

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Current Human Exposures 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 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).

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

Page 2

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)?

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

 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):

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 area 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

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).

²Recent 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.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

Page 3

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

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, 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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 4

Disposal Area	Affected Media	Contaminants of Concern
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
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 volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), phenols, polychlorinated biphenyls (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.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 5

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, 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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 6

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. Fluoride, 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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 7

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, VOCs, cyanides and phenols. Metals, PCBs, VOCs, 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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 8

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 9

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, VOCs, 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.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 10

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”	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	<u>no</u>	<u>no</u>	<u>no</u>	<u>no</u>			<u>no</u>
Air (indoors)	<u> </u>	<u> </u>	<u> </u>				
Soil (surface; <2 ft)	<u>no</u>	<u>no</u>	<u>no</u>	<u>no</u>	<u>no</u>	<u>no</u>	<u>no</u>
Surface Water	<u>no</u>	<u>no</u>			<u>no</u>	<u>no</u>	<u>yes</u>
Sediment	<u>no</u>	<u>no</u>			<u>no</u>	<u>no</u>	<u>no</u>
Soil (subsurface, >2 ft)				<u>no</u>			<u>no</u>
Air (outdoors)	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>		

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.

___ 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).

X If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation. Surface Water

___ If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 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

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 11

also entered into an order with the U.S. Environmental Protection Agency (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:

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 off-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:

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

Page 12

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 13

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 ALCOA's "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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 14

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 was 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.

Unpaved Plant Roads (OU6). In 2000, ALCOA excavated several segments of unpaved roads and disposed of the PCB-contaminated material in the on-site secure landfill. Many of the roads were abandoned by backfilling them with clean fill and seeding. Others were backfilled and paved for continued use by plant vehicles.

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

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 15

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 16

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, contaminated 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.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 17

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)?

 X 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):

In 1993, the TRC Environmental Corporation prepared a baseline human health risk assessment (BLRA) for the Aluminum Company of America (ALCOA) industrial facility located in Massena, NY. In June 2001, ALCOA submitted a letter to the EPA that outlined proposed changes to the BLRA. An updated risk assessment (RA) was submitted by ALCOA in 2002 to address the proposed changes. This RA utilizes data collected subsequent to the 1993 report, as well as exposure and toxicity factors that reflect current scientific and regulatory policy and conditions at the contaminated parts of the ALCOA facility (Study Area). The RA has been reviewed and approved by EPA-Region 2.

The 1993 BLRA identified PCBs as the primary constituent of concern for the Study Area, and, therefore, the RA submitted in 2001 has focused on PCBs only. Exposure pathways evaluated in the RA were the same as for the BLRA, including ingestion of fish by anglers, incidental ingestion of and dermal contact with sediment by recreational users and anglers from the St. Regis Mohawk Tribe (SRMT), and both incidental ingestion of and dermal contact with surface waters by recreational users. Like the BLRA, the RA found that the only exposure pathway of unacceptable risk to humans is through consumption of fish from the lower Grasse River.

In 1990, the New York State Department of Health issued a specific, restrictive fish advisory for the Grasse River, from the mouth of the river to the dam in Massena: Eat no more than one (one half pound) meal per month of smallmouth bass, brown bullhead, and walleye.

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.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 18

Women of childbearing age, infants and children under the age of 15, however, were advised to not eat any fish from this river stretch. In 1993, the advisory was changed to recommend that from the mouth of the Grasse River to the Massena Power Canal, no meals of any species of fish should be eaten, by any segment of the population. This advisory remains in effect in the current (2002/2003) advisories and is listed in the New York State Department of Environmental Conservation Fishing Regulation Guide, which is provided to all persons obtaining a fishing license.

Based upon the results of the Risk Assessment, the published NYSDOH fish consumption advisory, and upon consultation with corrective action program personnel at EPA-HQ, it is EPA's position that adequate measures have been established at the ALCOA facility to control unacceptable human health exposure to contamination with regard to the consumption of fish from the lower Grasse River and other immediate downstream water bodies.

It should be noted that a determination of 'Human Exposure Controlled' is an interim corrective action milestone and does not state, explicitly or implicitly, that all needed remedial measures have been done. Indeed, some type of sediment control (i.e., removal and/or capping) should be studied to determine if more permanent and effective controls can be installed. EPA, together with the New York State Department of Environmental Conservation, will be evaluating the final remedy measures for the site.

Page 19

_____ 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

[illegible]

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 20

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 Aluminum Company of America (ALCOA) facility located at Park Avenue East, 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 _____
Edwin Dassatti, P.E.
Bureau of Solid Waste and Corrective Action
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.