated sediment in the St. Lawrence River began in March 2001. The project consists of installation of

sheet piling to isolate the dredge area, dredging approximately 77,000 yards of sediment and capping of the dredge area (if capping is determined to be necessary). EPA has reported that all sheet piling has been installed around the dredge area preventing migration of contaminated sediments. EPA anticipates completion of dredging activities by March 2002 and capping will be completed by September 2002 (if required).

Summary of Human Health Assessment

There are no residences in the vicinity of this plant. On-site PCB contamination on the north end of the site which impacted the St. Lawrence River has been remediated. The nearest public water supply downstream of this site is the Akwesasne Indian Reservation. The river intake for their treatment plant is approximately 3 miles from the RMC facility. This water supply is closely monitored due to its proximity to this and other contaminated areas. No detectable PCBs are present in finished water.

Once the landfill is capped, remedial action at the site will be complete. Environmental impacts due to hazardous waste disposal practices have been addressed. A long term operation and maintenance (O&M) program has been initiated and will assess the effectiveness of the remediation at each area of concern.

An inspection by DER staff of the facility and areas of concern was performed on September 7, 2000. The remediation of the areas of concern have been satisfactorily completed (with the exception of the landfill as noted above) in accordance with approved work plans prepared as required by the March 1993 RD/RA Consent Order. Inspection of the remediation areas found no deficiencies and restoration of the impacted areas of the wetlands has been successful.

The release of PCBs from this site into the river has impacted local fish and wildlife. Elevated levels of PCBs have been detected in the tissue of fish taken from the St. Lawrence and Grasse Rivers and, as a result, the NYSDOH has issued a fish consumption advisory. This advisory is listed in the New York State Department of Environmental Conservation Fishing Regulation Guide,which is provided to all persons obtaining a New York State fishing license.

Additionally, the current risk assessment indicates that other potential pathways for human exposure include direct dermal contact and ingestion of contaminated sediments under a recreational user scenario. USEPA has stated that installation of the sheet piles surrounding the dredge area has effectively limited access to the contaminated sediments by any potential recreational user and that this isolation, coupled with the fish consumption advisory, has been effective at reducing or eliminating impacts to humans and controlling human exposure.

4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

___ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

___ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

___ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s): _____

5. Can the "significant" exposures (identified in #4) be shown to be within acceptable limits?

___ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

___ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

___ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s): _____

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

_X_ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Reynolds Metals Co. facility located at Massena NY under current and reasonably expected conditions. This determination will be re-evaluated when the State becomes aware of significant changes at the facility.

___ NO - "Current Human Exposures" are NOT "Under Control."

___ IN - More information is needed to make a determination.

Completed by _____ Date _____
Eric Hausamann
Environmental Engineer 2

Supervisor _____ Date _____
James Harrington
Bureau of Program Management
Division of Environmental Remediation

Director _____ Date _____
Paul J. Merges, Ph.D.
Bureau of Radiation and Hazardous Site Management
Division of Solid and Hazardous Materials

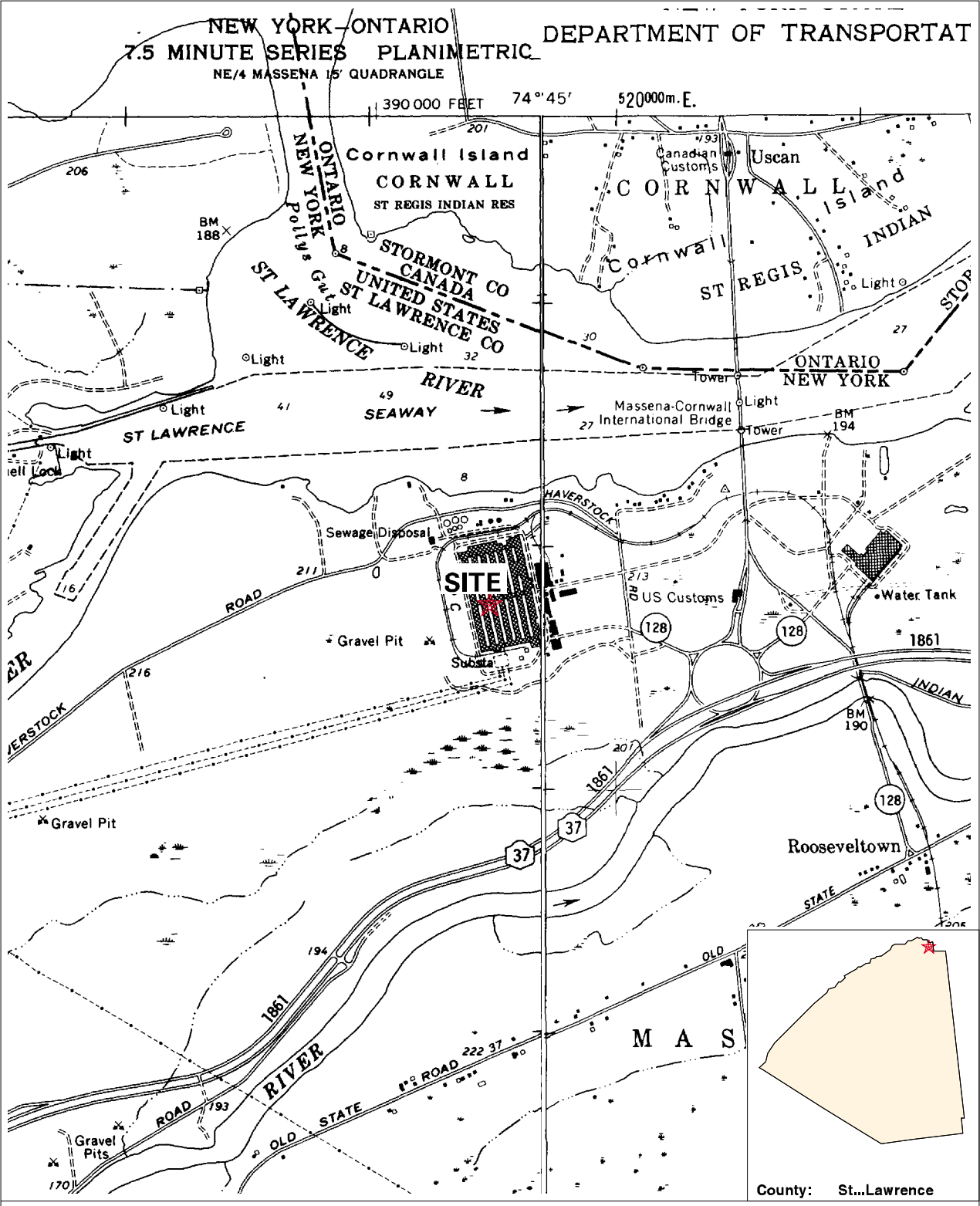
Locations where References may be found:

New York State Department of Environmental Conservation
Region 6
State Office Building
317 Washington St.
Watertown, NY 13601

Contact telephone and e-mail numbers

Darrell Sweredoski
(315) 785-2513
dmswered@gw.dec.state.ny.us

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.



Site Location Map

645009 Reynolds Metals Company

NYSDOT Planimetric Quadrangle(s):
HOGANSBURG, RAQUETTE RIVER

N

0 500 1000 1500 2000
FEET

Scale 1:24,000