DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Aluminum Company of America
Facility Address: Massena, NY 13662
Facility EPA ID #: NYD002232304

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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 #8 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, etc.) 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 "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

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. Is **groundwater** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

__X__ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

____ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

ALCOA's Massena Operations are located on 2,700 acres in the Town of Massena, St. Lawrence County, New York. The facility is bordered on the north by the St. Lawrence River, on the southwest by the Massena Power Canal, and on the southeast by the Grasse River. The Village of Massena is located to the west and to the south. The municipal water supply is obtained from the St. Lawrence River via an intake at the head of the Power Canal. An additional residential area is situated along Dennison Road to the northeast. Prior to implementation of a remedy in 1994, drinking water in this are was furnished by private wells.

The site topography is generally characterized by two northeast/southeast trending ridges surrounded by relatively low-lying areas. The subsurface geology consists of 50 to 150 ft of unconsolidated deposits overlying bedrock. More specific information on the environmental setting is provided in the documents entitled *Investigative Report* (August 1987) and *Supplemental Report* (March 1989).

Aluminum and aluminum products have been manufactured continuously at the plant since 1903, resulting in the generation of various types of industrial and hazardous wastes. These were disposed of at a number of locations throughout the facility, namely:

1. Oily Waste Landfill
2. Spent Potlining Pile I
3. Spent Potlining Pile A
4. Primary Lagoon and Dredge Soils Area
5. Soluble Oil Lagoon
6. Waste Lubricating Oil Lagoon
7. Dennison Road
8. Unnamed Tributary
9. West Marsh
10. General Refuse Landfill
11. Landfill Annex
12. 60 Acre Lagoon
13. Sanitary Lagoon
14. East Marsh
15. HPM Press Area
16. Storage Tank No. 51
17. West Fill Area
18. Unpaved Plant Roads

[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 appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

In 1985, ALCOA initiated a remedial investigation (RI) at the first fourteen of these disposal sites to characterize the nature and extent of contamination and to determine the impact of the contamination on public health and the environment. A number of additional investigations have been undertaken since that time to fill data gaps, including the following:

Waste Site Investigation	(1985 to 1987)
Supplemental Field Investigation	(1987 to 1989)
West Marsh Field Investigation	(1988)
Comprehensive Biota Sampling Program	(1989 to 1990)
General Refuse Landfill and Annex Investigation	(1989 to 1990)
Bedrock Monitoring Well Program	(1989 to 1990)
Groundwater Modeling Program	(1989 to 1991)
West Fill Area Phase II Investigation	(1994)

These documents are included in the complete document repository which is available to the public for review at the Massena plant site.

The following table summarizes the chemicals of concern (COCs) identified in various disposal areas and media at the site (prior to remediation):

Disposal Area	Affected Media	Contaminants of Concern
Oily Waste Landfill	soil, groundwater	PCBs, phenols, VOCs
Spent Potlining Pile I	leachate, groundwater	cyanide, fluoride, heavy metals
Spent Potlining Pile A	leachate, groundwater	cyanide, fluoride, heavy metals
Primary Lagoon and Dredge Spoils Area	dredge spoils, groundwater	PAHs, PCBs, heavy metals, creosote
Soluble Oil Lagoon	sludge, soil, groundwater	PCBs, phenols, VOCs, heavy metals
Dennison Road	soil, sediment, surface water, groundwater	PCBs, VOCs, PAHs
West Marsh	sediment, surface water	PCBs
Unnamed Tributary	sediment, surface water	PCBs PAHs
Waste Lubricating Oil Lagoon	soil, groundwater	PCBs, phenols, VOCs
General Refuse Landfill	waste, soil, leachate, surface water, groundwater	PCBs, VOCs, PAHs
Landfill Annex	waste, soil, leachate, surface water, groundwater	PCBs, VOCs, PAHs, fluoride, heavy metals

Disposal Area	Affected Media	Contaminants of Concern
Sanitary Lagoon	sludge, soil, sediment, surface water, groundwater	PCBs, PAHs, fluoride
60 Acre Lagoon	sludge, soil, sediment, surface water, groundwater	PCBs, PAHs, fluoride
East Marsh	sediment, soil, surface water	PCBs
Storage Tank No. 51	soil, groundwater	PCBs, VOCs
HPM Press Area	soil, surface water, groundwater	PCBs, PAHs
West Fill Area	soil, sediment, ground water, surface water	PCBs, VOCs, PAHs, cyanide
Unpaved Plant Roads	soil, sediment, surface water	PCBs

Groundwater contamination at the ALCOA facility is widespread, both in the overburden and in the bedrock. The contaminants in groundwater whose concentrations have exceeded water quality standards include VOCs, PAHs, phenols, PCBs, cyanide, fluoride, metals, and sulfate. Contaminants have been detected at depths as great as 150 ft beneath the ground surface.

Shallow groundwater in the overburden discharges to surface water at various locations including the Massena Power Canal, the Grasse River, Robinson Creek, and the on-site lagoons and marshes. In some areas, downward hydraulic gradients exist which allow overburden groundwater to discharge to the bedrock aquifer. In the facility areas adjacent to the Power Canal and Grasse River, bedrock groundwater flows toward these major discharge areas. It is also evident that a portion of the bedrock aquifer underlying the facility drains toward the Dennison Road residences. This is supported by the residential well groundwater quality data, where VOCs, fluoride, sulfate, and iron have been detected. Groundwater flow rates in the bedrock may be as high as 55,000 ft per year.

The nearest drinking water wells are on Dennison Road where municipal water was installed as a permanent remedy in 1994. The Grasse River receives waste water and storm water from ALCOA and is contaminated with PCBs. Contaminants have entered the food chain and affected wildlife and local fisheries. There is a fish consumption advisory for the St. Lawrence and Grasse Rivers.

The following is a brief summary of the environmental conditions at each of the disposal areas:

A. ALCOA Potliner Disposal Site "I" (6-45-001)

Spent potlining pile "I" received an estimated 32,000 cubic yards of potlining waste from the plant's aluminum smelting operations between 1951 and 1976. Significant quantities of cyanide and fluoride leached from the waste pile over time causing a contravention of groundwater quality in the vicinity of the site. The groundwater migrated to the nearby surface waters of the North and South ditches. The South ditch flows into the "unnamed tributary" (6-45-019), and eventually to the Grasse River. The groundwater has also impacted Robinson Creek, which is a tributary of the St. Lawrence River.

The Inactive Potliner Pile is on the northern portion of ALCOA's very large industrial facility. The site is a likely contributor to the groundwater contamination on the ALCOA property. The only private drinking water wells near by are on Dennison Road where municipal water was provided in 1994 to all potentially affected homes as a permanent remedy. The Grasse River receives waste water and storm water from ALCOA and is contaminated with PCBs. Contaminants have entered the food chain and impact wildlife and local fisheries. There is an advisory for consuming fish from the St. Lawrence and Grasse Rivers.

Analysis of groundwater confirms contamination by benzo(b)fluoranthene, total organic carbon, oil and grease, cyanide and fluoride. Cyanide exceeds the Part 703 groundwater standards in several shallow and deep wells. Cyanide waste has contaminated groundwater and, were it not for the groundwater recovery system currently in operation at the site, could potentially contaminate tributaries to the St. Lawrence River.

B. ALCOA General Refuse Landfill (6-45-002)

The general refuse landfill is a 22 acre site that received approximately 650,000 cubic yards of miscellaneous plant wastes from 1955 to 1990. Contaminants of concern in the waste and/or groundwater include PCBs, chlorinated solvents, polynuclear aromatic hydrocarbons (PAHs) and metals.

The landfill is on the western portion of ALCOA's very large industrial facility. This site is a likely source of on-site groundwater contamination. The closest private water supply wells are on Dennison Road at the opposite side of the ALCOA property where municipal water was installed in 1994. The Grasse River receives waste water and storm water from ALCOA and is contaminated with PCBs. Contaminants have entered the food chain and effected local fisheries. There is an advisory concerning the consumption of fish from the St. Lawrence and Grasse rivers.

C. ALCOA Potliner Disposal Site "A" (6-45-003)

The spent potlining pile "A" was placed in service in 1976 as a replacement for spent potlining pile "I". From 1976 until 1983 approximately 79,000 cubic yards of potlining waste from the plant's

aluminium smelting operation was dumped there. Groundwater in the immediate vicinity of the site was found to be contaminated with cyanide at levels as great as five orders of magnitude above the applicable Part 703 groundwater standards. Exceedances by fluoride were only slightly less than the cyanide contaminant levels.

The potliner pile is in the center of ALCOA's large industrial facility. The site is probably contributing to the groundwater contamination on the ALCOA property. The only residential water supply wells near the site are on Dennison Road where potentially affected homes were provided with municipal water as a permanent remedy in 1994. The Grasse River receives wastewater and storm water from ALCOA and is contaminated with PCBs. Contaminants have entered the food chain and affect wildlife and local fisheries. There is an advisory for consuming fish from the St. Lawrence and Grasse Rivers.

Contaminants of concern in groundwater include cyanide, butylbenzylphthalate, trimethylsilanol, ammonia, total organic carbon, total organic halogens, chloride, fluoride, oil & grease, and sulfate. Flouride, sulfate and cyanide levels exceed applicable groundwater standards in some of the wells.

D. ALCOA - Dennison Road (6-45-004)

This site is located approximately one mile east of the manufacturing operations, in a ravine that was formed by dredge sediments from the Grasse River. From 1969 to 1979, the site was used for disposing drums containing oil sludges, degreasers, and degreaser still bottoms. Waste samples revealed the presence of elevated levels of PCBs, volatile organic compounds (VOCs), and polynuclear aromatic hydrocarbons (PAHs). Groundwater monitoring detected the following compounds at concentrations exceeding Part 703 groundwater standards: metals, PCBs, VOCs, PAHs and phenols. A RI/FS was completed in 1990.

The Dennison Road site is located at the southeast corner of the ALCOA property and is outside of the fenced area. Samples from private drinking water wells on Dennison Road show low levels of contamination related to the ALCOA site. Municipal water was installed as a permanent remedy in 1994 to all potentially affected homes. The Grasse River receives waste water and storm water from ALCOA and is contaminated with PCBs. Contaminants have entered the food chain and affect wildlife and local fisheries. There is an advisory for consuming fish from the St. Lawrence and Grasse Rivers.

Elevated levels of VOCs remain in the groundwater following remediation activities. This contamination is limited to the immediate vicinity of the former waste cell, however, and will be monitored to assess the effects of natural attenuation.

E. ALCOA Wastewater & Waste Oil Lagoons (6-45-005)

This ALCOA site is made up of six operable units: 1) Primary Lagoon/ Dredge - OU1, 2) Sixty Acre Lagoon - OU2, 3) Soluble Oil Lagoon - OU3, 4) Waste Lubricating Oil Lagoon - OU4, 5) Sanitary Lagoon - OU5, and 6) Upaved Plant Roads.

The five waste lagoons are located at the center of ALCOA's very large facility. These lagoons are contributing to the groundwater contamination on the ALCOA property.

Contravention of groundwater standards has been documented. The primary contaminants are PAHs, PCBs, cyanide, and fluoride around the primary lagoon and PCBs, cyanide, and fluoride around the sixty acre lagoon. PAHs, VOCs, and PCBs are found around the soluble oil lagoon & waste lubricating oil lagoon. Waterfowl inhabit these lagoons year round and have been impacted by contaminants.

Primary Lagoon/Dredge (OU1). The 2.4 acre primary lagoon served as a settling basin for wastewater from air emissions scrubbers from 1972 to 1992.

Sixty Acre Lagoon (OU2). The sixty acre lagoon had operated since 1972. It received storm sewer run-off & process cooling waters from each of the manufacturing areas. Contamination was found in fill material that was used to construct the western berm of the lagoon (referred to as the "central fill area").

Soluble Oil Lagoon (OU3). The soluble oil lagoon is 2.8 acres & operated from 1959 to 1986 as a disposal area for waste oils & process waters from rolling mills & saw operations. At one time spent caustics, acids & wax emulsions were dumped here.

Waste Lubricating Oil Lagoon (OU4). The waste lubricating oil lagoon is 1.3 acres and operated from 1969 to 1980. It was a temporary storage basin for waste lubricating oils, grease & oil skimmed off the adjacent soluble oil lagoon.

Sanitary Lagoon (OU5). The sanitary lagoon is 18 acres and served as a settling pond for sitewide sanitary wastewater and limited flows of process water.

Unpaved Plant Roads (OU6). Through the 1950s, 1960s, and 1970s, several miles of unpaved roads were oiled to control dust. The oil was from waste lubricating oil lagoon and the on-site waste oil reservoir and contained PCBs.

F. ALCOA Oily Waste Landfill (6-45-016)

This site was placed into service in 1979 following the closure of the Dennison Road disposal area (6-45-004). It consisted of two pits that were used for disposal and solidification of heavy lubricating oils,

sludges and debris. The first pit was operated from 1979 until 1982, and the second was operated from 1982-'84. In 1980, two dewatering cells were added to handle wastes that contained significant amounts of water. Their operation ceased in 1984 also. Contaminants of concern identified in the waste included PCBs, volatile organic compounds (VOCs), cyanides and phenols. Metals, PCBs, VOCs, polynuclear aromatic hydrocarbons (PAHs), fluoride, and phenols were detected in the groundwater at levels exceeding Part 703 groundwater standards.

The Oily Waste Landfill is located on the western side of ALCOA's very large industrial facility. This site is contributing to the groundwater contamination on the ALCOA property.

G. ALCOA West Marsh (6-45-017)

Process waste from the ALCOA plant was discharged to a storm sewer for a number of years. This process waste effluent was generated from the ingot extrusion area of the manufacturing plant and contained significant contamination by PCB oil from the process equipment. The storm sewer led to a marsh area that is located south of the landfill annex and west of the general refuse landfill. Over time, a significant quantity of PCB laden waste water flowed into the marsh. The quantity of PCB contaminated sediment (at levels above 10 ppm) is currently estimated at 4,000 cubic yards. Plants and animals living in the marsh, especially waterfowl, could have been exposed to the contaminants. Twelve sediment samples were taken at various locations in the marsh in 1988. Analytical results revealed PCB contamination at levels ranging from 10 to 1000 ppm. A surface water sample taken near the outflow section of the marsh revealed PCBs at 1.4 ppb. This value exceeds the established surface water guidelines.

H. ALCOA Unnamed Tributary (6-45-019)

This site consists of 6,154 feet of 60-inch reinforced concrete pipe (RCP) and 7,600 feet of open channel. Historically, the RCP directed stormwater overflows and scrubber water from the smelting operations to the open channel, which eventually discharges to the Grasse River. Beginning in 1997, all flows to the RCP were diverted to a series of new stormwater impoundments. The interior surfaces of the pipe were contaminated with PCBs, PAHs, and cyanide. The bottom of the pipe was severely deteriorated, and these same contaminants were found in soils beneath the pipe at elevated levels. Similar contamination was also present in the channel sediment and surface water, as well as in biota inhabiting the area. The contaminated sediment in this stream may have been contributing to fish contamination in the Grasse and St. Lawrence Rivers. PCB-contaminated sediment was removed from the first 400 feet of the stream in 1990. Removal was completed in the off-site portion in 1998 as well as re-excavation of the first 400 feet.

High levels of PCBs (up to 1800 ppm) and other contaminants had been found in the tributary sediments. The area is extensively inhabited by beavers and other creatures. Elevated levels of contamination may

remain in the local biota following remediation activities.

I. ALCOA East Marsh (6-45-020)

This site received significant surface water discharge from the West Marsh via a pipe beneath the General Refuse Landfill. The area also received surface water run-off from the General Refuse Landfill and the Soluble Oil Lagoon.

J. ALCOA Storage Tank No. 51 (6-45-023)

Storage tank No. 51 (ST-51) is a 70,000 gallon underground concrete vault that was constructed back in 1941. It was originally used as a wet well for soluble oils that were used in a nearby rolling mill. Operations at the rolling mill were discontinued in the 1970s. After that, the vault was used to store soluble oils that were associated with a continuous mill during maintenance shutdowns. At one point it also held sediment and liquid that had been cleaned out of a No. 6 fuel oil tank. The vault was drained in 1990 and was not used after that. Soil surrounding the vault was sampled and found to contain high levels of PCBs. The groundwater in the area was also contaminated by PCBs at levels exceeding the applicable Part 703 groundwater standards (see *Remedial Investigation/Feasibility Study Report for Storage Tank 51*, Camp Dresser & McKee, May 1996).

The area of the storage tank is within the industrial complex. The stained soil surrounding the tank is contaminated with PCBs and there is some evidence this contamination has migrated beyond the storage tank area.

K. ALCOA HPM Press Area (6-45-024)

Historically, the HPM Press Area was a collection of buildings that served primarily to house hydraulic presses utilized in the manufacture of green carbon anodes. The presses were operated from 1942 until 1990, after which time they were taken out of service and demolition of the buildings was initiated. The hydraulic fluids used in the presses contained PCBs, and it was during demolition activities that extensive contamination was discovered on the interior surfaces of the buildings and in the underlying soils. The local groundwater also exhibited elevated levels of PCBs. As part of demolition activities, a large quantity of contaminated soil was removed. A RI/FS was carried out in 1996 and 1997 to characterize the nature and extent of the residual contamination, and to identify appropriate remedial actions.

The HPM press area is at the north end of ALCOA's very large industrial complex. The contaminant of concern in this area is PCBs which have contaminated on-site soils and groundwater. PCBs have been detected in off-site groundwater.

L. ALCOA West Fill Area (6-45-025)

This 25 acre inactive landfill is located in the western portion of ALCOA's 2,700 acre industrial complex. Significant filling of industrial waste, including hazardous waste, occurred between 1942 and 1954. This filling has resulted in the contamination of groundwater which migrates to the Massena Power Canal and storm sewers discharging to the Grasse River. A Phase II site investigation was completed in December 1994. The results of this investigation indicated that further investigation and remediation are necessary. A RI/FS work plan was negotiated after the conceptual site model was finalized. The RI/FS field work was carried out in 1998. Contamination of groundwater and surface water has been confirmed.

M. ALCOA Landfill Annex (6-45-026)

The Landfill Annex was used from 1942 to 1951 and again from 1976 to 1977 for disposing miscellaneous plant wastes. It is estimated that approximately 190,000 cubic yards of waste material is present. Contaminants of concern in the waste and/or groundwater include PCBs, volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), fluoride and metals.

The landfill annex is on the western portion of the ALCOA's very large industrial facility. This site is a likely source of groundwater contamination.

3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

__X__ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the horizontal or vertical dimensions of the "existing area of groundwater contamination").

____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination") - skip to #8 and enter "NO" status code, after providing an explanation.

____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

In January 1985, the DEC entered into a Consent Order with ALCOA to investigate and remediate all areas of hazardous and industrial waste at the facility. Several amended orders have been negotiated and signed since then, the most recent becoming effective April 1992. ALCOA has also entered into an order with the U.S. EPA to address contamination in the Grasse River.

Based on an evaluation of site risks, primarily associated with the migration of contaminants, the major concern (prior to remedy implementation) was ingestion of contaminated drinking water by nearby residents. Cyanide, fluoride, benzene, and other contaminants have been detected in remote, downgradient bedrock monitoring wells. In addition, cyanide and some VOCs have been found in private wells, although well below NYS drinking water standards. Another concern is human consumption of biota from off-site surface water bodies. Elevated levels of PCBs have been detected in the tissue of fish taken from the Grasse River and, as a result, the NYSDOH has issued a fish consumption advisory.

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:

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

Disposal Area	IRM Description
General Refuse Landfill	A leachate collection system was installed in 1989 along the south and east side slopes to intercept contaminant migration to the East Marsh. Collected leachate is shipped off-site for treatment.
West Marsh	In 1990, roughly 8,000 cubic yards of PCB-contaminated sediments were excavated to a depth of 1 to 3 ft and shipped off-site for disposal.
Unnamed Tributary	In conjunction with the West Marsh IRM, approximately 1,500 cubic yards of PCB-contaminated sediments were removed from the first 400 ft of the stream bed and sent of-site for disposal.

The DEC issued a ROD for eight inactive hazardous waste sites associated with the ALCOA Massena Operations facility in March 1991. A second ROD was signed in January 1992 for six additional sites. Since commencing remedial activities in 1991 for these 14 sites, four additional sites have been listed bringing the total number of sites to 18 at the Massena plant.

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

Contaminant	Areas Outside Groundwater Management Units (ppm)	Areas Within Groundwater Management Units (ppm)
1,1,1-Trichlorethane	0.76	7.6
Benzene	0.04	0.4
Tetrachloroethene	0.02	0.2
Trichloroethene	0.13	1.3
Toluene	0.15	1.5
Total Xylene	0.12	1.2
Phenanthrene	2.2	2.2
Pyrene	6.6	6.6
Other PAHs	0.3	0.3
PCBs	1.0	10.0

The following is a brief description of the remedies implemented at each of the disposal areas:

A. ALCOA Potliner Disposal Site "I" (6-45-001)

A Record of Decision (ROD) was signed on March 15, 1991. The ROD called for the site to be "contained in place". Remediation activities began in 1992 with the construction of a soil-bentonite slurry wall around the perimeter of the site. This was keyed into an underground clay stratum which established an inward hydraulic gradient. A leachate collection system was then installed inside the slurry wall. In 1993 a final cover was placed over the site and keyed into the slurry wall. The cover included a composite barrier layer made of a geosynthetic clay liner and a 40-mil high density polyethylene geomembrane. In order to address the contaminated water that was present outside the slurry wall, the DEC issued a second ROD on January 22, 1992. The ROD specified that two collection trenches were to be installed to intercept the water flowing to the North and South ditches. Remedial construction began in July 1992 and was completed in August 1993. A groundwater monitoring program was also started for the purpose of evaluating the performance of both the containment and the collection systems. After the construction activities were completed, the site was reclassified to a "class 4" in the Registry.

B. ALCOA General Refuse Landfill (6-45-002)

On January 22, 1992 a Record of Decision (ROD) was signed by the DEC. The ROD called for the landfill to be contained in place. The work required to contain the landfill in place began in 1993. It included the consolidation and grading of the waste mass, partial construction of an upgradient groundwater diversion trench and a downgradient leachate collection system, both of which were keyed to an underlying clay and/or dense till stratum. The diversion trench and the collection system were completed in 1994, and a final cover was installed. The final cover included a 60 mil high density polyethylene geomembrane barrier layer. A groundwater monitoring program was also initiated to evaluate the performance of the containment system. After these construction activities were completed, the site was reclassified to a "class 4" in the Registry. This reclassification took place in February 1995. Leachate collection system is in operation, and O&M has started.

C. ALCOA Potliner Disposal Site "A" (6-45-003)

A Record of Decision (ROD) was signed on March 15, 1991. The ROD called for the excavation of the waste so that it could be transferred to the ALCOA on-site secure landfill. Approximately 95% of the waste was removed during the 1994 construction season. During the 1995 construction season the remaining waste was excavated along with two feet of underlying soil that was highly contaminated with cyanide and fluoride. In order to address the contaminated groundwater plume beneath the site, ALCOA constructed a groundwater recovery system. This system was comprised of four collection trenches dug parallel to each other. To enhance the effectiveness of the system, stormwater retention ponds with central infiltration galleries were constructed between the trenches. The entire system was placed on-line in late 1996. A

groundwater monitoring system was initiated in order to evaluate the system's performance. After all the construction activities were completed here, the site was reclassified to a class "4".

D. ALCOA - Dennison Road (6-45-004)

A ROD was issued on March 15, 1991. The ROD required that the waste be excavated and placed in ALCOAs "on-site secure landfill" or sent off-site for treatment, depending upon compliance with the land disposal restrictions (LDRs). Remedial activities were carried out during the 1994 and 1995 construction seasons. Activities involved the excavation of an estimated 62,000 cubic yards of waste and contaminated soil and also 6,959 drums. The empty drums were disposed in the secure landfill along with the waste and soil. The contents of the remaining drums were consolidated according to visual classification and tested for LDRs. Whatever material failed the LDRs was shipped off-site for treatment. Excavation continued until verification sampling indicated that the clean-up goals specified in the ROD were achieved. The site was then backfilled and covered with a geosynthetic clay liner (GCL). In 1994, the municipal water supply was extended to include residents along Dennison Road. Further, a series of bedrock monitoring wells were installed east (downgradient) of Dennison Road to monitor conditions upgradient of a number of residences on Horton Road. These wells are monitored annually and have exhibited no evidence of contamination. Following construction activities, the site was reclassified to a class 4 registry site. Five years of groundwater monitoring indicates that contamination is limited to slight exceedences of Part 703 drinking water standards for a couple of VOCs. A class 5 designation is being proposed.

E. ALCOA Wastewater & Waste Oil Lagoons (6-45-005)

Primary Lagoon/Dredge (OU1). The ROD was issued in March 1991. The selected remedy consisted of: (1) excavation of dredge spoils, lagoon sludge, and underlying soil, (2) solidification and placement of excavated materials in an on-site secure vault, and (3) backfilling and capping of the excavated area. In January 1995, the ROD was amended to allow ALCOA to *contain in-place* solidified wastes with PCBs less than 50 ppm. Construction was completed in November 1996 and subsequent monitoring indicates no significant impact to groundwater and any contamination is being addressed by the adjacent Pile A recovery system.

Sixty Acre Lagoon (OU2). The ROD was issued on January 22, 1992. The selected remedy includes: 1) treatment of PCB contaminated sludges to a level of 50 ppm or less; 2) solidification and containment of the treatment residuals and PCB contaminated sediments; 3) in-place containment of PCB contaminated sediment; and 4) wetlands mitigation. In December 1999, the ROD was amended to allow alternative management options for the sludge. Sludge with PCB concentrations greater than 50 ppm would be solidified and placed in the on-site secure vault. In addition, sludge with PCB concentrations between 10 and 50 ppm would be solidified and consolidated on a lined shelf within the footprint of the

lagoon. The shelf design included a HDPE cap and leachate collection system. Construction was completed in 2000.

Soluble Oil Lagoon (OU3). The remedy consisted of: (1) dewater lagoon and treat water to facility discharge requirements, (2) excavate sludge and underlying soils and treat the waste by solvent extraction, (3) incinerate extracted contaminants at a permitted off-site facility, (4) treated residuals will be placed in on-site vault, (5) backfill with clean soil and cap. In 1994, an amendment to the ROD was issued by DEC to add anaerobic thermal treatment process for treatment of PCB-contaminated materials as an option to the solvent extraction process specified in the 1991 ROD. In April 2000, the ROD was again amended to allow the dewatered sludges to be treated *in situ* with either calcium sulfate or cement, then excavated, after curing, and disposed of in the on-site secure landfill. Design and construction began in 2000 and will be completed in 2001.

Waste Lubricating Oil Lagoon (OU4). The waste lubricating oil lagoon was a temporary storage basin for waste lubricating oils, grease & oil skimmed off the adjacent soluble oil lagoon. An amended ROD was issued on January 22, 1992. In October 1997, the solidified material was excavated & disposed of in the on-site secure landfill. A final cover system will eventually be installed in conjunction with remediation of the soluble oil lagoon.

Sanitary Lagoon (OU5). The ROD was issued on January 22, 1992. A ROD amendment was issued in September 1996. The selected remedy includes: 1) treatment of PCB contaminated sludge to a level of 25 ppm; 2) solidification and containment of the treated residuals and sediments; 3) in-place containment of PCB contaminated sediments less than 10 PPM; and 4) mitigation of wetlands. In 1996, the water in the lagoon was decanted for treatment and the sludge was dredged, solidified, and placed in the on-site secure landfill. A lined stormwater retention basin was then constructed in the area.

F. <u>ALCOA Oily Waste Landfill (6-45-016)</u>

A ROD was issued on March 15, 1991. The ROD required that the waste was to be excavated and put into ALCOA’s on-site secure landfill, or sent off-site for treatment depending upon compliance with land disposal restrictions (LDRs). In 1995, 20,000 cubic yards of waste and contaminated soil were excavated, including 3,575 drums. The empty drums were disposed in the secure landfill along with the waste and soil. The contents of the remaining drums were consolidated and tested for LDRs. The material that failed the LDRs was sent off-site for treatment. Excavation continued at this site until the clean up goals specified in the ROD were achieved. The site was then backfilled and covered with a geosynthetic clay liner. Elevated levels of VOCs remain in the groundwater following remediation activities. The site has been assigned a "class 4" Registry designation until such time that monitoring indicates that the residual groundwater contamination has been reduced.

G. ALCOA West Marsh (6-45-017)

In 1990, an IRM was undertaken which involved the removal of 8,000 cubic yards of sediment to a depth of 1 to 3 ft and subsequent transport off-site for disposal. In 1993, in accordance with the March 1991 ROD, the remaining sediments with PCB concentrations above 1 ppm were removed and placed into the adjacent Landfill Annex. This area was then backfilled and capped. There are no remaining environmental problems associated with the disposal of hazardous waste at this site. Remedial construction was completed in September 1993 and the site was delisted in February 1995.

H. ALCOA Unnamed Tributary (6-45-019)

In 1990, ALCOA removed 1,500 cubic yards of sediment from the first 400 ft of the channel as an IRM. A ROD was signed on March 15, 1991 to address the contamination in the remainder of the channel. As prescribed in the ROD, the interior surfaces of the concrete pipe were pressure washed, and contaminated soil was excavated from beneath the pipe until cleanup goals were achieved. The concrete pipe was slip-lined, and the annular space between the pipes was grouted. Sediment was excavated from the sidewalls and bottom of the channel until cleanup goals were achieved. The channel was returned to the original grade and vegetated. Construction was completed in December, 1998. Biological monitoring will be conducted in the channel for at least five years to evaluate the effectiveness of the remedy.

I. ALCOA East Marsh (6-45-020)

In accordance with the January 22, 1992 ROD, the sediments and underlying soils were excavated for placement in the on-site secure landfill. Construction was completed by the fall of 1994. During the 1994 construction, the contaminated sediments and underlying soil was excavated until a PCB concentration of less than 1 ppm was achieved. The area was then backfilled , capped, and converted to an upland. The site has been remediated to the satisfaction of DEC. There are no environmental problems remaining associated with the disposal of hazardous waste. The site was delisted in 1995.

J. ALCOA Storage Tank No. 51 (6-45-023)

A ROD was signed in August 1996. The ROD called for the tank and an associated pipe chase to be closed and left in place, and for the surrounding contaminated soil to be excavated and disposed in the ALCOA secure landfill. Work to complete this ROD requirement was done in September and October of 1996. After draining the remaining liquid and sludge from the tank and pipe chase, both were refilled with flowable fill concrete. The contaminated soil was excavated down to a level where ROD prescribed clean-up goals were achieved. This area was then backfilled and paved. A groundwater monitoring program was put in place in order to evaluate the effectiveness of the remedy. Remediation was completed in 1996. After the construction activities were completed,

the site was reclassified to a "Class 4" in the Registry. Elevated levels of PCBs and VOCs remain in the groundwater following the remediation activities. Monitoring is in progress.

K. ALCOA HPM Press Area (6-45-024)

A ROD was signed in March 1998, and design and construction activities were completed in the summer and fall of 1998, respectively. As prescribed in the ROD, PCB-contaminated soil and debris was excavated to a cleanup goal of 25 ppm. The area was then backfilled and capped utilizing a high density polyethylene (HDPE) geomembrane barrier layer and an asphalt wearing surface. Groundwater monitoring is underway, and provisions are in place for collection and treatment whenever water levels rise into permeable backfill and PCB concentrations exceed groundwater quality standards.

L. ALCOA West Fill Area (6-45-025)

Contamination of groundwater and surface water has been confirmed. RI/FS field work is completed, and the ROD has been issued. In 2000, contamainted hot spots were excavated and the material disposed in the on-site secure vault. The excavations were backfilled and covered with clean soil. Groundwater, surface and air monitoring is ongoing and the site was reclassified to a class 4.

M. ALCOA Landfill Annex (6-45-026)

On January 22, 1992, a ROD was signed calling for containing the landfill in place. Work was carried out in 1993, and included the consolidation of and grading of the waste mass, construction of a soil-bentonite perimeter slurry wall which was keyed into an underlying clay or dense till stratum. A leachate collection system was installed inside the slurry wall. A final cover was then constructed over the landfill which included a 60-mil high density polyethylene geomembrane barrier layer. All of the remedial work was determined to be complete in 1994. A groundwater monitoring program was begun in order to evaluate the performance of the containment system. Upon completion of the construction activities the site was reclassified to a class 4 registry site. Remediation of the site was completed in 1993 and should effectively limit environmental problems.

Data collected under the groundwater monitoring program demonstrate that the groundwater extraction systems are hydraulically containing the plume and that no significant off-site migration is occurring.

4. Does "contaminated" groundwater discharge into surface water bodies?

__X__ If yes - continue after identifying potentially affected surface water bodies.

____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Based on the results of past groundwater investigations performed at the site, shallow groundwater in the overburden discharges to surface water at various locations including the Massena Power Canal, the Grasse River, Robinson Creek, and the on-site lagoons and marshes. As a result of the remedial actions that have been taken at the site, contaminated groundwater which discharges to the surface within the central portion of the plant site is collected, along with storm water, treated and then discharged to the Grasse River via a 60-inch outfall pipe. This discharge is monitored under an existing SPDES permit.

In some areas, downward hydraulic gradients exist which allow overburden groundwater to discharge to the bedrock aquifer. In the facility areas adjacent to the Power Canal and Grasse River, bedrock groundwater flows toward these major discharge areas. Groundwater flow rates in the bedrock may be as high as 55,000 ft per year. In 1994, a series of bedrock monitoring wells were installed east (downgradient) of Dennison Road. These wells are monitored annually and have exhibited no evidence of contamination.

The Grasse River is contaminated with PCBs. Contaminants have entered the food chain and affected wildlife and local fisheries. There is a fish consumption advisory for the St. Lawrence and Grasse Rivers.

5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

__X__ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

Based on the results of recent groundwater sampling from monitoring wells located downgradient of the on-site disposal areas and east (downgradient) of Dennison Road, there is a slight possibility that some contaminants in the bedrock aquifer may be entering the Power Canal and the Grasse River. While there may some bedrock contamination, it is considered minimal and no action is to be taken by the DEC. Monitoring of bedrock wells will continue.

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the discharge of "contaminated" groundwater into surface water be shown to be "currently acceptable" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

___ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/ habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

___ If no - (the discharge of "contaminated" groundwater can not be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

___ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s): _____

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

__X__ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

____ If no - enter "NO" status code in #8.

____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

In accordance with the Operation, Maintenance & Monitoring (OM&M) Plan for the site, sampling of groundwater from monitoring wells on-site and on adjacent properties for VOCs by EPA Method 8260 is performed semi-annually. Additional wells are sampled on an annual basis.

Results to date from the site-wide monitoring well network show a decreasing trend in VOC concentrations in the sampled wells, indicating that the plume is being contained and is not migrating. Annual reports are submitted for all of the sites and reviewed for trends.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

X YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Aluminum Company of America (ALCOA) facility located at Park Avenue East, Massena NY. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater". This determination will be re-evaluated when the State becomes aware of significant changes at the facility.

___ NO - Unacceptable migration of contaminated groundwater is observed or expected.

___ 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

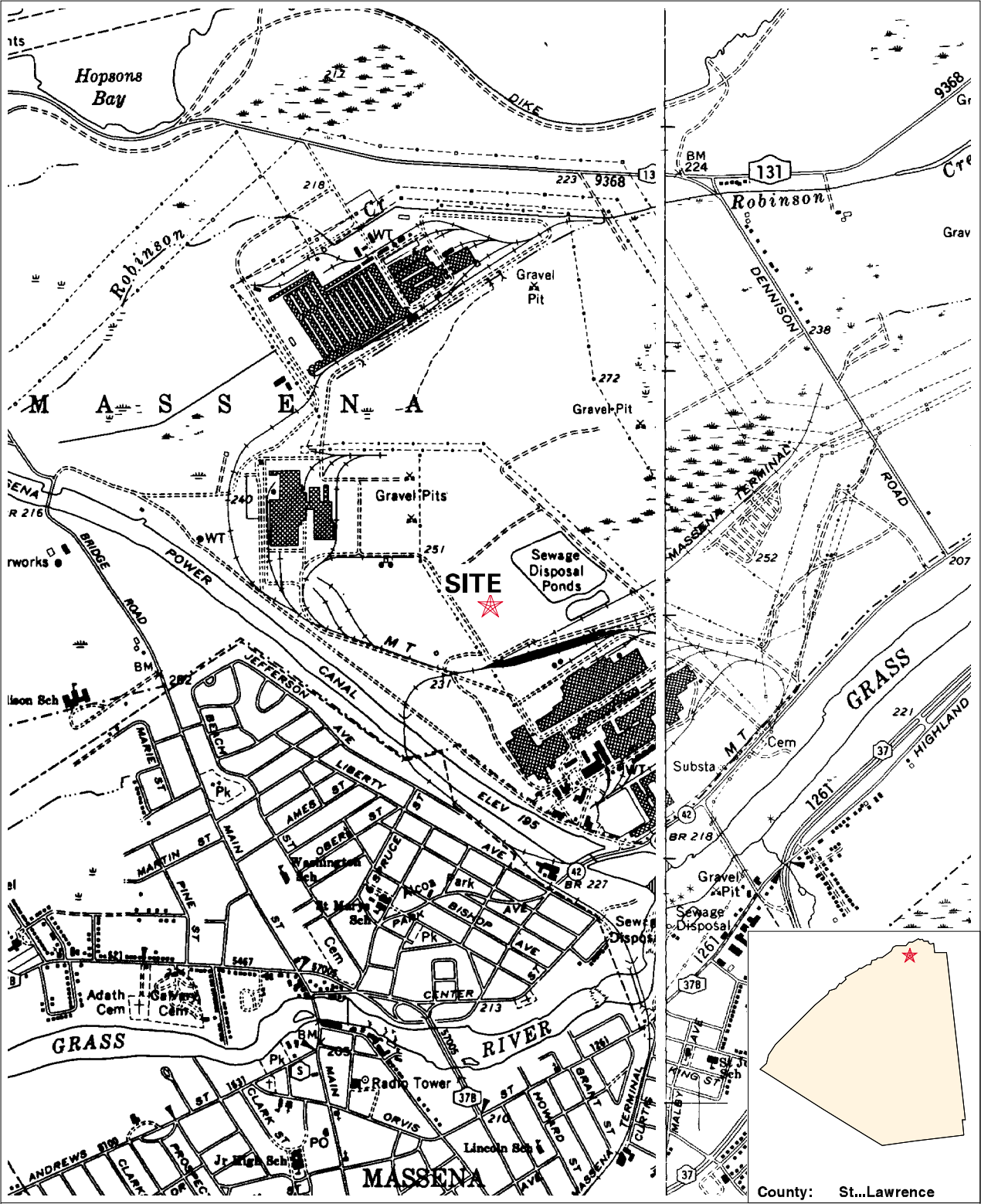
Director _____ Date _____
Paul J. Merges, Ph.D.
Bureau of Radiation and Hazardous Site Management
Division of Solid and Hazardous Materials

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



Site Location Map

645002 ALCOA General Refuse Landfill

NYSDOT Planimetric Quadrangle(s):
RAQUETTE RIVER, MASSENA

N

0 500 1000 1500 2000
FEET

Scale 1:24,000