ROD FILE
MET
1/17/92

RECORD OF DECISION

for

THE ALUMINUM COMPANY OF AMERICA
MASSENA OPERATIONS
MASSENA, NEW YORK

prepared by

THE NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION - REGION 6
WATERTOWN, NEW YORK

JANUARY 1992

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I. INTRODUCTION

This document is the second Record of Decision (ROD) to be issued concerning the remediation of hazardous waste at the Aluminum Company of America (ALCOA) facility in Massena, New York. Of the 14 areas of concern identified in previous investigations, the following 6 locations are the focus of this report:

Waste Lubricating Oil Lagoon - 645005, Unit 2
General Refuse Landfill - 645002, Unit 1
Landfill Annex - 645002, Unit 2
Sanitary Lagoon - 645005, Unit 5
60 Acre Lagoon - 645005 Unit 4
East Marsh - 645020

The other 8 sites were addressed in the first ROD, which was published in March 1991.

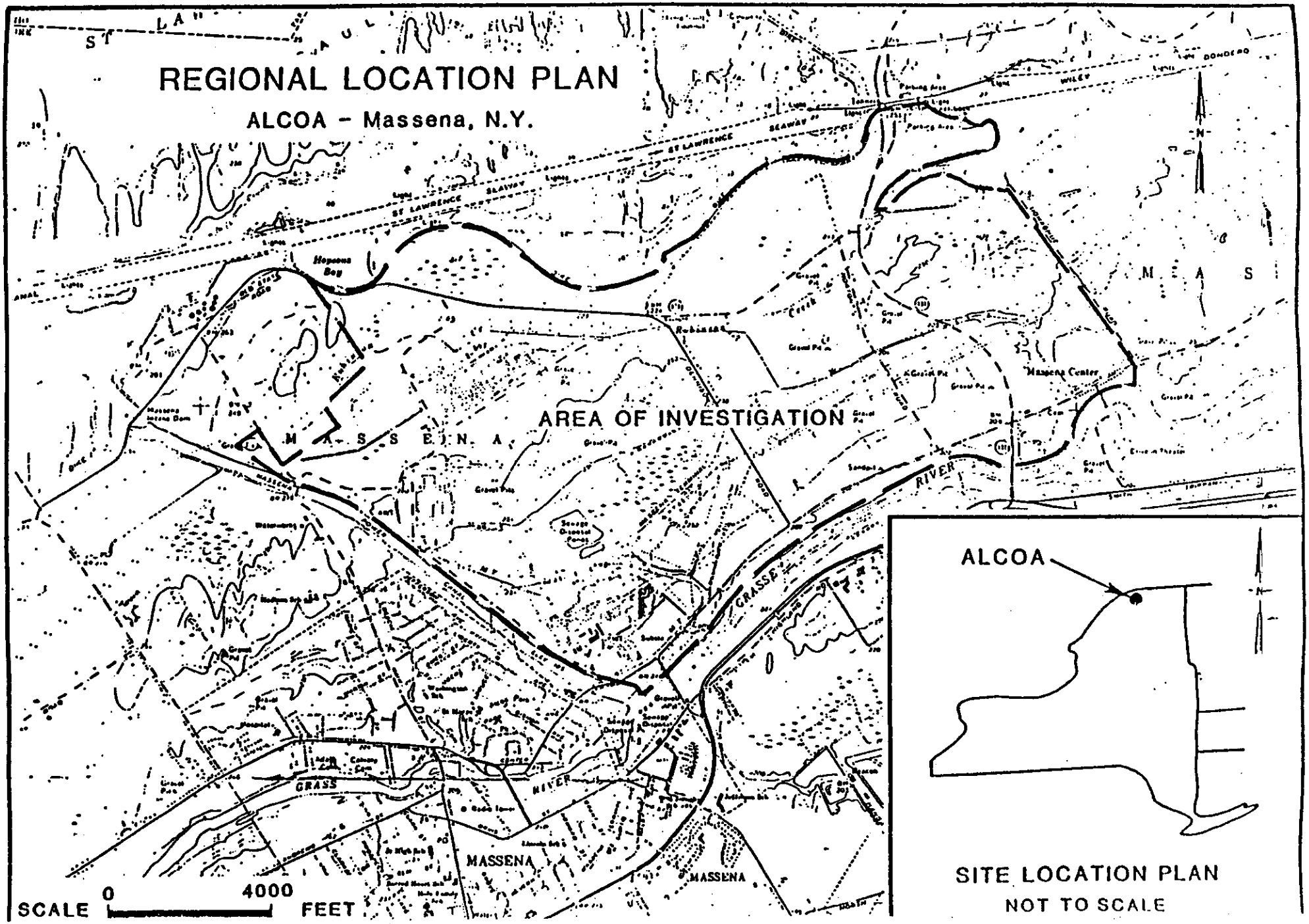
This document has been assembled as authorized by ECL Article 27, Title 13 (the New York State Superfund Program), and in accordance with New York State Department of Environmental Conservation (NYSDEC, the Department) and United States Environmental Protection Agency (USEPA) guidelines. Much of the information has been provided by ALCOA's consultant, Engineering-Science. The selected remedies are essentially those recommended by the NYSDEC in the November 30, 1990 Proposed Remedial Action Plan (PRAP). Any modifications are the result of comments received during the recently concluded public review period.

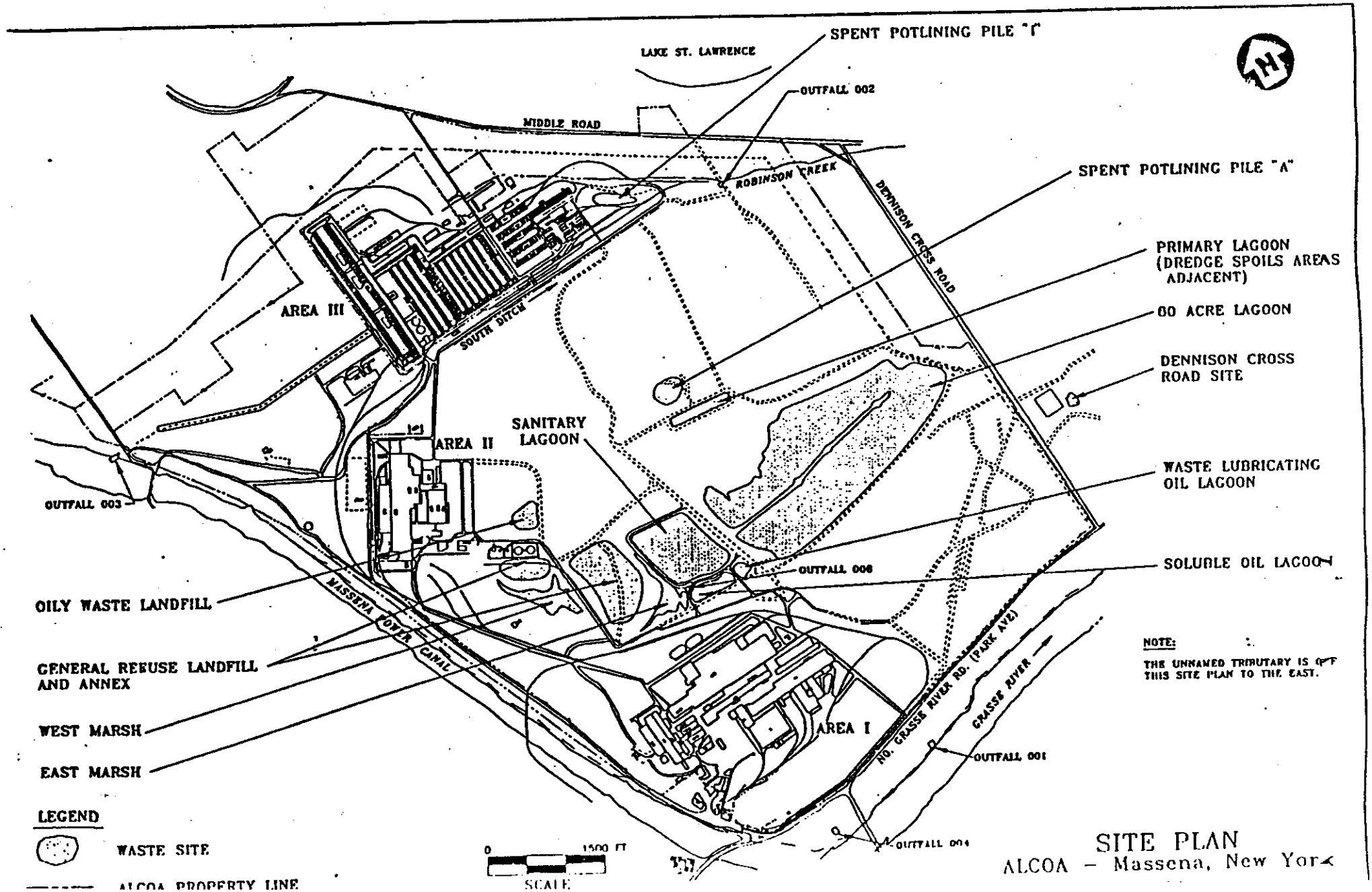
II. SITE LOCATION AND DESCRIPTION

ALCOA's Massena Operations are located on 3,500 acres in the Town of Massena, St. Lawrence County, New York (Figures 1 and 2). 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 (population 15,000) 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. Water in this area is furnished by private wells.

The site topography is generally characterized by two northeast/southwest trending ridges surrounded by relatively low-lying areas. The subsurface geology consists of 50 to 150 feet of unconsolidated deposits overlying bedrock. More specific information on the environmental setting was provided in the PRAP.

FIGURE 1


REGIONAL LOCATION PLAN
ALCOA - Massena, N.Y.
AREA OF INVESTIGATION
MASSENA
GRASSE RIVER
SCALE 0 4000 FEET
ALCOA
SITE LOCATION PLAN
NOT TO SCALE


SPENT POTLINING PILE "F"
LAKE ST. LAWRENCE
OUTFALL 002
MIDDLE ROAD
ROBINSON CREEK
DENNISON CROSS ROAD
SPENT POTLINING PILE "A"
PRIMARY LAGOON (DREDGE SPOILS AREAS ADJACENT)
00 ACRE LAGOON
DENNISON CROSS ROAD SITE
AREA III
SOUTH DITCH
AREA II
SANITARY LAGOON
WASTE LUBRICATING OIL LAGOON
OUTFALL 003
OUTFALL 006
SOLUBLE OIL LAGOON
OILY WASTE LANDFILL
MASSENA POWER CANAL
GENERAL REFUSE LANDFILL AND ANNEX
WEST MARSH
EAST MARSH
AREA I
NO. GRASSE RIVER RD. (PARK AVE.)
GRASSE RIVER
OUTFALL 001
OUTFALL 004
NOTE:
THE UNNAMED TRIBUTARY IS OFF THIS SITE PLAN TO THE EAST.
LEGEND
WASTE SITE
ALCOA PROPERTY LINE
0
1500 FT
SCALE
SITE PLAN
ALCOA – Massena, New York

III. SITE HISTORY

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 at a number of locations throughout the facility, as the table below indicates.

TABLE 1
HISTORY OF WASTE DISPOSAL

DISPOSAL LOCATION	PERIOD OF OPERATION
Oily Waste Landfill	1979-1984
Spent Potlining Pile I	1951-1976
Spent Potlining Pile A	1976-1983
Primary Lagoon and Dredge Spoils Area	1972-Present
Soluble Oil Lagoon	1959-1986
Waste Lubricating Oil Lagoon	1969-1980
Dennison Road	1969-1979
Unnamed Tributary	1958-Present
West Marsh	Unknown
General Refuse Landfill	1955-1990
Landfill Annex	1942-1951; 1976-1977
60 Acre Lagoon	1972-Present
Sanitary Lagoon	1962-Present
+Alleged Asbestos (Dross) Disposal Area	1955-1977
East Marsh	Unknown

+No longer considered a hazardous waste site.

In 1985, ALCOA initiated a remedial investigation (RI) to characterize the nature and extent of contamination at each of these disposal sites, 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 in order to fill existing data gaps or confirm earlier findings. Table 2 provides a chronological history of these investigations.

TABLE 2
REMEDIAL INVESTIGATION HISTORY

INVESTIGATION	DATE
Waste Site Investigation	Summer 1985-03/87
Supplemental Field Investigation	10/87-03/88
West Marsh Field Investigation	09/88-10/88
Comprehensive Biota Sampling Program	07/89-06/90
General Refuse Landfill & Annex Inves.	11/89-01/90
Bedrock Monitoring Well Program	11/89-01/90
Groundwater Modeling Program	11/89-Summer 1991

In conjunction with this work, a series of treatability studies have also been performed. These involve the application of a variety of treatment technologies to the wastes or contaminants of concern at the ALCOA facility to aid in selecting suitable remedies. Some studies are ongoing, though much of the work has been completed.

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. Each is discussed briefly below:

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 presently being shipped off-site for treatment.

West Marsh

In the Fall of 1990, roughly 8,000 cubic yards of PCB-contaminated sediments were excavated to a depth of 1 to 3 feet 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 feet of the stream bed. This waste was also sent off site for disposal.

IV. CURRENT STATUS

Upon completion of the initial field investigations, it was determined that the Alleged Asbestos (Dross) Disposal Area did not contain hazardous waste. Accordingly, it was closed pursuant to Solid Waste regulations (6 NYCRR Part 360).

With respect to the other sites, the presence of hazardous waste was confirmed. Each has been listed as a Class 2 site on the state-wide Registry of Inactive Hazardous Waste Disposal Sites. This designation indicates that existing conditions pose a significant threat to public health or the environment, and action is required.

Hazardous waste was also found in a section of the Grasse River adjacent to the facility. Further investigation and remediation of this area is under the management of the USEPA.

On March 15, 1991, the Department issued a ROD for the Oily Waste Landfill, Spent Potlining Piles I and A, the Primary Lagoon/Dredge Spoils Area, the Soluble Oil Lagoon, Dennison Road, the Unnamed Tributary, and the West Marsh. This document specified the remedial alternatives that will be implemented to address the contaminant source at each of these sites. The selection of groundwater remedies was reserved for this report.

This report will also present recommendations for the remediation of both the contaminant sources and impacted groundwater at all of the remaining sites (the Waste Lubricating Oil Lagoon, the General Refuse Landfill and Annex, the Sanitary and 60 Acre Lagoons, and the East Marsh). General information concerning each of these disposal areas is provided below, and summarized in Table 3.

SITE CHARACTERISTICS

WASTE LUBRICATING OIL LAGOON

The Waste Lubricating Oil Lagoon is 1.2 acres in size, and was operated from 1969 to 1980 as a temporary storage basin for waste lubricating oils generated in the manufacturing areas of the plant and oil skimmed from the adjacent Soluble Oil Lagoon.

Beginning in 1980, all floating oil and sludge was removed, and the remaining waste was solidified in-place with sand, fill, and cement dust. In 1982, a clay and topsoil cap was applied.

The site contains an estimated 19,000 cubic yards of solidified material, contaminated with PCBs, solvents and phenols.

The site is underlain by approximately 5 to 8 feet of a very soft to stiff, sandy silt and clay deposit. The stratigraphy of the underlying deposits, from top to bottom, is characterized by is a thin layer of peat; a four foot thickness of stiff to very stiff, sandy silty clay; 17 feet of moderate to dense, sandy till; and 56 feet of a dense to very dense, silty till. Bedrock is approximately 80 to 90 feet beneath the lagoon.

Shallow groundwater flows to the west toward the Soluble Oil Lagoon and to the north toward the Sanitary Lagoon.

The following discussion indicates the types of contaminants that have been detected, at levels exceeding water quality standards, in groundwater samples collected in the vicinity of the Waste Lubricating Oil Lagoon and the Soluble Oil Lagoon. In the shallow groundwater flow system, the presence of VOCs, PAHs, PCBs, phenols, fluoride, cyanide and metals has been reported. Groundwater samples collected from intermediate depth wells contained PAHs, PCBs, phenols, fluoride, cyanide and metals. PAHs, PCBs, phenols and metals were detected in groundwater samples collected from the bedrock/till interface zone.

GENERAL REFUSE LANDFILL

The General Refuse Landfill is a 22-acre site located in the south-central portion of the facility. Since its opening in 1955, it has been used for the disposal of miscellaneous industrial and hazardous waste, including asbestos, green potliner, PCBs, and solvents. An estimated 650,000 cubic yards of material is present.

Between 1987 and 1990, intermediate cover was applied to areas of the site which had reached final grade. The site stopped receiving waste altogether in the fall of 1990, and work on the intermediate cover was completed.

A leachate collection system installed around a portion of the site in 1989 currently collects an average of 10,000 gallons of leachate per day, with some seasonal fluctuation.

The northern portion of the site is underlain by a sand and gravel deposit whose thickness varies from approximately 0 to 15 feet. The deposit thins to the south to the extent that it is only present beneath the northern site area. The central and southern portions of the site are underlain by a silt and clay deposit whose thickness may be as great as 30 feet. The sand and gravel deposit and the silt and clay deposit are underlain by approximately 50 to 80 feet of glacial till.

In general, groundwater beneath the landfill flows to the southeast to discharge to the East Marsh. In addition, ALCOA's consultant believes that a groundwater divide between the West Marsh and East Marsh may exist beneath the road on the west side of the landfill. If it does exist, groundwater west of the road flows westward to discharge to the West Marsh. Groundwater at depth in the till flows downward toward the bedrock aquifer.

The following discussion indicates the types of contaminants that have been detected at levels exceeding water quality standards, in groundwater samples collected at the site. The analyses of shallow groundwater samples collected in the vicinity of the site have detected the presence of Volatile Organic Compounds (VOCs), PAHs, PCBs and metals at levels exceeding water quality standards.

LANDFILL ANNEX

The Landfill Annex is a 5-acre site containing approximately 190,000 cubic yards of material. Although background information is limited, it appears that the site was utilized during the 1940's and again in the mid-1970's for the disposal of miscellaneous industrial and hazardous waste. No record of closure activities exists, although the area is covered and heavily vegetated with weeds and brush.

The site is immediately underlain by approximately 3 to 8 feet of sand and gravel. In the western portion of the site, the sand and gravel unit is underlain by approximately 0 to 4 feet of clay and the clay is underlain by glacial till. In other site areas, the sand and gravel rests directly upon the till. The till is approximately 80 feet thick beneath the site.

Shallow groundwater beneath the waste flows to the west and south to discharge to the West Marsh. Groundwater at depth in the till flows downward toward the bedrock aquifer.

The following discussion indicates the types of contaminants that have been detected at levels exceeding water quality standards, in groundwater samples collected at the site. The analyses of shallow groundwater samples collected in the vicinity of the site have detected the presence of VOCs, PAHs, fluoride and metals at levels exceeding water quality standards.

SANITARY LAGOON

The Sanitary Lagoon is approximately 18 acres in size, and it has been in operation since 1962. It is used primarily to treat sanitary wastewater and storm water, although records indicate it also received process water in the past. Surface water from the lagoon is discharged through an interior point (Outfall 006) to Outfall 001, where it is released to the Grasse River. Chlorine treatment is provided between May and September. An estimated 34,000 cubic yards of PCB-contaminated sludge is present. The site is used by waterfowl as a resting and feeding area year-round.

The site is underlain by approximately 20 feet of a sandy, silt and clay deposit. The silt and clay is underlain by approximately 14 feet of moderate to dense sandy till, which is underlain by approximately 58 feet of dense to very dense silty till. The underlying bedrock is believed to occur at a depth of approximately 90 to 95 feet.

Shallow groundwater flows to the west to discharge to the East Marsh. Groundwater at depth in the till flows downward toward the bedrock aquifer.

The concentrations of PCBs in the sludge range between 0 and 560 ppm. Fluoride, as well as low levels of volatiles and PAHs are also present.

The following discussion indicates the types of contaminants that have been detected at levels exceeding water quality standards, in groundwater samples collected at the site. The analyses of shallow groundwater samples collected in the vicinity of the site have detected the presence of PAHs, PCBs, phenols, fluoride, cyanide and metals at levels exceeding water quality standards.

PCBs and volatiles have been detected in the surface water above standards.

60 ACRE LAGOON

The 60 Acre Lagoon is actually 83 acres in size, and it has been in operation since 1972. It currently receives the effluent from the Primary Lagoon, stormwater runoff, and process cooling water from the Ingot-Extrusion and Fabricating Areas. It contains approximately 194,00 cubic yards of PCB-contaminated sludge.

The 60 Acre Lagoon is located in the valley between the central and southern ridges. The site is immediately underlain by a silt and clay unit whose thickness has been reported to range from 2 to 26 feet. The unit contains some sandy silt lenses and is thin or absent along the flanks of the ridges but increases in thickness toward the center of the valley. As much as 10 feet of a sand and silt unit blankets the ridges. Its thickness decreases toward the valley, but it is believed to underlie the silt and clay unit. These units are underlain by approximately 10 to 40 feet of a moderate to dense sandy till. The sandy till is underlain by approximately 50 to 60 feet of dense to very dense silty till. Depth to bedrock at the site is believed to be approximately 100 feet.

The 60 Acre Lagoon behaves as a discharge zone for the shallow groundwater flow system. However, it is believed that shallow groundwater flows through the berm at the east end of the site and may discharge to surface water and/or shallow groundwater. Along the edges of the valley where the silt and clay layer thins out or is absent, groundwater may flow downward through the sand and silt unit. Groundwater at depth in the glacial till flows downward toward the bedrock aquifer.

A dike constructed along the centerline of the lagoon separates the site into two sections. Approximately 110,000 cubic yards of sludge are present in the northern half, at depths of 8 to 74 inches. Roughly 50,000 cubic yards exist within the initial 800 feet of the influent end. Cyanide, fluoride, PAHs, and PCBs at concentrations up to 2,690 ppm have been detected in the sludge. The levels of these contaminants are highest at the influent end, and generally decrease with distance and depth. 84,000 cubic yards of sludge are present in the southern half, at depths of less than 1 foot. Contaminant concentrations are also much lower, with only one PCB reading above 25 ppm.

The following discussion indicates the types of contaminants that have been detected, at levels exceeding water quality standards, in groundwater samples collected at the site. The contaminants detected in the shallow groundwater flow system include VOCs, PAHs, PCBs, phenols, fluoride, cyanide and metals. PAHs, PCBs, phenols, and metals have been detected in groundwater samples collected from the intermediate depth flow system. The presence of PAHs, PCBs, phenols and metals was reported for samples collected from the bedrock/till interface zone. VOCs, PAHs, PCBs, phenols, fluoride and metals have been detected in groundwater samples collected from the bedrock aquifer.

Cyanide, PAHs, and PCBs have all been detected in the lagoon water at concentrations above surface water standards or guidance values.

EAST MARSH

The East Marsh is a 4-acre site located adjacent to the General Refuse Landfill and the Soluble Oil Lagoon. In the past, it received significant surface water discharge from the West Marsh via a pipe beneath the landfill. The area also receives groundwater seepage from both the landfill and the lagoon, as well as surface water runoff from the landfill. Approximately 17,500 cubic yards of PCB-contaminated sediments are present in the bottom of the marsh.

In 1987, the discharge form the West Marsh was diverted away from the area to an outfall to the Grasse River. In addition, contaminant migration from the landfill has been reduced as a result of the installation of the leachate collection system at that site in 1989.

Subsurface geologic conditions at the East Marsh are similar to those at the General Refuse Landfill and the Sanitary Lagoon. However, a shallow sand and gravel deposit may be present beneath the northern portion of the site. In general, the site is believed to be underlain by approximately 20 to 30 feet of the silt and clay unit. However, the surficial geologic units are thought to overlie approximately 50 to 80 feet of glacial till.

Shallow groundwater in the vicinity of the East Marsh flows toward the site, since the marsh behaves as a groundwater discharge area. Groundwater at depth in the till flows downward toward the bedrock aquifer.

PCB concentrations in the sediment range from 0 to 482 ppm. PAHs above the recommended clean-up goals have also been detected.

The following discussion indicates the types of contaminants that have been detected at levels exceeding water quality standards, in groundwater samples collected at the site. The analyses of shallow groundwater samples collected in the vicinity of the site have detected the presence of PAHs, fluoride, cyanide and metals at levels exceeding water quality standards.

PCBs, PAHs, volatiles, cyanide, fluoride, and other inorganics (metals) have all been detected in the surface water above standards or guidance values.

TABLE 3
DISPOSAL AREA CHARACTERISTICS

DISPOSAL AREA	TYPE/ SIZE	WASTE/ QUANTITY	AFFECTED MEDIA	CONTAMINANTS OF CONCERN
WASTE LUBRICATING OIL LAGOON	LAGOON/ 1.2 ACRES	WASTE OIL SLUDGES SOL OIL SLUDGES/ 19,000 CY	RESIDUALS SOIL GROUNDWATER	PCBs PHENOLS VOCs
GENERAL REFUSE LANDFILL	LANDFILL/ 22 ACRES	MISC IND WASTE/ 650,000 CY	WASTE, SOIL LEACHATE SURFACE WATER GROUNDWATER	PCBs VOCs PAHs
LANDFILL ANNEX	LANDFILL/ 5 ACRES	MISC IND WASTE/ 190,000 CY	WASTE, SOIL LEACHATE SURFACE WATER GROUNDWATER	PCBs, VOCs PAHs, FLUORIDE HEAVY METALS
SANITARY LAGOON	LAGOON/ 18 ACRES	SLUDGE/ 34,000 CY	SLUDGE SOIL SURFACE WATER GROUNDWATER	PCBs PAHs FLUORIDE
60 ACRE LAGOON	LAGOON/ 83 ACRES	SLUDGE/ 194,000 CY	SLUDGE SOIL, SEDIMENT SURFACE WATER GROUNDWATER	PCBs PAHs FLUORIDE
EAST MARSH	MARSH/ 4 ACRES	SEDIMENT/ 17,500 CY	SEDIMENT, SOIL SURFACE WATER	PCBs

GROUNDWATER MANAGEMENT AREAS

Groundwater contamination at the ALCOA facility is widespread both in the overburden and in the bedrock. There are currently 14 separate sites spread across 3,500 acres, some of which appear to have identified pathways to the bedrock aquifer. The contaminants in the 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 approximately 130 to 150 feet 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 areas such as the central ridge, and in the deeper tills under a large portion of the facility, downward hydraulic gradients are present in the flow system which allow overburden groundwater to discharge to the bedrock aquifer. Groundwater flow directions in the bedrock are complex and therefore not well understood due to the anisotropic nature of the unit. However, some statements can be made regarding the directions of groundwater flow in the bedrock. In the facility areas adjacent to the Massena Power Canal and the Grasse River, groundwater in the bedrock flows toward these major discharge areas. Based on groundwater level information, and groundwater quality data, it is 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, which suggests that the contaminant plume has migrated into the area of the residences. Contaminants detected in the residential wells include VOCs, fluoride, sulfate, and iron.

Groundwater flow rates vary between the different overburden units, but tend to be relatively low. Exceptions to this include the silty sand unit in the vicinity of Potlining Pile I and the marine sand and gravel unit in the Central Valley area. Groundwater flow rates through fractures in the bedrock can be quite high. ALCOA's consultant has estimated that groundwater flow rates in the bedrock may be as high as 55,000 feet per year.

SITE RISKS

An evaluation has been conducted to identify potential public health impacts associated with the migration of contaminants from the sites.

A major concern is the ingestion of contaminated drinking water by nearby residents. Cyanide, fluoride, benzene, toluene, xylene, and other compounds have been detected in remote, down-gradient bedrock monitoring wells at parts per billion levels.

In addition, cyanide and volatiles have been found in private wells, although their levels were well below New York State Department of Health (NYSDOH) drinking water standards. ALCOA is monitoring these wells on a continuous basis to ensure the safety of the residents.

Another potential problem is the human consumption of biota from off-site surface water bodies. Elevated levels of PCBs and other compounds have been found in the tissue of fish taken from the Grasse River. As a result, the NYSDOH has issued an advisory recommending no more than one meal per month of small mouth bass, brown bullhead, or walleye. A similar advisory is in force for species taken from the St. Lawrence River. Women of childbearing age, infants, and children under the age of 15 have been advised against the consumption of any fish from these waters.

There is also concern with the consumption of migratory waterfowl which inhabit the area. Studies have shown that certain species, such as Canada geese, are bioaccumulating contaminants from the ALCOA waste sites.

Other possible exposure routes include workers coming into contact with or ingesting on-site wastes, and area residents or sportsmen coming into contact with or ingesting off-site contaminated soils, sediments, or surface water.

In addition to public health impacts, the effects of site contaminants on the biota itself were also addressed during the investigative process. In general, impacts were noted at each of the waste sites, except the General Refuse Landfill. No determination was made at the Soluble Oil Lagoon, the Waste Lubricating Oil Lagoon, the Unnamed Tributary, or the Landfill Annex, since they were not included as part of the investigation.

V. ENFORCEMENT STATUS

On January 16, 1985, the NYSDEC entered into a consent order with ALCOA to investigate and remediate all areas of hazardous and industrial waste at the facility.

On September 14, 1989, the Department entered into an amended order with ALCOA that required further investigation of the General Refuse Landfill and Landfill Annex, and operation of the landfill in accordance with Solid Waste regulations. The site ceased accepting waste on December 1, 1990, and an interim cap was completed over the landfill.

On August 16, 1990, the Department entered into two additional amended orders to address IRMs at the West Marsh and Unnamed Tributary.

In early 1990, it became apparent that the project had become so complex that a completely revised consent order was needed. A new order was drafted, segmenting the project into three feasibility studies (FS I, FS IA [General Refuse Landfill and Landfill Annex], and FS II), each with its own time frame. The order also updated the remedial process by requiring a Commissioner's ROD, Remedial Design, and implementation of a Remedial Program, including the operation and maintenance of the in-place remedial systems for a period of time to be determined by the NYSDEC. The order became effective on October 31, 1990.

ALCOA has also entered into an order with the USEPA to address contamination in the Grasse River.

VI. GOALS FOR THE REMEDIAL ACTIONS

In order to insure the proper development of a remedial program, a number of remedial action objectives were established for each of the disposal areas (Table 5), and cleanup goals, treatment thresholds, and treatment goals were identified for each of the contaminants of concern. For purposes of this ROD, the following definitions apply:

Cleanup Goals: Levels of contamination below which the residual contamination does not present a significant threat to health or the environment. Cleanup goals are developed according to the threat that a hazardous waste may present to various receptors and at various locations on the facility. Cleanup goals are normally most stringent where contaminants may directly impact off-site human receptors; where contaminants could migrate uncontrolled to receiving streams or a usable aquifer; or in biologically sensitive areas, such as wetlands. On industrial sites where public access is strictly controlled, and contaminant migration can be monitored and controlled, the cleanup goals are less stringent. Cleanup goals are normally obtained by excavation of the waste.

Treatment Thresholds: Levels of contamination above which the toxic substances must be destroyed or permanently immobilized. Lower level contamination is either contained in place by capping and groundwater control, or the waste is excavated down to cleanup goals, and moved to a landfill for secure disposal.

Treatment Goal: For any material requiring permanent treatment, the level of contamination that is allowed to exist in the residuals following treatment. Currently the USEPA TSCA regulations specify a treatment goal of less than 2.0 ppm for PCBs. Treatment goals for the other contaminants of concern are based on the USEPA Land Disposal Restrictions, 40 CFR 268.

The Department has determined that many of the identified remedial action objectives are best achieved through excavation of contaminated wastes, sludges, sediments, and soils. The degree of excavation is dependent upon cleanup goals, which are based on such site-specific criteria as location, contaminants of concern, potential human and environmental receptors, and controls to be implemented.

For those alternatives that include excavation, the following cleanup goals have been established. Unless otherwise noted, they are intended to address contamination at sites where ground and surface water controls (eg. recovery trenches, pumping wells, monitoring wells, SPDES-regulated outfalls) will be implemented. They are considered protective of groundwater and surface water quality.

TABLE 4
SOIL CLEAN UP GOALS

COMPOUND	GOAL
1,1,1-Trichloreothane	7.6 ppm
Benzene	.4 ppm
Tetrachloroethene	.2 ppm
Trichloroethene	1.3 ppm
Toluene	1.5 ppm
Total Xylene	1.2 ppm
Phenanthrene	2.2 ppm
Pyrene	6.6 ppm
Other PAHs -	.3 ppm
PCBs - Areas within the influence of groundwater and surface water controls.	10.0 ppm
- Areas outside the influence of groundwater and surface water controls.	1.0 ppm
- Biologically sensitive areas such as surface water bodies and wetlands.	0.1 ppm*

*It is recognized that, due to analytical and construction constraints and the widespread dispersion of contaminants, a cleanup goal of 0.1 ppm is impractical. Accordingly, a cleanup goal of 1.0 ppm will be utilized in these areas. The potential injuries to biota related to residual contamination below 1 ppm PCBs will be quantified and evaluated from a natural resources damages stand point. ALCOA is encouraged to eliminate as much of the contamination in these sensitive areas as possible while in the process of remediation, and to pursue the lowest possible cleanup level that is feasible under conditions existing.

Alternative treatment technologies not approved in this ROD may be evaluated further by ALCOA's consultant, and evaluated by this Department using the criteria contained in its' Technical and Administrative Guidance Memorandum HWR-90-4030 (Selection of Remedial Actions at Inactive Hazardous Waste Disposal Sites). Use of such alternative technologies will be subject to an amended ROD, as specified in the Department's Organization and Delegation Memorandum 89-05.

TABLE 5
REMEDIAL ACTION OBJECTIVES

DISPOSAL AREA	OBJECTIVES
WASTE LUBRICATING OIL LAGOON	1. Prevent direct contact with the waste. 2. Prevent adverse impacts to groundwater. 3. Prevent adverse impacts to surface water and biota associated with it.
GENERAL REFUSE LANDFILL	1. Prevent direct contact with the waste. 2. Prevent adverse impacts to groundwater. 3. Prevent adverse impacts to surface water and biota associated with it.
LANDFILL ANNEX	1. Prevent direct contact with the waste. 2. Prevent adverse impacts to groundwater. 3. Prevent adverse impacts to surface water and biota associated with it.
SANITARY LAGOON	1. Prevent direct contact with the waste. 2. Prevent adverse impacts to biota using the lagoon. 3. Prevent adverse impacts to groundwater. 4. Prevent adverse impacts to both on-site and off-site surface water. 5. Allow the lagoon to be reutilized as a stormwater retention basin.
60 ACRE LAGOON	1. Prevent direct contact with the waste. 2. Prevent adverse impacts to biota using the lagoon. 3. Prevent adverse impacts to groundwater. 4. Prevent adverse impacts to both on-site and off-site surface water.
EAST MARSH	1. Prevent direct contact with the waste. 2. Prevent adverse impacts to biota using the marsh. 3. Prevent adverse impacts to both on-site and off-site surface water.

VII. DESCRIPTION AND EVALUATION OF THE ALTERNATIVES

Subsequent to the establishment of remedial action objectives for each disposal area, the following general response actions were developed:

TABLE 6
GENERAL RESPONSE ACTIONS

No Action
Containment (control & isolation)
Source Removal (excavation)
Treatment
Disposal

These were utilized to identify and screen various remedial technologies which could be used to satisfy the remedial action objectives. To aid in this screening process, the media of concern at the facility were separated into two groups:

wastes, soils, sludges, sediments
surface water, groundwater, leachate, filtrate

The candidate technologies were evaluated on the basis of technical implementability, and the results are presented in Section 3 of both the February 1991 and June 1991 Feasibility Study (FS) reports.

After this initial evaluation, a number of process options, if available, were identified for each of the remaining technologies. These were screened for effectiveness and implementability in order to select a single process option for each technology. The results are also shown in Section 3 of the FS reports.

The technologies and process options were then assembled into remedial alternatives for each disposal area. These were evaluated on the merits of implementability and effectiveness. In instances where two similar alternatives emerged for a given site, cost was used as a deciding factor. The intent of this screening process was to preserve a set of alternatives representative of the entire range of general response actions. Section 4 of the FS reports details the results for each of the disposal areas.

As a final step, a Detailed Analysis was performed on each alternative proposed for a given site, utilizing the following criteria:

Short-term Impacts and Effectiveness
Long-term Effectiveness and Permanence
Reduction of Toxicity, Mobility, or Volume
Implementability
Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
Overall Protection of Human Health & Environment
Cost

Costs are calculated by adding construction and installation costs to the present worth cost for operation and maintenance (O&M) for 30 years. Present worth O&M costs are defined as the amount of money that would have to be set aside today (at a discount rate equivalent to the 30-year U.S. treasury bill rate minus taxes and inflation) to pay for O&M costs for the next 30 years.

A comparison of the results was then conducted to enable the selection of a final remedy for each site. A brief description of each set of alternatives follows. The results of the Detailed Analysis are discussed in the PRAP.

WASTE LUBRICATING OIL LAGOON

Alternative 1 - No Action/Long-Term Monitoring

Under this alternative, present conditions would be maintained. A fence would be erected around the perimeter of the site to restrict access, and a long-term groundwater monitoring program would be implemented. The estimated cost is $220,000.

Alternative 2 - In-Place Containment/Groundwater Recovery and Treatment

This alternative includes installation of a perimeter slurry wall and leachate collection system, improvements to the existing cap, and groundwater recovery and treatment. The estimated cost, excluding groundwater recovery and treatment, is $3,200,000.

Alternatives 3a, 3b, 3c - Excavation/On-Site Treatment/ Groundwater Recovery and Treatment

This alternative involves the excavation and treatment of the solidified waste and underlying soils, and implementation of a groundwater recovery and treatment system. Three types of treatment were considered: incineration, solvent extraction utilizing the BEST process, and dehalogenation via the APEG-PLUS process. The estimated costs for incineration, solvent extraction, and dehalogenation excluding groundwater recovery and treatment are $25,800,000, $9,700,000, and $22,300,000, respectively.

GENERAL REFUSE LANDFILL

Alternative 1 - No Action/Long-Term Monitoring

Under this alternative, the intermediate cover and leachate collection system would be maintained. The estimated cost is $6,600,000.

Alternative 2 - RCRA Cap/Slurry Wall/Passive Venting

This alternative would include upgrading the existing cover to meet hazardous waste disposal facility requirements, construction of a slurry wall to the north, northeast, and west of the site, installation of a passive venting system, and continued operation of the leachate collection system. The estimated cost is $9,200,000.

Alternatives 3a, 3b, 3c, 3d - Excavation (>50 ppm PCBs)/On-Site Treatment or On-Site Vault/Alternative 2

These alternatives include the excavation and treatment or vaulting of all material containing PCBs in excess of 50 ppm. Three types of treatment were evaluated: incineration, solvent extraction, and dehalogenation.

After the waste has been excavated, the area would be backfilled and the components of Alternative 2 would be implemented. The estimated costs are identified below:

Alternative	Cost
3a (Incineration)	$63,900,000
3b (Dehalogenation)	$64,300,000
3c (Solvent Extraction)	$44,200,000
3d (Vault)	$19,700,000

Alternatives 4a, 4b, 4c, 4d - Excavation (>500 ppm PCBs/On-Site Treatment or On-Site Vault/Alternative 2

This set of alternatives is similar to Alternatives 3a-3d, except excavation would be limited to material with PCBs in excess of 500 ppm. The estimated costs are as follows:

Alternative	Cost
4a (Incineration)	$28,900,000
4b (Dehalogenation)	$27,800,000
4c (Solvent Extraction)	$21,800,000
4d (Vault)	$12,600,000

Alternatives 5a, 5b, 5c, 5d - Shallow Excavation (>50 ppm PCBs)/ On-Site Treatment or On-Site Vault/Alternative 2

This set of alternatives is identical to Alternatives 3a-3d, except the depth of excavation would be limited to 4 feet. The associated costs are as follows:

Alternative	Cost
5a (Incineration)	$19,900,000
5b (Dehalogenation)	$18,400,000
5c (Solvent Extraction)	$15,900,000
5d (Vault)	$11,100,000

LANDFILL ANNEX

Alternative 1 - No Action/Long-Term Monitoring

Present conditions would be maintained under this alternative, and a long-term groundwater monitoring program would be instituted. The estimated cost is $500,000.

Alternative 2 - Drum Removal & Off-Site Disposal/Part 360 Cap/ Passive Venting

This alternative includes the excavation and off-site treatment and disposal of both visible and buried drums located along the southern periphery of the site. Any soil contaminated as a result of leaking drums would also be removed. The excavated area would then be backfilled, and a Part 360 (ie. Solid Waste) cap and passive venting system would be installed. The estimated cost is $3,100,000. In the event a RCRA cap is substituted, the cost would increase to $4,000,000.

Alternative 3 - Drum Removal & Off-Site Disposal/Part 360 Cap/ Passive Venting/Slurry Wall/Leachate Collection

This alternative includes all of the elements of Alternative 2, as well as the installation of a perimeter slurry wall and downgradient leachate collection system. The estimated cost utilizing a Part 360 cap is $4,000,000. The cost would increase to $4,800,000 if a RCRA cap was used.

SANITARY LAGOON

Alternative 1 - No Action/Long-Term Monitoring

Present conditions would be maintained under this alternative. A long-term groundwater monitoring program would be implemented at a cost of $1,040,000.

Alternative 2 - Dewatering/In-Place Solidification/Capping/Lagoon Management

Under this alternative, the lagoon would be dewatered and the sludge would be solidified in-place and encapsulated at one end of the site. The quantity of sludge handled in this manner would be dependent upon final use of the lagoon. If the lagoon is to be retained as a storm water basin (Option I), then all of the sludge would be excavated and encapsulated. If the lagoon is to be closed, however (Option II), then only the sludge with PCBs in excess of 50 ppm would be solidified and encapsulated. The remaining sludge would be mixed with gravel to provide support for a drainage layer and backfill. Groundwater recovery and treatment and wetlands relocation would be included with either option. The estimated costs, excluding groundwater recovery and treatment, are $13,800,000 for Option I and $14,100,000 for Option II.

Alternatives 3a, 3b, 3c, and 3d - Dewatering/Excavation/On-Site Treatment or On-Site Vault (>50 ppm PCBs)/Lagoon Management

This set of alternatives includes dewatering of the lagoon, followed by excavation and treatment or vaulting of the sludge with PCBs in excess of 50 ppm, relocation of the wetlands, and groundwater recovery and treatment. Three types of treatment were considered: incineration, solvent extraction, and dehalogenation. If the lagoon is to be utilized for storm water retention, then the remaining sludge would be solidified and encapsulated at one end of the site.

If the lagoon is to be closed, then the remaining sludge would be mixed with gravel to lend support to a drainage layer and backfill. The associated costs, excluding groundwater recovery and treatment, are identified below:

Alternative	Cost Option I/Option II
3a (Incineration)	$26,400,000/$25,000,000
3b (Solvent Extraction)	$21,500,000/$20,200,000
3c (Dehalogenation)	$25,700,000/$24,400,000
3d (Vault)	$17,200,000/$15,900,000

Alternatives 4a, 4b, 4c, and 4d - Dewatering/Excavation/On-Site Treatment or On-Site Vault (All)/Lagoon Management

Under this set of alternatives, the lagoon would be dewatered and all of the sludge would be excavated and either treated or placed in the vault, regardless of final lagoon management. Wetlands relocation and possibly groundwater recovery would be included. The associated costs, excluding groundwater recovery and treatment, are as follows:

Alternative	Cost Option I/Option II
4a (Incineration)	$35,300,000/$39,300,000
4b (Solvent Extraction)	$27,100,000/$31,200,000
4c (Dehalogenation)	$37,800,000/$42,000,000
4d (Vault)	$19,300,000/$24,400,000

Alternatives 5a, 5b, and 5c - Dewatering/Excavation/On-Site Treatment (>50 ppm PCBs)/On-Site Vault (<50 ppm PCBs)/Lagoon Management

Under this set of alternatives, the lagoon would be dewatered and all of the sludge would be excavated. The sludge with PCBs in excess of 50 ppm PCBs would be treated, and the remainder would be placed in the vault. These steps would be followed regardless of final lagoon management. Wetlands relocation and groundwater recovery and treatment would also be included. The corresponding costs, excluding groundwater recovery and treatment, are identified below:

Alternative	Cost Option I/Option II
5a (Incineration)	$28,900,000/$32,300,000
5b (Solvent Extraction)	$23,600,000/$25,500,000
5c (Dehalogenation)	$27,800,000/$31,600,000

60 ACRE LAGOON

Alternative 1 - No Action/Long-Term Monitoring

Under this alternative, present conditions would be maintained and a long-term groundwater monitoring program would be implemented. The expected cost is $1,100,000.

Alternative 2 - Dewatering/In-Place Solidification/Capping

Initially, the central dike would be extended to isolate the two halves of the lagoon. The northern half would then be dewatered, and all sludge with PCB concentrations in excess of 50 ppm would be solidified and encapsulated at the western end. The remaining sludge would be mixed with gravel, and the area would be backfilled and capped. A drainage network would be installed prior to capping.

The southern half of the lagoon would also be dewatered, and the sludges would be mixed with gravel. A drainage system would then be installed, and the area would be backfilled and capped.

The wetlands would be relocated, and a groundwater recovery and treatment system would be implemented. The estimated cost, exclusive of groundwater recovery and treatment, is $50,800,000.

Alternatives 3a, 3b, 3c, 3d - Dewatering/Excavation/On-Site Treatment or On-Site Vault (>50 ppm PCBs)/In-Place Solidification/Capping

Under this set of alternatives, the central dike would be extended to isolate the two halves of the lagoon. The northern half would then be dewatered, and all sludge with PCB levels above 50 ppm would be excavated and either treated or placed in the vault. Three types of treatment were considered: incineration, solvent extraction, and dehalogenation. The remaining sludge would be mixed with gravel, a drainage system would be installed, and the area would be backfilled and capped.

The southern half of the lagoon would be addressed in the same manner as described for Alternative 2.

The wetlands would be relocated, and a groundwater recovery and treatment system would be installed. The estimated costs, excluding groundwater recovery and treatment, are identified below:

Alternative	Cost Option I/Option II
3a (Incineration)	$ 93,200,000
3b (Solvent Extraction)	$ 77,000,000
3c (Dehalogenation)	$102,700,000
3d (Vault)	$ 60,500,000

Alternatives 4a, 4b, 4c, 4d - Dewatering/Excavation/On-Site Treatment or On-Site Vault (All)/Capping

These alternatives include dewatering of the lagoon, followed by excavation and either treatment or vaulting of all sludge from both halves of the site. The entire area would then be backfilled and capped, and the wetlands would be relocated. A groundwater recovery and treatment system would also be included. The associated costs for these alternatives, exclusive of groundwater recovery and treatment, are as follows:

Alternative	Cost Option I/Option II
4a (Incineration)	$180,200,000
4b (Solvent Extraction)	$144,000,000
4c (Dehalogenation)	$210,500,000
4d (Vault)	$104,900,000

Alternatives 5a, 5b, 5c - Dewatering/Excavation/On-Site Treatment (>50 ppm PCBs)/On-Site Vault (<50 ppm PCBs)/Capping

This set of alternatives is identical to alternatives 4a-4c, except only sludge with PCB concentrations in excess of 50 ppm would undergo treatment. The remaining sludge would be placed in the vault. The estimated costs, not including groundwater recovery and treatment, are:

Alternative	Cost Option I/Option II
5a (Incineration)	$137,600,000
5b (Solvent Extraction)	$109,200,000
5c (Dehalogenation)	$147,100,000

EAST MARSH

Alternative 1 - No Action/Long-Term Monitoring

Under this alternative, present conditions would remain unchanged. A long-term groundwater monitoring program would be implemented at a cost of $700,000.

Alternative 2 - Dewatering/Excavation/Solidification/On-Site Vault/Marsh Closure

This alternative would include dewatering of the marsh, followed by excavation and solidification of sludge with PCB concentrations in excess of 10 ppm. The solidified material would be placed in an on-site vault.

A subdrain system would be installed within the excavation, and then the area would be backfilled and capped. The wetlands would be relocated elsewhere on the property. The estimated cost is $8,500,000.

Alternatives 3a, 3b, 3c - Dewatering/Excavation/On-Site Treatment/Marsh Closure

This set of alternatives includes dewatering, followed by the excavation and treatment of all sludge. The excavated area would be closed in the same manner as described for alternative 2, and the wetlands would be relocated. The costs are as follows:

Alternative	Cost
3a (Incineration)	$19,000,000
3b (Solvent Extraction)	$13,800,000
3c (Dehalogenation)	$19,800,000

Alternatives 4a, 4b, 4c - Dewatering/Excavation/On-Site Treatment (>50 ppm PCBs)/Solidification and On-Site Vault (<50 ppm PCBs/ Marsh Closure

This set of alternatives is identical to alternatives 3a, 3b, and 3c, except the sludge with PCB concentrations below 50 ppm would be solidified and placed in an on-site vault. The costs are as follows:

Alternative	Cost
4a (Incineration)	$12,600,000
4b (Solvent Extraction)	$10,100,000
4c (Dehalogenation)	$12,800,000

VIII. SUMMARY OF THE GOVERNMENT'S DECISION

The NYSDEC's initial recommendations are discussed in detail in the PRAP. The set of criteria utilized by ALCOA's consultant during the Detailed Analysis formed the basis for the Department's decisions. Moreover, emphasis was placed on those alternatives which afforded a permanent and significant reduction in the toxicity, mobility, or volume of waste to be treated. Pursuant to the Department's Technical and Administrative Guidance Memorandum (TAGM) #HWR-90-4030, technologies and process options resulting in the destruction, separation and treatment, or solidification and chemical fixation of the waste are considered permanent remedies. Both the Department and the Federal Superfund and Reauthorization Act (SARA) require that preference be given to such remedies.

Below are the NYSDEC's final remedy selections for each of the disposal areas addressed in this document. The rationale for the Department's selections is included. In instances where ALCOA's recommendation differs, a brief explanation is provided.

WASTE LUBRICATING OIL LAGOON

The required action for the Waste Lubricating Oil Lagoon is Alternative 3b. Under this alternative, all of the solidified waste and visibly contaminated soil will be excavated. This will be followed by confirmatory sampling to determine if clean-up goals have been met. If the goals have not been met, then further remedial actions will be evaluated in accordance with the June 3, 1991 Preliminary Engineering Plan (PEP, Appendix A). The Department will determine which of these remedial actions provides adequate protection to public health and the environment.

The excavated material will be treated via solvent extraction to remove the PCBs and other contaminants. The concentrated waste stream which results from the treatment process will be sent off-site for incineration, while the residual soils will be placed in the on-site vault. If treatability studies indicate that solvent extraction cannot meet treatment standards, or another technology appears more viable, then an amendment to the Record of Decision will be considered.

Selection of this particular remedial action was based upon the following factors:

1. This alternative meets the preference criteria for permanent treatment in the most cost-effective manner. Any leachable constituents remaining in the treated residuals can be effectively immobilized in the on-site vault built to hazardous waste disposal facility specifications.

2. There will be no significant short-term risks to the community or environment during construction activities. Worker exposure will be minimized during excavation and waste handling through implementation of a Health and Safety Plan.

3. Long-term protection from exposure to <u>all</u> routes of contaminant migration will be provided.

4. This alternative is both technically and administratively feasible, although additional testing is needed before the solvent extraction process is fully approved.

5. This alternative would comply with all chemical-specific and action-specific ARARs if solvent extraction can meet treatment standards. (No location-specific ARARs have been identified for this site.)

6. This alternative would be protective of human health and the environment with respect to soil and groundwater contamination.

7. Of the three permanent remedies evaluated, 3b appears to be the most cost-effective. In addition, although it is more expensive than Alternatives 1 and 2, it also provides a greater degree of protection to human health and the environment. The costs associated with this alternative are summarized below:

Capital Cost (Million $)	Annual O&M Cost (Million $)	Present Worth O&M Cost (Million $)	Total Present Worth Cost (Million $)
$9.2	$.05	$0.5	$9.7

ALCOA also selected Alternative 3b for implementation.

GENERAL REFUSE LANDFILL

The recommended action for the General Refuse Landfill is Alternative 2. Under this alternative, the existing cover will be upgraded to conform to the requirements of a RCRA hazardous waste cap. As a minimum, this includes:

- a low-permeability soil barrier placed over the waste to minimize the migration of precipitation into the landfill;
- a drainage layer installed above the soil barrier to promote the diversion of infiltrating precipitation away from the waste; and
- a topsoil/vegetation layer that is resistant to erosion and, in conjunction with the drainage layer, protects the soil barrier from frost action and root penetration.

Areas or parts of the present interim cover may be utilized as the low- permeability soil barrier if it can be demonstrated through field efforts that the material satisfies the design criteria for a hazardous waste landfill cover.

A slurry wall will be constructed to the north, northeast, and west of the site to direct groundwater flow away from the area, and a passive venting system will be installed to reduce the concentrations of VOCs below the cap. The VOCs will be captured by carbon filters placed on the vents. Additionally, the leachate collection system will continue in operation. To insure the effectiveness of this system, a concrete sewer line running beneath the landfill to the East Marsh will be partially removed, and the section remaining will be plugged. Since hazardous waste will remain in place, the effectiveness of this alternative will have to be reviewed within 5 years after completion.

Selection of this particular remedial action was based upon the following considerations:

1. Although this alternative does not constitute a permanent remedy, such an action is not feasible. Due to the heterogeneous nature of the waste, it would be impossible to locate all of the hazardous material for excavation and treatment. Consequently, this type of action may not provide a significant reduction in the toxicity, volume, and/or mobility of the contaminants. In addition, the presence of cables and large objects would hinder excavation, and the problem is compounded by the possibility of encountering explosive materials.

2. Implementation of this alternative will include the placement of up to 7 additional feet of cover over the waste. Further, the landfill is located within the center of the facility, where the possibility of unauthorized public access is non-existent. Use by plant personnel will be restricted to routine operation and maintenance of the leachate collection system.

3. There will be no significant short-term risks to the community or environment during construction activities. Worker exposure will be minimized during excavation and waste handling through implementation of a Health and Safety Plan.

4. Long-term protection from exposure to all routes of contaminant migration will be provided.

5. This alternative utilizes proven remedies and conventional construction techniques and therefore, is technically and administratively feasible.

6. This alternative would comply with all ARARs.

7. This alternative would be protective of human health and the environment with respect to soil, surface water, and groundwater contamination.

8. This alternative is just as effective as any of the permanent remedies considered (Alternatives 3a, 3b, 3c, 4a, 4b, 4c, 5a, 5b, 5c), yet its cost is substantially lower.

Capital Cost (Million $)	Annual O&M Cost (Million $)	Present Worth O&M Cost (Million $)	Total Present Worth Cost (Million $)
$8.0	$0.12	$1.2	$9.2

ALCOA also selected Alternative 2 for implementation.

LANDFILL ANNEX

The recommended action for the Landfill Annex is Alternative 3 with a RCRA cap. Under this alternative, all of the visible drums located along the southern periphery of the site will be excavated. Any visibly stained soil in the vicinity of the drums, as well as additional drums unearthed during this work, will also be excavated. All of the excavated materials will then be characterized and managed in accordance with applicable regulations. Following excavation, the area will be backfilled with clean fill, and the entire site fitted with a RCRA cap. As a minimum, this includes:

- a low-permeability soil barrier placed over the waste to minimize the migration of precipitation into the landfill;
- a drainage layer installed above the soil barrier to promote the diversion of infiltrating precipitation away from the waste; and
- a topsoil/vegetation layer that is resistant to erosion and, in conjunction with the drainage layer, protects the soil barrier from frost action and root penetration.

Passive vents containing carbon traps will be installed to mitigate the accumulation of VOCs beneath the cap.

A slurry wall will be constructed around the entire perimeter of the site to direct groundwater flow away from the area, and to stop the migration of leachate into the West Marsh. The leachate will be directed into a collection system installed inside the slurry wall along the entire southern edge of the site.

Since a portion of the hazardous waste will remain, the effectiveness of this alternative will be reevaluated within 5 years.

The following factors were taken into account during selection of this remedy:

1. The excavation and off-site treatment and disposal of the drums (and effected soil) along the southern bank of the site will provide a permanent reduction in the toxicity and volume of hazardous waste present.

Based upon the levels of PCBs found at the edge of the site and the lack of sufficient information concerning the interior of the fill, it is likely that additional hazardous waste is present. By utilizing a RCRA cap in place of a Part 360 cap, a more significant reduction in the mobility of the remaining contamination should be achieved.

2. There will be no significant short-term risks to the community or environment during construction activities. Worker exposure will be minimized during excavation and waste handling through implementation of a Health and Safety Plan.

3. Long-term protection from exposure to all routes of contaminant migration will be provided.

4. This alternative utilizes proven remedies and conventional construction techniques and therefore, is technically and administratively feasible.

5. This alternative would comply with all ARARs.

6. This alternative would be protective of human health and the environment with respect to soil, surface water, and groundwater contamination.

7. Although more costly than the other permanent remedies, it provides a substantial increase in the protectiveness of groundwater and surface water.

Capital Cost (Million $)	Annual O&M Cost (Million $)	Present Worth O&M Cost (Million $)	Total Present Worth Cost (Million $)
$4.3	$0.06	$0.5	$4.8

ALCOA also selected Alternative 3 for implementation, although they did not recommend the substitution of a RCRA cap for the Part 360 cap. The Department's basis for specifying for a RCRA cap is detailed in the Responsiveness Summary.

SANITARY LAGOON

Due to the nature of contaminated sludge present at this site, ALCOA will be given an opportunity to pursue in situ treatment technologies, such as bioremediation. The following remedial program has been developed to address this issue, as well as insure that short and long-term protection to public health and the environment will be provided.

ALCOA will have until December 31, 1994 to complete research on in situ processes in order to determine what concentration of PCBs in the sludge can be effectively treated to a level of 25 ppm or less, or permanently immobilized. At the same time, ALCOA will identify and evaluate ex situ technologies that are capable of permanently treating the PCB contamination which cannot be reduced to the 25 ppm level or permanently immobilized via in situ means. The in situ and ex situ technologies will have to comply with both USEPA and Department criteria for the permanent treatment of industrial sludges. By December 31, 1994, ALCOA will recommend to the Department technologies for full-scale development. The Department will subsequently select technologies to be implemented by ALCOA.

By April 1, 1997, ALCOA will complete any additional testing necessary, as well as obtain all the required permits and/or approvals, in order to have the selected technologies implementable.

ALCOA will develop a work plan which discusses in detail the steps that will be taken to achieve the required milestones. This will include a proposal for regularly-scheduled meetings with the Department, and the submittal of periodic progress reports. If at any time prior to December 31, 1994 ALCOA determines that in situ remediation fails to meet the performance criteria specified above, ALCOA will immediately notify the Department and pursue ex situ treatment technologies in accordance with the above schedule.

During the 5 year technology evaluation and selection process, ALCOA will institute the following interim actions:

- A plan, as approved by the Department, will be developed, and implemented by the end of 1992, to eliminate, or discourage to the greatest extent practical, the use of the lagoon by waterfowl.

- A surface water discharge monitoring and control program will be put in place by the end of 1992 to meet all applicable discharge limits. ALCOA may use controls such as isolation of highly contaminated sludges and/or sediment in the lagoon, or treatment of effluents, to meet discharge limits imposed by the Department at the end of 1992.

Implementation of the approved treatment processes must commence by April 1, 1997, and continue until remediation goals have been obtained in a time frame acceptable to the Department. The material designated for ex situ treatment, or in situ treated sludges that do not obtain remediation goals, must be excavated and treated via the selected ex situ process to meet USEPA and Department criteria for treatment of industrial sludges. The ex situ treatment residuals must then be placed in the on-site vault.

Following completion of the in situ treatment process, all in situ treatment residuals and untreated material with PCB concentrations above 1 ppm must be solidified as needed and encapsulated within the lagoon to insure that PCBs do not reenter surface water or the environment. This will include placement of the solidified/encapsulated material above 10 ppm PCBs that is not permanently immobilized on a clay liner to elevate it above the water table. However, contaminated sediment below 10 ppm PCBs may be encapsulated in place if the lagoon is to be converted to an upland area.

In addition to the requirements set forth in this document, ALCOA must also satisfy all of the USEPA TSCA regulations governing this remedial program in effect at the time of implementation.

- The following factors were taken into consideration during remedy selection:

1. Approximately 90% of the PCBs will be subjected to permanent treatment, either through in situ or ex situ means. The residuals resulting from the in situ treatment process will be effectively contained in-place along with the untreated (ie. lightly contaminated) sludge, while the residuals from the ex situ treatment process will be placed in the on-site vault. As a result, this alternative will provide a permanent and significant reduction in the toxicity, volume, and mobility of the contaminants present.

2. There will be no significant short-term risks to the community or environment during construction activities. Worker exposure will be minimized during excavation and material handling through implementation of a Health and Safety Plan.

3. Long-term protection from exposure to all routes of contaminant migration will be provided.

4. This alternative is technically feasible, although some testing will be necessary once a treatment technology is selected. The containment portion of the alternative is readily implementable, and other than routine maintenance, no additional remedial action is anticipated. This alternative is also administratively feasible, but coordination with the USEPA is required.

5. This alternative will require compliance with all ARARs, including the USEPA TSCA regulations in effect at the time of implementation, which specify requirements for industrial sludge.

6. This alternative is protective of human health and the environment, and in particular, the waterfowl which frequent the lagoon.

7. This alternative offers the most cost-effective <u>permanent</u> remedy.

Capital Cost (Million $)	Annual O&M Cost (Million $)	Present Worth O&M Cost (Million $)	Total Present Worth Cost (Million $)
$13 - $17	$0.0008 - $0.026	Negligible	$13 - $17

This alternative satisfies ALCOA's request that they be given the opportunity to evaluate various in situ treatment technologies in an effort to reduce remedial costs, while still maintaining the required level of protectiveness. As a result, they have indicated a willingness to accept the alternative.

60 ACRE LAGOON

Due to the volume and nature of contaminated sludge present at this site, ALCOA will be given an opportunity to pursue in situ treatment technologies, such as bioremediation. The following remedial program has been developed between ALCOA and the Department to address this issue, as well as insure that short and long-term protection to public health and the environment will be provided.

ALCOA will have until December 31, 1994 to complete research on in situ processes in order to determine what concentration of PCBs in the sludge can be effectively treated to a level of 50 ppm or less, or permanently immobilized. At the same time, ALCOA will identify and evaluate ex situ technologies that are capable of permanently treating the PCB contamination which cannot be reduced to the 50 ppm level or permanently immobilized via in situ means. The in situ and ex situ technologies will have to comply with both USEPA and Department criteria for the permanent treatment of industrial sludge. By December 31, 1994, ALCOA will recommend to the Department technologies for full-sale development. The Department will subsequently select technologies to be implemented by ALCOA.

By April 1, 1997, ALCOA will complete any additional testing necessary, as well as obtain all the required permits and/or approvals, in order to have the selected technologies implementable.

ALCOA will develop a work plan which discusses in detail the steps that will be taken to achieve the required milestones. This will include a proposal for regularly-scheduled meetings with the Department, and the submittal of periodic progress reports. If at any time prior to December 31, 1994, ALCOA determines that in situ remediation fails to meet the performance criteria specified above, ALCOA will immediately notify the Department and pursue ex situ treatment technologies in accordance with the above schedule.

During the 5 year technology evaluation and selection process, ALCOA will institute the following interim actions:

- A plan, as approved by the Department, will be developed, and implemented by the end of 1992, to eliminate, or discourage to the greatest extent practical, the use of the lagoon by waterfowl.

- A surface water discharge monitoring and control program will be put in place by the end of 1992 to meet all applicable discharge limits. ALCOA may use controls such as isolation of highly contaminated sludges and/or sediment in the lagoon, or treatment of effluents, to meet discharge limits imposed by the Department at the end of 1992.

Implementation of the approved treatment processes must commence by April 1, 1997, and continue until remediation goals have been obtained in a time frame acceptable to the Department. The material designated for ex situ treatment, or in situ treated sludges that do not obtain remediation goals, must be excavated and treated via the selected ex situ process to meet USEPA and Department criteria for treatment of industrial sludges. The ex situ treatment residuals must then be placed in the on-site vault.

Following completion of the in situ treatment process, all in situ treatment residuals and untreated material with PCB concentrations above 1 ppm must be solidified as needed and encapsulated within the lagoon to insure that PCBs do not reenter surface water or the environment. This will include placement of the solidified/encapsulated material above 10 ppm PCBs that is not permanently immobilized on a clay liner to elevate it above the water table. However, contaminated sediment below 10 ppm PCBs may be encapsulated in place if the lagoon is to be converted to an upland area.

In addition to the requirements set forth in this document, ALCOA must also satisfy all of the USEPA TSCA regulations governing this remedial program in effect at the time of implementation.

The following factors were taken into consideration during remedy selection:

1. Approximately 90% of the PCBs will be subjected to permanent treatment, either through in situ or ex situ means. The residuals resulting from the in situ treatment process will be effectively contained in-place along with the untreated (ie. lightly contaminated) sludge, while the residuals from the ex situ treatment process will be placed in the on-site vault. As a result, this alternative will provide a permanent and significant reduction in the toxicity, volume, and mobility of the contaminants present.

2. This alternative will allow the southwestern quadrant of the lagoon to be utilized as a stormwater retention basin, without causing undue harm to waterfowl or other biota which may frequent the area.

3. There will be no significant short-term risks to the community or environment during construction activities. Worker exposure will be minimized during excavation and waste handling through implementation of a Health and Safety Plan.

4. Long-term protection from exposure to all routes of contaminant migration will be provided.

5. This alternative is technically feasible, although some testing will be necessary once a treatment technology is selected. The containment portion of the alternative is readily implementable, and other than routine maintenance, no additional remedial action is anticipated. This alternative is also administratively feasible, but coordination with the USEPA is required.

6. This alternative will require compliance with all ARARs, including the USEPA TSCA regulations in effect at the time of implementation, which specify requirements for industrial sludge.

7. This alternative is protective of human health and the environment and in particular, the waterfowl which frequent the lagoon.

8. This alternative offers the most cost-effective permanent remedy.

Capital Cost (Million $)	Annual O&M Cost (Million $)	Present Worth O&M Cost (Million $)	Total Present Worth Cost (Million $)
$38 - &70	$0.019-$0.065	Negligible	$38 - $70

This alternative satisfies ALCOA's request that they be given the opportunity to evaluate various in situ treatment technologies in an effort to reduce remedial costs, while still maintaining the required level of protectiveness. As a result, they have indicated a willingness to accept the alternative.

EAST MARSH

The required action for the East Marsh is Alternative 2. Initially, the marsh will be dewatered, then all of the sediments and contaminated soil with PCB concentrations above 10 ppm will be excavated. Confirmatory sampling will be performed to determine if this clean-up goal has been met. If the goals have not been met, then further remedial actions will be evaluated in accordance with the PEP (Appendix A). The Department will determine which of these remedial actions provides adequate protection to public health and the environment.

Following excavation, the contaminated material will be solidified and placed in the on-site vault. A drainage system will be installed within the excavation, and the area will be backfilled and capped.

Selection of this remedy was based upon the following considerations:

1. Although solidification does not constitute a permanent remedy for organic contaminants, such an action is not warranted. PCB concentrations above 50 ppm have only been detected in two discreet areas of the marsh. The sediment from these locations represents less than 15% of the total sediment volume, and this can be effectively contained in the on-site vault. Further, since the marsh will be converted to an upland, it is expected that biota will no longer be attracted to the area.

2. There will be no significant short-term risks to the community or environment during construction activities. Worker exposure will be minimized during excavation and waste handling through implementation of a Health and Safety Plan.

3. Long-term protection from exposure to <u>all</u> routes of contaminant migration will be provided.

4. This alternative utilizes proven remedies and conventional construction techniques and therefore, is technically and administratively feasible.

5. This alternative would comply with all ARARs.

6. This alternative would be protective of human health and the environment with respect to soil and surface water.

7. This alternative is just as effective as any of the permanent remedies considered (Alternatives 3a - 3c and 4a - 4c), yet its cost is significantly lower.

Capital Cost (Million $)	Annual O&M Cost (Million $)	Present Worth O&M Cost (Million $)	Total Present Worth Cost (Million $)
$8.3	$0.03	$0.2	$8.5

ALCOA also recommended Alternative 2 for implementation.

WETLANDS RESTORATION

Restoration and/or mitigation of the wetlands destroyed as a result of ALCOA's activities will be the subject of a study, acceptable to the Department to determine the scope of applicable alternatives consistent with applicable State laws, regulations, policy and guidance and any amendments or changes thereto. The study will thoroughly consider impacted wetlands restoration and/or mitigation. It is the Department's policy that wetlands restoration is the first priority and preferred course of action. In the event that impacted wetlands restoration and/or mitigation is determined not to be technically feasible, the study shall analyze and evaluate alternatives regarding off-site mitigation, enhancement, wetlands creation, land acquisition or on-site restoration and/or mitigation combined with off-site measures. The goal of the study will be to assess these measures as components of a program that, when implemented, will fully restore the wetlands values and benefits diminished, harmed, lost or destroyed as a result of the contamination and remediation of the impacted wetland. Upon the Department's approval of the study, the Department will advise ALCOA of the appropriate course of action for restoration and/or mitigation of the wetlands.

GROUNDWATER MANAGEMENT AREAS

Both the FS I ROD and this document require that the wastes and contaminated soils at a large number of the ALCOA sites be removed. At those sites, some residual contaminated soils may be left in place, depending on the extent of contamination. The wastes at the remainder of the sites will be contained in-place where it can be shown that containment would be effective, protective of public health, and meet environmental standards.

The installation and operation of groundwater collection and treatment systems may be necessary to effectively contain leachate migrating from contaminated soils or waste, and to restore groundwater quality in the vicinity of the sites. However, based on the areal and vertical extent of groundwater contamination, the nature of the contaminants, and the hydraulic conductivity, heterogeneity, and anisotropy of the geologic units, restoration of all groundwaters at, and downgradient of, the facility may not be feasible. Therefore, ALCOA's consultant has evaluated several alternatives for containing the contaminated groundwater at the various sites. The evaluated alternatives include the use of one or more of the following: groundwater recovery wells, trench collection systems, and slurry walls. The operation of properly designed and constructed containment systems should be successful in containing contaminants at the sites so as to prevent further releases to groundwater.

For many of the sites, ALCOA's consultant proposed the use of numerous pumping wells to control groundwater levels and to establish desired hydraulic gradients in the vicinity of the sites. However, due to the nature of the unconsolidated materials which underlie the sites, the Department is concerned that at many of the sites, it may be extremely difficult to establish and maintain the desired groundwater levels and hydraulic gradients through the use of groundwater pumping wells. Therefore, for most of the sites, the Department believes that hydraulic containment should be accomplished with groundwater recovery trench systems. It is the Department's opinion that these systems would likely be more effective for containing shallow contaminated groundwater, and they would be simpler to monitor and maintain.

However, based on correspondence between ALCOA and the Department, ALCOA appears to be confident that the use of pumping wells would be effective for containing ridge-site groundwater at their facility. If ALCOA can demonstrate that such systems would be as effective as those preferred by the Department, the Department will reconsider its decision. However, such a demonstration would need to include data generated from pilot scale pumping systems installed at the

various sites. The design of the pilot scale systems would need to be similar to the full scale pumping systems proposed by ALCOA. As part of the pilot test, an intensive monitoring system would be necessary to fully evaluate the systems' effectiveness.

Utilizing this criteria as a basis, the following site-specific groundwater management plans will be instituted.

In accordance with the Department's FS I ROD, all wastes and visibly contaminated soils at the Oily Waste Landfill, Spent Potlining Pile A, Primary Lagoon, and Dennison Road sites will be excavated. If soil cleanup goals are achieved, a groundwater monitoring system will be established to evaluate remedies' effectiveness in accordance with the PEP (Appendix A). If cleanup goals are not met, then further remedial actions will be evaluated in accordance with the PEP (Appendix A). This will include the evaluation of a leachate and shallow groundwater recovery system. The Department will determine which of the remedial actions provides adequate protection to public health and the environment. In the event groundwater recovery and treatment is selected, the system's configuration will be based upon the results of pilot scale tests conducted at the site following excavation. Groundwater monitoring will also be established to assess the effectiveness of the recovery system.

As indicated in the Department's FS I ROD, Spent Potlining Pile I will be contained in-place by upgrading the cap so that it conforms to the cap requirements for an approved hazardous waste facility. As also required by the FS I ROD, a deeper leachate collection system will be installed outside of the existing system and the two systems will be enclosed by a soil-bentonite slurry wall keyed into the underlying silt and clay layer. These measures are necessary to prevent any further contaminant releases from the site itself. Due to the site's proximity to the North Ditch, the South Ditch and Robinson Creek, additional remedial measures are necessary to cease the discharge of downgradient contaminated groundwater to these surface drainages. This will be accomplished either through the use of a groundwater recovery trench system or through the use of several downgradient recovery wells. If a trench system is used, the system will be installed parallel to and immediately upgradient of the North Ditch and the South Ditch. If a recovery well system is selected, the following strategy will be used to develop an effective system. The system will consist of a number of pumping wells installed downgradient of the site. At least one of the wells will be installed through the site to collect leachate and groundwater from the depression which ALCOA's consultant believes exists in the clay due to the overlying weight of the waste pile. The number and locations of the remaining pumping wells to be used is not known at this time. It is the Department's opinion that there is not sufficient information available to adequately design the complete system and that the overall design should be

based on pilot test results. Therefore, as part of remedial design, a portion of the system will be designed based on existing information. The initial phase of the extraction system will be installed and pilot tested upon completion of the FS I remedial activities. Based on the pilot testing results, the remainder of the system will be designed and constructed, and full scale operation will commence. An additional slurry wall may be installed outside the recovery system to prevent the flow of surface water into the system from the North and South Ditches during periods when water levels are low. A groundwater monitoring network will also be established to assess the effectiveness of the remedial actions.

Pursuant to the March 1991 ROD and this document, the SOL and WLOL will be excavated and treated via solvent extraction or other suitable technology. The treatment residuals will be placed in the on-site vault, and the area will be backfilled and capped. The groundwater management strategy proposed for this area also addresses the Sanitary Lagoon. If clean up goals are met, a groundwater monitoring system will be established to evaluate the ability of the remedial actions to prevent further contaminant migration into the groundwater. If clean up goals are not met, then further remedial actions will be evaluated in accordance with the PEP (Appendix A). This will include the evaluation of a leachate and shallow groundwater recovery system(s). The Department will determine which of the remedial actions provides adequate protection to public health, the environment, and natural resources. In the event groundwater recovery and treatment is selected, the system's configuration will be based upon the results of pilot scale tests conducted at the sites following excavation. A groundwater monitoring network will also be established to assess the effectiveness of the recovery system. ALCOA's consultant has indicated that a buried outwash channel may exist in the area south of the Soluble Oil Lagoon. If one is present, it could behave as a preferential pathway for the migration of contaminants away from the area. If this were occurring, it would be necessary to take the appropriate steps to prevent the future migration of contaminants via this route. Therefore, as part of remedial design, ALCOA will be required to perform a subsurface investigative program in this area to determine if such a pathway exists. If it does, the remedial design will need to incorporate a means for preventing further contaminant migration in this area.

ALCOA's consultant has indicated that shallow contaminated groundwater at the east end of the 60 Acre Lagoon leaks through a berm and may discharge to shallow groundwater and/or surface water. This is supported by available sampling data which indicates that the shallow groundwater downgradient of the berm is contaminated. If clean up goals are met following completion of the remedial program described earlier in this section, then a groundwater monitoring system will be established to evaluate the

ability of the remedial actions to prevent further contaminant migration into the groundwater. If clean up goals are not met, then further remedial actions will be evaluated in accordance with the PEP (Appendix A). This will include the evaluation of a leachate and shallow groundwater recovery system. The Department will determine which of the remedial actions provides adequate protection to public health, the environment, and natural resources. In the event groundwater recovery and treatment is selected, the system's configuration will be based upon the results of pilot scale tests conducted at the sites following remedial activities. A monitoring well network will also be established to assess the effectiveness of the recovery system.

The estimated capital cost associated with installation of the Department's preferred groundwater recovery and treatment systems is $9.06 million - $10.26 million. An annual O&M cost of approximately $.41 million to $.90 million would also be incurred. The costs corresponding to ALCOA's preferred systems are $6.04 million and $.64 million, respectively, for capital and O&M expenses. Present worth costs cannot be estimated since the length of time each of the various systems would have to remain in service is unknown.

The primary concern associated with the presence of contaminants in the bedrock aquifer is their ability to impact the residential wells located along Dennison Road. Although drinking water standards have not been exceeded in samples collected from the wells to date, contaminant concentrations which exceed such standards have been detected in groundwater samples collected from bedrock monitoring wells installed west of, and upgradient of, Dennison Road. Since the residences are located downgradient of these monitoring wells, and considering the rapid bedrock groundwater flow rates estimated by ALCOA's consultant, it is the Department's opinion that contaminant levels in the residential wells may increase in the future. Accordingly, the following remedial action plan has been devised.

ALCOA will perform a detailed evaluation of the feasibility of providing public water to the Dennison Road residents. This will include the development of a preliminary design which is sufficient in scope to allow the timely installation of a water supply in the event future monitoring results warrant such action. In the event a public water supply cannot be furnished, ALCOA will undertake the field testing necessary to fully evaluate the feasibility of creating a hydraulic barrier in the bedrock aquifer in the area to the west of Dennison Road. Based on the Department's review of the field testing program and the results of groundwater monitoring in this area, ALCOA may be required to design and install such a system to prevent the future migration of contaminants toward Dennison Road.

ALCOA will implement an intensive groundwater monitoring program which will involve the quarterly collection of samples from the residential wells and from new and existing monitoring wells. As part of this program, "early detection" monitoring wells will be installed in the area upgradient of the residential wells along Dennison Road and Horton Road. The purpose of the program is to provide a means to determine if contaminant levels are increasing in the residential wells and in the area upgradient of the residences. In order to ensure timely review of the results, ALCOA will be required to provide the analytical sampling data to the residents and the NYSDEC and NYSDOH within seven weeks of the sampling event. If the State's review of the results indicates a trend of increasing contaminant levels at or upgradient of the residences, the NYSDEC and NYSDOH will make a determination as to the need for ALCOA to take appropriate action (i.e. the extension of a public water supply, or the creation of a hydraulic barrier in the bedrock aquifer) to remedy the situation.

ON-SITE VAULT

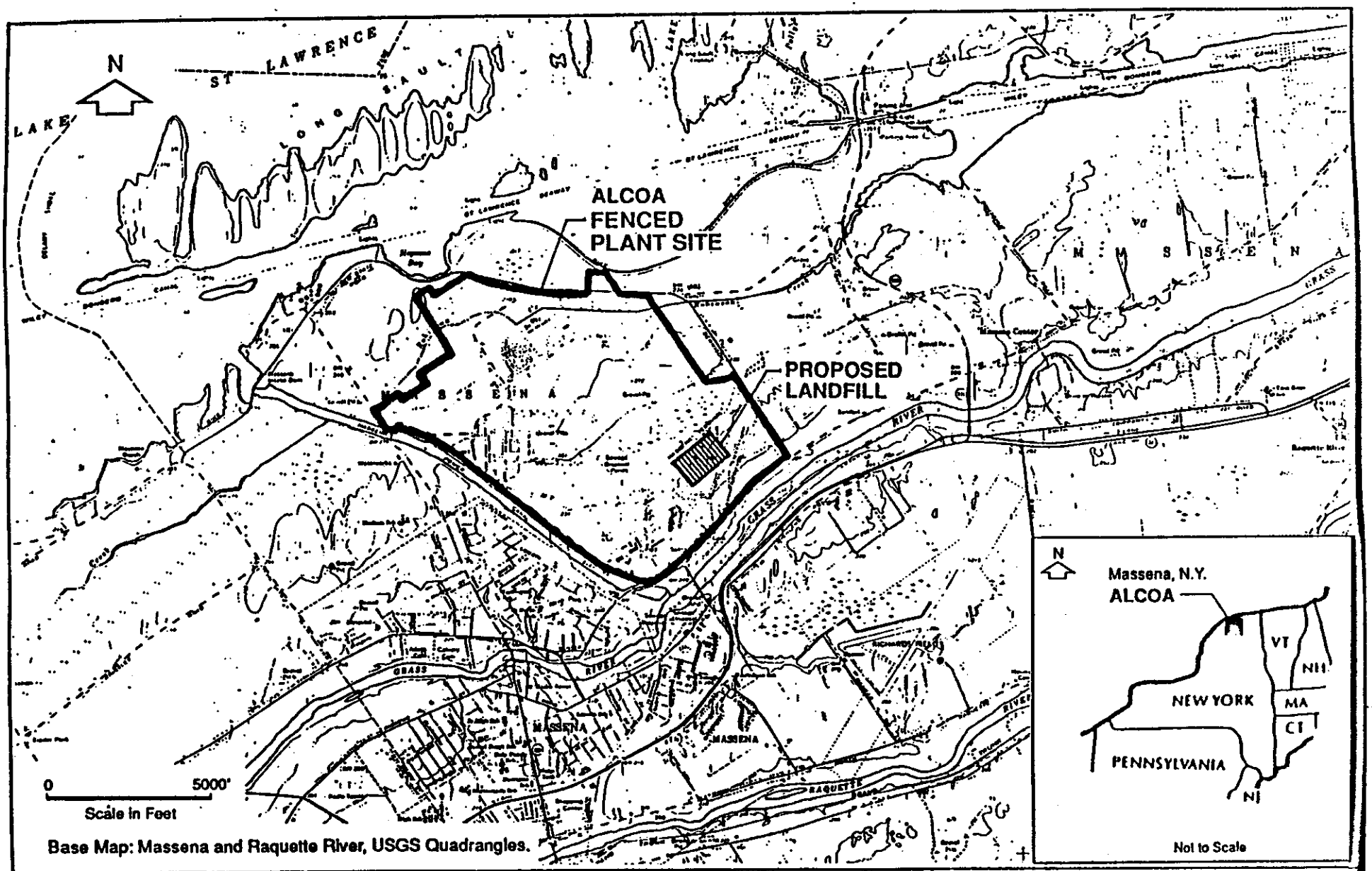
Many of the selected alternatives require the use of an on-site vault to contain excavated wastes, soils, sludges, sediments, or treatment residuals.

Based upon the NYSDEC site selection criteria (6 NYCRR Part 373-2), as well as geologic and environmental conditions and current land use at the ALCOA facility, the area identified in Figure 3 is considered the preferred location for a vault.

ALCOA shall submit detailed design specifications and drawings to the Department demonstrating compliance with 6 NYCRR Part 373 Surface Land Burial Facility requirements, and USEPA RCRA/TSCA Land Disposal requirements. Furthermore, since this facility lies within an active earthquake area, the engineer shall take into consideration appropriate engineering factors when designing the vault.

The associated costs are included with the cost estimates for each alternative. The cost is proportioned according to the volume of waste expected at each site. The construction cost has been estimated at $90 per cubic yard of waste, and the O & M cost at $.93 per cubic yard.

FIGURE 3



Base Map: Massena and Raquette River, USGS Quadrangles.

Figure 1-1

Local Map

ALCOA - Massena, New York

CDM

environmental engineers, scientists, planners & management consultants

MONITORING AND REVISITING

A monitoring and maintenance program will be developed for each site where waste or waste constituents are left in-place or relocated. The objective of the monitoring and maintenance program is to ensure that all remedial work is functioning according to design specifications, and to monitor environmental media to ensure that human health and the environment are being protected.

At each site where untreated hazardous waste remains, the remedial work will be re-evaluated, or revisited, at least once every five years to determine if additional remedial work is appropriate. Additional remedial action is appropriate when the completed remedy no longer protects public health and the environment.

Based on the areal and vertical extent of groundwater contamination at the facility, it is likely that migration of residual contaminants through the overburden units and into the bedrock aquifer will continue long after the groundwater collection and treatment systems have begun operating. The impact of this residual contamination upon overburden and bedrock aquifer quality is uncertain at this time. Therefore, a long term monitoring program will be established to monitor the effectiveness of remediation and to note long term trends in groundwater quality at the facility. The monitoring program will incorporate new and existing wells, as appropriate. As part of the program, new wells will be installed in the various geologic units, including the deep till and the bedrock. Locations will include areas in the vicinity of the sites and locations upgradient of and in close proximity to Dennison Road, between Dennison Road and Horton Road, the Massena Power Canal, the Grasse River, and Robinson Creek. The actual number, locations and depths of the new wells will be determined during remedial design. If it is determined by the Department that contaminant migration into a useable aquifer continues to cause an unacceptable impact to health or the environment, the Department may amend the ROD, in accordance with O&D Memorandum 89-05, to require further remedial actions as deemed appropriate.

Since groundwater is discharging to surface waters at and adjacent to the plant, and the impacts (if any) are unknown, a long term surface water monitoring program will be established at the facility. Monitoring stations used in the program will include the various on-site streams, wetlands, etc. and the Massena Power Canal, the Grasse River and Robinson Creek. If the monitoring program results indicate that the discharge of contaminated groundwater is unacceptably impacting surface water quality, the Department may amend the ROD, in accordance with O&D Memorandum 89-05, to require further remedial actions as deemed appropriate.

ALCOA will be required to provide financial assurances for monitoring and maintenance requirements of the remedial program pursuant to one of the methods set forth in 6 NYCRR Part 373-2.8.f.

REMEDIATION SCHEDULE

A proposed remediation schedule for each of the disposal sites and groundwater management areas addressed in this document is contained in Appendix B. Exact schedules will be determined as part of the remedial design process. Activities at the various disposal areas may take place simultaneously. The Department will review and approve each stage of design, construction, operation, and monitoring. The Department will monitor all construction activity with on-site personnel to ensure conformance to approved design.

IX. ADMINISTRATIVE RECORD

Table 7 provides a comprehensive list of reports and correspondence that was utilized by the Department during the final decision-making process. All of this information is available for public review.

TABLE 7

- Waste Site Investigation

  Volumes I & II - Investigative Report, August 1987

  Volume IV - Supplemental Report, March 1989

  Volumes VI, VII A, VII B - Feasibility Study Report Number 1 (FS I), September 1990

  Volume VI, Appendix C - Baseline Public Health Assessment, July 1990

  Volumes VIII, IXA, IXB - General Refuse Landfill and Landfill Annex Feasibility Study Report IA (FS IA), February 1991

  Volumes X, XIA, XIB - Feasibility Study Report II (FS II), June 1991

  Volume XII - Final Comprehensive Biota Sampling Program Report, March 1991

  Volume XIII - Waste Lubricating Oil Lagoon Supplement to the Feasibility Study Report I, April 1991

- Bedrock Monitoring Well Program, August 1990

- General Refuse Landfill and Annex Investigation Report, June 1990

- Revised FS II Costs

  Tom Lightfoot, ALCOA to Darrell Sweredoski, NYSDEC, August 19, 1991

  Tom Lightfoot, ALCOA to Darrell Sweredoski, NYSDEC, August 28, 1991

  Tom Lightfoot, ALCOA to Darrell Sweredoski, NYSDEC, September 17, 1991

  Tom Lightfoot, ALCOA to Mike Sirowich, NYSDEC, September 25, 1991

- Revised Preliminary Engineering Plan (PEP), June 1991

- Record of Decision (ROD), March 1991

- Proposed Remedial Action Plan (PRAP), September 1991

- NYSDEC Division of Hazardous Waste Remediation Technical and Administration Guidance Memoranda (TAGM)

  HWR-89-4022 Records of Decision for Remediation of Class 2 Inactive Hazardous Waste Disposal Sites, February 7, 1989 (Commissioner's Organization and Delegation Memorandum 89-05, January 26, 1989)

  HWR-90-4030 Selection of Remedial Actions at Inactive Hazardous Waste Sites, May 15, 1990

- Public Comments on PRAP

  St. Lawrence County Environmental Management Council, Jon Montan, November 20, 1991

  Massena Economic Development Council, Frank Alguire to Darrell Sweredoski, November 26, 1991

  General Motors Corporation, Douglas Premo to Gregg Townsend, November 27, 1991

  St. Regis Mohawk Tribe, Ken Jock to Gregg Townsend, November 27, 1991

  Public Advisory Committee for the St. Lawrence River Remedial Action Plan at Cornwall, Ontario, Canada, John Milnes to Gregg Townsend, November 30, 1991

  Mohawk Council of Akwesasne, Chief Lloyd Benedict/James Ransom to Gregg Townsend, December 2, 1991

  Luke Dailey, Colton to Gregg Townsend, December 3, 1991

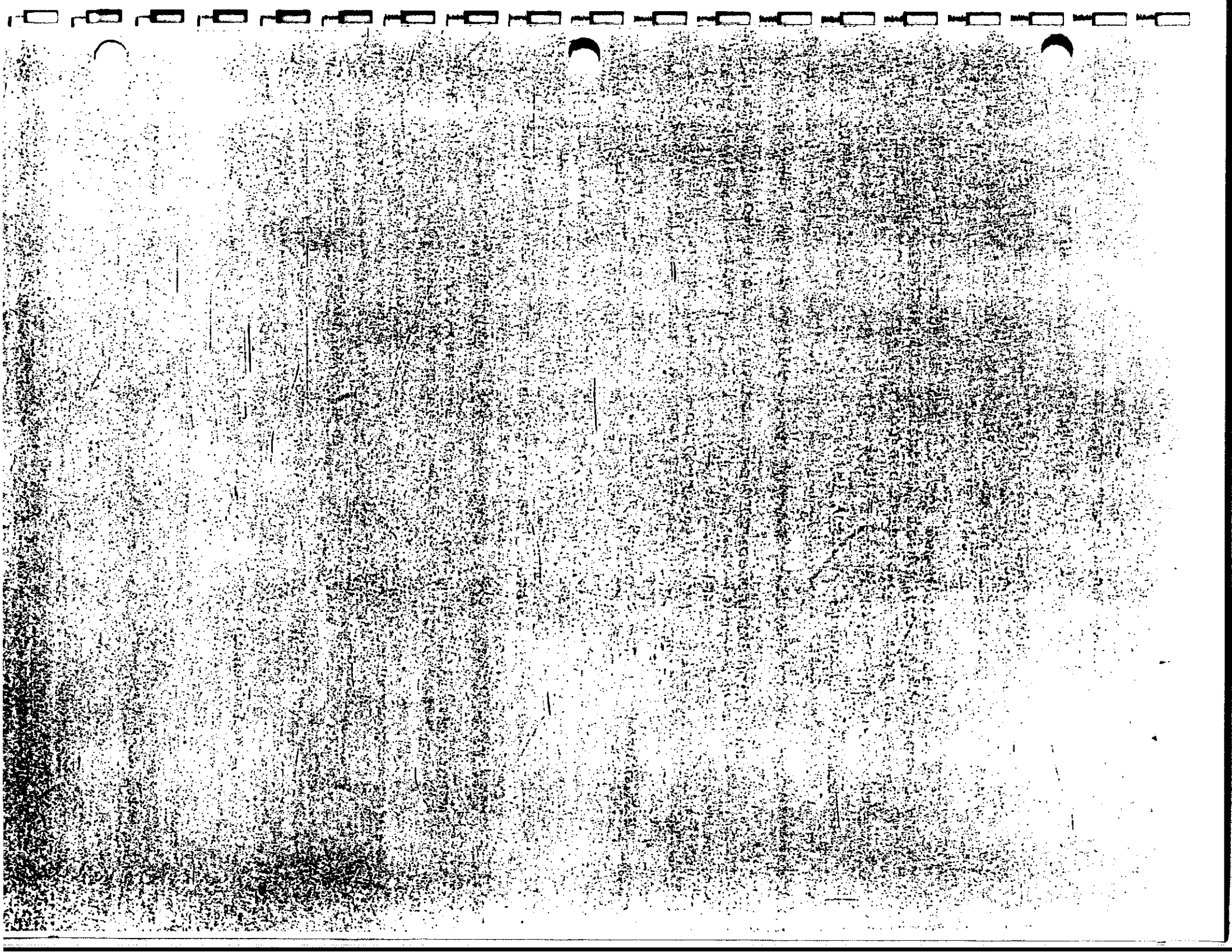
  Earl Jackson, Massena during October 24, 1991 public information meeting on PRAP

  Canadian Review Panel, Peter McKellar/David Egar to Thomas Jorling, November 27, 1991

- ALCOA comments on PRAP, John Millett to Gregg Townsend, November 27, 1991

- Responsiveness Summary to Public Comments

- Responsiveness Summary to ALCOA Comments



APPENDIX A

PRELIMINARY ENGINEERING PLAN

REVISED

PRELIMINARY ENGINEERING PLAN

FOR ALCOA FS I DISPOSAL AREAS

Prepared for:

ALUMINUM COMPANY OF AMERICA
MASSENA, NEW YORK

Prepared by:

ENGINEERING-SCIENCE, INC.
290 ELWOOD DAVIS ROAD
SUITE 312
LIVERPOOL, NEW YORK

JUNE 3, 1991

REVISED
PRELIMINARY ENGINEERING PLAN
FOR ALCOA FS I DISPOSAL AREAS

TABLE OF CONTENTS

SECTION 1

INTRODUCTION

1.1 BACKGROUND AND PURPOSE

In accordance with Articles IX and XVIII of the Order on Consent dated October 1990 ("Order on Consent"), the Aluminum Company of America ("ALCOA") submitted to the New York State Department of Environmental Conservation ("NYSDEC") and NYSDEC approved a revised Feasibility Study Report I ("FSI"). FSI evaluated and recommended remedies for nine (9) areas or sites at ALCOA's Massena Operations in Massena, New York.

In March 1991 NYSDEC issued a Record of Decision ("ROD"), which selected the remedies to be implemented by ALCOA at eight (8) of the nine (9) sites evaluated in FSI. NYSDEC selected excavation as specified in Section VI of the ROD as the remedy at the following six (6) sites: Oily Waste Landfill; Spent Potlining Pile A; Primary Lagoon/Dredge Spoils Area; Soluble Oil Lagoon; Dennison Road Disposal Area; and the Unnamed Tributary. In accordance with and as partial fulfillment of its obligation under Article XXII of the Order on Consent to submit a Remedial Design for sites covered in the FS I ROD, ALCOA submits this Preliminary Engineering Plan ("Plan") to cover these sites.

The purpose of this Plan is (1) to establish procedures to determine if soil cleanup goals as specified in Section VI of the ROD have been met; (2) to establish procedures to determine whether and what additional remedial actions as specified in Section VI of the ROD ALCOA shall be required to implement if soil cleanup goals are not met; (3) to clarify site classification/declassification and the applicability and scope of five-year reviews referred to in Section VIII, p. 43 of the ROD; and (4) to establish procedures (a) to evaluate further the extent of contamination at the Dennison Road Disposal Area and the Unnamed Tributary as specified in Section VIII of the ROD and (b) to amend the ROD based on this further evaluation. In accordance with Article XVII of the Order on Consent, this Plan shall become an enforceable part of the Order on Consent upon the Department's approval of it.

1.2 INDICATOR COMPOUNDS BY SITE

In Section VI of the ROD, NYSDEC identified soil cleanup goals for various organic and inorganic compounds or classes of compounds. Waste characterization results in FSI and groundwater quality monitoring data in Feasibility Study Report II ("FSII") provide the basis for selecting the indicator compounds for the Oily Waste Landfill; Spent Potlining Pile A; Primary Lagoon/Dredge Spoils Area; Soluble Oil Lagoon; Dennison Road Disposal Area; and the Unnamed Tributary, which are set forth in Table 1.1.

1.3 ORGANIZATION OF PLAN

This Plan is organized into six (6) sections including this Section 1 ("Introduction"). Section 2 presents the procedures for and clarifies the consequences of excavation as specified in Section VI of the ROD. Sections 3, 4, and 5 present the procedures for and clarify the consequences of further evaluation at the Oily Waste Landfill, Dennison Road Disposal Area and the Unnamed Tributary respectively. Section 6 presents a statistical approach and general procedures for analyzing the scope and assessing the results of confirmatory sampling efforts.

TABLE 1.1

INDICATOR PARAMETERS AND REMEDIAL ACTION OBJECTIVES FOR EACH DISPOSAL AREA

Disposal Area	Indicator Parameters						Affected Media	Remedial Objectives
				Inorganics				
	VOCs	PAHs	PCBs	Cyanide	Fluoride	Sulfate		
Oily Waste Landfill	X	X[1]	X		X[1]		Waste Residuals and Soil	Prevent direct contact with wastes. Prevent adverse impacts on local biota.
							Groundwater	Prevent contaminant migration from the site via groundwater.
Spent Potlining Pile A		X		X	X	X	Spent Potlining	Prevent direct contact with wastes. Prevent adverse impacts on local biota.
							Groundwater	Prevent contaminant migration from the site via groundwater.
							Leachate/Surface Water	Prevent adverse impacts on aquatic biota and downstream surface water.
							Soil	Control leaching of contaminants to groundwater.
Primary Lagoon/ Dredge Spoil Areas		X	X	X	X	X	Sludge and Dredge Spoils	Prevent direct contact with wastes. Prevent adverse impacts on local biota.
							Groundwater	Prevent contaminant migration from the site via groundwater.
Soluble Oil Lagoon	X	X	X	X	X		Sludge and Soil	Prevent direct contact with wastes. Prevent adverse impacts on local biota.
							Groundwater	Prevent contaminant migration from the site via groundwater.

TABLE 1.1 (CONTINUED)

INDICATOR PARAMETERS AND REMEDIAL ACTION OBJECTIVES FOR EACH DISPOSAL AREA

	Indicator Parameters							
				Inorganics				
Disposal Area	VOCs	PAHs	PCBs	Cyanide	Fluoride	Sulfate	Affected Media	Remedial Objectives
Dennison Road Disposal Area	X	X	X		X		Waste Residuals and Soil	Prevent direct contact with wastes. Prevent adverse impacts on local biota.
							Sediment/Surface Water	Prevent exceedance of water quality standards on down-stream surface water.
							Groundwater	Prevent contaminant migration from the site via groundwater.
Unnamed Tributary			X(2)				Sediments and Surface Water	Prevent adverse impacts on aquatic biota and any users of local surface waters.

(1) Parameter was detected only in groundwater at levels exceeding NYSDEC groundwater quality standards.

(2) Parameter was detected only in the solid matrix (i.e., waste, soil, etc.) at levels above the average and normal range of concentrations detected in soils.

SECTION 2

PROCEDURES FOR COMPLIANCE WITH THE ROD AT SITES DESIGNATED FOR EXCAVATION

2.1 THE ROD

Section VI of the ROD recommends soil cleanup goals for organic compounds or classes of organic compounds and for inorganic compounds present in soils at sites designated for excavation. Section VI further provides that:

> [E]xcavation will proceed at the given disposal site until all visible waste and waste contaminated soil is removed but not greater than one foot beyond the predetermined waste-soil boundary. The in-place soils will then be analyzed to determine if the [soil] cleanup goals have been met. A determination will be made at that time regarding the feasibility of, and the need for, additional remediation. If the [soil] clean-up goals are not achieved, and significant soil contamination remains, in-situ permanent treatment alternatives or a more stringent cap and groundwater monitoring and/or a pumping system, will be given preference over continued excavation.

ROD, pp. 15-16 (emphasis supplied).

Section VIII of the ROD specifies that:

> At each site where untreated hazardous waste remains, the remedial work will be re-evaluated, or revisited, at least once every five years to determine if additional remediation work is appropriate.

ROD, p. 43 (emphasis supplied).

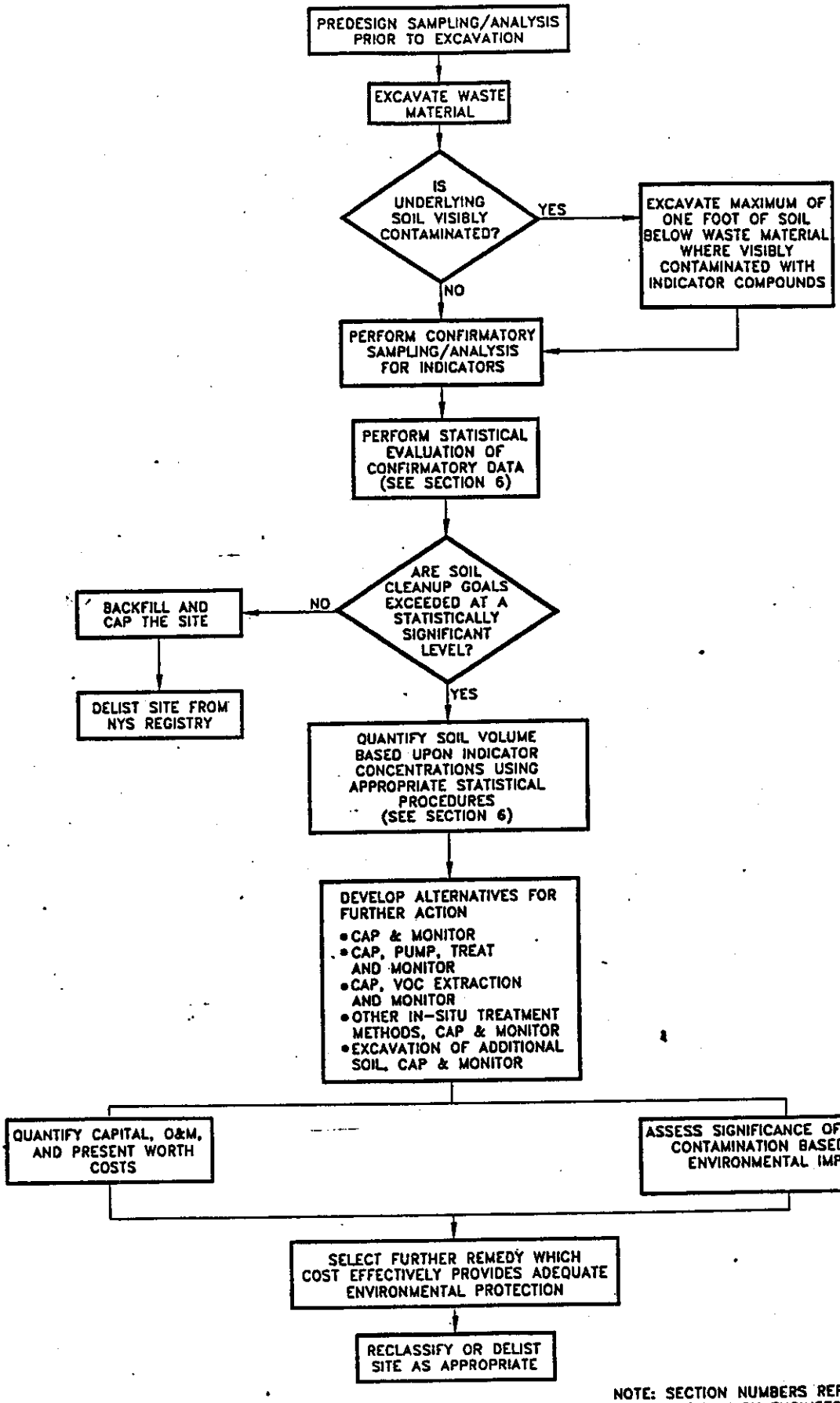
2.2 OVERVIEW AND DECISION TREE

The procedures to comply with Section VI of the ROD are illustrated in a decision tree, which is Figure 2.1. NYSDEC shall review and approve all sampling and analytical work plans and concur with each decision point on the tree.

The first step is predesign sampling and analysis for indicator compounds to more precisely characterize the lateral and vertical extent of contaminants at the site.

The next step is excavation of the waste material, followed by visual inspection of the underlying soil. If the underlying soil does not appear stained by indicator compounds, confirmatory sampling and analysis will be conducted. The number of samples, sample location and the determination of whether soil cleanup goals have

DECISION TREE FOR FURTHER REMEDIAL ACTION



NOTE: SECTION NUMBERS REFER TO THE PRELIMINARY ENGINEERING PLAN.

FIGURE 2.1

indicator compounds in accordance with the procedures set forth in Section 6 of this Plan.

If the underlying soil appears stained by indicator compounds in whole or in part, the stained portions will be excavated to a maximum depth of one (1) foot. Confirmatory sampling and analysis will be conducted and the determination of whether soil cleanup goals have been met and to what extent additional remediation is needed, if any, will be made in accordance with the statistical procedures set forth in Section 6 of this Plan.

If the soil cleanup goals still have not been met after excavation of the waste plus one (1) foot of underlying soil, the significance of the remaining soil contamination will be evaluated. Where significant soil contamination remains, the following additional remedial actions will be evaluated for implementation: cap and monitor; cap, "pump-and-treat" and monitor; cap, VOC extraction and monitor; other in-situ treatment methods, cap and monitor; and excavation, cap and monitor (see Figure 2.1). The excavation of additional soil is the least preferred additional remedial action and therefore will only be implemented if other potential additional remedial actions do not cost effectively provide adequate environmental protection.

Sites where soil cleanup goals have been met will be backfilled and capped with 18 inches of clay and 6 inches of topsoil and delisted from the Registry of Inactive Hazardous Waste Disposal Sites. Soil cleanup goals are met if the lowest soil cleanup goals specified in Section VI of the ROD are met (i.e., for areas outside of groundwater management units) and groundwater quality standards are achieved in the area of the waste disposal site.

Sites where soil cleanup goals have not been met, but where additional remediation is not warranted, will be placed in Classifications 4 or 5, whichever is appropriate considering the need for monitoring and maintenance. Additional remedial action as specified above will be implemented at sites where soil cleanup goals have not been met and the remaining soil contamination is significant. These sites will then be placed in Classifications 4 or 5 or delisted as appropriate.

Sites in Classifications 4 or 5 will be reevaluated every five (5) years to determine if additional remedial action is appropriate as specified in Section VIII, p. 43 of the ROD. Additional remedial action is appropriate where the completed remedy no longer protects public health and the environment. Additional remedial action is not appropriate to implement newly-developed, more permanent remedial technologies or to comply with a new analysis of information in the administrative record for the FSI ROD unless the completed remedy no longer protects public health and the environment.

2.3 EVALUATION OF SUPPLEMENTAL REMEDIAL ACTIONS

NYSDEC considers the soil cleanup goals recommended in the FSI ROD protective of groundwater quality (see ROD, p. 15). Information to be considered when determining whether and what further remedial action is warranted if soil cleanup goals are not met may include additional site-specific data and possible modeling analyses incorporating additional site-specific data as approved by NYSDEC.

Additional site data will be collected to quantify contaminant concentrations in the source material and in local groundwater at appropriate monitoring wells. In addition, ALCOA plans to conduct more hydrogeologic tests to refine the groundwater flow analysis for individual disposal areas. These new data may allow an evaluation of the dilution and attenuation of VOCs, PAHs, PCBs and cyanide/fluoride/sulfate taking place at each disposal area. In addition, groundwater migration pathways and travel times will continue to be assessed as more groundwater flow analyses are conducted.

SECTION 3

OILY WASTE LANDFILL REMEDIATION PROCEDURE

The ROD specifies that wastes and visibly contaminated soils in the Oily Waste Landfill be excavated. According to the ROD, the excavated material would then be placed in an on-site vault with or without prior treatment depending upon whether the material meets land disposal restrictions. Contaminated groundwater would be recovered and treated as well, according to the ROD. Instead of excavation, ALCOA had proposed in its Feasibility Study I that the Oily Waste Landfill be capped with a hazardous waste cap and that migrating contaminants be contained with a groundwater management system as described in Feasibility Study II. ALCOA believes that the remedial action objectives presented in Table 1.1 can be met via containment with a cap and groundwater management. However, ALCOA is willing to reassess its position and reconsider excavating the waste materials and soils visibly contaminated with indicator compounds if agreement can be reached on the elements of this Plan presented in Sections 2 and 6.

SECTION 4

DENNISON ROAD REMEDIATION PROCEDURE

Prior to initiation of remedial actions at the Dennison Road Disposal area, a pre-design exploratory soil boring program will be conducted at the Dennsion Road Disposal Area to further explore the level of contaminants in soil both beneath the drum disposal area and outside the drum disposal area in the adjacent former ravine. Outside the drum disposal area, the exploratory borings will be conducted both within and beneath the fill zone. The stained soil zone which exists at depths along the north-south center line of the ravine will also be analyzed. Additional soil/sediment samples will be collected in a ditch south of the drum disposal area. Based upon these results the preliminary design for the remedial action will be prepared to include:

1. Drum Disposal Area

   a. The drum disposal area, and any additional waste and soil visibly stained with indicator compounds within the drum disposal area will be excavated. Materials which meet the RCRA land disposal restrictions (LDRs) will be placed in the proposed on-site vault. Empty drums or other debris which cannot physically undergo treatment will also be placed in the vault. The remaining material will be subject to solvent extraction (alternative 3b) in order to concentrate the contaminants in a waste oil stream. This stream will be incinerated off-site, while the treated material will be placed in the proposed vault. If upcoming treatability studies show that solvent extraction cannot meet the LDRs, alternative treatment technologies will be considered in an amended Record of Decision.

   b. Following the initial excavation, confirmatory sampling will be conducted to determine the level of residual soil contamination in accord with Section 2 of this Plan.

   c. If the soil cleanup goals are not met, then the decision process for further action as defined in Section 2 will be followed.

2. Areas Outside Drum Disposal Area

   a. If the statistically-based pre-design sampling results confirm that contamination in the soil-stained zone and the area south of the drum disposal area is below proposed soil cleanup goals, then no further action will be conducted in these areas.

   b. If the pre-design sampling results show that significant contamination exists outside the drum disposal area at levels above the proposed soil cleanup goals, then an analysis of further remedial action will be conducted using the decision process outlined in Section 2. Implementation of remedial alternatives other than excavation at areas outside of the drum disposal area is subject to ROD amendment.

SECTION 5

UNNAMED TRIBUTARY REMEDIATION PROCEDURE

At the Unnamed Tributary, a sampling program will be conducted to define the lateral extent and depth of sediment contamination and contaminant concentrations between the end of the 400 feet IRM work zone and the Grasse River. A biota study will be performed if warranted based on results of the sediment sampling program to determine what impact the contamination is having on the Unnamed Tributary biota and to develop baseline data for the long term biota monitoring as required in the ROD.

With these additional data on the actual lateral extent, depth, concentration and volumes of sediment, an evaluation of alternative remedial actions will be conducted. Remedial actions to be addressed could include none, one, or a combination of the following alternatives:

1. Excavation of contaminated sediment-soil and disposal in an on-site vault.
2. Capping the contaminated sediments and continuing use of the existing streambed.
3. Rerouting the Unnamed Tributary with excavation or capping of the existing streambed.
4. Any other appropriate remedial action alternatives (e.g., in-situ biotreatment).

The procedure described in Section 2 will be used in conjunction with the NYSDEC TAGM 4030 to evaluate the alternatives. ALCOA may then request the Department to amend the ROD. With NYSDEC concurrence, the preferred alternative will then be implemented.

SECTION 6

PROPOSED STATISTICAL PROCEDURES FOR DETERMINATION OF CLEANUP EFFECTIVENESS

6.1 INTRODUCTION

Statistical procedures will be used for determination of cleanup effectiveness. The major objectives of the statistical approach are:

1. To statistically determine if a sufficient number of confirmatory samples have been collected.
2. To determine if the concentration of residual contamination at the site is statistically less than the cleanup goal or greater than the cleanup goal.
3. To quantitatively define the areas of residual contamination where soil cleanup goals are exceeded.

The statistical procedures used will follow the fundamentals of the technical references given in Attachment B plus those outlined in SW 846 and USEPA 1989. These procedures will be based on the factors that are being addressed as a result of the site cleanup.

When employing these statistical procedures, appropriate checks and balances will be used to determine if the concentration of residual contaminants is statistically less than the cleanup goal. Additionally, sampling procedures will incorporate sampling reliability and gage capability factors into this determination. The goal is to maintain an appropriate level of reliability in all aspects of the sampling and analytical processes.

Should the statistical evaluation show that adequate cleanup was not attained, additional statistical tests will be used to describe the magnitude and location(s) of the "exceedance".

6.2 SPECIFIC STATISTICAL ISSUES

When evaluating site cleanup effectiveness, existing data will be examined and used to determine sample sizes necessary to statistically validate the cleanup levels achieved. The data will be reviewed to determine if it is parametric or nonparametric in nature.

If the data are parametric, an analysis will be made to determine if the data fits a normal distribution. If the data is normal, the sampling standard deviation, appropriate levels of alpha and beta (risk levels), and the cleanup goal will be used to determine the sample size necessary to validate the cleanup goal achieved. Appropriate values for probabilities will be included.

Should the data not be normally distributed, either data transformation techniques or alternate statistical methods will be used to determine the sample size. Values for alpha, beta, and the cleanup goal would remain the same as described in the previous paragraph.

If the data are parametric, i.e., data which cannot be quantified (e.g., values less than the MDL), then parametric statistics (e.g., binomial distribution and associated techniques) will be used for data analysis. At all times, values for alpha, beta, and the soil cleanup goal would remain the same.

Should the data include a combination of parametric (quantified) and nonparametric (non-quantified) values, then two (2) statistical analyses will be performed. In the first analysis, parametric data will be assigned a value (e.g., one-half of the MDL) and a parametric analysis will be carried out as described above. In the second analysis, parametric data will be designated as a "hit", and a nonparametric analyses will be used to evaluate sample sizes needed to determine site cleanup effectiveness.

As a general policy, sample statistics will be used in the place of ideal population values. Sample statistics take into account the natural variability encountered when sampling in an industrial environment.

ATTACHMENT A

ERRATA SHEET FOR ROD

p. 31 - line 19, "Section IV" should be "Section VI"

p. 33 - line 11, "Section IV" should be "Section VI"

p. 34 - line 17, "Section IV" should be "Section VI"

p. 36 - lines 4-5, "Section IV" should be "Section VI"

ATTACHMENT B

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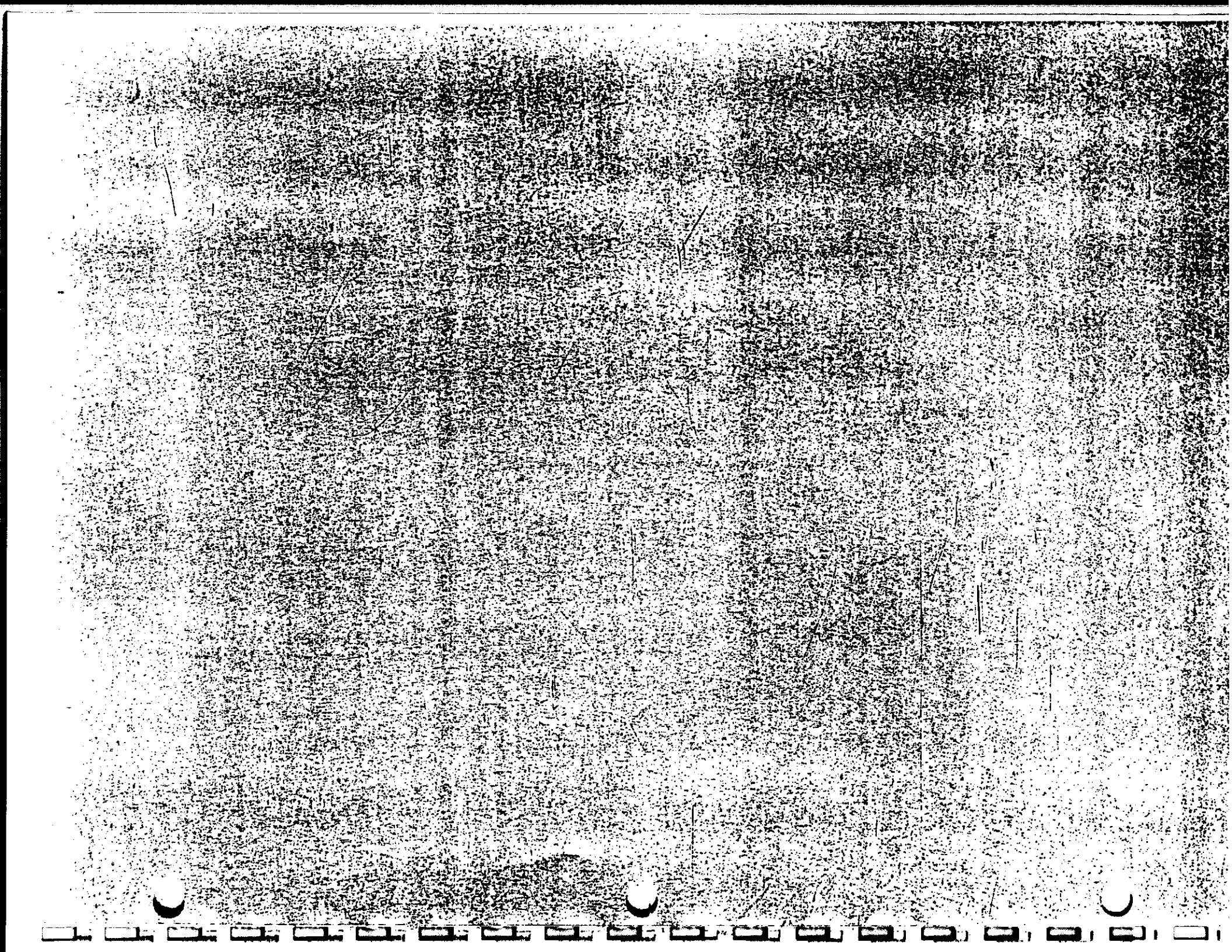

APPENDIX B

REMEDIATION SCHEDULE

WASTE LUBRICATING OIL LAGOON

Design	June 1996 - February 1997
Construction	April 1997 - December 1997

GENERAL REFUSE LANDFILL

Design	April 1992 - February 1993
Construction	April 1993 - December 1993

LANDFILL ANNEX

Design	April 1992 - February 1993
Construction	April 1993 - December 1993

SANITARY LAGOON

Complete remediation by July 1999.

60 ACRE LAGOON

Complete remediation by December 2001.

EAST MARSH

Design	October 1993 - May 1994
Construction	September 1996 - July 1997

GROUNDWATER MANAGEMENT AREAS

Pile I	Complete by December 1994
Pile A, Primary Lagoon & Dredge Spoils Area	Complete by December 1997
Oily Waste Landfill	Complete by December 1997
Dennison Cross Road	Complete by December 1997
Soluble Oil Lagoon, Sanitary Lagoon & Waste Lubricating Oil Lagoon	Complete by December 2000
60 Acre Lagoon	Complete by December 2002

APPENDIX C

RESPONSIVENESS SUMMARY

to

ALCOA COMMENTS ON THE

ALCOA SEPTEMBER 30, 1991 PRAP

II. GENERAL

Q/C The Department has indicated that hazardous waste (ie. PCB-contaminated sediments) was found in the Grasse River adjacent to the ALCOA facility. This determination will be subject to the outcome of various federal and state regulations currently being revised.

R Remediation of this area is subject to a 106 order with the USEPA.

Q/C The contention that Canada Geese are bioaccumulating contaminants from the ALCOA facility is not fully supported by the existence of PCBs in goslings taken from the site. Canada Geese are mobile and, therefore, may be accumulating contaminants from other areas. It is possible that the goslings may inherit the PCBs from the adult birds.

R The Department's position is that since the goslings were taken form ALCOA's facility, the contaminants found in the goslings were obtained from the ALCOA facility.

Q/C The PRAP implies that the soil cleanup goals identified in Table II are only applicable to the Waste Lubricating Oil Lagoon and the East Marsh.

R The soil cleanup goals listed in Table III are relevant for all sites requiring excavation, including the Sanitary and 60 Acre lagoons. Emphasis has been placed on PCBs at these latter two sites due to their predominant presence. The Department believes that if the PCB cleanup goals can be met, then the other cleanup goals will also be satisfied. The confirmatory sampling programs at each of these sites must include all of the contaminants of concern.

Q/C As a matter of practicality, sediment may be removed from a lagoon during the excavation of sludge and contaminated soils for ease of operation. However, unless the sediment is contaminated, there should be no requirement to remove it. Excavation should be conducted in accordance with the procedures described in ALCOA's June 1991 Preliminary Engineering Plan (PEP).

R The Department agrees that uncontaminated sediment (ie. sediment that does not exhibit statistically significant contaminant levels above the specified cleanup goals) does not need to be excavated. The determination as to whether or not the sediment is contaminated will be made pursuant to the June 1991 PEP.

Q/C ALCOA does not agree with the technical or legal basis for the Department's soil cleanup goals.

R Title 13, Article 27 of the ECL clearly gives the Department the authority to develop and implement remedial action plans that provide protection to public health and the environment.

Q/C The cost estimates identified in the PRAP do not include the cost of managing remedial construction activities after remedial design is completed. ALCOA considers this cost to increase the overall remediation cost by 10%.

R The costs utilized in the PRAP were obtained directly from the costs prepared by ALCOA's consultant, Engineering-Science, in the FS reports and supplemental correspondence.

III. 60 ACRE AND SANITARY LAGOONS

A. PERMANENCE

Q/C Existing laws and regulations do not require remedies favoring permanence or treatment, especially when the health and environment benefits associated with such remedies are not commensurate with increased costs.

R The remedial plan follows both Federal and State legislation for the development of remedial actions that provide long term protection of health and environment.

Q/C Article 27, Title 13 of the ECL (§27-1313(5)(2)) mandates that a remedial program eliminate the significant threat posed to the environment by a hazardous waste site. It does not require the elimination of all threats, nor the restoration of pre-existing conditions.

R The remedial plan does not require the elimination of all threats.

Q/C Article 27, Title 13 of the ECL (§27-1301(3)) does not specify a preference for permanent treatment in the elimination of a significant threat.

R Agreed, however, the second paragraph of Article XVII of the October 31, 1990 Order on Consent between the Department and ALCOA (page 16) requires the Feasibility Studies to comply with both CERCLA/SARA and the Department's "Technical and Administrative Guidance Memorandum for the Selection of Remedial Actions at Inactive Hazardous Waste Sites" (TAGM #HWR-90-4030). Both SARA and Section 2 of the TAGM specify a preference for permanent remedies. In addition, the Commissioner's Organization and Delegation Memorandum 89-05 states a preference for permanent treatment.

Q/C Article 27, Title 13 does not mandate that remedial programs comply with ARARs.

R Agreed, but again, the Order on Consent and O&D 89-05 requires compliance with SARA and TAGM 4030. SARA does specify that the selected remedial program must comply with ARARs, and similarly, the TAGM requires compliance with New York State Standards, Criteria, and Guidelines (SCGs).

Q/C The USEPA's "Guidance on Remedial Actions for Superfund Sites with PCB Contamination" does not yield remedial programs for the 60 Acre and Sanitary Lagoons comparable to those chosen by the Department.

R The guidance document is oriented toward the remediation of landfills and solids, not lagoons and sludges. TSCA requirements for treatment of industrial sludges at active lagoons is contained in 40 CFR Part 761, not in the guidance document.

B. SLUDGE AND SEDIMENT TREATMENT LEVELS

Q/C The USEPA's guidance document supports the in-place containment of PCB-contaminated sludge and sediment at both lagoons due to the large volumes and low concentrations, and treatment prior to containment of only that material which contains PCBs in excess of 500 ppm.

R Again, this guidance document is not applicable for active industrial wastewater lagoons and sludges.

Q/C Neither the USEPA's policy governing the disposal of sludges containing PCBs in excess of 500 ppm, nor the anti-dilution rule preclude the scenario suggested in the previous comment.

R Again, this guidance document is not applicable for active industrial wastewater lagoons and sludges.

Q/C Nothing in the RCRA LDRs requires the treatment of any sludges or sediments excavated from the lagoons.

R The presence of VOCs in the lagoons is very low and, therefore, the LDRs were never cited as an ARAR for these sites.

Q/C The sludges and sediments in the 60 Acre and Sanitary Lagoons are not RCRA-listed nor characteristic hazardous wastes, therefore, vaulting of treated PCB waste is not required.

R It is the Department's position that the most highly contaminated sludges also contain other contaminants that cannot be effectively treated (fluorides, cyanide, heavy metals) and, therefore, the most secure location for these residuals once they are treated is the secure vault now under design as part of FS I ROD.

C. SPECIFICATION OF REMEDY

1. DEVELOPMENT OF INNOVATIVE TECHNOLOGIES

Q/C Because the Department cannot presently determine the true costs of its proposed excavation and treatment remedies for the lagoons, alternative costs cannot be accurately weighed against the presumed benefits to waterfowl.

R The costs utilized by the Department in its comparison of the various remedial alternatives were calculated by ALCOA's consultant, Engineering-Science.

Q/C The Department's selection of excavation and treatment by solvent extraction overlooks the benefits to be gained by in situ treatment technologies.

R The Department recognizes the potential benefits of an in situ process, and ALCOA will be allowed an opportunity to pursue any feasible treatment technology (in situ or ex situ) prior to making a final selection.

Q/C ALCOA needs the flexibility to use either the Sanitary Lagoon or the southwestern quadrant of the 60 Acre Lagoon as a stormwater retention basin.

R This flexibility is provided for in the ROD.

2. IMPACT ON SCHEDULE

Q/C ALCOA believes that the schedule proposed for implementability of a treatment technology at the lagoons does not allow innovative technologies to be properly evaluated.

R The Department will allow ALCOA the requested 3 years to evaluate various treatment technologies, and an additional 2 years to secure a fully implementable technology. It should also be commensurate with construction of the on-site vault, as well as completion of the FS I remedial programs. During the evaluation period, ALCOA will be expected to:

- o provide the Department with progress reports according to a pre-determined format and schedule;
- o monitor and treat, as needed, the effluent from each lagoon; and
- o eliminate or minimize wildlife use of the lagoons.

Q/C In the event that a currently "unidentified" technology becomes available in the future, where cost-effectiveness over a previously chosen technology can be achieved without compromising treatment efficiency, ALCOA should have the right to implement this technology at the appropriate site(s), and the Record of Decision (ROD) should provide flexibility to automatically allow a more cost-effective technology to be implemented without revising the ROD itself.

R Since the ROD does not specify implementation of a particular treatment technology, but rather the protocol to be used in technology evaluation and selection, an amendment to the ROD may not be necessary., However, ALCOA will be required to gain Department approval of <u>any</u> treatment technology prior to its utilization.

3. INTERIM WATERFOWL IMPACT REDUCTION PLAN

R The Department will require ALCOA to implement a Wildlife Impact Reduction Plan in the interim and until the lagoons are finally closed.

D. LAGOON CLOSURE

Q/C There is no sound basis for the Department's requirement that the 60 Acre Lagoon be retained as a wetland. Conversion of the lagoon to an upland may be more protective of the environment, and replacement of large wetland acreages is feasible.

R The Department will require a study to determine the feasibility of restoring the wetland to pre-release conditions, or provide restitution for lost wetlands in some other form.

IV. GENERAL REFUSE LANDFILL AND ANNEX

A. PART 360 AND PART 373 CAPS

Q/C There is no data to support the need for a RCRA cap at either the Landfill or the Annex. Further, nothing in the Department's regulations dictates a RCRA cover, regardless of whether they contain hazardous waste.

R Both the Landfill and the Annex contain hazardous waste (i.e., PCBs above 50 ppm) as defined by 6 NYCRR Part 371. Although some waste removal will occur at the Annex, this will be limited to observed contamination at the periphery of the site. The fact that many of the drums are partially buried is a strong indication that similar waste is present within the interior of the site. 6 NYCRR Part 373-2 requires a RCRA cap for the closure of sites containing hazardous waste. Furthermore, ALCOA and its consultant, Engineering-Science, recommended a RCRA cap for the landfill. The Feasibility Study (FS IA) did not even consider a Part 360 cap.

Q/C A Part 373 cap costs approximately $3 per square foot more to construct than a Part 360 cap, due to the inclusion of a drainage layer, a synthetic geomembrane, an additional 6" of compacted clay, and two layers of filter fabric. The result is an increase in the overall capital cost of $4.6 million.

R The majority of the $3 per square foot cost difference is borne by the synthetic geomembrane. However, a geomembrane is merely recommended as a component of a RCRA cap; it is not required. If ALCOA can demonstrate through a QA/QC program that the existing cap meets the performance criteria for an impermeable barrier at hazardous waste landfills, the FML will not be required.

Q/C Independent of the type of cover to be placed, ALCOA should receive credit for the intermediate cover already in place at the Landfill.

R The Department will allow the existing clay cover to be incorporated into the final cap system, as long as ALCOA can demonstrate that it satisfies the performance criteria for the protective layer.

B. EXCAVATION OF THE LANDFILL ANNEX

Q/C The ROD should specify that the recommended alternative does not include the use of a drum location device throughout the entire Annex, nor the excavation of a large portion of the Annex.

R It is the Department's intent to limit excavation to the drums and visibly contaminated soil which are readily accessible along the southern embankment of the site. This will be clearly stated in the ROD.

C. LACK OF HAZARDOUS WASTE EVIDENCE IN THE ANNEX

Q/C The presence of small concentrations of chlorinated solvents that are listed hazardous wastes when spent does not necessarily lead to the conclusion that the site is a hazardous waste landfill.

R The mere existence of listed hazardous waste at the Annex constitutes its categorization as a hazardous waste site. In fact, it is impossible to estimate the quantities of hazardous waste present based upon the limited data available from the test pits and soil borings.

V. WASTE LUBRICATING OIL LAGOON

Q/C The selection of a preferred treatment technology (i.e., solvent extraction) is premature, since other treatment technologies are currently being evaluated by ALCOA.

R ALCOA and Engineering-Science have historically discussed the Waste Lubricating Oil Lagoon in conjunction with the Soluble Oil Lagoon, due to the proximity of the two sites and the similarities of their waste profiles and groundwater contamination. Solvent extraction was identified as the preferred treatment at the Soluble Oil Lagoon in the first ROD, although the flexibility to evaluate and select an alternate technology was provided. The Waste Lubricating Oil Lagoon will be addressed in the same manner in the second ROD.

VI. GROUNDWATER MANAGEMENT

A. GROUNDWATER RECOVERY AT RIDGE SITES

Q/C ALCOA disagrees with the Department that the installation of trenches at the ridge sites will effectively capture contaminated groundwater.

R If groundwater recovery becomes necessary at these sites, then the appropriate types of recovery systems will be determined via pilot scale tests conducted at the sites following initial remedial activities.

C. LONG TERM GROUNDWATER MONITORING

Q/C ALCOA requests that the long term monitoring program be designed and implemented following a review of the results of the Bedrock Pathway Investigation.

R It is the Department's interpretation that contaminants from a number of the sites have migrated downward through the till and into the bedrock aquifer. One of the purposes of the monitoring program is to determine if contaminant levels in groundwater in the overburden and in the bedrock diminish following remediation of the various sites. Since such an analysis would require a sufficient baseline (pre-remediation) data set, the long-term monitoring program, which will include the installation and sampling of new monitoring wells, must commence in the near future. We concur that the results of the bedrock pathway investigation may indicate that changes to the monitoring program are necessary. If this occurs, the Department would consider modifying the program, as appropriate.

D. NATURAL ATTENUATION OF CONTAMINANTS

Q/C ALCOA disagrees with the Department's proposed two-year attentuation period, and instead recommends that provisions of the Preliminary Engineering Plan be applied.

R The two year monitoring period was proposed for those sites at which cleanup goals are met. As has been previously indicated, the groundwater at each of the sites is contaminated at levels which exceed groundwater quality standards and guidance values However, since the cleanup goals listed in the PRAP were established to be protective of groundwater quality, further degradation of groundwater quality would not be anticipated in the immediate vicinity of those sites where cleanup goals are met. Therefore, the Department proposed a two year monitoring period to

establish whether contamination levels were decreasing due to natural attenuation processes. Such a proposal was made so that ALCOA would not be required to operate costly groundwater extraction systems at those sites where natural processes will cause contaminant levels to significantly decrease in the short term (2 years). However, since each of the sites exhibits unique hydrogeologic characteristics, the required period of monitoring will be determined on a site-specific basis.

E. APPLICATION OF PRELIMINARY ENGINEERING PLAN (PEP)

Q/C ALCOA recommends that the PEP be applied to those FS II sites where soil cleanup goals are not met in order to address groundwater monitoring requirements.

R The PEP may be utilized in such circumstances. However, the range of additional remedial actions evaluated must include groundwater recovery and treatment. The Department will determine which of the remedial actions provides adequate protection to public health and the environment.

VII. BEDROCK AQUIFER

A. DENNISON ROAD WATER SUPPLY

Q/C ALCOA will continue to investigate the various options for providing an alternate water supply to the Dennison Road residences. However, since depending on the option selected, approval might be required from the Village of Massena, ALCOA cannot commit to having a system operational within the time period specified in the PRAP.

R In the event drinking water conditions on Dennison Road deteriorate to the point where public water is warranted, a system must be available for implementation in a <u>timely manner</u>. Accordingly, potential delays that might be associated with extending the Village supply must be factored into ALCOA's evaluation of alternative options.

B. BEDROCK AQUIFER HYDRAULIC BARRIER

Q/C ALCOA believes that the creation of a hydraulic barrier in the bedrock aquifer would be extremely difficult if not impossible.

R The Department concurs that the establishment of a hydraulic barrier in the bedrock aquifer may not be feasible. However, if other alternatives of ensuring a permanent safe water supply for the Dennison Road residents are exhausted, ALCOA will be required to fully evaluate such a system. ?

C. INTENSIVE GROUNDWATER MONITORING PROGRAM

Q/C ALCOA believes that the installation of "early detection" monitoring wells is not necessary. ALCOA also believes that semi-annual monitoring would be sufficient and that the groundwater sample results turnaround time should be 10 weeks rather than the 6 week period proposed in the PRAP.

R As discussed in the PRAP, even though drinking water standards have not been exceeded in the residential water supply wells, such standards have been exceeded in samples collected from bedrock monitoring wells located upgradient of the residences.

As has been stated previously, it is the Department's opinion that contaminant levels in the bedrock aquifer beneath the residences may increase in the future. The locations of the existing bedrock monitoring wells and the levels of contaminants detected in samples collected from these wells preclude the use of these monitoring points as early detection monitoring wells. Therefore, ALCOA will be required to install additional monitoring wells which will be used to provide an early warning of increased contaminant levels in the bedrock aquifer immediately upgradient of the Dennison Road residences. The purposes of these additional wells will be to ensure that private well users downgradient of Dennison Road are not impacted.

As has been indicated in the past, the use of carbon treatment units on the residential wells is considered to be a temporary solution to a likely long term problem. The purpose of the monitoring program is to detect changes in the contaminant plume in the vicinity of the residences. Given the uncertainties regarding the plume migration rate, the extent of the plume, and seasonal variations in the plume's characteristics, the requirement of quarterly sampling is justified.

We do not agree that reducing the time between sampling and submitting the results to the State and the residents is impractical. We concur that a 3 to 4 week laboratory turnaround time is reasonable. However, it is our opinion that a two week time period for data validation is sufficient. In addition, as quarterly submissions will not need to include a report, one week for submittal of the data should be ample time. Therefore, the Department will require that the data be provided within 7 weeks of the sampling event. In recognition of potential laboratory delays, the data may be submitted in raw (ie. unvalidated) form.

APPENDIX D

RESPONSIVENESS SUMMARY

to

PUBLIC COMMENTS ON THE

ALCOA SEPTEMBER 30, 1991 PRAP

EXECUTIVE SUMMARY

The Department published the Proposed Remedial Action Plan for ALCOA on September 30, 1991. A public meeting was held in Massena on October 24, 1991, and the close of the public comment period was December 2, 1991.

Many of the comments received by the Department were concerned with the amount of permanent treatment (destruction) of hazardous waste. Many commenters felt that the Department did not go far enough in permanent treatment of wastes, and a few commenters thought that the Department's proposal was too stringent and costly.

The Department's decision on remedial actions follows USEPA guidance documents and this Department's Technical and Administrative Guidance Memoranda for selection of remedies at hazardous waste sites. The decision also embraces the concept of permanently treating the "principal threat" on large industrial facilities, and containing low level contamination that does not present a high level of risk to public health and the environment. At PCB contaminated disposal sites, approximately 90% of the PCBs will be destroyed, with the remaining PCBs immobilized by capping and instituting groundwater and surface water controls and monitoring to prevent further migration from the site. At other areas where excavation and treatment are not practical, such as in the industrial landfill where the hazardous waste is mixed and buried with other non-hazardous waste, a hazardous waste landfill cover system and leachate collection system will effectively contain the waste.

Many commenters also felt that cost should not be considered when selecting a remedy. However, the legislation, policies, and guidance documents clearly state that remedy cost must be considered as a balancing factor in the selection process.

Many commenters also were confused over cleanup goals and treatment thresholds. Cleanup goals and treatment thresholds are not synonymous.

Cleanup goals are levels of contamination below which the residual contamination does not present a significant threat to health or the environment. Cleanup goals are developed according to the threat that a hazardous waste may present to various receptors and at various locations on the facility. Cleanup goals are normally most stringent where contaminants may directly impact off-site human receptors; where contaminants

could migrate uncontrolled to receiving streams or a usable aquifer; or in biologically sensitive areas, such as wetlands. On industrial sites where public access is strictly controlled, and contaminant migration can be monitored and controlled, the cleanp goals are less stringent. Cleanup goals are normally obtained by excavation of the waste.

Treatment thresholds are levels of contamination above which the toxic substances must be destroyed or permanently immobilized. Lower level contamination is either contained in place by capping and groundwater control, or the waste is excavated down to cleanup goals, and moved to a landfill for secure disposal.

Some commenters felt that not enough data had been collected to base a remedy selection on. The Remedial Investigation and Feasibility Studies are only the preliminary, or conceptual, stage of the total remedial action program. This stage of the process has been in progress for 3 to 5 years, resulting in the collection of volumes of data on the nature and extent of contamination at each disposal site. The Department recognizes that more data could be gathered, but we are comfortable with the available data to support the selection of an engineering concept for hazardous waste remediation. The commenters should also understand that much more field data will be collected to support final design decisions. If additional data reveals that the concepts developed in this document need to be modified, the Record of Decision can be modified.

Canadian commenters expressed concern over the potential for transboundary pollution, either via airborn contaminants or by migration through the groundwater to the river systems. Cleanup goals should be comparable to Canadian remediation standards.

Extensive groundwater monitoring at the facility has not documented significant off-site migration of contaminated groundwater that could impact the quality of transboundary surface waters. However, long term monitoring will be instituted to ensure that remedial measures are adequate to protect transboundary surface water quality.

All remedial work, both during excavation and during operation of treatment systems, will be strictly controlled to minimize fugitive dust emissions, and to ensure that stack emissions meet strict discharge limitations. New York State ambient air quality standards must be met at the facility boundary.

Q/C The terms "solidified" and " encapsulated" are not explicitly defined in the PRAP. The untreated waste from both the Sanitary and 60 Acre Lagoons should be placed in the on-site vault, rather than be contained in-place.

R "Solidification" refers to the process of mixing the excavated sludge with an agent, such as fly ash or lime, in an effort to increase the stability of the material, as well as reduce the leachability of the inorganic contaminants present. Prior to solidification, the sludge will undergo gravity dewatering. This will also aid in improving the handling ability of the sludge, while at the same time reducing the mobility of the contaminants.

"Encapsulation" refers to containment of the solidified material within a low-permeability clay dike and a RCRA (ie. hazardous waste) cap. A leachate collection and removal system may also be included.

The Department believes that these measures provide as effective a means of containment as the on-site vault for sludge with low-level contamination. Conditions are favorable for in-place containment, as proven by the fact that no contamination has penetrated the clay layer beneath the 60 Acre or Sanitary Lagoons. Placement of material with low levels of contamination in the vault would not substantively reduce risks.

Q/C Threshold values for soil treatment vary throughout the document, from 10 ppm (in the case of a lagoon being taken out of service and capped) to 25 ppm (in the case of the Sanitary Lagoon) to 50 ppm (in the case of the 60 Acre Lagoon). There is inadequate justification for these differing thresholds.

R The 10 ppm value is a <u>clean-up goal</u>, which means that any material with a higher PCB concentration must be excavated for treatment or contained in-place. It is considered protective of ground and surface water, and it is applicable to any site which is not (or will not) be utilized by waterfowl and other biota. In the event a site remains accessible to biota, such as a lagoon which is not backfilled and capped (ie. closed), then a more stringent clean-up goal (1 ppm) will be applicable.

The 25 ppm and 50 ppm values represent treatment thresholds for the Sanitary and 60 Acre Lagoon sludges, respectively. In other words, any material with PCB concentrations at or above these levels must be permanently treated with solvent extraction or other suitable process. These values have been selected because they represent the point at which 90% (or greater) of the PCBs present would be destroyed. They also represent the point of diminishing returns. Any further increases in the levels of treatment would result in a disproportionate increase in cost.

According to the Commissioner's Organization and Delegation Memorandum #89-05, the remedy selection process should conform with the requirements of CERCLA/SARA and the National Contingency Plan (NCP). In addition, this directive states that the Department should give preference to technologies that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances. Ninety percent destruction of PCB contamination in the 60 Acre and Sanitary Lagoons would meet the criteria for significant reduction. The directive also requires that the selection process balance environmental, technical, and economic factors. We believe that the selected remedies at these two sites do balance these factors.

Q/C A public water supply for the residents along Dennison Road is preferable to installation of a hydraulic barrier. With respect to shallow groundwater contamination, recovery trenches are preferable to pumping systems.

R The Department also believes that a public water supply on Dennison Road is more feasible than construction of a hydraulic barrier in the bedrock. However, we want ALCOA to at least address that remedial alternative.

Although we consider groundwater recovery trenches preferable to pumping wells, we will allow ALCOA and their consultants an opportunity to demonstrate, in the field, the ability of pumping wells to achieve an equivalent degree of success.

Q/C Although in situ bioremediation offers tremendous advantages as a remedial method, many difficulties have been encountered in attempting to measure its real-world effectiveness.

R While the preliminary results of the bioremediation studies show promise, there is much more testing to be done before the Department will allow full-scale implementation. We are aware of the problems associated with proving the effectiveness of in situ bioremediation, and therefore, we will require that ALCOA's consultant furnish an acceptable criteria for gaging this effectiveness. We will also require ALCOA to secure a proven technology for <u>immediate</u> implementation in the event the additional studies are unsuccessful, or inconclusive.

Q/C By specifying excavation for the material in the Sanitary and 60 Acre Lagoons, the Department is precluding the use of in situ treatment technologies. Additionally, the requirement to have treatment technologies fully implementable by the 1994 and 1995 construction season is unnecessarily restrictive.

R The preliminary results of the bioremediation studies are encouraging, and the Department will allow ALCOA the opportunity to continue its evaluation of this technology as well as any other technologies (in situ or ex situ) that appear feasible.

The time frames allotted to ALCOA for further technology evaluation and selection will take into account the construction schedule of the on-site vault, as well as the treatment/disposal schedules of the FS I sites.

Q/C The specification of a RCRA cap for the General Refuse Landfill and the Landfill Annex appears unnecessary. A cap built to the specifications of a sanitary landfill, as required by 6 NYCRR Part 360, should provide ample environmental protection and save a considerable amount of capital.

R In conjunction with its consultant, ALCOA recommended a RCRA cap for the General Refuse Landfill. In fact, the Feasibility Study (FS IA) did not even consider a Part 360 cap. The Department concurs with ALCOA's recommendation, based on the presence of hazardous waste (ie. solvents, PCBs) in the landfill.

The subsurface information available at the Annex is very limited, and no definitive conclusions can be drawn regarding the presence of hazardous waste. High concentrations of PCBs have been found in partially exposed drums along the periphery of the site, however, which is a strong indication that similar materials are present in the interior of the landfill. Consequently, the Department has specified a RCRA cap for this site as well.

The major difference between a RCRA cap and a Part 360 cap is the inclusion of a drainage layer, which would not result in a significant cost increase.

may be inconsistent with title 3

Q/C It appears that the Department's remediation plan, given its high cost, does not consider the local economy.

R The Commissioner's Organization and Delegation Memorandum #89-05 requires that the remedy selection process balance environmental, technical, and economic factors. We believe that each of the selected remedies provides a cost-effective solution, while not compromising the level of protection needed.

Q/C State and federal governments may well be regulating remediation of PCB deposits and sources that pose no harm to the environment or human health. Only Aroclor 1260 is a suspect carcinogen, and there is no justification to regulate all PCBs based on this one Aroclor.

R There is mounting evidence of varied adverse human health outcomes, other than cancer, as a result of exposure to PCBs. PCBs do not induce a single set of toxic endpoints; the mechanisms of action appear to be several. The different structural classes of PCB congeners which compose the Aroclor mixtures now contaminating the environment may very well exert toxic effects via different mechanisms.

Cancer is not the only site indictor of adverse health effects resulting from chronic exposure to PCBs. There is mounting evidence in a number of recent studies linking PCB congeners, contained in Aroclor mixtures 1016, 1242, and 1248, with developmental neurotoxicity. These effects include delayed reflex development, altered activity patterns, and impaired learning and memory in humans, monkeys, and rodents exposed to PCBs during fetal and neonatal development (Tilson et al, Neurotoxicol. Terarol. 12:239-248, 190; and Shantz et al, Env. Toxicology and Chem. 10:757-763, 1991). Referring to these studies, the USEPA has suggested that, for humans, these neurotoxic endpoints may be more sensitive than the cancer endpoint.

In addition, there are 209 theoretically possible PCB congeners that make up mixtures of commercial PCB formulations, such as Aroclor 1242, 1248, 1254, and 1260. There is a considerable degree of overlap in the congeners that compose commercial PCB formulations. In fact, from a recent characterization study of PCB congeners in commercial Aroclor mixtures, the Aroclor 1260 and 1254 had a 70% commonality of congeners. Add to that the fact that PCB congeners have different chemical characteristics, and they will partition differently in the environment, causing actual human and animal exposure effects to differ from those effects observed by exposure to commercial PCB formulations.

Because of the above, the Department believes that the current remedial action framework based on the best available toxicity information makes prudent policy.

GENERAL MOTORS

Q/C The PCB cleanup goals presented in the PRAP are unjustifiably stringent.

R The PCB cleanup goals are based on New York State environmental quality standards and/or EPA assessments, whichever is more stringent.

Q/C What is the basis for considering the 10 ppm level protective of ground and surface water? A 1 ppm clean-up goal has been specified for the Sanitary and 60 Acre Lagoons if they are to be retained as a wastewater/stormwater basin or as a wetland, with no basis provided.

R The 10 ppm level is based, in part, on the partitioning co-efficient equation, which is utilized to predict the soil concentration of a contaminant that, if released to the groundwater or surface water, would not cause a contravention of water quality standards. Although the equation yields a value of roughly 1 ppm for PCBs, the Department felt that the effects of attentuation also had to be taken into account. Accordingly, a factor of 10 was assigned to the value, resulting in the 10 ppm level.

Additionally, the EPA considers the 10 ppm level to be protective of human health in the event of direct contact or inhalation.

With respect to the 1 ppm cleanup goals specified for the Sanitary and 60 Acre Lagoons, the rationale is based upon biota considerations. In the event a lagoon is retained as a wastewater/storm water basin or as a wetland, it will continue to attract waterfowl and other biota. A PCB concentration of 0.1 ppm is considered protective of biota that might ingest contaminated sludges or sediments, but such a cleanup goal is impractical from both a construction and analytical perspective. Accordingly, a more realistic clean-up goal of 1 ppm has been selected. The potential injuries to biota related to residual contamination below 1 ppm will be evaluated from a natural resources damages standpoint.

Q/C The volume estimates in the Feasibility Studies and the PRAP were based on the volume of actual waste material, including an assumed buffer of 1 foot of underlying soils, not the volume of material exceeding cleanup goals. The effects of possible increases in soil volumes should be considered in the remedy selection process.

R Each of the sites designated for excavation is underlain by relatively tight soils, and the field investigations have shown minimal contaminant penetration, in particular at the Sanitary and 60 Acre Lagoons. The Department believes that the 1 foot buffer specified by ALCOA's consultant is reasonable, and possibly even conservative.

Q/C The PRAP has not quantitatively considered potential inhalation risks to off-site residents and on-site workers resulting from excavation, handling, and transportation of soil and waste material.

R A Health and Safety Plan will be implemented in each instance that involves the excavation, handling, and transport of hazardous waste. This will include an extensive real-time air monitoring program utilizing published exposure limits to insure the protection of on-site workers and off-site residents.

Q/C If excavation and treatment of soils is necessary, the selection of treatment technologies should be more flexible.

R The Department will allow ALCOA an opportunity to evaluate in situ bioremediation and any other technologies that appear feasible. The schedule for final remedy selection will take into account construction of the on-site vault, as well as remediation of the FS I sites.

Q/C The PRAP may be precluding the use of innovative technologies by specifying a 2 ppm treatment goal.

R The Department recognizes that certain innovative technologies may not be able to consistently meet the TSCA required 2 ppm treatment standard. However, such technologies could be given further consideration if the treated residuals were placed in the on-site vault.

Q/C A high PCB treatment threshold (ie. 500 ppm or greater) would be more appropriate than those specified in the PRAP.

R The 25 ppm and 50 ppm treatment thresholds have been selected for the Sanitary and 60 Acre Lagoons, respectively, because they represent the point at which 90% (or greater) of the PCBs present would be destroyed. Higher treatment thresholds would result in a sharp decrease in the percentage of PCBs destroyed, and the desired level of protection would be compromised.

Q/C Backfilling treatment residuals which are equal to or less than the risk-based cleanup goals should be protective of human health and the environment.

R Each of the waste sites at ALCOA contains a mixture of organic and inorganic contaminants. Since the primary criteria in selecting a technology is its ability to treat PCBs, it is likely that other contaminants requiring management will still be present in the treatment residuals.

Q/C The siting of a secure RCRA-approved vault in an area with extremely tight soils, stable geology and hydraulic isolation from adjacent rivers and streams is critical to ensure a landfill option is effective. Permanent treatments and remedies are encouraged for all areas of the ALCOA site and a landfill or vault does not qualify as a permanent treatment or remedy. The remedy should, therefore, emphasize an effective protective life span of at least 7 generations of 250 years.

R The Department has given preference to remedies which include permanent treatment. The on-site vault will only be utilized for lightly contaminated materials, treatment residuals, or waste for which no permanent treatment is available.

Although the Department will insure that the site selected for the vault is in an acceptable geologic and hydrogeologic setting, it must be recognized that "perfect" sites may not exist. Any shortcomings will be addressed in the design stage, using standard engineering procedures.

Q/C The slurry wall proposed for the General Refuse Landfill may not be an effective barrier to the migration of some chemicals.

R The slurry wall will be located <u>upgradient</u> of the landfill, in order to prevent the flow of uncontaminated groundwater into the site. The migration of contaminated groundwater will continue to be controlled via the existing leachate collection system.

Q/C All waste above 10 ppm PCBs should be removed from the Annex and treated. Again, the effectiveness of the proposed slurry wall is questioned.

R High levels of PCBs have not been defined within the Annex, and the presence of heterogeneous material precludes excavation. The Department believes that the proposed RCRA cap, slurry wall, and leachate collection system will provide effective protection. As was the case at the General Refuse Landfill, the slurry wall will be located upgradient of the site to divert the flow of uncontaminated groundwater.

Q/C The treatment levels for the Sanitary and 60 Acre Lagoons should be consistent (ie. 25 ppm). The material with PCB concentrations below this level should be placed in the on-site vault, not contained in-place. If the 60 Acre Lagoon is to remain a wetland, the cleanup goal should be .1 ppm, not 1 ppm.

R The 25 and 50 ppm treatment thresholds have been selected for the Sanitary and 60 Acre Lagoons, respectively, because they represent the point at which 90% (or greater) of the PCBs present would be destroyed. If the treatment threshold at the 60 Acre Lagoon was lowered to 25 ppm, the destruction efficiency would only improve a few percentage points, yet the overall cost would increase several million dollars.

Due to analytical and construction constraints and the widespread dispersion of contaminants, a .1 ppm cleanup goal is impractical. The 1 ppm cleanup goal has been specified because it is the lowest concentration which can reasonably be achieved. Any potential injuries to biota related to residual contamination below this level will be evaluated from a natural resources damages standpoint.

Q/C What does the term "encapsulation" mean? The saturated conditions in the Sanitary and 60 Acre Lagoons will, in time, break down the solidification agents used to treat the lightly-contaminated sludge and sediments. Therefore, the solidified material should be placed in the on-site vault rather than be encapsulated.

R "Encapsulation" refers to containment of the solidified material within a low-permeability clay dike and a RCRA cap. A leachate collection and removal system will also be included. The containment cell will be constructed on a clay pedestal to elevate the waste above the water table.

Q/C There are several other areas associated with the ALCOA facility that were excluded from the PRAP. These include the stretch of Robinson Creek within the facility, a wetland located north of Route 131, and an upland area west of Horton Road. These should be addressed.

R Elevated levels of cyanide and fluoride have been found in the surface water of Robinson Creek adjacent to Potlining Pile I. These contaminants are attributable to shallow groundwater migration from Pile I, and will be controlled via the leachate collection system to be installed as part of the remedial efforts at Pile I. No contamination has been identified in on-site sediment samples.

Many of the contaminants found in the wetland and upland areas were also detected at elevated levels in the on-site biota sampling stations. However, since some of the contaminants were transported via the air pathway, their presence may be attributable to other industries in the area in addition to ALCOA. The detected levels of contaminants, while not suitable as "background" conditions, did not reach levels which would warrant investigation and cleanup.

Q/C No action levels, treatment thresholds, and end-of-treatment criteria have been established for contaminants of concern other than PCBs.

R Table III of the PRAP establishes cleanup goals for all of the contaminants of concern at the ALCOA facility. These values will be utilized during the confirmatory sampling programs to determine the adequacy of the excavation work.

As specified on page 15 of the PRAP, any treatment residuals are subject to the USEPA's TSCA requirements, and the USEPA's Land Disposal Restrictions.

With respect to groundwater, the Part 703 groundwater Quality Standards govern the need for, and effectiveness of, remediation.

Q/C There is an inconsistency associated with the approach to incinerating hazardous waste coming from different locations within the plant facility. It would seem inappropriate to incinerate some waste on-site, while sending the remainder to an off-site, undeclared commercial incinerator.

R The PRAP did not specify the use of on-site incineration for any of the wastes at ALCOA, and off-site incineration will be limited to the waste oil streams resulting from the solvent extraction process. It should be noted that this represents a small component of the overall treatment process. The use of incineration as an independent technology, whether on-site or off-site, was not regarded as cost-effective.

Q/C Should off-site treatment be implemented, the destruction facility, the method of on-site storage, and the duration of storage prior to shipment must be identified.

R At this time, only solvent extraction has been identified as a viable treatment option. The waste oil stream associated with this process will be shipped off-site for final treatment (ie. incineration) immediately after generation.

Q/C There is concern that the waste sites have undergone inadequate site characterization. As a result, the proposed actions will not properly deal with the problems at the sites.

R The Department believes that sufficient characterization has been performed at each site to allow the selection of effective remedial actions. Additional characterization will occur, however, to aid in the design of the various elements of the remedial actions.

Q/C The Remedial Action Objectives declared throughout the PRAP address the prevention of contacts and/or impacts with elements when such has already occurred. If the intent is to prevent further contact or impact, this should be clarified.

R The Remedial Action Objectives were developed to prevent the occurrence of certain problems (eg. human contact with hazardous waste), as well as address the continued or future impacts of existing problems (eg. contaminant migration into groundwater).

Q/C With respect to the Waste Lubricating Oil Lagoon, any permanent treatment should be undertaken on-site.

R Waste from this site will be treated on-site via solvent extraction, and the resulting solids and water will also be managed on-site. The waste oil stream will be sent off-site for destruction at a permitted incineration facility.

Q/C The proposed remedial action for the General Refuse Landfill is unacceptable, since it does not provide permanent treatment. In addition, how does the Department intend to satisfy its cleanup goal of 10 ppm?

R Due to the heterogeneity of the material within the landfill, excavation and treatment is not feasible from both a construction and economic standpoint. Accordingly, the Department has not established cleanup goals for this site.

Q/C PCBs have not been included in the discussion of groundwater contamination at the Landfill Annex.

R The PRAP only addresses those contaminants which were detected above groundwater quality standards.

Q/C The background information at the Annex is not sufficient to determine the contents of the site.

R Although the investigative work at this site has been limited, there is enough information to determine the types of contaminants present.

Q/C A further concern with the Annex is the lack of information regarding the contents of the drums found along the edge of the site.

R The drums and their contents will be excavated and treated as part of the remedial action at this site. Following excavation, the material will undergo complete characterization to determine the most appropriate method of treatment.

Q/C Anything short of complete excavation followed by permanent treatment at the Annex is unsatisfactory.

R The heterogeneity of waste at the Annex precludes total excavation. The Department believes the proposed remedy provides adequate protection for both health and the environment.

Q/C The Sanitary Lagoon should not be used by waterfowl, and every effort should be made to discourage its use as a waterfowl habitat.

R The Department will require ALCOA to develop and implement a waterfowl impact reduction plan at this site. This plan will remain in effect after remediation is complete, in the event the site is retained as a stormwater retention basin.

Q/C The 1 ppm cleanup level at the Sanitary Lagoon should be enforced, regardless of whether the site is retained or closed, since waterfowl will still use the area.

R Closure of the lagoon would result in the elimination of the water body, thus waterfowl would not longer be attracted to the area. Under this scenario, the 1 ppm cleanup goal is not warranted.

Q/C All material at the Sanitary Lagoon with more than 10 ppm PCBs should be permanently treated on-site.

R In-place containment of material with low levels of contamination is considered to be an effective remedial measure.

Q/C The 60 Acre Lagoon should not be retained as a wetland.

R ALCOA will be given the option of reusing this site as a wetland, since it may be very difficult to create a new wetland of this magnitude. However, ALCOA would have to demonstrate that the specified cleanup goals were met prior to such reuse.

Q/C Any contaminated material at the 60 Acre Lagoon with more than 10 ppm PCBs should be permanently treated, and any material with less than 10 ppm PCBs should be vaulted. Further, the cleanup goal should remain 1 ppm, regardless of final use of the site.

R In-place containment of material with low levels of contamination is considered an effective remedial measure. The 1 ppm cleanup goal is unnecessary if the lagoon is to be converted to an upland.

Q/C All of the material in the East Marsh should be excavated. Material with PCBs below 10 ppm should be vaulted, while the remainder should be permanently treated on-site.

R It is not necessary to excavate material below 10 ppm since the site will be converted to an upland, and waterfowl and other biota will not longer frequent the area. The material which will be excavated does not contain significantly high PCB levels, and treatment is not warranted.

Q/C A combined groundwater recovery trench system and recovery wells should be installed around the perimeter of the Oily Waste Landfill.

R As stated in the PRAP, due to the nature of the subsurface geologic materials, and the concentrations and properties of the contaminants, restoration of all contaminated groundwater at, and downgradient of, the facility is not likely feasible. For this reason, the PRAP recommends the various remedial alternatives to ensure that further contaminant releases to groundwater do not occur. A groundwater extraction system will be installed, if warranted, following the completion of remedial activities at the site. It is anticipated that contaminant levels in deep groundwater will diminish following site remediation. However, the rate at which this will occur is not known. Therefore, the Department recommended the implementation of a monitoring program to evaluate the extent of groundwater contamination and to monitor changes in the contaminant plume. The results of the monitoring program will be evaluated to determine if further remedial action is necessary to address groundwater contamination.

Q/C A combined groundwater recovery trench and numerous down-gradient pumping stations should be installed at Pile I.

R Please see the response regarding the Oily Waste Landfill.

Q/C A groundwater recovery trench and downgradient pumping stations should be installed at Pile A and the Primary Lagoon/Dredge Spoils Area.

R Please see the response regarding the Oily Waste Landfill.

Q/C Consideration should be given to reclassification of the spent potlining material and resource recovery.

R At this time, there are not viable technologies for treating or processing this material.

Q/C The existence of the suspected outwash channel in the vicinity of the Soluble Oil, Waste Lubricating Oil, and Sanitary Lagoons should be confirmed. In addition, extensive pumping stations should be installed to collect contaminated groundwater.

R The Department will require that the potential existence of a buried channel be explored during implementation of the groundwater monitoring program. Regarding groundwater recovery systems, please see the response regarding the Oily Waste Landfill.

Q/C A perimeter groundwater recovery trench should be installed immediately at Dennison Road.

R Please see the response regarding the Oily Waste Landfill.

Q/C In addition to the northwest oriented recovery trench, an adequate number of pumping stations should be installed at the 60 Acre Lagoon.

R Please see the response regarding the Oily Waste Landfill. The Department is concerned about the migration of the contaminant plume in the vicinity of Dennison Road. To aid in identifying the extent of the plume, and to address concerns regarding potential impacts on downgradient groundwater users and environmental receptors, the installation of additional monitoring wells upgradient of Dennison Road will be required by the Department.

Q/C A hydraulic barrier should be established in the bedrock aquifer, and permanent treatment at the contaminated groundwater should be provided.

R As indicated above, it is the Department's opinion that the complete restoration of the quality of all groundwater at and downgradient of the facility is not likely feasible. This certainly applies to the groundwater at depth in the bedrock aquifer as well as to shallower groundwater. It is anticipated that the contaminant levels in groundwater will diminish following the remediation of the various hazardous waste sites. If warranted by the long-term monitoring program results and/or experience with the shallow groundwater extraction systems, additional remedial measures would be considered by this Department.

Q/C The cleanup goal at the Waste Lubricating Oil Lagoon should be 1 ppm, not 10 ppm.

R The 10 ppm goal has been established because it is considered protective of ground and surface waters. The material with PCB concentrations below this level will be contained in-place via a low-permeability cap and a groundwater recovery and treatment system. Utilizing a cleanup goal of 1 ppm would significantly increase the cost of remediation without providing any additional protection.

Q/C The proposed remedial action for the General Refuse Landfill (ie. RCRA cap, slurry wall, leachate collection) is not as effective as any of the permanent remedies considered. It is recommended that the PCB "hotspots" be excavated and treated prior to capping the site. In addition, groundwater flow is downward toward the bedrock aquifer, and a containment remedy will not address this route of migration.

R Due to the heterogeneity of the waste within the landfill and the randomness of the PCB-contaminated material, excavation is considered impractical. The Department believes that in-place containment offers the best remedy.

Groundwater beneath the landfill flows laterally to the southeast due to the presence of a dense silt and clay deposit. This is effectively controlled via the existing leachate collection system.

Q/C The Annex should undergo further characterization prior to the selection of a remedy. The proposed remedial action (ie. RCRA cap, slurry wall, leachate collection) is not as effective as any of the permanent remedies considered.

R Due to the heterogeneity of the waste at this site, the only feasible remedy is in-place containment. However, additional characterization will take place to aid in the design of the slurry wall and the leachate collection system.

Q/C The Department should utilize a cleanup goal of 1 ppm for the Sanitary Lagoon. All material with PCB concentrations in excess of this level should be excavated and treated. If 90% of the PCBs will be treated using a treatment threshold of 25 ppm, then it is difficult to understand why the remaining 10%, which is approximately 3,400 cubic yards, will not also be treated.

R A cleanup goal of 1 ppm will be utilized, if the lagoon is retained as a stormwater basin as planned. However, if the lagoon is closed and biota are no longer active on the site, then a cleanup goal of 10 ppm is more appropriate.

The 25 ppm treatment threshold will result in the treatment of 15,500 cubic yards of sludge, and the destruction of approximately 90% of the PCBs. Using a treatment threshold of 1 ppm would require the treatment of an additional 18,500 cubic yards of sludge, and the overall remediation cost would nearly double, from $15 million to $27 million. The in-place containment of the 18,500 cubic yards of lightly-contaminated material is viewed as equally protective of health and the environment as total treatment and it provides a substantial cost savings.

Q/C A cleanup goal of .1 ppm should be specified for both the northern and southern halves of the 60 Acre Lagoon. All material should be excavated down to this level, and then treated.

R Due to analytical and construction constraints, a cleanup goal of .1 ppm may not be feasible. The 1 ppm goal is considered the lowest concentration that can reasonably be achieved.

The 50 ppm treatment threshold will result in the treatment of 65,000 cubic yards of sludge, and the destruction of 93% of the PCBs. A treatment threshold of .1 ppm would require the treatment of an additional 129,000 cubic yards of sludge, and the overall remediation cost would be approximately $144 million. The proposed alternative provides the same level of protection as total treatment at a substantial cost savings.

Q/C A cleanup goal of 1 ppm, and preferably .1 ppm, should be utilized at the East Marsh. Will water entering the drainage system be monitored and treated? Where will it be discharged? How will the creation of an upland impact groundwater flows in this area?

R The 10 ppm cleanup goal is considered protective of ground and surface waters. There is no justification for a lower cleanup goal, since the area will be converted to an upland and will no longer attract waterfowl and other biota.

The water within the drainage system will be monitored and treated, if necessary, prior to being discharged through one of the facility's permitted outfalls. No significant effect on groundwater flow is expected from implementation of the proposed remedy.

Q/C Available groundwater quality data indicates that contaminants from the Oily Waste Landfill have migrated to depth. A groundwater recovery trench system and bedrock groundwater recovery wells should be installed in this area to recover as much contaminated groundwater as possible.

R As stated in the PRAP, due to the nature of the subsurface geologic materials, and the concentrations and properties of the contaminants, restoration of all groundwater at, and downgradient of, the facility is not likely feasible. For this reason, the PRAP recommends the various remedial alternatives to ensure that further contaminant releases to groundwater do not occur. A groundwater extraction system will be installed, if warranted, following the completion of remedial activities at the site. It is anticipated that contaminant levels in deep groundwater will diminish following site remediation. However, the rate at which this will occur is not known. Therefore, the Department recommended the implementation of a monitoring program to evaluate the extent of groundwater contamination and to monitor changes in the contaminant plume. The results of the monitoring program will be evaluated to determine if further remedial action is necessary to address groundwater contamination.

Q/C Available groundwater quality data from Potlining Pile I identified the migration of contaminants to depth. Groundwater recovery wells should therefore be installed in the deeper aquifer.

R Please see the response regarding the Oily Waste Landfill. As an additional note, one of the comments indicates that the capping of the site "will increase the downward pressure on contaminants". It is assumed that the comment is suggesting that site capping will result in contaminants in groundwater being "driven" to depth. However, it is the Department's opinion that this will not occur, especially since site capping will significantly reduce recharge to the groundwater system in the immediate vicinity of the site.

Q/C Since contaminants have been detected at depth in the area of Potlining Pile A and the Primary Lagoon/Dredge Spoils Area, groundwater recovery wells should be installed.

R Please see the response regarding the Oily Waste Landfill.

Q/C Due to the detection of contaminants at depth near the Soluble Oil Lagoon, Waste Lubricating Oil Lagoon, and Sanitary Lagoon, and the possibility of a buried outwash channel, the installation of recovery wells is recommended.

R See the response regarding the Oily Waste Landfill.

Q/C Given the presence of a downward vertical gradient in the groundwater flow system at the Dennison Road site, and the fact that contaminants have been found at depth, a groundwater recovery trench system and groundwater recovery wells should be installed.

R Please see the response regarding the Oily Waste Landfill.

Q/C Groundwater monitoring wells should be installed to determine the extent of the downward migration of contaminants at the 60 Acre Lagoon. Recovery wells should be installed if the sample data indicates that contamination is moving downward.

R Please see the response regarding the Oily Waste Landfill. As an additional note, a number of new monitoring wells will be installed at and downgradient of the facility as part of long-term monitoring. This will include the installation of additional wells in this area.

Q/C Field testing should be performed to determine the feasibility of creating a hydraulic barrier in the bedrock aquifer upgradient of the Dennison Road residential wells.

R We have indicated that the feasibility of establishing a hydraulic barrier in the bedrock must be evaluated by ALCOA if all other options for ensuring a safe water supply to the Dennison Road residents was exhausted. In addition, a long-term monitoring program will be implemented to evaluate groundwater quality trends in the bedrock and in the overburden. If warranted by the monitoring results, further remedial actions may be required by the Department.

LUKE DAILEY

Q/C Page 19 - common measurements should be included in the discussion of health risks associated with dibenzofurans.

R 16 kg is equivalent to 35 pounds; 200 mg is equivalent to 0.00044 pounds.

Q/C Capping the General Refuse Landfill should not be considered a permanent solution. ALCOA should commit itself to excavation and treatment, even if it does not occur for several years.

R The Department does not consider in-place containment to be a permanent remedy. However, given the geologic and hydrogeologic conditions present, we believe that the combination of a RCRA cap, slurry wall, and leachate collection system will provide adequate protection to health and the environment. Further, the heterogeneity of the waste within the landfill renders excavation impractical.

Q/C There is no Alternative # identified for the proposed remedy at the Sanitary Lagoon.

R The proposed remedy differs from all of the alternatives evaluated in the Feasibility Study. Therefore, no number has been assigned.

Q/C Does the 60 Acre Lagoon contain 194,000 cubic yards of sludge, or 19,400 cubic yards?

R 194,000 cubic yards.

Q/C Groundwater contamination has been encountered int he bedrock over 100 feet below the ground surface. Is this situation unique to ALCOA, or is ALCOA the only company which has conducted this thorough an investigation?

R All of the remedial investigations managed by the Department typically include the installation and sampling of bedrock monitoring wells. The degree of contamination at ALCOA is more extensive than what has been found at other sites.

Q/C No Alternative # has been identified for the proposed remedy at the 60 Acre Lagoon.

R The proposed remedy differs from all of the alternatives evaluated in the Feasibility Study. Therefore, no number has been assigned.

Q/C What type of solidification agent will be utilized at the 60 Acre Lagoon for material with less than 50 ppm PCBs?

R Commonly used solidification agents include fly ash and lime, although a number of other suitable agents are available.

Q/C What are the concentrations of other contaminants in the southern half of the 60 Acre Lagoon?

R The following concentrations were detected in sludge samples collected in 1991:

Total VOCs	0 - .14 ppm
Total PAHs	6.64 - 119.41 ppm
Cyanide	0
Fluoride	350 - 5,500 ppm

These are well below the levels found in samples taken from the northern half of the lagoon, and they are not considered significant.

Q/C Will PCB waste from ALCOA be incinerated at Reynolds?

R The Proposed Remedial Action Plans for these two sites were assembled independently of one another. Any PCB-contaminated material from ALCOA requiring off-site incineration (ie. the oil stream generated from the solvent extraction process) will not be sent to Reynolds.

Q/C Are additional hydrogeologic investigations warranted in the area of the East Marsh?

R The Department believes that there is sufficient subsurface information available for this site to support the recommended alternative.

Q/C The importance of placing the contaminated material in the on-site vault should be emphasized.

R The proposed remedial action clearly states that the excavated material will be placed in the on-site vault.

Q/C What does "anisotropic" mean?

R It refers to the random manner in which groundwater moves through the bedrock.

Q/C Implementation of the ALCOA and Reynolds PRAPs will require large quantities of sand and clay, resulting in extensive areas of excavation. Is it feasible to utilize these areas to enhance existing wildlife habitat?

R Restoration of any borrow area will be subject to an approved mined land reclamation plan. Such plans could include the creation of a wildlife habitat if site conditions are favorable.

EARL JACKSON

Q/C The groundwater contamination in the bedrock aquifer has already impacted the residential wells along Dennison Road. What provisions will be made to insure that the contaminant plume does not migrate further east to the wells on Horton Road?

R ALCOA will be required to monitor the bedrock aquifer upgradient of Horton Road following remedial activities to insure that any potential impacts to homeowner wells can be eliminated in a timely manner.

CANADIAN REVIEW PANEL

Q/C ALCOA has requested a 5-year period to evaluate various treatment technologies and it is likely that additional studies will be required for those technologies which initially prove feasible. Will the entire remediation process be put on hold at those sites where treatment has been included in order to accommodate this work?

R The technology evaluation period has only been requested for the Sanitary and 60 Acre Lagoons, due to the exorbitant costs associated with the implementation of solvent extraction. The Department will allow ALCOA the opportunity to investigate alternative technologies for these sites, although they will be required to minimize wildlife usage of the lagoons and monitor and treat discharges in the interim.

Q/C There is no information provided on how collected leachate will be treated and/or disposed. Details are needed on whether treatment facilities are presently available for the large volumes of leachate that will be collected; how is the leachate treated; what is the leachate tested for; and what are the treatment goals. The goals should meet Ontario Water Quality Objectives of 0.001 µg/L PCBs.

R The intent is to manage each of the leachate streams on-site through new facilities. In fact, construction is underway on a carbon system to handle leachate from the General Refuse Landfill. At the same time, several treatability studies are in progress utilizing other treatment processes, such as alkalyne hydrolysis. The effluent from the treatment facilities will be directed to permitted outfalls, whose discharges must comply with prescribed surface water quality standards, including 0.001 ppm PCBs.

Q/C Although permanent technologies have been proven on an experimental basis, it is unknown whether they will work in the field. Despite this uncertainty, no alternatives have been set up.

R Any proposed technology must be successfully demonstrated at full-scale (ie. in the field) before it can be implemented. In the event an innovative technology fails this prerequisite, there are a number of conventional technologies (eg. incineration) that can be readily employed.

Q/C The on-site vault, while initially less expensive than a permanent solution, will require annual monitoring and periodic upgrading. As a result, it will cost more in the long run.

R Any permanent remedy will require use of the on-site vault to handle the treatment residuals. Therefore, the monitoring and maintenance (O&M) costs associated with the vault will be incurred regardless of the selected action, with the exception of in-place containment.

Q/C There is an absence of an air component in the remediation program at ALCOA. The Department has dismissed the atmospheric exposure route as being insignificant relative to other media, but does not present the evidence to support this assumption.

R The Department recognizes the significance of air-born contaminants, especially at sites where excavation and processing will occur. Accordingly, ALCOA will be required to develop and implement site-specific Health and Safety Plans during remediation activities to insure the protection of on-site workers and off-site residents.

Q/C Monitoring and reviewing the effectiveness of remediation once every 5 years is not adequate. A more stringent monitoring system (ie. annually) is required.

R Monitoring and maintenance activities will be performed at each site on a continuous basis throughout the year. The 5-year revisitation schedule is intended to supplement this program at those sites where hazardous waste has been contained without treatment.

Q/C Plans for monitoring the success/failure of remedial measures are vague. The prevention of contaminant loading via groundwater pathways has not been addressed.

R Detailed, site-specific monitoring and maintenance programs will be developed during the design phase of the project. Contaminant migration into, and through, the groundwater will be controlled via removal of the contaminant source, or with the use of slurry walls, leachate collection systems, and groundwater recovery and treatment systems if necessary.

Q/C There is a concern regarding the lack of a backup system for the on-site vault should contaminants leak out. No monitoring or leachate collection system has been mentioned in the report.

R The on-site vault will be a state-of-the-art, double-lined facility with a leachate collection system installed above the primary liner and a leak detection system placed above the secondary liner. A groundwater monitoring program will also be implemented.

Q/C The groundwater management strategy should include a monitoring site in the St. Lawrence River. Monitoring of air, sediments, soil, water, and biota is required before, during, and after remediation.

R The Department currently monitors ambient surface water conditions in the St. Lawrence, and remote groundwater monitoring wells will be installed upgradient of the river to examine the effectiveness of the remedial actions on the contaminated groundwater plume. In addition, a separate remedial program is being conducted in the river by the USEPA. Monitoring stations will be required in order to characterize the extent of the problem, as well as evaluate the effectiveness of the remedial effort.

Q/C In general, the methods employed in collection of the data were questionable and, therefore, the results unreliable.

R The data collection process employed standard methods, and although certain sites (eg. the Landfill Annex) may not have been completely characterized, the information gathered was sufficient to allow the selection of remedies. Furthermore, additional site characterization will be performed during the predesign phase of the project.

Q/C The Biota Report indicates that fauna were inadequately sampled.

R The biota study was a comprehensive sampling effort that provided the information necessary to adequately assess impacts to fauna. Following remediation, monitoring programs will be implemented in biologically sensitive areas to determine the effectiveness of the remediation on all biota of concern.

Q/C Cleanup goals for contaminants other than PCBs were not addressed adequately.

R Cleanup goals were established for all of the contaminants of concern at ALCOA, but emphasis was placed on PCBs because of their predominant occurrence throughout the facility. The confirmatory sampling programs to be instituted following excavation will address all of the contaminants, however.

Q/C The on-site vault does not satisfy the need for a permanent solution for highly contaminated wastes.

R The Department agrees. Accordingly, use of the on-site vault has only been considered for lightly contaminated waste, treatment residuals, and material for which no viable treatment presently exists (ie. spent potlining).

Q/C Due to a lack of downgradient monitoring wells, groundwater contamination at the Waste Lubricating Oil Lagoon cannot be adequately assessed.

R A comprehensive monitoring well network will be installed as part of the remedial program at this site.

Q/C The proposed remedial action plan does not satisfactorily deal with contamination at the bedrock/till interface beneath the Waste Lubricating Oil Lagoon.

R The complex nature of groundwater movement within the deeper geologic units precludes the installation of a recovery system. The Department believes that waste removal, combined with shallow groundwater recovery and treatment, if needed, will in time eliminate the deeper groundwater contamination.

Q/C The proposed remedy for the General Refuse Landfill will not address the downward migration of contaminants into the underlying clay.

R The available information indicates that the clay layer is providing an effective deterrent to downward contaminant migration. This is evidenced in part by the existence of a major groundwater discharge area adjacent to the landfill.

Q/C The remedial action plan proposed for the General Refuse Landfill does not ensure long-term, permanent effectiveness. Complete excavation of the contaminants is strongly recommended.

R Due to the heterogeneous nature of the landfill material, excavation and treatment is not practical from either a construction or economic standpoint. However, the Department believes that the proposed in-place control and isolation remedy will provide an effective, long-term solution.

Q/C Since site characterization at the Landfill Annex is incomplete, the assumption that no downward contaminant migration exists is premature.

R Although additional characterization of the Annex will be required, the available information indicates that the predominant groundwater flow path is laterally to the south. This is supported by the presence of the West Marsh (ie. a groundwater discharge area) immediately adjacent to the site. The ability of the proposed containment system to effectively control groundwater contamination will be evaluated with monitoring wells installed in the vicinity of the Annex.

Q/C Due to the uncertainties regarding the permeabilities of underlying soils, the only appropriate remedial action for the Annex is excavation.

R The material within the Annex is suspected to be similar in composition to that at the General Refuse Landfill. As a result, excavation is not a feasible remedial option. The in-place containment alternative recommended by the Department is considered a sound, long-term solution for this site.

Q/C Since the leachability of organics from solidified material has not been widely assessed, solidification is not considered a long-lasting, permanent solution. Consequently, all of the material in the Sanitary Lagoon not designated for treatment should be excavated and vaulted.

R Solidification has been included in the proposed remedial action primarily for its ability to increase the stability of the sludge. In conjunction with encapsulation, it will provide an effective, long-term remedy for the <u>low level</u> contamination.

Q/C The groundwater characterization for the Sanitary Lagoon is inadequate and, thus, the proposed groundwater recovery system may not effectively prevent future contamination of deep groundwater.

R A comprehensive groundwater monitoring network will be installed to assess the adequacy of the proposed remedial action, as well as determine if further measures are warranted.

Q/C The 1 ppm cleanup goal specified for the Sanitary Lagoon will not eliminate all effects on aquatic biota. This is of particular concern since the stormwater retention basin will essentially act as a wetland.

R In recognition of the fact that a stormwater retention basin would continue to act as a wetland, ALCOA will be required to develop and implement a program to discourage wildlife use of the site as part of the overall remedial effort.

Q/C The possibility of stormwater overflow should be factored into any remedial option selected for the Sanitary Lagoon.

R If the final remedy includes retention of the lagoon as a stormwater basin, then the possibility of overflow will certainly be taken into account during system design.

Q/C All material in the 60 Acre Lagoon not destined for treatment should be excavated and vaulted.

R Solidification and encapsulation is considered to be an effective, long-term remedy for the low level contamination present in the lagoon.

Q/C The basis for the 50 ppm treatment criterion in the 60 Acre Lagoon is questioned, in light of the fact that a 25 ppm level was chosen for the Sanitary Lagoon.

R The 50 ppm treatment threshold represents the point at which 90% or greater of the PCBs present in the lagoon would be destroyed. Any increases in the amount of treatment required would result in disproportionate increases in cost. The 25 ppm level was chosen for the Sanitary Lagoon using the same rationale.

Q/C The 1 ppm cleanup goal specified for the 60 Acre Lagoon is questioned as being protective of biota, especially since the Department recommended a .1 ppm level in the Reynolds PRAP.

R Although .1 ppm is theoretically considered protective of biota, the 1 ppm value is the lowest practical cleanup level that can be achieved in the field. This was clearly explained in the Reynolds PRAP.

Q/C The 60 Acre Lagoon should not be retained as a wetland, due to the widespread contamination on-site. A new wetland should be created in a different watershed to avoid future contamination.

R The Department is similarly concerned with both the restoration or re-creation of wetlands on-site. Accordingly, ALCOA will be required to determine the feasibility of restoring the existing wetland to its pre-contaminated condition, or replace the wetland, or enhance an existing off-site wetland.

Q/C An adequate groundwater recovery system should be installed at the 60 Acre Lagoon.

R A groundwater recovery trench may be installed east of the site, if necessary, to prevent the migration of contaminants into an adjacent marsh. In addition, a groundwater monitoring network will be installed to assess the effectiveness of the remedial actions to be undertaken.

Q/C Relocating the East Marsh wetlands on-site imposes a risk to biota, since it may take several years to evaluate the effectiveness of the proposed remedial actions.

R ALCOA will be required to determine the feasibility of restoring the existing wetland to its pre-contaminated condition, or replace the wetland, or enhance an existing off-site wetland.

Q/C All of the sludge at the East Marsh should be excavated and placed in the on-site vault.

R Since the marsh will be converted to an upland and wildlife will no longer be attracted to the area, a cleanup goal of 10 ppm is considered protective of health and the environment.

Q/C The major concern with the proposed groundwater management plan is the inability of the containment measures to effectively prevent the downward migration of contaminated groundwater to the glacial till and the bedrock.

R As recommended in the PRAP, the wastes and contaminated soils will be removed at a majority of the sites. Following removal, further releases of contaminants to the groundwater system are anticipated to be minimal. For those sites located over groundwater recharge areas, and where groundwater extraction systems are required (based on the effectiveness of the removal and based on groundwater monitoring results), groundwater pilot pump and treat systems will be operated to allow for an effective design, installation, and operation of the full scale groundwater extraction systems. Groundwater monitoring of shallow, intermediate and deep groundwater will be performed to aid in evaluating the effectiveness of the remedial action. If monitoring results indicate that significant vertical movement of contaminants is occurring, further remedial measures may be considered by the Department.

Q/C The necessary data for reviewing the proposed remedial activities has not been gathered. The downward migration of contaminants is occurring at each of the sites, yet no deep groundwater sampling has been done. It is unlikely that the ALCOA site has the assumed homogeneous qualities.

R The statement that no deep groundwater sampling has been performed is incorrect since a number of till/bedrock interface monitoring wells and bedrock monitoring wells which are located at, and downgradient of, the facility have been sampled. The installation and sampling of additional deep wells will be required to aid in monitoring the effectiveness of the remedial activities.

The reference to "homogeneous topography" is unclear. It is assumed that the intent of the comment is to state that the geologic units are heterogeneous in character. The Department recognized this property of the subsurface materials and discussed it on page 62 of the PRAP.

Q/C The NYSDEC remedial action objective for groundwater at the majority of the 14 identified waste sites is to "prevent adverse impacts to groundwater" and specifically to "effectively prevent the release of contaminants to the underlying bedrock aquifer". Furthermore, the ROD indicated the remedial objective for groundwater at the first eight sites to be "remediation of existing groundwater contamination". It is not clear that the proposed actions will meet these objectives. NYSDEC does not consider groundwater remediation to be demonstrable or perhaps even feasible at ALCOA. Since groundwater downgradient of the sites may not be remediated, but only monitored, this is of concern because of the resulting potential discharge of contaminants to the St. Lawrence River.

R The comment is correct in stating that the Department does not believe that complete restoration of groundwater quality at, and downgradient of, the facility is likely. Based on the nature of the subsurface geologic materials and the properties and concentrations of the contaminants, achieving the objective for remediating all of the contaminated groundwater just does not appear to be feasible. Therefore, the Department proposed remedial alternatives which will be employed to prevent the further releases of contaminants to the groundwater system.

The Department shares the panel's concern with the potential discharge of contaminated groundwater to the St. Lawrence River. Therefore, the Department will require groundwater monitoring at location(s) downgradient of Dennison Road to aid in determining if significant levels of contaminants are being discharged to the St. Lawrence River. If warranted by the monitoring results, further remedial actions may be required to abate those impacts.

Q/C There are too many uncertainties in the groundwater management proposals and a lack of confidence in the alternatives has been implied throughout the document. An effective long-term groundwater management plan cannot be evaluated or implemented until significant uncertainties with the downward migration of contaminated groundwater are eliminated.

R The effectiveness of groundwater extraction systems depends greatly on a number of factors <u>including</u> system design and operation, contaminant properties and concentrations, and aquifer properties. Considering the above details relative to the ALCOA facility, it is not possible to accurately state the effectiveness of a given system design at that facility. It is the Department's opinion that groundwater recovery trenches would be effective in collecting contaminated groundwater migrating laterally from the sites. However, the degree to which vertical contaminant migration may continue is not known. Considering the nature of the subsurface geologic materials, the Department has expressed concerns about the use of pumping wells in the relatively low permeability materials. However, the Department will allow ALCOA to explore the feasibility of operating groundwater recovery well systems. The performance of pilot tests of the pumping systems prior to the construction of full scale systems will aid in selecting an effective means for hydraulically isolating the sites. Results of the long-term monitoring program will also be used to evaluate the effectiveness of the full scale extraction systems. If warranted by the monitoring results, changes to the groundwater extraction systems would be considered by the Department.

Q/C The marine clay layer beneath Potlining Pile I is not as impervious as believed. Excavation of the waste and it's placement in an on-site vault is recommended.

R The Department agrees that contaminants have migrated laterally from, and vertically downward from, the site. However, it is important to recognize that except for the existing cap and the infrequent operation of a poorly designed shallow leachate collection system, wastes and leachate at the site have been relatively uncontrolled.

The proposed containment alternative does not rely solely on the integrity of the underlying silt and clay unit since it includes the upgrading of the cap, the installation of a slurry wall around the site and the operation of an active groundwater recovery system within the contained area. It is believed that this alternative would be effective at preventing further contaminant releases to the groundwater system.

WASTE COMPANIES CHALLENGE PCB CHARGES BEFORE EPA APPEALS BOARD

Waste-handling companies are defending their claim, already accepted by an administrative law judge, that EPA has tried to illegally penalize them for failing to use a waste-measuring method that the agency never officially required, in a challenge before the agency's Environmental Appeals Board. The companies charged with polychlorinated biphenyl (PCB) disposal violations claim their right to due process was violated, as the agency policy on how to measure PCB concentrations in solid waste does not appear in any legally binding regulation.

At June 23 oral arguments before the Environmental Appeals Board, an attorney representing CWM Chemical Services Inc., Chemical Waste Management Inc. and Waste Management Inc. reiterated earlier claims that EPA may not mandate a measurement technique unless the agency adopts it as part of the formal rulemaking process or includes it in the companies' operating permit. Boston-based attorney Roger Zehntner, representing CWM, told the appeals board that the requirements are clear and that EPA must give "fair warning" — a comment period, as required by the Administrative Procedure Act — that it is deviating from official regulations.

EPA's attorney, Lee Spielman of Region II, asked the two-judge panel — Judge Edward Reich recused himself from the case — to vacate an administrative law judge's ruling that threw out $3.425 million in proposed fines against the companies. Spielman argued that the "dry-weight" method — the drying of waste samples in a laboratory before measuring for contaminants — is the only way to take an accurate reading of PCB concentration. Dry-weight testing, he said, is "reproducible and verifiable by a third party," whereas the wet-weight method — before removal of water and other matter — "introduces variability into the measurement."

Spielman said, "Anyone in the field of PCB disposal should know of the dry-weight procedure and the necessity of using it. . . . It is uniformly recognized in the scientific community."

One scientist familiar with PCB measuring techniques, a chemistry professor at Florida State University, agrees that wet-weight testing produces variable results, depending on the amount of water present, and says the practice offers "an opportunity for cheating." This source calls the dry method a "reasonable" standard.

EPA's assertions notwithstanding, however, CWM maintains its claim that there is no relevant official requirement to do dry-weight testing. EPA has since added the provision to CWM's operating permit, but it was not included during the period of the alleged violations, between June 1986 and October 1987. EPA omitted the requirement inadvertently when it revised Toxic Substances Control Act PCB regulations in 1984 and has yet to reinstate the provision. The agency issued a proposal to that effect in 1990 but has not finalized it.

"It's irrelevant whether the omission was inadvertent," Zehntner argued. "If they really saw it as a mistake they would have proposed to put it back in years ago."

CWM is charged with illegal disposal of 500 loads of PCB-contaminated solid waste from a General Motors plant in Massena, NY, and faces a possible fine of more than $7 million. Action on the 240 loads disposed of before June 25, 1986 — with proposed penalties greater than $3.5 million — is stayed pending a federal court's resolution of whether a five-year statute of limitations applies to TSCA administrative enforcement cases. The appeals board has asked for additional briefs, due July 23, on other cases referred to as precedent during the oral arguments. A decision is not expected until at least mid-August.

NEW PCB RULES MAY OFFER GREATER FLEXIBILITY, LIMIT INCINERATION

Proposed changes to disposal standards for polychlorinated biphenyls (PCBs) would give the regulated community more leeway in handling the toxic chemical, EPA and industry attorneys say. The proposed PCB disposal amendments would bring one of the rule's major provisions in line with site-specific Superfund procedures, allowing some PCB wastes to be disposed of in landfills instead of mandating incineration in all cases.

The proposal to amend Toxic Substances Control Act PCB regulations is nearing workgroup closure, sources say, and should be published for public comment by the end of the year.

EPA is eyeing the PCB anti-dilution rule for major revision, addressing a provision that has come under fire from industry for its mandate to incinerate contaminated soil, regardless of the PCB concentration. "It's a nightmare that seems not to end," Marion Herrington of General Electric Co. said at an American Bar Association TSCA subcommittee meeting June 15 in Washington, DC. She and others at the meeting complained that compliance costs regularly outweigh any environmental benefits.

Harrington, EPA Pesticides & Toxics Enforcement chief Michael Walker and industry attorney Cynthia Lewis all noted the need to reform the rule, and the consensus favored applying the Superfund model for anti-dilution of PCB-contaminated soil to Toxic Substances Control Act regulation. Under Superfund, liquid wastes must be incinerated, but solid wastes may be treated and stored in approved landfills. The remediation method is based on site-specific risk.

The amendments as a whole are intended to make regulation more flexible for all parties involved and to provide a comprehensive solution to the PCB problem, EPA says. According to Walker, a decade ago EPA thought it had all necessary controls in place, but now the agency seems to discover a new use or abuse of PCB two or three times per year. "We hope the PCB amendment will be the watershed regulation to deal with the problem," he said.