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report.hw932051 .1983-06 Phase I .pdf

example: *report . Site Number . Year-Month . ReportName . pdf*

if a non-foilable site: add ".nf.pdf" at end of file name

Project Site numbers will be proceeded by the following:

Municipal Brownfields - B
Superfund - HW
Spills - SP
ERP - E
VCP - V
BCP - C

932051

PHASE I REPORT

ENGINEERING INVESTIGATIONS AND EVALUATIONS AT INACTIVE HAZARDOUS WASTE DISPOSAL SITES

DRAFT

Olin Chemical
Niagara County, NY

SUBMITTED TO

New York State Department of Environmental Conservation

DRAFT
SUBJECT TO REVISION
NOT FOR EXTERNAL RELEASE

RECEIVED
JUN 7 1983
BUREAU OF HAZARDOUS WASTE
DIVISION OF SOLID WASTE

SUBMITTED BY

RECEIVED
JUL 7 1983
N.Y.S. DEPT. OF
ENVIRONMENTAL CONSERVATION
REGION 9 HEADQUARTERS

ENGINEERING-SCIENCE, INC.
in association with
DAMES & MOORE

RECEIVED
JUN 0 7 1983
DIRECTOR'S OFFICE
DIVISION OF SOLID WASTE

JUNE 1983

PHASE I REPORT

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Olin Chemical
Niagara County, NY

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JUNE 1983

TABLE OF CONTENTS

SECTION I

EXECUTIVE SUMMARY

Olin Chemical

Objective

The purpose of this two phase program is to conduct engineering investigations and evaluations at inactive hazardous disposal sites in New York State in order to calculate a Hazard Ranking System (HRS) score for each site and estimate the cost of any recommended remedial action. During the initial portion of this investigation (Phase I) all available data and records combined with information collected from a site inspection were reviewed and evaluated to determine the adequacy of existing information for calculating an HRS score. On the basis of this evaluation, a Phase II Work Plan was prepared for collecting additional HRS data (if necessary), evaluating remedial alternatives and preparing a cost estimate for recommended remedial action. The results of this Phase I study for this site are summarized below and detailed in the body of this report.

Site Background

The Olin Chemical Plant is an active chemical manufacturing facility located on Buffalo Avenue west of Gill Creek, in the City of Niagara Falls, Niagara County. The surrounding area is heavily industrialized, particularly by the chemical industry. The plant site contains several areas in which Olin utilized waste sludges containing mercury as fill material. During a period of plant expansion Olin excavated and disposed of some of this material. In addition, several areas containing sludge were paved over with asphalt. Site investigations have determined the presence of mercury, chlorophenols and BHC (insecticide) in the soil.

Assessment

Insufficient data was available to complete a final HRS scoring. The preliminary HRS scoring was:

$S_M = 6.6$ $S_A = 0$

$S_{GW} = 0$ $S_{FE} = 0$

$S_{SW} = 11.5$ $S_{DC} = 0$

The low route scores are due to the low usage of groundwater and surface water in this area. Although ? groundwater analyses are available, the location of the samples is unclear and must be determined in Phase II. Air and surface water analytical information is required.

Recommendation

The following recommendations are made for the completion of Phase II:

- A surface water monitoring system consisting of three stations;
- Sample analyses should include mercury, cyanide, chlorophenols and BHC; and
- Air monitoring survey with an OVA meter.

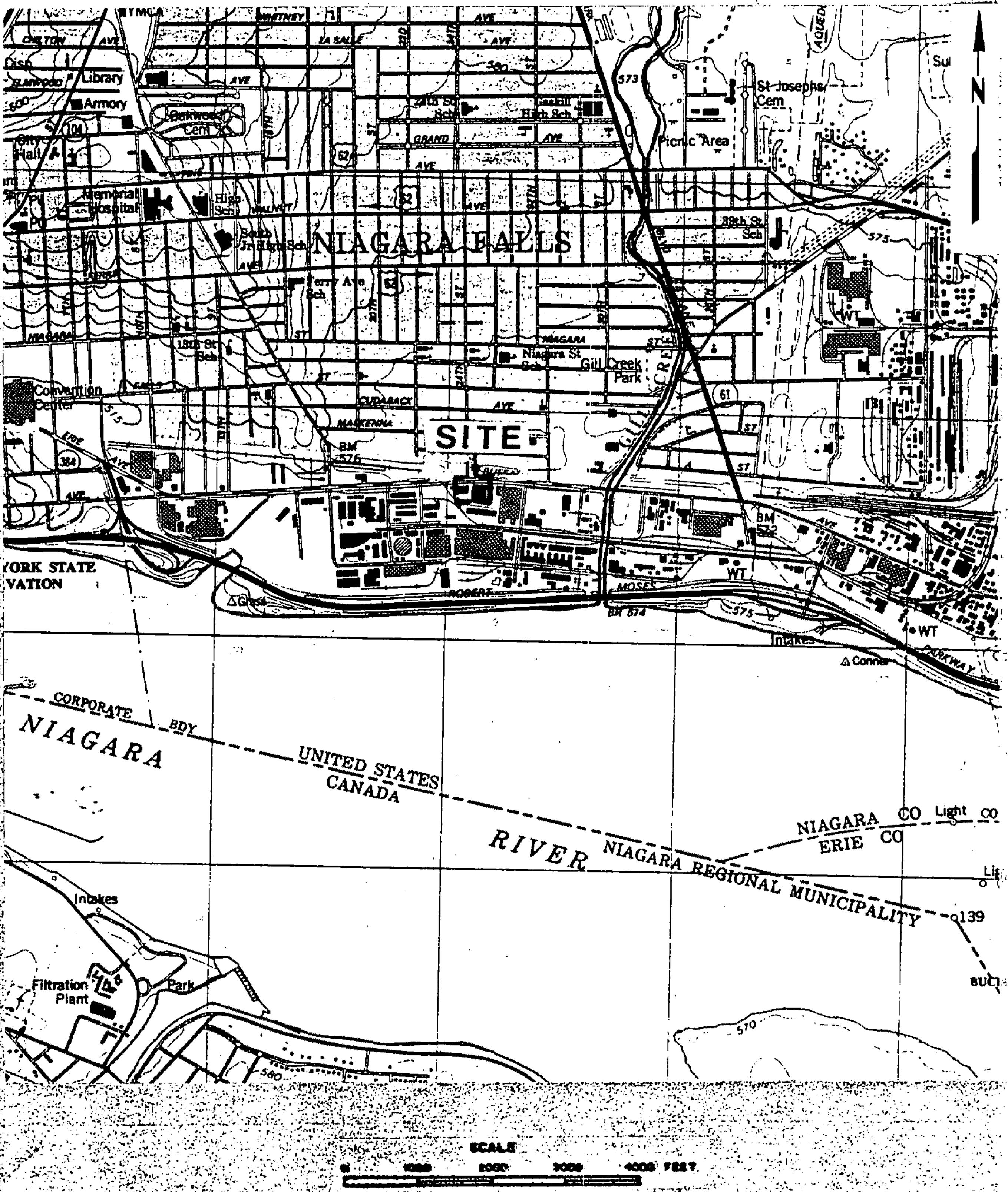
The estimated manhours required to complete Phase II are 231, while the estimated cost is $8,511.

SECTION II

SITE DESCRIPTION

Olin Chemical

The Olin Chemicals plant site is an active chemical manufacturing facility located on Buffalo Avenue west of Gill Creek, in the City of Niagara Falls, Niagara County (NYS). The surrounding area is heavily industrialized, particularly by the chemical industry. The plant site contains several areas in which Olin utilized waste sludges as fill material. During a period of plant expansion, Olin excavated and disposed of some of this material. In addition several areas containing sludge were covered with asphalt. Present concern centers on the possible leaching and migration of this material offsite.



SITE LOCATION MAP
OLIN PLANT

REFERENCE: U.S.G.S. 7.5' TOPOGRAPHIC MAP
NIAGARA FALLS, NY-ONT (1980)
QUADRANGLE

SECTION III

HRS SCORING

HRS COVER SHEET

Facility name: Olin Plant Site

Location: Niagara Falls

EPA Region: II

Person(s) in charge of the facility:

Olin Corporation

Niagara Falls

Name of Reviewer: John Kubarewicz/Eileen Gillian Date: 5/20/83

General description of the facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

Several areas of Olin Plants 1 and 2 were used to dispose of brine sludge containing mercury. The sludge was used to fill holes and shallow areas. A large portion of these areas have been either excavated or paved over since that time.

Scores: $S_M = 6.6$ ($S_{gw} = 0$ $S_{sw} = 11.5$ $S_a = 0$)

$S_{FE} = 0$

$S_{DC} = 0$

GROUND WATER ROUTE WORK SHEET

Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Sectio
1 Observed Release	0 [✓ 45]	1	45	45	3.1
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	3.3
4 Waste Characteristics					3.4
Toxicity / Persistence	0 3 6 9 12 15 [✓ 18]	1	18	18	
Hazardous Waste Quantity	0 1 2 3 [✓ 4] 5 6 7 8	1	4	8	
Total Waste Characteristics Score			24	26	
5 Targets					3.5
Ground Water Use	[✓ 0] 1 2 3	3	0	9	
Distance to Nearest Well / Population Served	[✓ 0] 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			0	49	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			0	57,330	

7 Divide line 6 by 57,330 and multiply by 100 S_{gw} = 0

SURFACE WATER ROUTE WORK SHEET

Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Re (Section)
1 Observed Release	[✓ 0] 45	1	0	45	4.
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.
Facility Slope and Intervening Terrain	[✓ 0] 1 2 3	1	0	3	
1-yr. 24-hr. Rainfall	0 1 [✓ 2] 3	1	2	3	
Distance to Nearest Surface Water	0 1 [✓ 2] 3	2	4	6	
Physical State	0 [✓ 1] 2 3	1	1	3	
	Total Route Characteristics Score		7	15	
3 Containment	0 1 2 [✓ 3]	1	3	3	4.
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 [✓ 18]	1	18	18	
Hazardous Waste Quantity	0 1 2 3 [✓ 4] 5 6 7 8	1	4	8	
	Total Waste Characteristics Score		22	26	
5 Targets					4.
Surface Water Use	0 1 [✓ 2] 3	3	6	9	
Distance to a Sensitive Environment	[✓ 0] 1 2 3	2	0	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 [✓ 10] 12 16 18 20 24 30 32 35 40	1	10	40	
	Total Targets Score		16	55	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			7392	64,350	

AIR ROUTE WORK SHEET

Air Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	[✓ 0] 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line 1 is 0, the S_a = 0. Enter on line 5. If line 1 is 45, then proceed to line 2.					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
4 Multiply 1 x 2 x 3				35,100	
5 Divide line 4 by 35,100 and multiply by 100		S_a = 0			

DIRECT CONTACT WORK SHEET

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Sectio
1 Observed Incident	[✓ 0] 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	[✓ 0] 1 2 3	1.	0	3	8.2
3 Containment	0 [✓ 15]	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 [✓ 3]	5	15	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 1 2 [✓ 3] 4 5	4	12	20	
Distance to a Critical Habitat	[✓ 0] 1 2 3	4	0	12	
Total Targets Score			12	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			0	21,500	

7 Divide line 6 by 21,500 and multiply by 100 S_{DC} = 0

Fire and Explosion Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Sectio
1 Containment	1 3	1		3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 3	1		3	
Ignitability	0 1 2 3	1		3	
Reactivity	0 1 2 3	1		3	
Incompatibility	0 1 2 3	1		3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1		5	
Distance to Nearest Building	0 1 2 3	1		3	
Distance to Sensitive Environment	0 1 2 3	1		3	
Land Use	0 1 2 3	1		3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
	Total Targets Score			24	
4 Multiply 1 x 2 x 3				1,440	
5 Divide line 4 by 1,440 and multiply by 100		S_{FE} = 0			

WORKSHEET FOR COMPUTING S_M

	S	S^2
Groundwater Route Score (S_{gw})	0	0
Surface Water Route Score (S_{sw})	11.5	132.3
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$	▨	132.3
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$	▨	11.5
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} \,/\, 1.73 = S_M =$	▨	6.6

June 28, 1982

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: OLIN CHEMICAL

LOCATION: NIAGARA FALLS

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

CHLOROPHENOLS
BHC
MERCURY

Rationale for attributing the contaminants to the facility:

CHEM ANALYSIS OF GILL CREEK

BUFFALO AVE WELLS

Location of wells uncertain, may not be appropiate for this site.

* * *

EASTERN PORTION OF PLANT SITE

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

INTERMITTENT SHALLOW AQUIFER (<10' DEEP)
STATIC AQUIFER (IN BEDROCK (17'-34' DEEP)

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Depth from the ground surface to the lowest point of waste disposal/ storage:

<10' TO 12'

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

40

Mean annual lake or seasonal evaporation (list months for seasonal):

27

Net precipitation (subtract the above figures):

13

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

FILL MATERIAL
SAND AND GRAVELS, SILTS

Permeability associated with soil type:

10^{-3} CM/SEC

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

SLUDGE, WHICH HARDENS TO "BLACK PLASTER

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

UNCONTAINED - SURFACE SPREAD

Method with highest score:

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

CHLOROPHENOLS
MERCURY

Compound with highest score:

MERCURY 18

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

264 CU YD DISPOSED
-100 ESTIMATED REMOVAL
164

Basis of estimating and/or computing waste quantity:

DOH REPORT, olin Memo

* * *

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

NOT USED

OLIN WELL
INDUSTRIAL COOLING

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

UNKNOWN

Distance to above well or building:

N/A

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

0

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

N/A

Total population served by ground water within a 3-mile radius:

0

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

NONE

Rationale for attributing the contaminants to the facility:

N/A

* * *

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

0

Name/description of nearest downslope surface water:

NIAGARA RIVER GILL CREEK

Average slope of terrain between facility and above-cited surface water body in percent:

,3

Is the facility located either totally or partially in surface water?

NO

Is the facility completely surrounded by areas of higher elevation?

NO

1-Year 24-Hour Rainfall in Inches

2.1

Distance to Nearest Downslope Surface Water

.37

Physical State of Waste - AT PRESENT TIME SOLID (LEACHABLE)

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

UNCONTAINED

Method with highest score:

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

CHLOROPHENOLS (3,1)
MERCURY (~~2~~3)

Compound with highest score:

(3,1) ⇒ VAlVE=12

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

264 CU YD
-100
164

Basis of estimating and/or computing waste quantity:

OLIN

* * *

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

FISHING
Tourrsim

Is there tidal influence?

NO

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

N/A

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

N/A

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

N/A

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

N/A

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

N/A

Total population served:

N/A

Name/description of nearest of above water bodies:

N/A

Distance to above-cited intakes, measured in stream miles.

N/A

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

NONE DETECTED

Date and location of detection of contaminants

N/A

Methods used to detect the contaminants:

N/A

Rationale for attributing the contaminants to the site:

N/A

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

N/A

Most incompatible pair of compounds:

N/A

Toxicity

Most toxic compound:

N/A

Hazardous Waste Quantity

Total quantity of hazardous waste:

N/A

Basis of estimating and/or computing waste quantity:

N/A

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi 0 to 1 mi 0 to 1/2 mi 0 to 1/4 mi

710,000 WITHIN 2 MILES

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

N/A

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

N/A

Distance to critical habitat of an endangered species, if 1 mile or less:

N/A

Land Use

Distance to commercial/industrial area, if 1 mile or less:

0

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

1.0

NYS RESERVATION AT NIAGARA FALLS

Distance to residential area, if 2 miles or less:

0.5

Distance to agricultural land in production within past 5 years, if 1 mile or less:

N/A

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

N/A

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

UNKNOWN

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE: NY
02 SITE NUMBER: 93051-b

II. SITE NAME AND LOCATION

01 SITE NAME *(Legal, common, or descriptive name of site)*: OLIN CORPORATION
02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: 2400 BUFFALO AVENUE
03 CITY: NIAGARA FALLS
04 STATE: NY
05 ZIP CODE: 14303
06 COUNTY: NIAGARA
07 COUNTY CODE: 63
08 CONG DIST: 36
09 COORDINATES LATITUDE: 43°05 000"
LONGITUDE: 079°01 58.0"
10 TYPE OF OWNERSHIP *(Check one)*
☑ A. PRIVATE ☐ B. FEDERAL ________ ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER ________ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION: 4 28 83 (MONTH DAY YEAR)
02 SITE STATUS: ☐ ACTIVE ☑ INACTIVE
03 YEARS OF OPERATION: 1957 1958 (BEGINNING YEAR ENDING YEAR) ___ UNKNOWN
04 AGENCY PERFORMING INSPECTION *(Check all that apply)*
☐ A. EPA ☐ B. EPA CONTRACTOR ENGINEERING-SCIENCE *(Name of firm)* ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ________ *(Name of firm)*
☐ E. STATE ☑ F. STATE CONTRACTORS DAMES + MOORE *(Name of firm)* ☐ G. OTHER ________ *(Specify)*

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
ART SEANOR	GEOIOGIST	DHM	(315) 635-257

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
JOHN KUBAREWICZ	CHEMICAL ENGINEER	ES	(703) 591-757
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
AL KAPTEINA	ENV MANAGER	BUFFALO PIT	(716) 278-658
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY *(Check one)*: ☐ PERMISSION ☐ WARRANT
18 TIME OF INSPECTION: 16:00
19 WEATHER CONDITIONS: CLOUDY SITE VIEWED FROMROAD ONLY

IV. INFORMATION AVAILABLE FROM

01 CONTACT: JOHN KUBAREWICZ
02 OF *(Agency/Organization)*: ES
03 TELEPHONE NO.: (703) 591-75
04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM:
05 AGENCY:
06 ORGANIZATION:
07 TELEPHONE NO.:
08 DATE: 5 19 83 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	93051-b

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES *(Check all that apply)*

☐ A. SOLID
☐ B. POWDER, FINES
☑ C. SLUDGE
☐ D. OTHER ______ *(Specify)*
☐ E. SLURRY
☐ F. LIQUID
☐ G. GAS

02 WASTE QUANTITY AT SITE *(Measures of waste quantities must be independent)*

TONS ______
CUBIC YARDS 264
NO. OF DRUMS ______

03 WASTE CHARACTERISTICS *(Check all that apply)*

☑ A. TOXIC
☐ B. CORROSIVE
☐ C. RADIOACTIVE
☐ D. PERSISTENT
☐ E. SOLUBLE
☐ F. INFECTIOUS
☐ G. FLAMMABLE
☐ H. IGNITABLE
☐ I. HIGHLY VOLATILE
☐ J. EXPLOSIVE
☐ K. REACTIVE
☐ L. INCOMPATIBLE
☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
[✓ SLU]	SLUDGE	264	Yd³	BRINE SLUDGE WITH
OLW	OILY WASTE			30-45 PPM
SOL	SOLVENTS			MERCURY
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES *(See Appendix for most frequently cited CAS Numbers)*

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	MERCURY	7439-976	LAND SPREAD	.0056	PPM
OCC	CHOROPHENOTS	999	LAND SPREAD	.08	PPM
OCC	BHC (INSECTICIDE)	999	LAND SPREAD	1.11	PPM
OCC	CYANIDE	999	LAND SPREAD	1.2-2	PPM

V. FEEDSTOCKS *(See Appendix for CAS Numbers)*

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	MERCURY	7439-976	FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

"AN INVESTIGATION OF SELECTED INACTIVE TOXIC LANDFILLS IN CONJUNCTION WITH THE NIAGARA RIVER STUDY AUG 1981 USGS "OLIN CORPORATION" REVIEW OF ANALYTICAL DATA NIAGARA FALLS PIT MAY 19, 1980

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE NY

02 SITE NUMBER 93051-b

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☑ A. GROUNDWATER CONTAMINATION — 02 ☑ OBSERVED (DATE: 11/20/78) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED:

04 NARRATIVE DESCRIPTION

CHLOROPHENOLS
BHC
MERCURY

ONGOING MONITORING (Location uncertain confirmation required)

01 ☐ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE:) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED:

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE:) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED:

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE:) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED:

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE:) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED:

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☑ F. CONTAMINATION OF SOIL — 02 ☑ OBSERVED (DATE: 10/19/81) — ☐ POTENTIAL — ☐ ALLEGED

03 AREA POTENTIALLY AFFECTED: (Acres)

04 NARRATIVE DESCRIPTION

USGS CORE SAMPLES CONTAINED MERCURY, CYANIDE, BHC

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE:) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED:

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE:) — ☐ POTENTIAL — ☐ ALLEGED

03 WORKERS POTENTIALLY AFFECTED:

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE:) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED:

04 NARRATIVE DESCRIPTION

UNKNOWN

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE NY

02 SITE NUMBER 93051-b

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

01 ☐ J. DAMAGE TO FLORA　02 ☐ OBSERVED (DATE: ______)　☐ POTENTIAL　☐ ALLEGED

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ K. DAMAGE TO FAUNA　02 ☐ OBSERVED (DATE: ______)　☐ POTENTIAL　☐ ALLEGED

04 NARRATIVE DESCRIPTION *(Include name(s) of species)*

UNKNOWN

01 ☐ L. CONTAMINATION OF FOOD CHAIN　02 ☐ OBSERVED (DATE: ______)　☐ POTENTIAL　☐ ALLEGED

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/Runoff/Standing liquids, Leaking drums)*　02 ☐ OBSERVED (DATE: ______)　☐ POTENTIAL　☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ______

04 NARRATIVE DESCRIPTION

NO SIGN OF EXPOSED WASTES.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY　02 ☐ OBSERVED (DATE: ______)　☐ POTENTIAL　☐ ALLEGED

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs　02 ☐ OBSERVED (DATE: ______)　☐ POTENTIAL　☐ ALLEGED

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING　02 ☐ OBSERVED (DATE: ______)　☐ POTENTIAL　☐ ALLEGED

04 NARRATIVE DESCRIPTION

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: ______

IV. COMMENTS

V. SOURCES OF INFORMATION *(Cite specific references, e. g., state files, sample analysis, reports)*

OLIN MEMO MAY 19, 1983

USGS STUDY, AUGUST 1981

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE NY
02 SITE NUMBER 93051-b

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY *(Check as applicable)*

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☐
NON-COMMUNITY	C. ☐	D. ☐

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☐
D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE

A. ____________(mi)
B. ____________(mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY *(Check one)*

☐ A. ONLY SOURCE FOR DRINKING
☐ B. DRINKING *(Other sources available)* COMMERCIAL, INDUSTRIAL, IRRIGATION *(No other water sources available)*
☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION *(Limited other sources available)*
☑ D. NOT USED, UNUSEABLE

INCORRECT

02 POPULATION SERVED BY GROUND WATER 0

03 DISTANCE TO NEAREST DRINKING WATER WELL N/A (mi)

04 DEPTH TO GROUNDWATER INTERMITTENT AT <10' STATIC 17'-34' (ft)

05 DIRECTION OF GROUNDWATER FLOW Possibly NNE

06 DEPTH TO AQUIFER OF CONCERN ________(ft)

07 POTENTIAL YIELD OF AQUIFER ________(gpd)

08 SOLE SOURCE AQUIFER ☐ YES ☐ NO

09 DESCRIPTION OF WELLS *(including useage, depth, and location relative to population and buildings)*

8 DEEP WELLS (>135') ARE LOCATED ON OLIN OR ADJACENT PROPEITY ALSO 10 SHALLOW MONITORINE WELLS ARE LOCATED ON OLIN PLANT PROPERTY

10 RECHARGE AREA
☑ YES
☐ NO
COMMENTS

11 DISCHARGE AREA
☐ YES
☑ NO
COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE *(Check one)*

☑ A. RESERVOIR, RECREATION DRINKING WATER SOURCE
☑ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES
☑ C. COMMERCIAL, INDUSTRIAL
☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
NIAGARA RIVER	☐	0.37 (mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE A. 3000 NO. OF PERSONS
TWO (2) MILES OF SITE B. 5700 NO. OF PERSONS
THREE (3) MILES OF SITE C. 9500 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 1500' (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE 3000

04 DISTANCE TO NEAREST OFF-SITE BUILDING 500' (mi)

05 POPULATION WITHIN VICINITY OF SITE *(Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)*

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION
01 STATE: NY
02 SITE NUMBER: 93051-b

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES	N.A.			
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☐ F. LANDFILL		
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☑ I. OTHER FILL (Specify)	264	YD3

04 TREATMENT (Check all that apply)
- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☑ H. OTHER NONE (Specify)

05 OTHER
- ☑ A. BUILDINGS ON SITE

06 AREA OF SITE
4 (Acr

07 COMMENTS
SLUDGE USED TO FILL HOLES AND LOW AREAS ON SITE IN 1975 AND 1958

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one) UNKNOWN
☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☐ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.
PART OF AREA WAS EXCAUATED DURING BUILDING, ANOTHER PART PARED WITH ASPHLT.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☐ YES ☑ NO
02 COMMENTS SITE FENCED AND GUARDED

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

OLIN MEMO
DEC SUMMARY
SITE VISIT

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE: NY
02 SITE NUMBER: 93051-D

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE *(Check one)*

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☑ B. $10^{-4} - 10^{-6}$ cm/sec ☐ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK *(Check one)*

☐ A. IMPERMEABLE *(Less than 10^{-6} cm/sec)* ☑ B. RELATIVELY IMPERMEABLE *($10^{-4} - 10^{-6}$ cm/sec)* ☐ C. RELATIVELY PERMEABLE *($10^{-2} - 10^{-4}$ cm/sec)* ☐ D. VERY PERMEABLE *(Greater than 10^{-2} cm/sec)*

03 DEPTH TO BEDROCK: 10'-12' (ft)
04 DEPTH OF CONTAMINATED SOIL ZONE: UNKNOWN (ft)
05 SOIL pH: UNKNOWN

06 NET PRECIPITATION: 13 (in)
07 ONE YEAR 24 HOUR RAINFALL: 2.1 (in)
08 SLOPE
SITE SLOPE: 0 %
DIRECTION OF SITE SLOPE:
TERRAIN AVERAGE SLOPE: 0.26 %

09 FLOOD POTENTIAL
SITE IS IN 500 YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS *(5 acre minimum)*
ESTUARINE
A. ______ (mi)
OTHER
B. >3 (mi)

12 DISTANCE TO CRITICAL HABITAT *(of endangered species)*
>3 (mi)
ENDANGERED SPECIES: HALIAEETUS LEUCOCEPHALUS
FALCO PEREGRINUS

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL
A. ______ (mi)

RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES
B. ______ (mi)

AGRICULTURAL LANDS
PRIME AG LAND
C. ______ (mi)
AG LAND
D. ______ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

SITE IS IN ON A NEARLY HORIZONTAL PLAIN

VII. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

USGS

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE NY

02 SITE NUMBER 93051-6

II. SAMPLES TAKEN N.A.

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILAB
GROUNDWATER			
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL

02 IN CUSTODY OF ______________________ (Name of organization or individual)

03 MAPS
☐ YES
☐ NO

04 LOCATION OF MAPS

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE: NY
02 SITE NUMBER: 932051-b

II. CURRENT OWNER(S)

01 NAME: OLIN CHEMICALS
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.): 2400 BUFFALO AVE
04 SIC CODE:
05 CITY: NIAGARA FALLS
06 STATE: NY
07 ZIP CODE: 14303

01 NAME
02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)
04 SIC CODE
05 CITY
06 STATE
07 ZIP CODE

01 NAME
02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)
04 SIC CODE
05 CITY
06 STATE
07 ZIP CODE

01 NAME
02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)
04 SIC CODE
05 CITY
06 STATE
07 ZIP CODE

PARENT COMPANY (If applicable)

08 NAME: OLIN CORPORATION
09 D+B NUMBER:
10 STREET ADDRESS (P.O. Box, RFD #, etc.): PO BOX 248
11 SIC CODE:
12 CITY: CHARLESTOWN
13 STATE: TN
14 ZIP CODE: 37310

08 NAME
09 D+B NUMBER
10 STREET ADDRESS (P.O. Box, RFD #, etc.)
11 SIC CODE
12 CITY
13 STATE
14 ZIP CODE

08 NAME
09 D+B NUMBER
10 STREET ADDRESS (P.O. Box, RFD #, etc.)
11 SIC CODE
12 CITY
13 STATE
14 ZIP CODE

08 NAME
09 D+B NUMBER
10 STREET ADDRESS (P.O. Box, RFD #, etc.)
11 SIC CODE
12 CITY
13 STATE
14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME
02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)
04 SIC CODE
05 CITY
06 STATE
07 ZIP CODE

01 NAME
02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)
04 SIC CODE
05 CITY
06 STATE
07 ZIP CODE

01 NAME
02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)
04 SIC CODE
05 CITY
06 STATE
07 ZIP CODE

IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME
02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)
04 SIC CODE
05 CITY
06 STATE
07 ZIP CODE

01 NAME
02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)
04 SIC CODE
05 CITY
06 STATE
07 ZIP CODE

01 NAME
02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)
04 SIC CODE
05 CITY
06 STATE
07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Olin Memo May 19, 1983

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	93051-b

II. CURRENT OPERATOR *(Provide if different from owner)*

01 NAME: SAME
02 D+B NUMBER:
03 STREET ADDRESS *(P.O. Box, RFD #, etc.)*:
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:
08 YEARS OF OPERATION:
09 NAME OF OWNER:

OPERATOR'S PARENT COMPANY *(If applicable)*

10 NAME: SAME
11 D+B NUMBER:
12 STREET ADDRESS *(P.O. Box, RFD #, etc.)*:
13 SIC CODE:
14 CITY:
15 STATE:
16 ZIP CODE:

III. PREVIOUS OPERATOR(S) *(List most recent first; provide only if different from owner)*

01 NAME: SAME
02 D+B NUMBER:
03 STREET ADDRESS *(P.O. Box, RFD #, etc.)*:
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:
08 YEARS OF OPERATION:
09 NAME OF OWNER DURING THIS PERIOD:

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS *(P.O. Box, RFD #, etc.)*:
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:
08 YEARS OF OPERATION:
09 NAME OF OWNER DURING THIS PERIOD:

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS *(P.O. Box, RFD #, etc.)*:
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:
08 YEARS OF OPERATION:
09 NAME OF OWNER DURING THIS PERIOD:

PREVIOUS OPERATORS' PARENT COMPANIES *(If applicable)*

10 NAME:
11 D+B NUMBER:
12 STREET ADDRESS *(P.O. Box, RFD #, etc.)*:
13 SIC CODE:
14 CITY:
15 STATE:
16 ZIP CODE:

10 NAME:
11 D+B NUMBER:
12 STREET ADDRESS *(P.O. Box, RFD #, etc.)*:
13 SIC CODE:
14 CITY:
15 STATE:
16 ZIP CODE:

10 NAME:
11 D+B NUMBER:
12 STREET ADDRESS *(P.O. Box, RFD #, etc.)*:
13 SIC CODE:
14 CITY:
15 STATE:
16 ZIP CODE:

IV. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION

01 STATE: NY
02 SITE NUMBER: 93051-b

II. ON-SITE GENERATOR

01 NAME: OLIN CORP
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.): 2400 BUFFALO AVE
04 SIC CODE:
05 CITY: NIAGARA FALLS
06 STATE: NY
07 ZIP CODE: 14303

III. OFF-SITE GENERATOR(S)

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:

IV. TRANSPORTER(S)

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:

01 NAME:
02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):
04 SIC CODE:
05 CITY:
06 STATE:
07 ZIP CODE:

V. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

Olin Memo

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION
01 STATE NY
02 SITE NUMBER 93051-b

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ D. SPILLED MATERIAL REMOVED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ E. CONTAMINATED SOIL REMOVED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ F. WASTE REPACKAGED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☑ G. WASTE DISPOSED ELSEWHERE 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION ACCORDING TO DUN, MUCH OF THE WASTE MATERIAL WAS TAKEN AWAY DURING EXCAVATION FOR BUILDING

01 ☐ H. ON SITE BURIAL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ I. IN SITU CHEMICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ J. IN SITU BIOLOGICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ K. IN SITU PHYSICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☑ L. ENCAPSULATION 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
PORTION OF SITE PAVED OVER

01 ☐ M. EMERGENCY WASTE TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ N. CUTOFF WALLS 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ P. CUTOFF TRENCHES/SUMP 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

01 ☐ Q. SUBSURFACE CUTOFF WALL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
NO

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE: NY
02 SITE NUMBER: 93051-b

II PAST RESPONSE ACTIVITIES *(Continued)*

01 ☐ R. BARRIER WALLS CONSTRUCTED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NO

01 ☑ S. CAPPING/COVERING 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION WASTE MATERIAL IS NOW LOCATED EITHER BENEATH BUILDING FOUNDATIONS OR BENEATH [illegible] PAVED [illegible]

01 ☐ T. BULK TANKAGE REPAIRED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NO

01 ☐ U. GROUT CURTAIN CONSTRUCTED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NO

01 ☐ V. BOTTOM SEALED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NO

01 ☐ W. GAS CONTROL 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NO

01 ☐ X. FIRE CONTROL 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NO

01 ☐ Y. LEACHATE TREATMENT 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NO

01 ☐ Z. AREA EVACUATED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NO

01 ☑ 1. ACCESS TO SITE RESTRICTED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION RESTRICTED - PRIVATE PROPERTY

01 ☐ 2. POPULATION RELOCATED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NO

01 ☐ 3. OTHER REMEDIAL ACTIVITIES 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION
NONE

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

NIAGARA CO. DOH REPT OF NIAGARA RIVER STUDY
OLIN MEMO MAY 19, 1983

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☑ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

APRIL, 1983 REFERRED TO
STATE ATTORNEY GENERAL ?

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

NYS ATTORNEY GENERAL'S OFFICE
APRIL 21, 1983

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION
01 STATE: NY
02 SITE NUMBER: 93051-b

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site): OLIN CORPORATION
02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: 2400 BUFFALO AVENUE
03 CITY: NIAGARA FALLS
04 STATE: NY
05 ZIP CODE: 14303
06 COUNTY: NIAGARA
07 COUNTY CODE: 63
08 CONG DIST: 36
09 COORDINATES LATITUDE: 43°05 00.0" LONGITUDE: 079°01' 58.0'
10 DIRECTIONS TO SITE (Starting from nearest public road): AREAS OF CONCERN WERE FORMER BUILDING 13, 46, AND GAS HOLDER, NOW PAVED WITH ASPHALET AND A CAUSTIC STORAGE FACILITY

III. RESPONSIBLE PARTIES

01 OWNER (If known): OLIN CORPORATION
02 STREET (Business, mailing, residential): 2400 BUFFALO AVE
03 CITY: NIAGARA FALLS
04 STATE: NY
05 ZIP CODE: 1430
06 TELEPHONE NUMBER: (716) 278-6584
07 OPERATOR (If known and different from owner): SAME
08 STREET (Business, mailing, residential):
09 CITY:
10 STATE:
11 ZIP CODE:
12 TELEPHONE NUMBER: ( )

13 TYPE OF OWNERSHIP (Check one)
☑ A. PRIVATE ☐ B. FEDERAL: ______ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER: ______ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: __/__/__ MONTH DAY YEAR ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__ MONTH DAY YEAR ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☐ YES DATE __/__/__ MONTH DAY YEAR
☑ NO
Viewed from Road

BY (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR ☑ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: ______ (Specify)
CONTRACTOR NAME(S): Engineer-Science / Dames + Moore

02 SITE STATUS (Check one)
☐ A. ACTIVE ☑ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
1957 BEGINNING YEAR | 1958 ENDING YEAR ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
MERCURY CHLOROPHENOLS
BHC

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
BRINE SLUDGE WITH MERCURY WAS USED TO FILL SEVERAL AREAS AT
OLIN PLANTSITE SOME MATERIAL MAY HAVE BEEN REMOVED HE
EXCAVATING MUCH OF AREA PAVED OR BUILT ON NOW. LOW LEVELS OF
CONTAMINATION FOUND IN GROUNDWTR SOIL

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☑ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT: JOHN KUBAREWICZ
02 OF (Agency/Organization): ES
03 TELEPHONE NUMBER: (703) 591-7575
04 PERSON RESPONSIBLE FOR ASSESSMENT: SAME
05 AGENCY:
06 ORGANIZATION:
07 TELEPHONE NUMBER: ( )
08 DATE: 5, 19, 83 MONTH DAY YEAR

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	93051-b

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS.

01 PHYSICAL STATES *(Check all that apply)*

☐ A. SOLID
☐ B. POWDER, FINES
☐ C. SLUDGE
☐ D. OTHER ______ *(Specify)*
☐ E. SLURRY
☐ F. LIQUID
☐ G. GAS

02 WASTE QUANTITY AT SITE *(Measures of waste quantities must be independent)*

TONS ______
CUBIC YARDS 264
NO. OF DRUMS ______

03 WASTE CHARACTERISTICS *(Check all that apply)*

☑ A. TOXIC
☐ B. CORROSIVE
☐ C. RADIOACTIVE
☐ D. PERSISTENT
☐ E. SOLUBLE
☐ F. INFECTIOUS
☐ G. FLAMMABLE
☐ H. IGNITABLE
☐ I. HIGHLY VOLATILE
☐ J. EXPLOSIVE
☐ K. REACTIVE
☐ L. INCOMPATIBLE
☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
[✓ SLU]	SLUDGE	264	Yd^3	BRINE SLUDGE WITH
OLW	OILY WASTE			30-45PPM MERCURY
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES *(See Appendix for most frequently cited CAS Numbers)*

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	MERCURY	7439-97-6	LAND SPREAD	.0056	PPM
OCC	CHOROPHENTS	999	LAND SPREAD	.08	PPM
OCC	BHC (INSECTIDA	999	LAND SPREAD	1.11	PPM
OCC	CYANIDE	999	LAND SPREAD	1.2-2	PPM

V. FEEDSTOCKS *(See Appendix for CAS Numbers)*

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	MERCURY	7439-976	FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

"AN INVESTIGATION OF SELECTED INACTIVE TOXIC LANDFILL
IN CONJUNCTION WITH THE NIAGARA RIVER STUDY AUG 1981
USGS" OLIN CORPORATION "REVIEW OF ANAIYTICAL DATA
NIAGARA FALLS PIT MAY 19, 1982

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	93051-D

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☑ A. GROUNDWATER CONTAMINATION
02 ☑ OBSERVED (DATE: 11/20/78) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

CHLOROPHENOLS
BHC
MERCURY

ONGOING MONITORING

01 ☐ B. SURFACE WATER CONTAMINATION
02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ C. CONTAMINATION OF AIR
02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS
02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ E. DIRECT CONTACT
02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☑ F. CONTAMINATION OF SOIL
02 ☑ OBSERVED (DATE: 10/19/81) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: (Acres)
04 NARRATIVE DESCRIPTION

USGS CORE SAMPLES CONTAINED MERCURY, CYANIDE, BHC

01 ☐ G. DRINKING WATER CONTAMINATION
02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ H. WORKER EXPOSURE/INJURY
02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ I. POPULATION EXPOSURE/INJURY
02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

UNKNOWN

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE: NY
02 SITE NUMBER: 93051-b

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

01 ☐ J. DAMAGE TO FLORA　　02 ☐ OBSERVED (DATE: ______)　　☐ POTENTIAL　　☐ ALLEGED

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ K. DAMAGE TO FAUNA　　02 ☐ OBSERVED (DATE: ______)　　☐ POTENTIAL　　☐ ALLEGED

04 NARRATIVE DESCRIPTION *(Include name(s) of species)*

UNKNOWN

01 ☐ L. CONTAMINATION OF FOOD CHAIN　　02 ☐ OBSERVED (DATE: ______)　　☐ POTENTIAL　　☐ ALLEGED

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/runoff/standing liquids/leaking drums)*　　02 ☐ OBSERVED (DATE: ______)　　☐ POTENTIAL　　☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ______

04 NARRATIVE DESCRIPTION

NO SIGN OF EXPOSED WASTES

01 ☐ N. DAMAGE TO OFFSITE PROPERTY　　02 ☐ OBSERVED (DATE: ______)　　☐ POTENTIAL　　☐ ALLEGED

04 NARRATIVE DESCRIPTION:

UNKNOWN

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs　　02 ☐ OBSERVED (DATE: ______)　　☐ POTENTIAL　　☐ ALLEGED

04 NARRATIVE DESCRIPTION

UNKNOWN

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING　　02 ☐ OBSERVED (DATE: ______)　　☐ POTENTIAL　　☐ ALLEGED

04 NARRATIVE DESCRIPTION

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: ______

IV. COMMENTS

V. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

OLIN MEMO MAY 19, 1983
USGS STUDY, AUGUST 1981

SECTION IV

SITE HISTORY

Olin Chemical

In 1957 and 1958 Olin disposed of an estimated 264 cubic yards of brine sludge, containing 30 to 45 ppm mercury, by filling in holes and low areas on the plant site. Several areas were filled including the area near the former cell building (building 13), the caustic storage facility, the area behind building #46 and the former gas holder. Much of the area around the former building #13 has since been excavated to one foot or more. It is reported by Olin that much of the waste material was removed (Cummings, 1982).

The areas behind building #46 and the former gas holder are now paved with asphalt. A caustic storage facility has been built on a portion of the site formerly occupied by building #13. In 1981, Olin installed ten monitoring wells, and since that time has been sampling and testing the quality of the groundwater, as well as calculating groundwater flow rates. Chemical analysis of the groundwater show high levels of chlorophenols, BHC, and mercury. In addition, 10 borings were made at the sites with soil analyses as part of the USGS Niagara River Groundwater Study (Cummings, 1983B).

SECTION V

SUMMARY OF AVAILABLE DATA

Olin Corporation

Regional Geology and Hydrology

The site is located in the Erie-Ontario lowlands physiographic province. The bedrock of this region is predominantly limestone, dolostone, and shale. Most of the rocks are deep aquifers with regional flow to the south.

In the recent past, most of New York State, including the site, has been repeatedly covered by a series of continental ice sheets. The activity of the glacier widened preexisting valleys and deposited widespread accumulations of till. The melting of ice, ending approximately 12,000 years ago, produced large volumes of meltwater; this water subsequently shaped channels and deposited thick accumulations of stratified, granular sediments. As glacial ice retreated from the region, meltwater formed lakes in front of the ice margin. This region is covered by lake sediments, the most recent being from Lake Iroquois (a larger predecessor to Lake Ontario) and from Lake Tonawanda (an elongate lake which occupied an east-west valley and drained north into Lake Iroquois). The sediments consist of blanket sands and beach ridges which are occasionally underlain by lacustrine silts and clays (indicating quiet, deeper water deposition). Granular deposits in this region frequently act as shallow aquifers, whereas lacustrine clays, as well as tills, often inhibit groundwater movement. However, fine-grained, water-lain sediments, such as silts and clays, frequently contain horizontal laminations and sand seams. These internal features facilitate lateral groundwater movement through otherwise low permeability materials.

Site Geology

?

No boring logs are available from the site, although 10 monitoring wells were installed in 1981. Based on USGS topographic maps, NYS Museum and Science Service Bedrock Geology Maps, NYS Geological Association (1982 & 1966) and nearby off-site borings, the following site geology interpretation can be made: Bedrock consists of Lockport dolomite and is found at depths between 10 feet and 12 feet. This is overlain by a clayey silt till. Above the till, a layered silt/clay lacustrine deposit is occasionally found which is then overlain by a blanket of sandy silt.

Site Hydrology

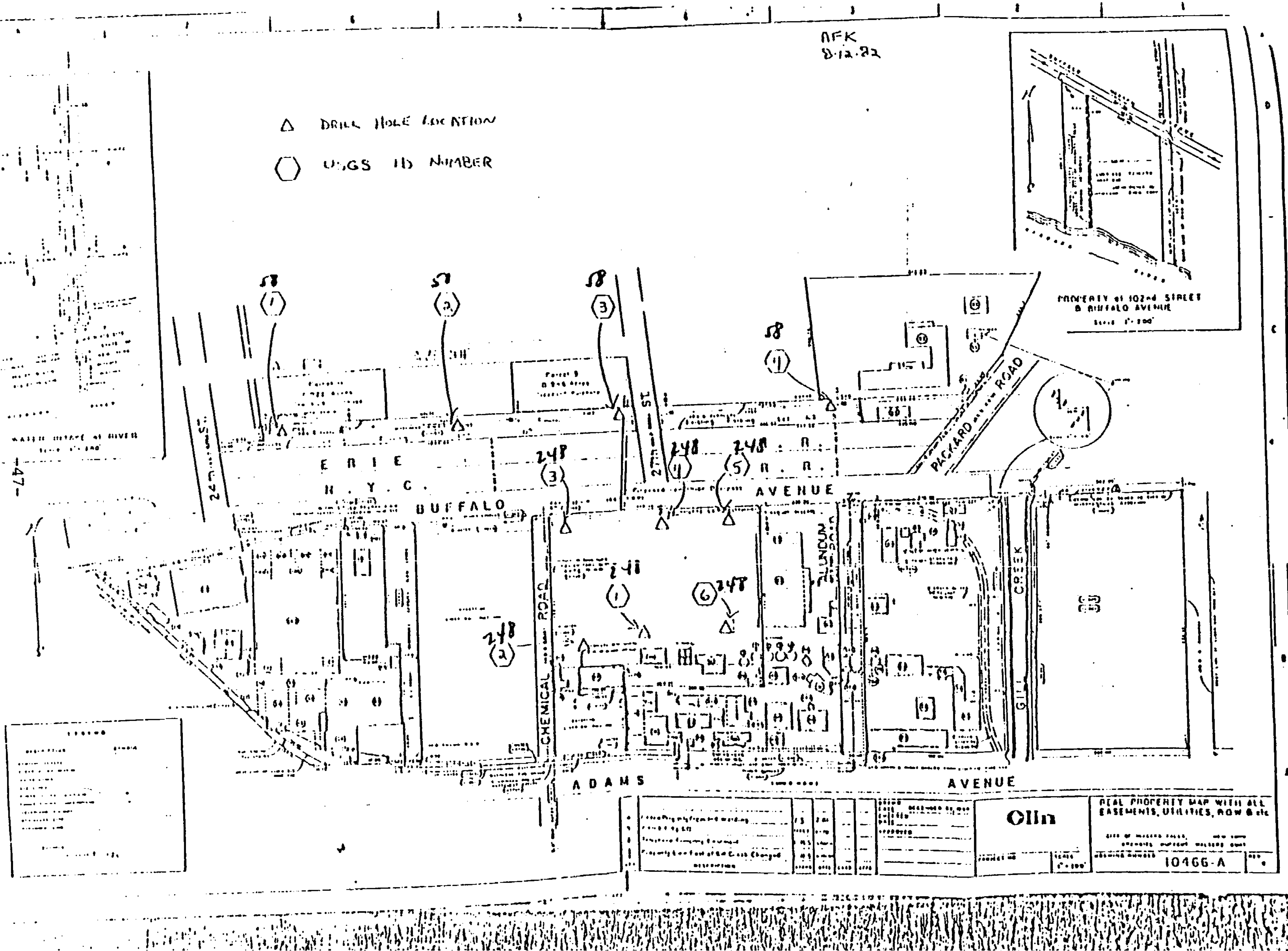
This discussion of site hydrology is based on interpretations made by Niagara County DOH.

Although the silts are apparently low permeability materials, they comprise a shallow groundwater aquifer. A deep bedrock aquifer exists in the dolomite; water table levels are given as 17 to 34 feet. Flow directions have not been evaluated.

Sampling and Analysis

Six soil borings were made at the Olin Site as part of the joint NYSDEC/USGS/USEPA Niagara River study (Cummings, 1983). The locations of these borings are shown in Figure V-1. Analyses of samples taken from the borings are summarized in Table V-1. As shown, the principal contaminants were found to be mercury (2.8-4 ug/g), phenol (0.76-0.85 ug/g), and BHC (0.1-94 ug/kg). Data from the pond site is included since Olin indicated that although this site was listed separately by the NYSDEC, it is immediately adjacent to the plant site and may overlap since subsequent excavations and paving have made the exact location of these sites difficult to determine (Olin Summary Report, 1983). Figure V-2 shows the approximate location of the site.

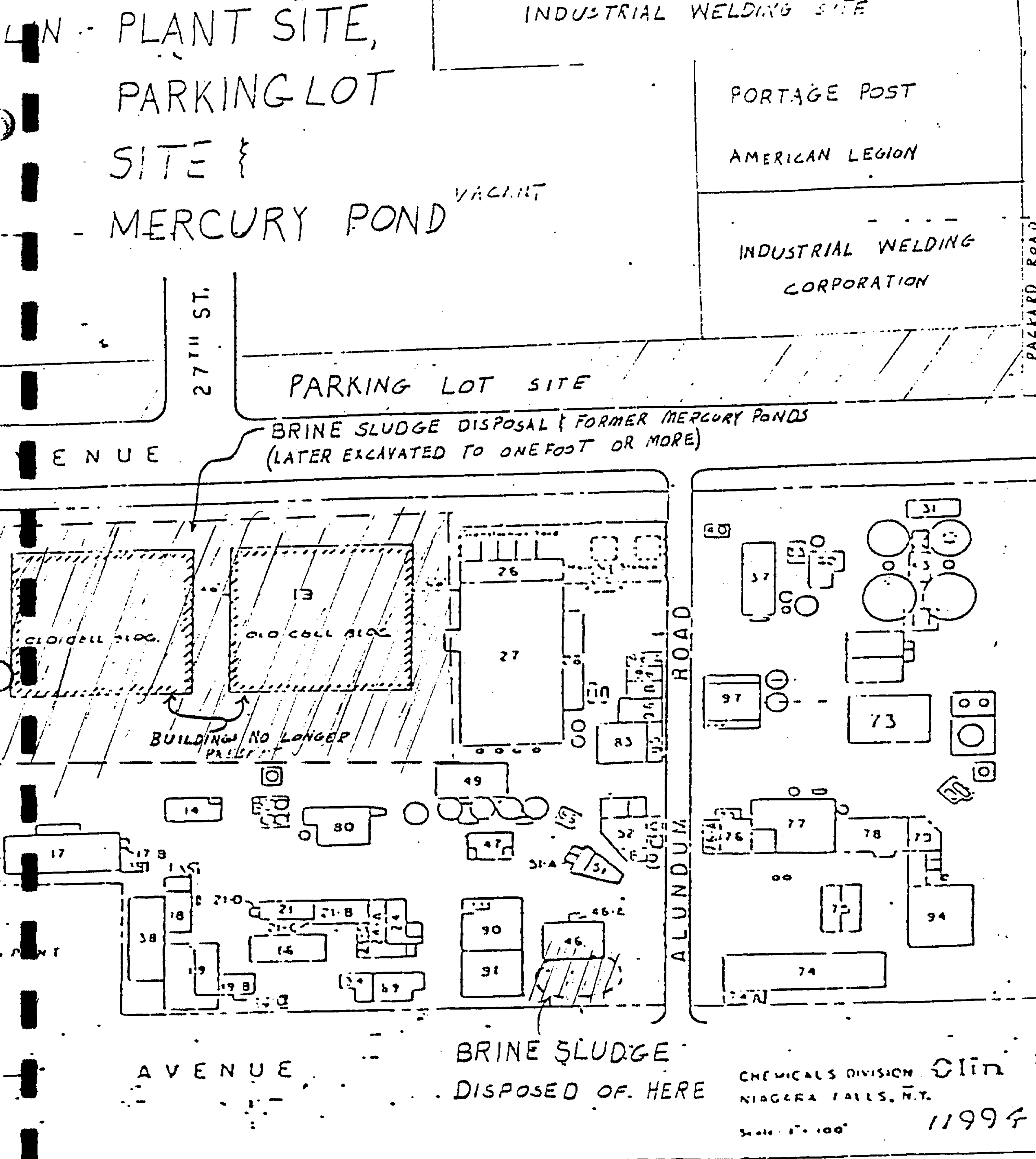
F[redacted]E V[redacted]ore[redacted]le [redacted]tio[redacted]Oli[redacted]rpo[redacted]on [redacted]mma[redacted]epo[redacted]198[redacted]



OLIN CORPORATION
DATA SUMMARY
JOINT NYSDEC/USGS/USEPA NIAGARA RIVER - GROUNDWATER STUDY
ANALYSIS OF USGS BORING SAMPLES PERFORMED BY RECRA RESEARCH, INC.

SAMPLE IDENTIFICATION (DATE)

arameter	Units of Measure	Building 13 USGS Site No. 248 Sample No. 6 2J10105 (8/9/82)	Building 13 USGS Site No. 248 Sample No. 1 2J10112A -(8/9/82)	Near Bldg. 13 USGS Site No. 248 Sample No. 2 2J10107 (8/9/82)	Pond USGS Site No. 248 Sample No. 5 2J10108 (8/9/82)	Pond USGS Site No. 248 Sample No. 4 2J10109 (8/9/82)	Near Pond USGS Site No. 248 Sample No. 3 2J10106 (8/9/82)
ASE/NEUTRALS							
cenaphthene	μg/g dry	--	--	< 2	--	< 2	--
cenaphthylene	μg/g dry	--	--	< 2	--	--	--
nthracene	μg/g dry	--	--	< 2	--	< 2	--
enzo(a)anthracene	μg/g dry	< 2	< 2	2.9	--	3.1	--
enzo(a)pyrene	μg/g dry	< 2	2.2	< 2	--	5.9	--
enzo(b)fluoranthene	μg/g dry	< 2	< 2	2.0	--	4.2	--
enzo(g.h.i.)perylene	μg/g dry	< 5	< 5	< 5	--	< 5	--
ibenzo(a,h)anthracene	μg/g dry	--	< 5	--	--	6.9	--
luoranthene	μg/g dry	< 2	< 2	3.6	--	< 2	--
luorene	μg/g dry	--	--	< 2	--	< 2	--
exachlorobenzene	μg/g dry	< 2	< 2	< 2	--	< 2	--
exachlorobutadiene	μg/g dry	< 2	< 2	--	--	--	--
ndeno(1,2,3-cd)pyrene	μg/g dry	< 5	< 2	< 5	--	< 2	--
aphthalene	μg/g dry	--	< 5	< 2	--	5.2	--
henanthrene	μg/g dry	< 2	< 2	3.5	--	< 2	--
yrene	μg/g dry	< 2	< 2	3.3	--	< 2	--
,2,4-trichlorobenzene	μg/g dry	--	< 2	--	--	< 2	--
OLATILES							
crolein	μg/kg dry	--	--	--	--	< 400	--
enzene	μg/kg dry	<10	--	< 10	--	< 10	--
romodichloromethane	μg/kg dry	--	--	--	--	< 10	--
arbon tetrachloride	μg/kg dry	--	--	--	--	74	--
hloroform	μg/kg dry	<10	< 10	< 10	--	94	--
thylbenzene	μg/kg dry	<10	--	< 10	--	--	--
ethylene chloride	μg/kg dry	32	29	120	--	11	11
etrachloroethylene	μg/kg dry	<10	< 10	< 10	< 10	29	--
oluene	μg/kg dry	56	< 10	11	--	< 10	--
richloroethylene	μg/kg dry	--	< 10	--	--	22	--
ESTICIDES							
-BHC	μg/g dry	0.024	--	< 0.01	--	0.017	--
-BHC	μg/g dry	0.056	0.041	--	< 0.01	0.038	--
-BHC	μg/g dry	0.012	0.040	< 0.01	< 0.01	0.041	--
-BHC	μg/g dry	--	0.025	--	--	0.029	--
,4'-DDD	μg/g dry	0.02	--	--	--	--	--
-4'-DDE	μg/g dry	0.02	--	--	--	--	--
-Endosulfan	μg/g dry	--	--	0.04	--	--	--
ron, Total	μg/g dry	9,100	13,000	16,000	11,000	16,000	6,800
henolics, Total Recoverable	μg/g dry	0.76	--	0.85	--	--	--
yanide, Total	μg/g dry	2.0	--	1.2	--	--	--
ercury, Total	μg/g dry	17	2.8	6.7	5.9	40	--
CRA EP Test - Mercury	μg/g l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5



Not to Scale

North ↑

7A

4/29/82

FIGURE V-2 Olin Corporation

Groundwater monitoring wells were installed along Gill Creek and Buffalo Avenue. A location map for these wells was not available at the time of this writing and this information may therefore not be appropriate for this site. Complete monitoring data for these wells (1980-1982) is contained in Appendix A. A summary of the average concentration and mass flow rate of contaminants is presented below:

Parameter	Concentration (ppm)	Mass (lbs/day)	Mass (lbs/yr)
Gill Creek Wells (9/81-10/82)			
Mercury	0.0056	0.00002	0.007
BHC	1.11	0.004	1.460
Chlorophenols	0.08	0.0003	0.110
Buffalo Avenue (9/81-10/82)			
Mercury	0.024	0.00006	0.022
BHC	0.16	0.0004	0.146
Chlorophenols	0.04	0.000096	0.035

SECTION VI

ASSESSMENT OF ADEQUACY OF DATA

Site: Olin Chemical

HRS Data Requirement	Comments on Data
Observed Release	
Ground Water	Data available, adequate for HRS evaluation.
Surface Water	No available data, field data collection recommended for Gill Creek.
Air	No available data, field data collection recommended.
Route Characteristics	
Ground Water	Data available, adequate for HRS evaluation.
Surface Water	Data available, adequate for HRS evaluation.
Air	Data available, adequate for HRS evaluation.
Containment	Information available, adequate for HRS evaluation.
Waste Characteristics	Information available, adequate for HRS evaluation.
Targets	Information available, adequate for HRS evaluation.
Observed Incident	Information available revealed no report of incident. No further investigation recommended.
Accessibility	Adequate information available.

SECTION VII

PHASE II WORK PLAN

Site: Olin Chemical

Objectives

The objectives of the Phase II activities are:

- To collect additional field data necessary to complete the HRS scoring.
- To perform a conceptual evaluation of remedial alternatives and estimate budgetary costs for the most likely alternative.
- To prepare a site investigation report.

The additional field data required to complete the HRS are defined as follows:

Surface Water - A surface water monitoring system consisting of 3 monitoring stations is recommended. The samples are to be analyzed for Hg, CN, chlorophenols, and BHC.

Air - An air monitoring survey with an OVA meter is recommended to check the air quality above the surface of the site.

TASK DESCRIPTION

The proposed Phase II tasks are described in Table VII-1.

COST ESTIMATE

The estimated manhours required for the Phase II project are presented in Table VII-2 and the estimated project costs by tasks are presented in Table VII-3. The cost for performing the Phase II project is $8,511.

TABLE VII-1
PHASE II WORK PLAN - TASK DESCRIPTION
Site: Olin Chemical

Tasks	Description of Task
TASK	
II-A Update Work Plan	Review the information in the Phase I report, conduct a site visit, and revise the Phase II work plan.
II-B Conduct Geophysical studies	No further studies necessary.
II-C Conduct Boring/Install Install Monitoring Wells	No further installation of monitoring wells necessary.
II-D Construct Test Pits/ Auger Holes	No further construction of test pits/auger holes necessary.
II-E Perform Sampling and Analysis	
Soil samples from borings	No further sampling necessary.
Soil samples from surface soils	No further sampling necessary.
Soil samples from test pits and auger holes	No further sampling necessary.
Sediment samples from surface water	No further sampling necessary.
Ground-water samples	No further sampling necessary.
Surface water samples	Analyze samples for Hg, CN, chlorophenols, and BHC.
Air samples	Using the OVA, determine the presence of organics.
Waste samples	No further sampling necessary.
II-F Calculate Final HRS	
II-G Conduct Site Assessment	Prepare final report containing Phase I report, additional field data, final HRS and HRS documentation records, and site assessments. The site assessment will consist of a conceptual evaluation of alternatives and a preliminary cost estimate of the most probable alternative.
II-H Project Management	Project coordination, administration and reporting.

TABLE VII-2
PERSONNEL RESOURCES BY TASK
PHASE II HRS SITE INVESTIGATION (SITE: OLIN CHEMICAL)

TASK DESCRIPTION	TEAM MEMBERS, MANHOURS													
	PIC	TRB	PM	DPM	PCM	QAM	HSM	FTL	FT	RAAL	RAAT	SS	TOTAL HOURS	TOTAL $
II-A UPDATE WORK PLAN	1		4	1		1	1	6		6		8	28	469
II-B CONDUCT GEOPHYSICAL STUDIES													0	0
II-C CONDUCT BORING/INSTALL MONITORING WELLS													0	0
II-D CONSTRUCT TEST PITS/AUGER HOLES													0	0
II-E PERFORM SAMPLING AND ANALYSIS														
SOIL SAMPLES FROM BORINGS													0	0
SOIL SAMPLES FROM SURFACE SOILS													0	0
SOIL SAMPLES FROM TEST PITS AND AUGER HOLES													0	0
SEDIMENT SAMPLES FROM SURFCE WATER													0	0
GROUND-WATER SAMPLES													0	0
SURFACE WATER SAMPLES			1					2	12			2	17	191.18
AIR SAMPLES								1	8			2	11	109.56
WASTE SAMPLES													0	0
II-F CALCULATE FINAL HRS			2	2				2	6			8	20	262.7
II-G CONDUCT SITE ASSESSMENT	1	2	4	2				4	8	6	24	32	83	1029.44
II-H PROJECT MANAGEMENT	2		6	2		4	4					8	26	442.9
TOTALS	4	2	17	7	0	5	5	15	34	12	24	60	185	2504.78

TABLE VII-3
COST ESTIMATE BREAKDOWN BY TASK
PHASE II HRS SITE INVESTIGATION (SITE: OLIN CHEMICAL)

TASK DESCRIPTION	DIRECT LABOR HOURS	DIRECT LABOR COST	OTHER DIRECT COSTS (ODC), $ LAB ANALYSIS	TRAVEL AND SUBSISTANCE	SUPPLIES	EQUIP. CHARGES	SUBCON-TRACTORS	MISC.	SUBTOTAL ODC	TOTAL ($)
II-A UPDATE WORK PLAN	28	469		100	50	50		25	225	694
II-B CONDUCT GEOPHYSICAL STUDIES									0	0
II-C CONDUCT BORING/INSTALL MONITORING WELLS									0	0
II-D CONSTRUCT TEST PITS/AUGER HOLES									0	0
II-E PERFORM SAMPLING AND ANALYSIS										
SOIL SAMPLES FROM BORINGS									0	0
SOIL SAMPLES FROM SURFACE SOILS									0	0
SOIL SAMPLES FROM TEST PITS AND AUGER HOLES									0	0
SEDIMENT SAMPLES FROM SURFACE WATER									0	0
GROUND-WATER SAMPLES									0	0
SURFACE WATER SAMPLES	17	191.18	339	85	50			15	489	680.18
AIR SAMPLES	11	109.56		85	25	15		5	130	239.56
WASTE SAMPLES									0	0
II-F CALCULATE FINAL HRS	20	262.7			50	50		25	125	387.7
II-G CONDUCT SITE ASSESSMENT	83	1029.44			100	200		75	375	1404.44
II-H PROJECT MANAGEMENT	26	442.9		150	150	50		50	400	842.9
TOTALS	185	2504.78	339	420	425	365	0	195	1744	4248.78

OVERHEAD=	3631.93
SUBTOTAL=	7880.71
FEE=	630.45
TOTAL PROJECT COST=	8511.16

APPENDIX A

BIBLIOGRAPHY

APPENDIX A

Bibliography

Olin Corporation

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Cummings, David L. (9182), Letter (including borehole analyses) from Olin Chemicals Group, Charleston, TN, to Peter Buechi, NYSDEC, Region 9. December 10, 1982.

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NEW YORK STATE GEOLOGICAL ASSOCIATION
54th ANNUAL MEETING
October 8-10, 1982
Amherst, New York

GUIDEBOOK FOR FIELD TRIPS IN WESTERN NEW YORK, NORTHERN PENNSYLVANIA AND ADJACENT, SOUTHERN ONTARIO

Edward J. Buehler
and
Parker E. Calkin
Editors

Department of Geological Sciences
State University of New York at Buffalo

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April 29 - May 1, 1966

GUIDEBOOK

Geology of Western New York

Edward J. Buehler, Editor

Department of Geological Sciences
State University of New York at Buffalo

Additional copies are available from the permanent secretary of the New York State Geological Association: Dr. Kurt E. Lowe, Department of Geology, City College of the City University of New York, 139th St. at Convent Ave., New York, N. Y.

Olin CHEMICALS GROUP
P.O. BOX 248, CHARLESTON, TN 37310, (615) 336-4000

December 10, 1982

Mr. Peter Buechi, P.E.
Senior Hydraulic Engineer
NYSDEC Region 9
600 Delaware Ave.
Buffalo, N.Y. 14202

Re: Olin Niagara Falls Plant
Monitoring Well Data Report

Dear Mr. Buechi:

The following information is being furnished in response to your request of October 20, 1982. This data updates the series of previously submitted reports, the last of which was submitted to you by Mr. Jack O'Grady on November 20, 1981.

Tables I through XI summarize all of the data that has been collected from the wells to date. Despite some fluctuations most likely attributable to sampling and analytical variability, the listed compound concentrations for each well remain fairly constant.

Monthly groundwater flow rates for the period 7/81-10/82 are presented in Tables XII and XIII. These tabulated results, obtained utilizing the methods outlined in the original report, represent the flow rates in the direction of Gill Creek and Buffalo Avenue, respectively. The results remain fairly constant throughout the year. It appears that the flow rate toward Gill Creek has decreased by approximately 20 precent as compared to previously submitted flows.

An analysis of the data collected from the monitoring wells along Gill Creek (No. 1,2,3,5,6, and 10) for the period 9/81 to 10/82 provided the following results:

Parameter	Concentration (mg/l)	Mass (lbs/day)	Mass (lbs/yr)
Chlorophenols	0.08	0.0003	0.110
BHC	1.11	0.004	1.460
Mercury	0.0056	0.00002	0.007

A similar analysis of the wells along Buffalo Avenue (No. 1 and 4) over the same time period yields the following:

Parameter	Concentration (mg/l)	Mass (lbs/day)	Mass (lbs/yr)
Chlorophenols	0.04	0.000096	0.035
BHC	0.16	0.0004	0.146
Mercury	0.024	0.00006	0.022

As a result of the small variation observed in the results over the last 24 months and the insignificant amount of mass migrating off the plant site, Olin plans to reduce its monitoring of these wells from quarterly to annually.

As you know, Olin has pursued this problem since its discovery. An outside consulting engineer (Harza) was engaged to provide the initial evaluation of "bank seepage" and the basis for its continued observation and evaluation. We believe the program has provided the information and data to show that the seepage presents a de minimus situation and that our decision to reduce the monitoring frequency is justified. The annual monitoring will provide a mechanism for continued observation of the situation.

We wish to continue to cooperate with the NYSDEC on all justifiable environmental concerns and we look forward to your support of our decision.

Sincerely,

OLIN CORPORATION

David L. Cummings
Senior Environmental Specialist

VOL/vrp

cc: J. Spagnoli
Y. Eck

LE 1

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-1

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	< 2	< 5	< 5	< 50	< 25	IS	< 25	< 30
3-chlorophenol 4-chlorophenol	< 2	< 5	< 5	< 50	< 25	IS	< 25	< 30
2,3-dichlorophenol 2,4-dichlorophenol 2,5-dichlorophenol	< 2	< 5	< 5	< 50	< 25	IS	< 25	< 30
2,6-dichlorophenol	< 2	< 5	< 5	< 50	< 25	IS	< 25	< 30
3,4-dichlorophenol	< 2	< 5	< 5	< 50	< 25	IS	< 25	< 30
3,5-dichlorophenol	< 2	< 5	< 5	< 50	< 25	IS	< 25	< 30
2,4,5-trichlorophenol 2,3,4-trichlorophenol	< 5	< 5	< 5	< 50	< 25	IS	< 25	< 30
2,3,5-trichlorophenol 2,3,6-trichlorophenol	< 5	< 5	< 5	< 50	< 25	IS	< 25	< 30
2,4,6-trichlorophenol	< 5	< 5	< 5	< 50	< 25	IS	< 25	< 30
3,4,5-trichlorophenol	< 5	< 5	< 5	< 50	< 25	IS	< 26	< 30
2,3,4,5-tetrachlorophenol	<10	<10	<10	< 50	< 25	IS	< 25	< 30
2,3,4,6-tetrachlorophenol	<10	<10	<10	< 50	< 25	IS	< 25	< 30
2,3,5,6-tetrachlorophenol	36	<10	<10	< 50	< 25	IS	< 25	< 30
Pentachlorophenol	<10	<10	<10	< 50	< 25	IS	< 25	< 30
α-BHC	5.5	2.7	0.56	19	55	IS	0.52	4.8
β-BHC	1.1	0.45	0.35	1.9	2.7	IS	0.22	1.9
γ-BHC	2.9	2.8	0.31	26	54	IS	0.52	6.0
δ-BHC	2.3	1.3	0.23	4.3	9.2	IS	0.24	6.1
Halogenated Organic Scan	24	5.7	2.2	81	150	IS	2.0	17
Volatile Halogenated Organic Scan	30	110	280	NA		IS	7.1	310

* Values in ppm.
IS - Insufficient Sample
NA - Not analyzed.

VDL/vrp
12/1/82

TABLE II

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-2

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
3-chlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
4-chlorophenol								
2,3-dichlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
2,4-dichlorophenol								
2,5-dichlorophenol								
2,6-dichlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
3,4-dichlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
3,5-dichlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
2,4,5-trichlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
2,3,4-trichlorophenol								
2,3,5-trichlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
2,3,6-trichlorophenol								
2,4,6-trichlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
3,4,5-trichlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
2,3,4,5-tetrachlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
2,3,4,6-tetrachlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
2,3,5,6-tetrachlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
Pentachlorophenol	DRY	IS	IS	IS	IS	IS	IS	IS
α-BHC	DRY	IS	IS	IS	IS	IS	IS	IS
β-BHC	DRY	IS	IS	IS	IS	IS	IS	IS
γ-BHC	DRY	IS	IS	IS	IS	IS	IS	IS
δ-BHC	DRY	IS	IS	IS	IS	IS	IS	IS
Halogenated Organic Scan	DRY	IS	IS	IS	IS	IS	IS	IS
Volatile Halogenated Organic Scan	DRY	I S	IS	IS	IS	IS	IS	IS

* Values in ppb
IS - Insufficient Sample
NA - Not analyzed.

VDL/vrp
12/1/82

TABLE III

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-3

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	32	18	100	170	< 25	< 25	< 50	< 30
3-chlorophenol	40	15	98	34	< 25	< 25	< 50	95
4-chlorophenol								
2,3-dichlorophenol	20	9	83	< 25	< 25	< 25	< 50	< 30
2,4-dichlorophenol								
2,5-dichlorophenol								
2,6-dichlorophenol	< 2	< 5	5	< 25	< 25	< 25	< 50	< 30
3,4-dichlorophenol	12	5	35	< 25	< 25	< 25	< 50	< 30
3,5-dichlorophenol	2	5	< 5	< 25	< 25	< 25	< 50	< 30
2,4,5-trichlorophenol	30	19	140	54	< 25	< 25	< 50	51
2,3,4-trichlorophenol								
2,3,5-trichlorophenol	10	8	48	28	< 25	< 25	< 50	< 30
2,3,6-trichlorophenol								
2,4,6-trichlorophenol	< 5	< 5	6	< 25	< 25	< 25	< 50	< 30
3,4,5-trichlorophenol	< 5	< 5	< 5	< 25	< 25	< 25	< 50	< 30
2,3,4,5-tetrachlorophenol	< 10	<10	<10	< 25	< 25	< 25	< 50	< 30
2,3,4,6-tetrachlorophenol	< 10	<10	<10	< 25	< 25	< 25	< 50	< 30
2,3,5,6-tetrachlorophenol	< 10	<10	<10	< 25	< 25	< 25	< 50	< 30
Pentachlorophenol	< 10	<10	<10	< 25	< 25	< 25	< 50	< 30
α-BHC	510	540	520	360	1,100	750	3,000	3,500
β-BHC	96	91	100	74	170	86	33	100
γ-BHC	980	900	870	590	1,200	700	550	4,200
δ-BHC	850	900	860	340	470	410	380	3,300
Halogenated Organics Scan	3,100	1,400	3,200	2,400	4,100	2,900	1,600	14,000
Volatile Halogenated Organic Scan	3,000	2,000	4,800	4,200	4,300	3,900	2,700	9,400

* Values in ppb.
IS - Insufficient Sample
NA - Not analyzed.

VDL/vrp
12/1/82

TABLE IV

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-4

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
3-chlorophenol 4-chlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
2,3-dichlorophenol 2,4-dichlorophenol 2,5-dichlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
2,6-dichlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
3,4-dichlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
3,5-dichlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
2,4,5-trichlorophenol 2,3,4-trichlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
2,3,5-trichlorophenol 2,3,6-trichlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
2,4,6-trichlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
3,4,5-trichlorophenol	NA	< 5	< 5	< 50	**	IS	IS	IS
2,3,4,5-tetrachlorophenol	NA	< 10	< 10	< 50	**	IS	IS	IS
2,3,4,6-tetrachlorophenol	NA	< 10	< 10	< 50	**	IS	IS	IS
2,3,5,6-tetrachlorophenol	NA	< 10	< 10	< 50	**	IS	IS	IS
Pentachlorophenol	NA	< 10	< 10	< 50	**	IS	IS	IS
α-BHC	NA	4.3	1.5	110	**	IS	IS	IS
β-BHC	NA	0.97	0.69	7.7	**	IS	IS	IS
γ-BHC	NA	4.6	0.69	110	**	IS	IS	IS
δ-BHC	NA	1.9	0.55	43	**	IS	IS	IS
Halogenated Organic Scan	NA	9.3	6.6	610	**	IS	IS	IS
Volatile Halogenated Organic Scan	NA	36	63	NA	**	IS	IS	IS

* Values in ppb
IS - Insufficient Sample
NA - Not analyzed.
** - A vehicle backed over the sampling port of well BH-4 making sample collection impossible for this period.

VDL/vrp
12/1/82

TABLE V

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-5

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	< 2	< 5	IS	< 50	< 50	< 25	IS	< 50
3-chlorophenol 4-chlorophenol	< 2	< 5	IS	< 50	< 50	< 25	IS	< 50
2,3-dichlorophenol 2,4-dichlorophenol 2,5-dichlorophenol	< 2	< 5	IS	< 50	< 50	< 25	IS	< 50
2,6-dichlorophenol	< 2	< 5	IS	< 50	< 50	< 25	IS	< 50
3,4-dichlorophenol	< 2	< 5	IS	< 50	< 50	< 25	IS	< 50
3,5-dichlorophenol	< 2	< 5	IS	< 50	< 50	< 25	IS	< 50
2,4,5-trichlorophenol 2,3,4-trichlorophenol	< 6	< 5	IS	< 50	< 50	< 25	IS	< 50
2,3,5-trichlorophenol 2,3,6-trichlorophenol	< 5	< 5	IS	< 50	< 50	< 25	IS	< 50
2,4,6-trichlorophenol	< 5	< 5	IS	< 50	< 50	< 25	IS	< 50
3,4,5-trichlorophenol	< 5	< 5	IS	< 50	< 50	< 25	IS	< 50
2,3,4,5-tetrachlorophenol	<10	<10	IS	< 50	< 50	< 25	IS	< 50
2,3,4,6-tetrachlorophenol	<10	<10	IS	< 50	< 50	< 25	IS	< 60
2,3,5,6-tetrachlorophenol	<10	<10	IS	< 50	< 50	< 25	IS	< 50
Pentachlorophenol	<10	<10	IS	< 50	< 50	< 25	IS	< 50
α-BHC	IS	24	1.1	1.7	39	46	196	3.4
β-BHC	IS	2.1	0.30	0.38	1.5	1.2	6.7	0.60
γ-BHC	IS	0.56	0.80	1.7	37	35	290	4.2
δ-BHC	IS	2.1	1	0.87	4.9	6.1	87	4.9
Halogenated Organic Scan	IS	27	4	8.4	92	130	810	10
Volatile Halogenated Organic Scan	81	13	130	NA	8.7	18	21	74

* Values in ppb.
IS - Insufficient Sample
NA - Not analyzed.

VDL/vrp
12/1/82

TABLE VI

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-6

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
3-chlorophenol 4-chlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
2,3-dichlorophenol 2,4-dichlorophenol 2,5-dichlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
2,6-dichlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
3,4-dichlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
3,5-dichlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
2,4,5-trichlorophenol 2,3,4-trichlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
2,3,5-trichlorophenol 2,3,6-trichlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
2,4,6-trichlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
3,4,5-trichlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
2,3,4,5-tetrachlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
2,3,4,6-tetrachlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
2,3,5,6-tetrachlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
Pentachlorophenol	DRY	IS	DRY	IS	< 100	< 25	IS	IS
α-BHC	DRY	IS	DRY	IS	51	9.1	750	IS
β-BHC	DRY	IS	DRY	IS	2.2	0.55	60	IS
γ-BHC	DRY	IS	DRY	IS	34	7.4	1,500	IS
δ-BHC	DRY	IS	DRY	IS	4.4	1.4	700	IS
Halogenated Organic Scan	DRY	IS	DRY	IS	100	25	4,000	IS
Volatile Halogenated Organic Scan	DRY	IS	DRY	IS	3.4	45	100	IS

* Values in ppb.
IS - Insufficient Sample
NA - Not analyzed.

VDL/vrp
12/1/82

TABLE VII

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-7

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	< 2	< 5	6	< 25	< 25	< 25	< 25	< 25
3-chlorophenol 4-chlorophenol	200	130	550	200	200	220	570	< 25
2,3-dichlorophenol 2,4-dichlorophenol 2,5-dichlorophenol	40	46	110	58	56	71	< 25	< 25
2,6-dichlorophenol	< 2	< 5	< 5	< 25	< 25	< 25	97	< 25
3,4-dichlorophenol	530	300	550	690	230	290	1,500	97
3,5-dichlorophenol	28	10	40	< 25	< 25	12	150	< 25
2,4,5-trichlorophenol 2,3,4-trichlorophenol	1,500	1,200	2,800	6,900	4,800	4,800	9,740	2,700
2,3,5-trichlorophenol 2,3,6-trichlorophenol	< 5	90	250	190	100	170	689	86
2,4,6-trichlorophenol	7	< 5	15	< 25	< 25	< 25	< 25	< 25
3,4,5-trichlorophenol	< 5	< 5	< 5	< 25	< 25	< 25	< 25	< 25
2,3,4,5-tetrachlorophenol	< 10	38	< 10	< 25	33	25		44
2,3,4,6-tetrachlorophenol	1,400	430	1,100	1,200	840	1,400		620
2,3,5,6-tetrachlorophenol	140	60	130	64	56	430	3,500	< 25
Pentachlorophenol	23	16	49	< 25	47	78	270	< 25
α-BHC	140	33	IS	150	330	290	10	170
β-BHC	18	3.1	IS	20	28	18	1.8	19
γ-BHC	7.7	33	IS	18	6.2	27	11	4.3
δ-BHC	17	17	IS	11	11	14	6.3	29
Halogenated Organic Scan	580	90	IS	670	730	710	88	350
Volatile Halogenated Organic Scan	1,200	1,000	1,800	400	1,100	910	870	1,700

* Values in ppb.
IS - Insufficient Sample
NA - Not analyzed.

VIH /vrp
12/1/82

TABLE VIII

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-8

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	< 2	< 5	< 5	< 50	<100	< 25	< 50	< 50
3-chlorophenol 4-chlorophenol	25	13	36	< 50	<100	< 25	95	76
2,3-dichlorophenol 2,4-dichlorophenol 2,5-dichlorophenol	20	10	28	< 50	<100	< 25	< 120	< 50
2,6-dichlorophenol	< 2	< 5	< 5	< 50	<100	< 25	< 50	< 50
3,4-dichlorophenol	250	130	29	420	<100	74	670	< 50
3,5-dichlorophenol	23	8	160	< 50	<100	< 25	< 50	< 50
2,4,5-trichlorophenol 2,3,4-trichlorophenol	1,500	1,100	2,400	4,100	1,800	1,800	7,300	50
2,3,5-trichlorophenol 2,3,6-trichlorophenol	75	34	57	50	< 100	56	< 270	64
2,4,6-trichlorophenol	6	< 5	< 5	< 50	< 100	< 25	< 50	100
3,4,5-trichlorophenol	< 5	< 5	< 5	< 50	< 100	< 25	< 50	< 50
2,3,4,5-tetrachlorophenol	< 10	< 10	17	< 50	< 100	< 25		< 50
2,3,4,6-tetrachlorophenol	1,100	220	310	630	310	470		65
2,3,5,6-tetrachlorophenol	250	26	91	82	< 100	130	1,600	< 50
Pentachlorophenol	20	< 10	31	< 50	< 100	< 25	90	< 50
α-BHC	16	18	11	63	200	66	8.2	4.5
β-BHC	5.5	5.6	4.9	13	10	4.0	1.4	1.2
γ-BHC	3.2	1.1	0.81	82	190	53	8.5	3.2
δ-BHC	3.2	3.6	1.2	25	30	13	4.6	4.5
Halogenated Organic Scan	140	50	75	110	490	210	64	60
Volatile Halogenated Organic Scan	280	1,200	280	NA	19	84	67	140

* Values in ppb.
IS - Insufficient Sample
NA - Not analyzed.

VDL/vrp
12/1/82

TABLE IX

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-9

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	< 2	< 5	< 5	< 50	< 50	IS	30	< 30
3-chlorophenol 4-chlorophenol	< 2	< 5	< 5	< 50	< 50	IS	≤ 25	< 30
2,3-dichlorophenol 2,4-dichlorophenol 2,5-dichlorophenol	≤ 2	< 5	≤ 5	< 50	< 50	IS	≤ 25	≤ 30
2,6-dichlorophenol	< 2	< 5	< 5	< 50	< 50	IS	< 25	< 30
3,4-dichlorophenol	< 2	≤ 5	< 5	< 50	< 50	IS	≤ 25	≤ 30
3,5-dichlorophenol	< 2	< 5	< 5	< 50	< 50	IS	< 25	< 30
2,4,5-trichlorophenol 2,3,4-trichlorophenol	9	43	6	< 50	≤ 50	IS	≤ 25	≤ 30
2,3,5-trichlorophenol 2,3,6-trichlorophenol	< 5	≤ 5	< 5	< 50	≤ 50	IS	≤ 25	≤ 30
2,4,6-trichlorophenol	< 5	< 5	< 5	< 50	≤ 50	IS	≤ 25	≤ 30
3,4,5-trichlorophenol	< 5	< 5	< 5	< 50	< 50	IS	< 25	< 30
2,3,4,5-tetrachlorophenol	<10	< 10	< 10	< 50	< 50	IS	< 25	< 30
2,3,4,6-tetrachlorophenol	<10	≤ 10	< 10	< 50	< 50	IS	< 25	< 30
2,3,5,6-tetrachlorophenol	49	≤ 10	< 10	< 50	< 50	IS	< 25	< 30
Pentachlorophenol	<10	< 10	< 10	< 50	< 50	IS	< 25	< 30
α-BHC	15	2.9	7.6	0.38	370	IS	0.20	60
β-BHC	3.3	0.97	1.5	2.2	25	IS	0.30	2.9
γ-BHC	25	2.2	10	0.15	390	IS	0.20	120
δ-BHC	18	1.5	6.3	0.15	82	IS	0.10	64
Halogenated Organic Scan	86	5.9	45	1.8	1,200	IS	2.0	340
Volatile Halogenated Organic Scan	190	410	390	NA	18	IS	87	250

* Values in ppb.
IS - Insufficient Sample
NA - Not analyzed.

VDL/vrp
12/1/82

TABLE X

OLIN-Niagara Falls
Bore Hole Sample Analysis*

BH-10

Sampling date(s)	12/17/80 12/18/80	3/31/81 4/01/81	6/18/81 6/19/81	9/17/81 9/18/81	12/09/81	3/25/82 3/26/82	7/01/82 7/02/82	10/01/82
2-chlorophenol	< 2	< 5	5	< 25	< 25	< 25	< 25	< 30
3-chlorophenol 4-chlorophenol	< 2	< 5	8	< 25	< 25	< 25	< 25	< 30
2,3-dichlorophenol 2,4-dichlorophenol 2,5-dichlorophenol	< 2	< 5	6	< 25	< 25	< 25	< 25	< 30
2,6-dichlorophenol	< 2	< 5	< 5	< 25	< 25	< 25	< 25	< 30
3,4-dichlorophenol	< 2	< 5	7	< 25	< 25	< 25	< 25	< 30
3,5-dichlorophenol	< 2	< 5	< 5	< 25	< 25	< 25	< 25	< 30
2,4,5-trichlorophenol 2,3,4-trichlorophenol	6	< 5	6	< 25	< 25	< 25	< 25	< 30
2,3,5-trichlorophenol 2,3,6-trichlorophenol	< 5	< 5	< 5	< 25	< 25	< 25	< 25	< 30
2,4,6-trichlorophenol	< 5	< 5	< 5	< 25	< 25	< 25	< 25	< 30
3,4,5-trichlorophenol	< 5	< 5	< 5	< 25	< 25	< 25	< 25	< 30
2,3,4,5-tetrachlorophenol	< 10	< 10	< 10	< 25	< 25	< 25	< 25	< 30
2,3,4,6-tetrachlorophenol	< 10	< 10	< 10	< 25	< 25	< 25	< 25	< 30
2,3,5,6-tetrachlorophenol	< 10	< 10	< 10	< 25	< 25	< 25	< 25	< 30
Pentachlorophenol	< 10	< 10	< 10	< 25	< 25	< 25	< 25	< 30
α-BHC	1.6	0.81	0.33	10	3.1	1.7	34	0.08
β-BHC	0.33	0.01	0.14	1.5	0.31	0.13	3.4	0.04
γ-BHC	2.6	1.0	0.29	14	1.5	1.6	59	0.12
δ-BHC	1.7	0.05	0.37	2.3	0.38	0.48	30	0.13
Halogenated Organic Scan	8.4	2.8	1.6	50	4.0	89	190	0.50
Volatile Halogenated Organic Scan	11	270	140	280	25	84	53	58

* Values in ppb.
IS - Insufficient Sample
NA - Not analyzed.

VDL/vrp
12/1/82

TABLE XI
OLIN-NIAGARA FALLS
BORE HOLE SAMPLE ANALYSIS FOR MERCURY (ppm)

	SAMPLING DATES				
Bore Hole Number	9/17-18/81	12/9-11/81	2/17/82	3/25/82	10/01/82
1	0.0023	0.0054	0.0038	IS	0.004
2	IS	0.0040	0.0018	0.0054	IS
3	0.0120	0.0215	0.0183	0.0095	0.006
4	0.0450	IS	IS	IS	IS
5	0.0022	0.0044	0.0026	0.0064	0.003
6	IS	0.0097	0.0078	0.0018	IS
7	0.2000	0.1300	0.0930	0.1600	0.077
8	0.0040	0.0076	0.0064	0.0100	0.006
9	0.0008	0.0041	0.0018	IS	0.005
10	0.0013	0.0037	0.0020	0.0014	0.003

Samples not collected during the 2nd quarter, 1982

TABLE XII
OLIN-NIAGARA FALLS
GROUNDWATER FLOW TOWARD GILL CREEK

MONTH	FLOW (gpd)
July 1981	483*
August 1981	450*
September 1981	463*
October 1981	438*
November 1981	482*
December 1981	473*
January 1982	No Data
February 1982	568*
March 1982	571*
April 1982	515*
May 1982	477
June 1982	487
July 1982	438
August 1982	464
September 1982	447
October 1982	458
Average	481

* Gill Creek elevation estimated

TABLE XIII
OLIN-NIAGARA FALLS
GROUNDWATER FLOW TOWARDS BUFFALO AVENUE

MONTH	FLOW (gpd)
July 1981	338
August 1981	316
September 1981	326
October 1981	310
November 1981	324
December 1981	319
January 1982	No Data
February 1982	316
March 1982	346
April 1982	332
May 1982	322
June 1982	322
July 1982	309
August 1982	315
September 1982	314
October 1982	311
Average	321

Several of the wells were damaged at various times and consequently, some elevati data used to make these calculations was estimated (Well 1 - February 1982; Well 4 February, March, June, October 1982).

Olin CHEMICALS GROUP
P.O. BOX 248, CHARLESTON, TN 37310, (615) 336-4000

May 19, 1983

Mr. John Kubarewicz, P.E.
Engineering Science, Inc.
10521 Rosehaven Street
Fairfax, Virginia 22030

Re: Preliminary Field Investigation
NYS Superfund
Plant Site - Site Code - 932051-b
Pond - Site Code - 932038

Dear Mr. Kubarewicz:

The information enclosed represents essentially all of the available information regarding the two sites noted above. We believe that the NYSDEC has listed only the Plant Site - 932051-b under the NYS Superfund program, however, the two sites are immediately adjacent to one another and may even overlap. Any consideration of the "Plant Site" practically must also include the "Pond".

Since the available data includes six (6) borings on the sites with associated soil analyses, we do not believe that further data will be needed to fully address the sites. Borings were made to refusal and had depths as follows: 1) 3.5 ft.; 2) 4 ft.; 3) 2 ft.; 4) 2 ft.; 5) 2.5 ft.; 6) 2 ft.. No groundwater was found in the boreholes.

We have attached a "Summary Report - Plant Site and Pond Site" which includes the analytical data from the soil samples, our review and comments on the significance of the data, and past correspondence regarding the sites. The report has been taken from a more comprehensive summary report, on three (3) Olin sites which was submitted to the NYSDEC on March 2, 1983. We have omitted the analytical data related to the third site and have occasionally rewritten a paragraph to redirect it to the Plant Site and/or Pond Site only. Some of the attached correspondence has been condensed to omit data on other sites or other matters.

The following information is contained within the enclosed materials, however, we have repeated it here to make it more readily available.

a) All generators of wastes deposited at the site - Olin.

b) Types and quantities of such wastes - Type: brine muds; Quantity: see below.

c) Period of time site was operated - Plant Site - no actual operation as such. Brine mud depositions reported on 9/12/57 (156 yd^3), 10/10/57 (90 yd^3), 6/9/58 (12 yd^3), and 7/14/58 (6 yd^3). The Pond Site was used for about 2-3 months around 1970.

d) Description of site operational practices - Plant Site - fill low areas or potholes. Pond Site - The pond was used as a holding basin for cell room wastewaters and compressor seal water. There was no deposition of solid wastes as such.

e) Description of testing, monitoring, or remedial action taken or planned - see attached.

f) Description of any known health or environmental problems at the site - no health or environmental problems present.

g) Any other information which may assist NYSDEC or its consultant evaluate the public health or environmental significance of the site - see enclosed material.

Please advise us if you believe a field inspection is necessary as we must coordinate it with several Olin representatives.

Sincerely,

OLIN CORPORATION

David Cummings
David L. Cummings
Senior Environmental Specialist

DLC/vrp
Attachments

cc: J. Starrett - ES
J. Spagnoli, Region 9
P. Buechi, Region 9
C. Goddard, Albany

SUMMARY REPORT

OLIN CORPORATION
NIAGARA FALLS, NEW YORK

REPORTED DISPOSAL SITES

PLANT SITE
POND SITE

INTRODUCTION

Olin Corporation has carried out a thorough investigation of past waste disposal sites. The investigations were initiated at the time of the Interagency Task Force Report development and continue to date. All sites which potentially received hazardous wastes were reported to the various agencies without regard to size, type, or amount of waste. The two (2) subject sites (plant site and pond) are among those minor sites which were not believed to present any hazard to the public or environment. We have continued to research the sites since 1978 and have provided additional information to the DEC on several occasions.

Two (2) of the sites did appear in "Interagency Task Force on Hazardous Wastes - Draft Report" (March 1979) with some inaccuracies. All three sites appeared in "Hazardous Waste Disposal Sites in New York State" (June 1980) again with some inaccuracies. The 1980 report applied site codes as follows:

Olin Corporation

Site Code 932051-b	Plant Site
Site Code 932038	Pond

The most recent and hopefully final phase of the investigations was participation in the joint USGS-USEPA-NYSDEC Niagara River/Groundwater Study. Split samples from ten (10) borings collected in the study were analyzed by RECRA Research, Inc. and results are provided in this "Summary Report". The analytical data has been submitted to the DEC previously, however, time constraints did not allow any evaluation of the data. The analytical data has been reviewed and evaluated in this report and we have enclosed a complete appendix of our records of information, submissions, DEC field inspections, and analytical data.

OLIN CORPORATION
REVIEW OF ANALYTICAL DATA - NIAGARA FALLS PLANT
JOINT NYSDEC/USGS/USEPA NIAGARA RIVER - GROUNDWATER STUDY

Attached Table I provides a summary of all positive identifications of priority pollutants as determined by gas chromatography/mass spectrometry (gc/ms). Table II provides a summary of the inorganic analyses including priority pollutants and Resource Conservation and Recovery Act (RCRA) toxic extraction procedure (EP) results for mercury. This report will review the analytical data in two (2) ways - 1) by type of compound and 2) by the particular boring sample or site.

Polynuclear Aromatic Hydrocarbons (PAH)

PAH compounds (or alternatively, Polycyclic Organic Compounds, POC) are ubiquitous in the environment and are expected to be higher than typical national levels in Western New York. PAH's have many sources, however, the major one is as a result of the pyrolysis of organic fuels. Background material on the formation, distribution and quantities of PAH's from combustion are reported in various sources.[1,2,3,4]

> Incomplete combustion, which may occur naturally, inadvertently, or intentionally, is the major mechanism of POM formation and emission. POM's, however, are present in vegetation, fossil fuels, and other natural oils.[3]

The attached Tables III, IV, V and VI exhibit some of the sources and amounts of PAH's emitted and distributed through airborne pathways. Western New York has a particular PAH load because of the large population base with its required energy production, the heavy industrial base and its associated energy production, the history of steel manufacturing (sintering plants), petroleum cracking and coke production. The City of Niagara Falls bears an even greater load due to its long history of abrasives and carbon electrode manufacturing and its long standing practice of spreading flyash and/or bottom ash mixed with salt on city streets for ice control in the winter months. The abrasives and carbon electrode industries both use or have used coal tars and pitch which is ultimately fired in furnaces.[5,6] In addition, particulate matter from petroleum coke products is widely distributed. Asphalt batching plants, asphalt per se, roofing pitch and shingles are also sources of PAH's. The local industry, coupled with the heavy Western New York industry and power generation and the general anthropogenic sources throughout the world create a base or background of PAH's that are found nearly everywhere.

Acenaphthene -	Coal tar residue produced during coking of coal[2] Chief component of coal tar[7] Wood-fired stoves and fireplaces[1]
Acenaphthylene -	Emitted from petroleum and coal tar distillation[2] Wood-fired stoves and fireplaces[1]

Anthracene -	Produced during combustion and pyrolysis of fossil fuels; found in coal tar, pitch, asphalt, and cresote[2] Chief component of coal tar[7] Wood-fired stoves and fireplaces[1]
Benzo(a)anthracene-	Found in engine exhaust, cigarette smoke, coal tar pitch, and soot and smoke of industrial and domestic stacks[2]
Benzo(a)pyrene -	Found in coal tar, pitch, asphalt, and cresote and in pyrolysis products of combustion of fossil fuels[2] Coal-fired combustion product[4] Wood-fired stoves and fireplaces[1]
Benzofluoranthene-	Found in coal tar pitch, asphalt, cresote and in pyrolysis products from the combustion of fossil fuels[2] Wood-fired stoves and fireplaces[1]
Benzo(g,h,i)perylene -	Produced as a pyrolysis product during the combustion of fossil fuels; found in coal tar pitch, asphalt and cresote[2] Wood-fired stoves and fireplaces[1]
Dibenzo(a,h)anthracene -	Produced as a pyrolysis product during the combustion of fossil fuels; found in coal tar pitch, asphalt and cresote[2]
Fluoranthene -	Produced as a residue during pyrolysis and/or combustion of coal and pertroleum (fossil fuels). Also found in coal tar pitch, asphalt, cresote, and as a by-product during the carbonization of coal[2] Coal-fired combustion product[4] Wood-fired stoves and fireplaces[1]
Fluorene -	Pyrolysis product formed during combustion of fossil fuel, also found in coal tar, coal tar pitch, asphalt, cresote[2] Chief component of coal tar[7]
Indeno(1,2,3-cd)pyrene -	Pyrolysis product formed during the combustion of fossil fuels[2]
Naphthalene -	Derived from coal tar[2] Chief component of coal tar[7]
Phenanthrene -	Pyrolysis of fossil fuels occurring during combustion found in coal tar pitch, asphalt, and cresote[2] Chief component of coal tar[7] Wood-fired stoves and fireplaces[1]
Pyrene -	Formed during pyrolysis of fossil fuels Coal-fired combustion product[4] Wood-fired stoves and fireplaces[1]

There are some industrial uses for several of the pure PAH-type compounds, however, they are normally associated with the dyestuff industry and would not be typical of general Niagara Falls industry.

Over 80% (44/55) of the detections of PAH's are noted as ≤ detection limits. The limits are predominantly 2 parts per million (ppm), although the limits for benzo(g,h,i)perylene and indeno (1,2,3-cd) pyrene are noted as 5 ppm. Olin believes that a substantial portion of these ≤ detections are in fact "false positive" detections and that the compounds in question may not actually be present. We look forward to receiving the USGS analyses of these split samples for confirmation. The 11 detections above the limits of detection ranged from ≤2 ppm to 6.9 ppm.

Other Base/Neutrals - Chlorobenzenes

Chlorobenzenes are also quite common, particularly in industrial areas. They result from a variety of industrial and consumer uses. Hexachlorobenzene is ubiguitous in the world environment.

Hexachlorobenzene - Fungicide for wood preserving[8]

1,2,4-Trichlorobenzene - Capacitor dielectric (in mixtures), dye carrier, heat transfer fluid and as an intermediate in herbicide manufacture[2]
Heat transfer lubricant[8]

There were no positive detections of these chemicals above gas chromatograph/mass spectrometer (gc/ms) detection limits (≤2 ppm). The 8 detections may represent "false positive" detections and should be confirmed through the split samples collected in this program.

Other Base/Neutrals

Hexachlorobutadiene - Produced as a by-product waste in the production of perchloroethylene, trichloroethylene[2]
Solvent, by-product of trichloroethylene manufacturing[8]

The two (2) detections of hexachlorobutadiene at ≤ detection limits may also be "false positives" and duplicate confirmation will aid in making the judgment as to its actual presence of absence.

Volatiles - Chlorinated Methanes and Ethanes

All of the light chlorinated methanes and ethanes are common solvents and are present in industrial and consumer products.

Carbon tetrachloride - Commonly used all purpose solvent and chemical intermediate[2]
Household liquid degreaser, garden pesticide[8]

Methylene Chloride - Commonly used organic solvent[2]
Oven cleaner, tar remover, wax degreaser, spray deodorants[8]

Tetrachloroethylene - General solvent and dry cleaning[2]
Contact cement, degreasers, was removers, shoe dye, shoe polish, garden pesticides, upholstery and rug cleaner[8]

Trichloroethylene - General all purpose solvent[2]
Upholstery cleaner, degreaser, tar remover, waxes[8]

Chlorinated methanes and ethanes were found at or above detection limits in 17 instances. Eight (8) of these were at detection limits of 10 parts per billion (ppb), and should be confirmed by duplicate analyses to insure that they are not "false positive" results. It must be kept in mind that the volatile anlayses are shown at 3 orders of magnitude less than the base/neutral and pesticide analyses. The higher volatile data (e.g., 74 ppb carbon tetrachloride or 94 ppb chloroform) would be 0.074 or 0.094 ppm when reported on the same basis as the other gc/ms fractions. The predominance of methylene chloride leads us to suspect a laboratory contamination problem. A laboratory blank was apparently run which did prove negative, however, no field blank was collected or analyzed.

Volatiles - Refrigerants

Bromodichloromethane - Drinking water (as a halomethane), fire extinguisher fluid, solvent[8]
Refrigerant

There was only one (1) detection of bromodichloromethane and it was at the detection limit. We believe that it may be a "false positive" result.

Volatiles - Others

Acrolein - Intermediate for chemical manufacturing, food products[8]

Benzene - Fabric adhesives, anti-perspirants, deodorants, detergents, oven cleaners, paint brush cleaner, dandruff remover and shampoo, tar remover, medicines, solvents and thinners[8]

Chlorobenzene - Chemical intermediate in the manufacture of phenol, aniline, and DDT[2]
Household liquid degreaser[8]

Ethelbenzene - Manufacture of styrene[2]
Solvent, manufacturer of plastic[8]
Wood smoke[1]
Stormwater runoff from asphaltic surfaces

Toluene -	Solvent, occurs naturally in fossil materials such as coal and petroleum[2] Contact cement, detergents, paint brush cleaner, perfume, degreasers, dandruff shampoos[8] Coal tar[7]

There were 10 detections of these compounds of which 8 (80%) were at detection limits of 10 ppb. Many of these may represent "false positive" data. The highest single detection was at 0.098 ppm.

Pesticide - Non-BHC

4,4'DDD -	May be an impurity in DDT[8] Insecticide for fruits and vegatables[9]
4,4'DDE -	May be an impurity in DDT[8]
α-Endosulfan -	Acaricides, industrial insecticide[8] Insect control on potatoes, cotton, seed peas, many other vegetables, tobacco, apples, peaches, strawberries, ornamentals[9]

There were three identifications of these pesticides of which two were at detection limits. The maximum levels detected were 0.040 ppm (or 40 ppb).

Pesticides - BHC

BHC -	Industrial insecticide, home insecticide, fumgicide, insect repellant[8] Broad spectrum insecticide for fruits, legumes, cole crops, circubits, tomatoes, other vegetables[9] Pet flea and tick insecticide

Some level of BHC (various isomers) was found in most samples although levels were extremely low. The highest value found was 0.056 ppm or 56 ppb.

Inorganics and Wet Chemical

Iron was found in all samples at values ranging from 6,800 ppm to 16,000 ppm. Iron is the fourth element and second metal in abundance in the earth's crust. It's environmental or health significance in soils is nil.

Total recoverable phenolics were detected in only two samples, both associated with the Building 13 site. The levels were extremely low (less than 1 ppm) and are not deemed significant. The detected levels are most likely due to background in the area from past production operations involving coal tars (carbon or graphite products) and chemical products and intermediate. There are no guidelines or standards for phenol levels in soils. The USEPA water quality criterion for protection of freshwater aquatic life from acute toxicity is 5,800 µg/l or 5.800 µg/g. The detected levels are an order of magnitude less than the water standard in this comparison.

Total cyanide data was surprising in that any positive values were found. There were two (2) positive detections at 1.2 and 2.0 ppm. We have some doubt as to the validity of the data and look forward to receipt of the USGS analytical data for confirmation. If cyanide is actually present, we believe that it must be in the form of stable metallocyanide complexes. The solubility and reactivity of simple, alkali metal cyanides or unstable complexes would have resulted in their rapid disappearance.

Cyanide and its compounds are almost universally found where life and industry are found. "Besides being found in a number of manufacturing processes, they are found in many plants and animals as metabolic intermediates which are generally not stored for long periods of time."[16] The toxicity of the metallocyanide complexes is relatively low[17] and the iron-cyanide complexes are not materially toxic.[18] "Regulatory distinction between cyanide complexed with iron and that found with less stable complexes, as well as between the complexed cyanide and free cyanide or HCN, can, therefore, be justified."[18] No standards or guidelines have been established for cyanide levels in soils. It must be kept in mind that the basis of water quality standards is normally free cyanide rather than total cyanide. The soil samples from the USGS joint study were analyzed for <u>total</u> cyanide.

Mercury is the only parameter which should bear any scrutiny regarding the reported sites. The largest single source of anthropogenic mercury is fossil fuel combustion. Mercury is found in all coals in ranges from 0.16 ppm to 33 ppm. The estimated total airborne output of mercury from 0.14 - 2.72 x 10^9 grams/yr.[19] (or 154 to 3,000 tons/yr). Other sources are cement manufacture, iron ore and other mineral refining. Because of the magnitude of natural and man-made sources of mercury, all rain and snow has a significant, measurable mercury content. In addition, most natural soils and stone contain mercury.[19] (See Table VIII). The reported disposal was brine sludge which can contain an average of 50 ppm mercury. All but one sample contained mercury in levels ranging from 2.8 to 40 ppm. Such levels are not at all unusual considering the long history of mercury cell operations at Olin and other companies in the area and the other noted sources that are often not considered.

BUILDING 13 SITE

USGS SITE 248
SAMPLE NOS. 1 and 6
POTENTIALLY SAMPLE NO. 2
NYSDEC SITE CODE 932051-b

Olin has previously reported data and information relative to the "Plant Site" disposal. We have noted that the Building 13 area was reported to have received 246 cubic yards of brine sludge in 1957. Samples (borings) 1 and 6 were closest to the original Building 13 site and sample 2, although further away from the site, can be associated with it. Analytical data from these two samples can be summarized as follows:

	No. 6	No. 1	No. 2
Polynuclear Aromatic Hydrocarbons (PAH)	<<<27.2 ppm	<<<22 ppm	<<<37.3 ppm
Chlorobenzenes	<<4 ppm	≤2 ppm	≤2 ppm
Hexachlorobutadiene	≤2 ppm	≤2 ppm	0
Chlorinated Methanes and Ethanes	<<<0.059 ppm	<<0.052 ppm	<<0.140 ppm
Other Volatiles	≤0.066 ppm	≤0.010 ppm	≤ 0.021 ppm
Pesticides - Non-BHC	0.04 ppm	0	0.04 ppm
Pesticides - BHC	0.092 ppm	0.106 ppm	≤0.02 ppm
Cyanide, Total	2.0 ppm	0	1.2 ppm
Mercury, Total	17 ppm	2.8 ppm	6.7 ppm
RCRA EP Extract Mercury	<0.5 ppm	<0.5 ppm	<0.5 ppm

The former Building 13 area is immediately north of the boiler house. Just to the northeast of the boiler house, and southeast of the former Building 13, there was a railcar, coal unloading station. The coal silo stood at the east end of the boiler house. It is probable, therefore, that the immediate area was subjected to coal fines for many years (through 1974). We have reported (10/19/81) that this entire area has excavated to a depth of several inches in 1977 and that several other building and construction projects contributed to the removal of soil from the area, thus removing the majority of any residual coal fines. We expect, however, that the major source of PAH's detected in the subject samples was our coal handling operations in the vicinity. Airborne deposition may also have contributed to the presence of PAH's. PAH compounds are extremely insoluble in water and are not expected to transport significantly from the area. The current levels of PAH's are extremely low and represent either "false positive" gc/ms data or general background levels for the area. The levels detected do not represent a hazard to health or environment.

The BHC levels, to the extent that it is actually present, could have resulted from consumer agricultural applications in the area. We believe that these levels, if confirmed as present, are equivalent general background levels in the area. [11,12,13] These BHC levels are not sufficiently high to represent any health or environmental hazard and are not as high as expected background in typical farming or agricultural areas. [14,15] We expect that the more reasonable explanation is as a result of the BHC manufacturing operation at Olin. In particular, we believe that the presence of BHC at the test site is as a result of the BHC plant explosion in August 1956. The concentration of total BHC appears to be directly related to the distance from the former plant site. The higher concentrations are found at plant site sample Nos. 1 and 4 and parking lot No. 4. Parking lot No. 3 and 2 are lower and parking lot No. 1 was zero. Plant site sample Nos. 2, 3 and 5 are substantially lower in concentration because there were buildings at these locations at the time of the explosion which have since been demolished. Plant site No. 6 is an anomoly in this postulation. Chlorobenzenes can be analyzed in a similar manner, however, the detected levels are substantially lower.

The levels in question are not of particular concern. Typical agricultural applications of BHC would retain about 1-10 ppm up to four years after initial application. The extremely low levels presents insolubility, immobility and lack of public exposure combine to show that BHC at these sites do not present a problem. A similar rationale can be developed for chlorobenzenes.

Hexachlorobutadiene is typically associated with the chlorinated solvents industry and has not been associated with Olin operations. Its unconfirmed presence at ≤2 ppm does not represent a problem.

Chlorinated methanes and ethanes were detected at extremely low levels in the three samples. The compounds in question were generally not associated with Olin operations. The compounds are more typical of the chlorinated solvents industry which was active in the area in the past. The compounds are typically very volatile and should be released from soils relatively rapidly. We do not believe the compounds detected present a problem at their noted levels.

Toluene was detected at low levels and can be associated with the coal operations and asphalt runoff. Toluene is not associated with past or present Olin production operations.

DDD and DDE were found at detection levels in Sample 6. The results can be explained a "false positive" or simply contamination resulting from agricultural operations in the area. Both pesticides were used on the crops of Western New York and airborne dusts from spraying could easily account for the levels found. Stern[10] reports air concentrations of 8000 $\mu g/1000m^3$ in agricultural communities during days when fogging or spraying was occurring. While Niagara Falls would certainly be considered industrial; agricultural (orchard) operations occur immediately outside city boundaries and in southwestern Ontario, upwind of the city. The levels found are not above background levels and do not represent problems.

Cyanide in the form of metallocyanide complexes have manufactured in the area for many years and incidental losses from these operations is undoubtedly the source of any actual metallocyanides present. Based on the cyanide levels detected and the forms present, we do not believe there can be any public health or environmental concern.

We believe the majority of mercury found at the plant site is due to incidental losses from past and present operations. The detected total mercury values are generally far less than that of brine sludge and the presence of deposited wastes is clearly eliminated. The more critical parameter is one which can characterize the soils or materials as hazardous waste or as non-hazardous materials. The RCRA extraction procedure is precisely the type of test to provide that classification and is, in fact, the legally required test. The EP test was applied to all samples with mercury analysis of the resultant leachate. No mercury was found in the extracts. The soil samples were, by observation, not waste materials or brine sludge and the EP tests shown they are not characteristic hazardous wastes with respect to mercury.

Compounds not found are often as significant as those which are found. No phenol, cresols, chlorophenolics, other phenolics, or PCB's were detected in the samples. The lack of PCB's is particularly significant because it verifies Olin's 1979 report (attached) on the use of PCB fluids at the plant and invalidates the rumored disposal of PCB transformer oils.

POND SITE

USGS SITE NO. 248
SAMPLE NOS. 4 and 5
POTENTIALLY SAMPLE NOS. 6 and 3
NYSDEC SITE CODE 932038

Olin has previously reported data and information relative to the "pond". We have noted that the pond was used for 2-3 months to receive recycled overflow water from the cell room which contained mercury. The only contaminant that could be present from this operation is mercury. Sample Nos. 4 and 5 are in the area of the former pond. Sample 3 was somewhat removed from the site but can be associated with the pond.

	No. 3	No. 4	No. 5
Polynuclear Aromatic Hydrocarbons (PAH)	0	<<<44.3 ppm	0
Chlorobenzenes	0	<4 ppm	0
Chlorinated Methanes and Ethanes	0.011 ppm	<0.229 ppm	<0.010 ppm
Other Volatiles	0	<0.420 ppm	0
Pesticides-BHC	0	≤0.125 ppm	0
Mercury, Total	0	40 ppm	5.9 ppm
RCRA EP Extract Mercury	<0.5 ppm	<0.5 ppm	<0.5 ppm

Comments regarding the "pond" site can generally be taken from those for the Building 13 site.

CONCLUSIONS

The overall conclusions regarding these three sites that can be drawn are as follows:

1. The review of all analytical data indicates background contamination levels - not deposition of wastes. Any wastes which were deposited in the Building 13 area have since been removed. Some mercury values (Plant Site No. 6 and Pond No. 4) were higher than expected for background, but EP tests show the mercury is not available to the environment.

2. As reported earlier (1/3/83), no groundwater was found in the borings. Consequently, those compounds present even at their very low concentrations are not expected to transfer to groundwater or create a groundwater problem.

3. The high insolubility of most of the compounds and the high volatility of the others are additional deterrents to the development of groundwater problems.

4. The extremely low concentrations, generally background levels for the area, are not sufficient to be a cause for concern.

5. The site (Plant Site-932051-b and Pond-932038) should be removed from all NYSDEC lists as a site of concern. The background information, data, and boring analysis all show no problems (or indeed no disposal) exist at the sites.

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TABLE I

OLIN CORPORATION
DATA SUMMARY
JOINT NYSDEC/USGS/USEPA NIAGARA RIVER - GROUNDWATER STUDY
ANALYSIS OF USGS BORING SAMPLES PERFORMED BY RECRA RESEARCH, INC.

SAMPLE IDENTIFICATION (DATE)

Parameter	Units of Measure	Building 13 USGS Site No. 248 Sample No. 6 2J10105 (8/9/82)	Building 13 USGS Site No. 248 Sample No. 1 2J10112A (8/9/82)	Near Bldg. 13 USGS Site No. 248 Sample No. 2 2J10107 (8/9/82)	Pond USGS Site No. 248 Sample No. 5 2J10108 (8/9/82)	Pond USGS Site No. 248 Sample No. 4 2J10109 (8/9/82)	Near Pond USGS Site No. 248 Sample No. 3 2J10106 (8/9/82)
BASE/NEUTRALS							
acenaphthene	µ g/g dry	--	--	≤ 2	--	≤ 2	--
acenaphthylene	µ g/g dry	--	--	≤ 2	--	--	--
anthracene	µ g/g dry	--	--	≤ 2	--	≤ 2	--
benzo(a)anthracene	µ g/g dry	≤ 2	≤ 2	2.9	--	3.1	--
benzo(a)pyrene	µ g/g dry	≤ 2	2.2	≤ 2	--	5.9	--
benzo(b)fluoranthene	µ g/g dry	≤ 2	≤ 2	2.0	--	4.2	--
benzo(g.h.i.)perylene	µ g/g dry	≤ 5	≤ 5	≤ 5	--	≤ 5	--
dibenzo(a,h)anthracene	µ g/g dry	--	≤ 5	--	--	6.9	--
fluoranthene	µ g/g dry	≤ 2	≤ 2	3.6	--	≤ 2	--
fluorene	µ g/g dry	--	--	≤ 2	--	≤ 2	--
hexachlorobenzene	µ g/g dry	≤ 2	≤ 2	≤ 2	--	≤ 2	--
hexachlorobutadiene	µ g/g dry	≤ 2	≤ 2	--	--	--	--
indeno(1,2,3-cd)pyrene	µ g/g dry	≤ 5	≤ 2	≤ 5	--	≤ 2	--
naphthalene	µ g/g dry	--	≤ 5	≤ 2	--	5.2	--
phenanthrene	µ g/g dry	≤ 2	≤ 2	3.5	--	≤ 2	--
pyrene	µ g/g dry	≤ 2	≤ 2	3.3	--	≤ 2	--
1,2,4-trichlorobenzene	µ g/g dry	--	≤ 2	--	--	≤ 2	--
VOLATILES							
acrolein	µg/kg dry	--	--	--	--	≤ 400	--
benzene	µg/kg dry	≤10	--	≤ 10	--	≤ 10	--
bromodichloromethane	µg/kg dry	--	--	--	--	≤ 10	--
carbon tetrachloride	µg/kg dry	--	--	--	--	74	--
chloroform	µg/kg dry	≤10	≤ 10	≤ 10	--	94	--
ethylbenzene	µg/kg dry	≤10	--	≤ 10	--	--	--
methylene chloride	µg/kg dry	32	29	120	--	11	11
tetrachloroethylene	µg/kg dry	≤10	≤ 10	≤ 10	≤ 10	29	--
toluene	µg/kg dry	56	≤ 10	11	--	≤ 10	--
trichloroethylene	µg/kg dry	--	≤ 10	--	--	22	--
PESTICIDES							
α-BHC	µg/g dry	0.024	--	≤ 0.01	--	0.017	--
β-BHC	µg/g dry	0.056	0.041	--	≤ 0.01	0.038	--
δ-BHC	µg/g dry	0.012	0.040	≤ 0.01	≤ 0.01	0.041	--
γ-BHC	µg/g dry	--	0.025	--	--	0.029	--
4,4'-DDD	µg/g dry	0.02	--	--	--	--	--
4-4'-DDE	µg/g dry	0.02	--	--	--	--	--
α-Endosulfan	µg/g dry	--	--	0.04	--	--	--

TABLE II

OLIN CORPORATION
DATA SUMMARY
JOINT NYSDEC/USGS/USEPA NIAGARA RIVER - GROUNDWATER STUDY
ANALYSIS OF USGS BORING SAMPLES PERFORMED BY RECRA RESEARCH, INC.

		SAMPLE IDENTIFICATION (DATE)					
Parameter	Units of Measure	Building 13 USGS Site No. 248 Sample No. 6 2J10105 (8/9/82)	Building 13 USGS Site No. 248 Sample No. 1 2J10112A (8/9/82)	Near Bldg. 13 USGS Site No. 248 Sample No. 2 2J10107 (8/9/82)	Pond USGS Site No. 248 Sample No. 5 2J10108 (8/9/82)	Pond USGS Site No. 248 Sample No. 4 2J10109 (8/9/82)	Near Pond USGS Site No. 248 Sample No. 3 2J10106 (8/9/82)
Iron, Total	μg/g dry	9,100	13,000	16,000	11,000	16,000	6,800
Phenolics, Total Recoverable	μg/g dry	0.76	--	0.85	--	--	--
Cyanide, Total	μg/g dry	2.0	--	1.2	--	--	--
Mercury, Total	μg/g dry	17	2.8	6.7	5.9	40	--
RCRA EP Test - Mercury	μg/g l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5

Olin CHEMICALS GROUP
P.O. BOX 248. CHARLESTON, TENNESSEE 37310. (615) 336-2251

November 21, 1979

Mr. John C. McMahon, P.E.
Regional Engineer
NYS Department of Environmental Conservation
584 Delaware Avenue
Buffalo, New York 14202

Re: Transformer Oil

Dear Mr. McMahon:

We have investigated the transformer/rectifier situation and have collected the following information. The prime opportunity for any disposal of transformer oils was when the old rocking cell building was dismantled in 1960. We have confirmed however, that the electrical equipment (including transformers and rectifiers) were removed by the demolition contractor (Hyman Silbergeld Scrap Iron and Metals of Niagara Falls, N.Y.). The units were removed from the site intact. The old system used 25 cycle power, and the equipment would not have been useful elsewhere in western New York. We are not certain what type of oil was in that equipment, however, it is believed that the units were not built to handle the synthetic oils (PCBs). Most of the transformers removed in 1960 were originally installed around the turn of the century. We do have one transformer on hand that was originally 25 cycle and was later rewound as a 60 cycle. Its original nameplate lists the oil as General Electric 10-C which is a mineral oil type.

The present cell room electrical equipment is all listed as containing General Electric 10-C mineral type oil as specified by Olin. Our insurance carrier at the time even required extra fire protection equipment because the oil was not an non-flammable type. We have no records of changing out oil on these units. The oil is commonly filtered with an external filter unit, recirculating back to the transformer.

There are three transformer units at Plant I, one of which is a PCB containing unit. It has been recorded as such for some time and it is appropriately marked. Also at Plant I, there are 12 PCB containing capacitors currently in use. These are 50 KVAR units and contain 2.2 gallons of oil per unit. A 13th capacitor was replaced some time ago with the old unit disposed of in the Newco secure landfill on March 17, 1978.

In addition, we have interviewed several employees who would have been directly involved with this type of equipment. Their experience with Olin (Olin Mathesion) goes back over 30 years. In all cases, there is no knowledge of handling transformer oil except for the filtering noted previously. One individual did recall one instance where oil from one transformer was drained, placed in special heavy-duty barrels (∿35 gal), and shipped to a reclaimer or reprocesser. They are emphatic that no transformer oils were disposed of north of Buffalo Avenue, or at any other location except the single reclaimer noted above.

We reserve the right to supplement, expand, or correct any portion of this submission where warranted. We do feel however, that without more specific detail as to the disposal report submitted to your office, we have no further input for this portion of the investigation.

We have reviewed our current property ownership north of Buffalo Avenue and find that there is no location on our property where a test well could reasonably be expected to intercept ground water movement from the Industrial Welding site.

Very truly yours,

OLIN CHEMICALS GROUP

David Cummings

D. L. Cummings, Sepcialist
Environmental Affairs Department

DLC/mea

NAME

OLIN-PLANT SITE (DEC #932051 - b)

LOCATION

Several areas of Olin Plant #1 and Plant #2 have been used as disposal areas for brine sludge containing mercury. These areas include the northwest portion of Plant #2, the area behind building #46 and the former gas holder at Plant #1.

A sketch is included.

OWNERSHIP

The property is owned by the Olin Chemical Corporation, 2400 Buffalo Avenue, Niagara Falls, NY 14303. The contact person at Olin is Mr. Al Kapteina, Environmental Manager (278-6584).

HISTORY

In 1957 and 1958 Olin disposed of an estimated 264 cubic yards of brine sludge containing 30 to 45 ppm mercury by filling in holes and low areas around the Plant Site. The sludge was used as fill, but was not actually "landfilled."

Several areas were filled including the area near the former cell building (building 13) and the caustic storage facility, the area behind building #46 and the former gas holder at Plant #1.

Much of the area around the former building #13 has since been excavated to one foot or more. It is assumed by Mr. Kapteina of Olin that much of the waste material was removed. The excavated soil was disposed of at Newco. This area is also the former location of the Mercury Pond (932038). A separate report has been written for this site.

The areas behind building #46 and the former gas holder are now paved with asphalt. A caustic storage facility has been built on a portion of the site formerly occupied by building #13.

An inspection made in April, 1982, revealed no visible signs of previous disposal.

PREVIOUS SAMPLING

There is no record of any specific sampling at this site. Additional information is provided in the Olin-Parking Lot Site report.

SOIL/GEOLOGY

See Olin-Parking Lot Site.

GROUNDWATER

See Olin-Parking Lot Site.

SURFACE WATER

See Olin-Parking Lot Site.

AIR/FIRE/EXPLOSION

See Olin-Parking Lot Site.

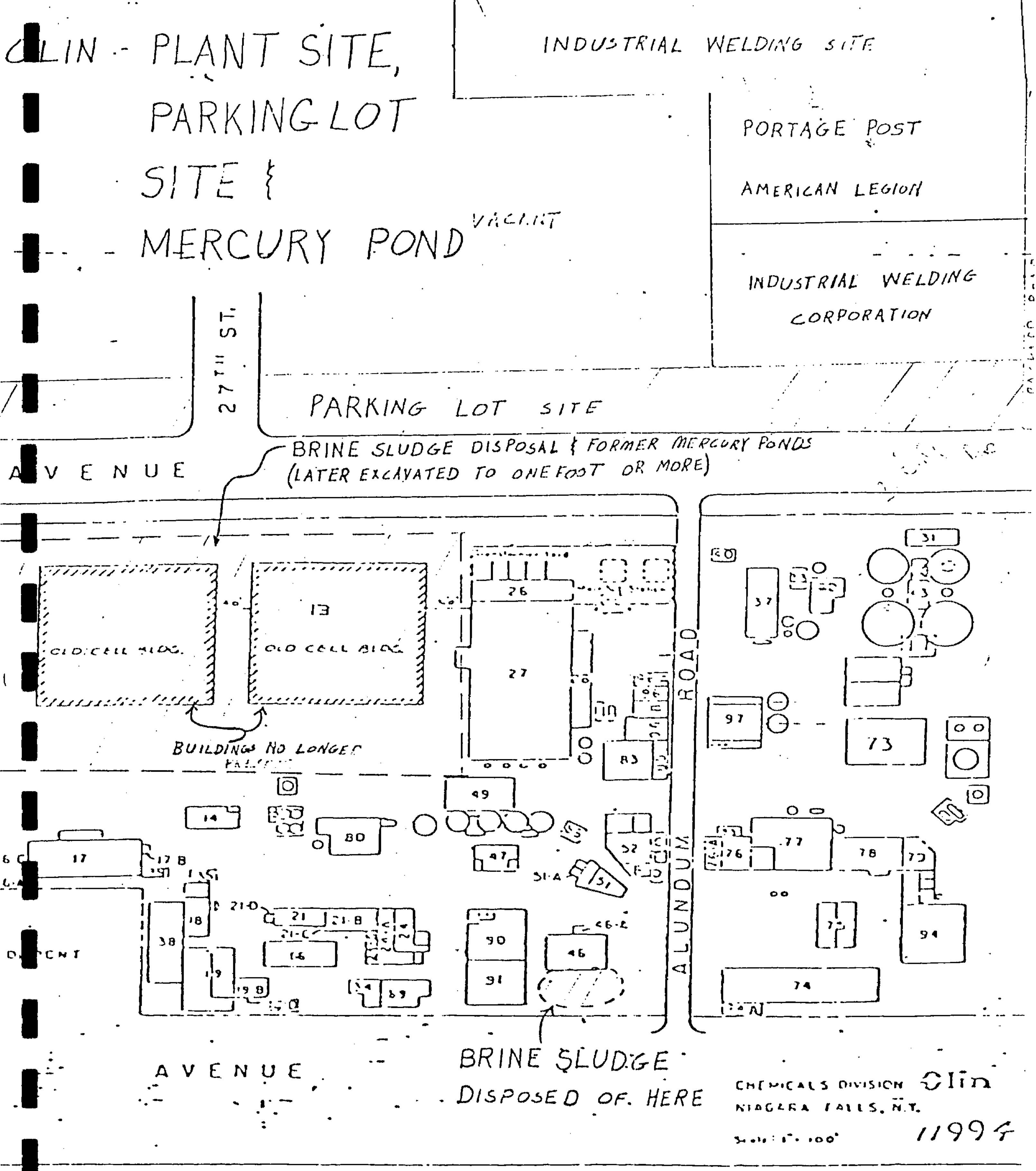
DIRECT CONTACT

No sign of exposed wastes was found. The area is within the Plant grounds and therefore, access is restricted.

CONCLUSIONS

Brine sludge with Mercury was used to fill several areas of the Olin-Plant Site. Some of this material may have been removed by excavating since then. Much of the area is now either paved or built upon. There is no record of previous sampling and additional data is needed.

OLIN - PLANT SITE, PARKING LOT SITE & MERCURY POND

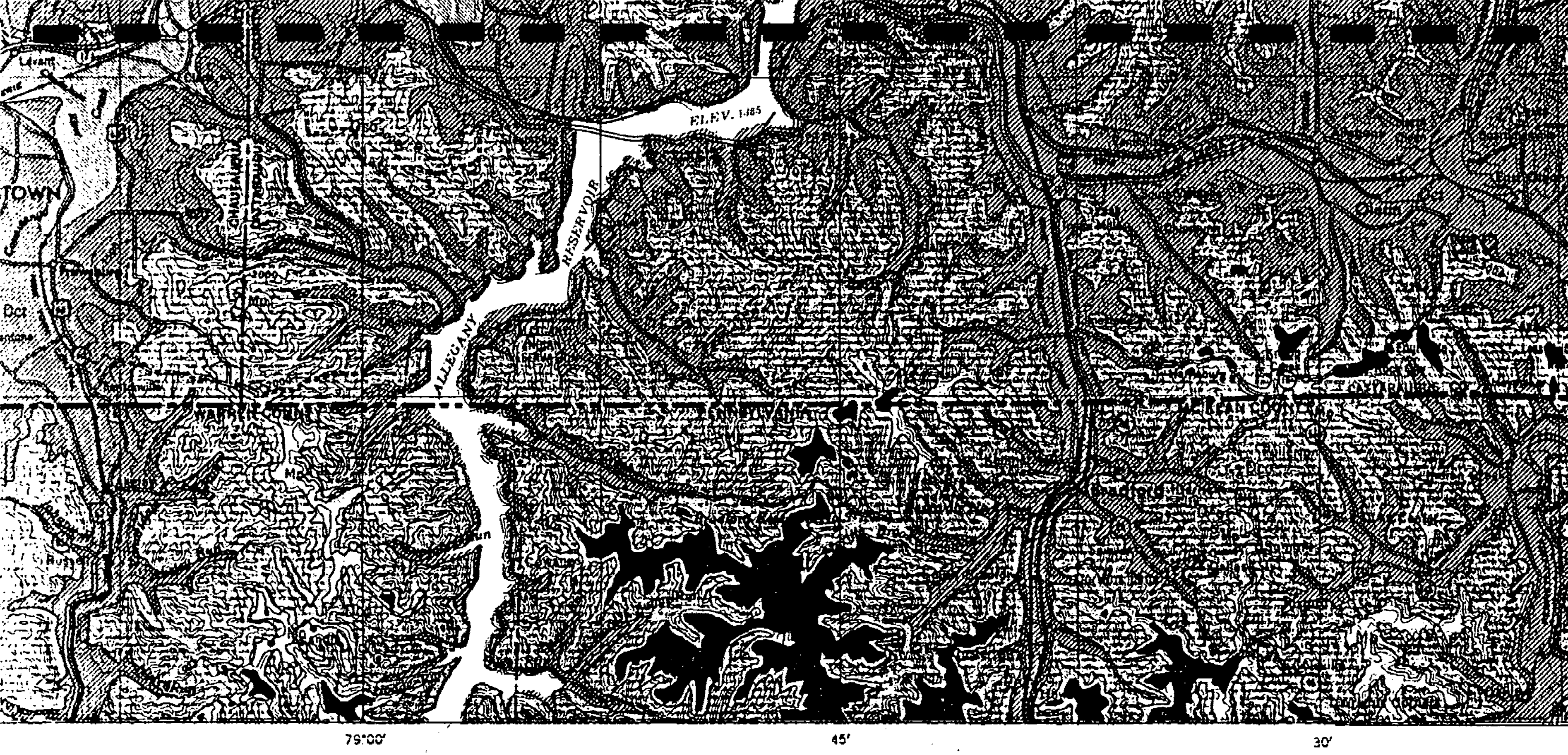


Not to Scale

North

7A

4/29/82

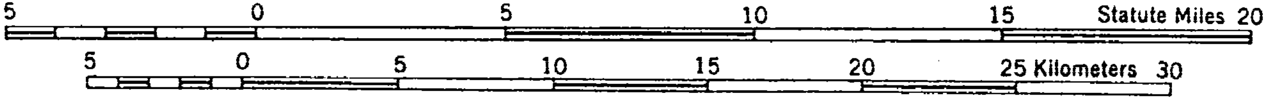


GEOLOGIC MAP OF NEW YORK

1970

Niagara Sheet

Scale 1:250,000



CONTOUR INTERVAL 100 FEET

New York State Department of Environmental Conservation
600 Delaware Avenue, Buffalo, New York 14202

Robert F. Flacke
Commissioner

August 10, 1981

RECEIVING
AUG 17 1981
D.L.CUMMINGS

Mr. David Cummings
Olin Chemicals Group
P.O. Box 248
Charleston, Tenn. 37310

Dear Mr. Cummings:

This is to confirm the discussions that took place during our meeting of July 23, 1981 regarding the initiation of a sampling program at inactive hazardous waste disposal sites operated by Olin in Niagara County.

As stated during our meeting, the information provided on the referenced sites in your letters of April 23 and June 12, 1981 needs to be supplemented with analytical data. It is therefore requested that a soil sampling program be initiated at the Old Building 13 site (932051-b) at the Buffalo Avenue Plant and the Olin Parking Lot site (932051-a) to assess the existant conditions at these sites. This program should include the collection of composite soil samples to a depth of at least five feet. These soil samples should be analyzed for mercury and THO, both total concentration and EPA leachate extraction concentration. The number of soil samples taken should be sufficient to determine the boundaries of the old disposal sites. The results of this soil sampling program should be submitted to this office by October 15, 1981.

Should you have any questions regarding this request, please feel free to contact me at 716/842-5041.

Yours truly,

Peter J. Buechi, P.E.
Senior Hydraulic Engineer

PJB:cag

cc: J. McMahon
R. McCarty
J. Kehoe
Y. Erk

APPENDIX B

NYS REGISTRY FORM

47-15-11(2/80)

HAZARDOUS WASTE DISPOSAL SITES REPORT
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

?
(

Code: ____________

Site Code: 932051-b

Name of Site: Olin - Plant Site

Region: 9

County: Niagara

Town/City Niagara Falls (C)

Street Address Buffalo Avenue

Status of Site Narrative:

Brine sludge with mercury was spread here in a land spreading fashion. Olin is required to checl for mercury and PCBs.

Type of Site: Open Dump ☐ Landfill ☒ Structure ☐ Treatment Pond(s) ☐ Lagoon(s) ☐

Number of Ponds ______

Number of Lagoons ______

Estimated Size 1 Acres

Hazardous Wastes Disposed? Confirmed ☒ Suspected ☐

*Type and Quantity of Hazardous Wastes:

TYPE	QUANTITY (Pounds, drums, tons, gallons)
Brine Sludge with Mercury	264 cu. yds.

* Use additional sheets if more space is needed.

47-15-11(2/80)

Name of Current Owner of Site: Olin Corporation

Address of Current Owner of Site: Niagara Falls, NY

Time Period Site Was Used for Hazardous Waste Disposal:

_____, 1957 To _____, 1958

Is site Active ☐ Inactive ☒
(Site is inactive if hazardous wastes were disposed of at this site and site was closed prior to August 25, 1979)

Types of Samples: Air ☐ Groundwater ☒ None ☐
Surface Water ☐ Soil ☒

Remedial Action: Proposed ☐ Under Design ☐
In Progress ☒ Completed ☐
Nature of Action:

Status of Legal Action: Referred to A.G. State ☒ Federal ☐

Permits Issued: Federal ☐ Local Government ☐ SPDES ☐
Solid Waste ☐ Mined Land ☐ Wetlands ☐ Other ☐

Assessment of Environmental Problems:

Possible groundwater contamination by Hg.

Assessment of Health Problems:

Unknown.

Persons Completing this Form:

John Kubarewicz

New York State Department of Environmental Conservation

New York State Department of Health

Date May 23, 1983

6/3/81

APPENDIX C

GENERIC HEALTH AND SAFETY PLAN

APPENDIX C

HEALTH AND SAFETY PLAN OUTLINE

I. PURPOSE

The purpose of this plan is to assign responsibilities, establish personnel protection standards, mandatory operating procedures, and provide for contingencies that may arise while operations are being conducted at the site.

II. APPLICABILITY

The provisions of the plan are mandatory for all on-site investigation personnel and personnel under contract while initial site reconnaissance and/or preliminary investigation activities are being conducted at the site. These activities include investigation, sampling, and monitoring undertaken on the site or at any off-site areas which may be affected by contamination from the site.

III. RESPONSIBILITY

1. Principal Investigator (PI)

   a. The PI shall direct on-site investigation efforts for each discipline. At the site, the PI, assisted by the Team Safety Officer, has the primary responsibility for:

      1) Assuring that appropriate personnel protection equipment is available and properly utilized by all on-site personnel and subcontractor personnel.

      2) Assuring that personnel are aware of the provisions of this plan, are instructed in the work practices necessary to

ensure safety, and in planned procedures for dealing with emergencies (Provisions, Work Practices and Emergency Procedures) appropriate to this investigation.

3) Assuring that personnel are aware of the potential hazards associated with site operations.
4) Supervising the monitoring of safety performance by all personel to ensure that required work practices are employed.
5) Correcting any work practices or conditions that may result in injury to personnel or exposure to hazardous substances.

HEALTH AND SAFETY PRELIMINARY SITE INVESTIGATION

Based on the appropriate listed field activity plans, as well as other site information (such as waste types and chemistry) as learned from the data collecting and analysis, the Principal Investigator/Team Safety Officer will develop an appropriate health and safety plan for the site.

Planning for Site Entry

In order to determine whether it is safe for the investigative team to proceed with the study and/or to determine what appropriate level of protective clothing and equipment should be used, the nature and extent of the on-site hazards will be assessed prior to site inspection. An on-site reconnaissance utilizing appropriate monitoring equipiment will check for:

- expposivity
- atmospheric concentrations of hazardous vapors, bases, fumes, and dusts
- oxygen deficiencies
- physical hazards posed by site features/topography

If during the initial site reconnaissance, the monitoring equipment detects evidence of fire or explosion potential or high levels of radiation, further entry into the site will not be allowed. The site inspection will be delayed until such problems can be resolved appropriately.

The initial site reconnaissance will be performed by team personnel equipped with the level of protective clothing and any additional gear that is required for their safe entry to the site. In order to provide sufficient lead time to "fine tune" safety and data gathering plans, this initial site reconaissance should be performed at least one week before the scheduled site investigation.

Based on this information regarding the associated conditions, a detailed plan providing for the safety of field personnel and the public will be developed in accordance with EPA and OSHA and regulations and USAF operating procedures. This plan may address such factors as (dependent on specific site/waste conditions):

- Types of exposures to hazardous materials (e.g., inhalation, skin absorption, ingestion, and eye contact), and the potential effects of each exposure pathway for each hazardous waste.
- High risk areas (surface contamination, exposed containers, or areas containing concentrations of chemical vapor, oxygen deficiency, explosive or flammable potential or radioactivity).
- Required protective and related equipment and procedures to adequately protect field personnel from perceived hazards on site.
- Decontamination procedures.
- Procedures for the prevention of accidental releases of hazardous substances to the air, soil, or surface water and procedures for implementation of proper contingency plans if such releases do occur.
- Procedures for the proper disposal of hazardous wastes generated in the course of the site inspection.
- Equipment and procedures for handling special site inspection conditions (e.g., prolonged operations, weather extremes, etc.).
- Emergency procedures.
- Arrangements with local hospitals and other local authorities.

The site-specific safety plan should be sufficient to provide the site inspection team with all applicable information assure health and safety. However, additional procedures may need to be considered and developed given site-specific conditions identified both before and during the site inspection.

Site Entry and Field Activities

Three sequential stages are identified to constitute the field activities:

- Initial setup
- Exploration and sampling
- Demobilization

Initial Setup

The main functions in this step are to secure entry and establish safety criteria. All operations will be managed from a central point, including:

- General supervision of area activities
- Decontamination process coordination
- Field communication
- Safety and medical coordination
- Equipment staging
- Recordkeeping
- Other functions as required

Exploration and Sampling

During this stage most field activities will be performed by pairs or small groups of team members. These tasks will include the following:

- Observation of visible spills, leachate seeps, etc., and sampling water and/or soils at these areas.
- Photography.
- Geophysical surveys (Electromagnetic or Metal Detection).
- Electrical resistivity measurements to detect ground-water contamination.
- Soil sampling using hand-operated equipment and drilling rigs.
- Ground-water sampling and water level measurements from existing wells.
- Surface water sampling.

Demobilization

This is the final stage of field activities in which field personnel will:

- Decontaminate used equipment.
- Transfer equipment and samples obtained to the decontamination staging area.
- Undergo personnel decontamination procedures.
- Load all equipment and samples on to the project vehicle(s).

The PI will supervise all the above steps through its conclusion. Field team members should not depart until all subcontractors personnel and equipment have left the site.

APPENDIX D

GENERAL FIELD PROCEDURES

APPENDIX D

General Field Procedures

Installation of Groundwater Quality Monitoring Wells

To investigate the groundwater quality within the aquifer of concern, groundwater monitoring wells will be installed. To accomplish the purposes of the monitoring wells a series of separate field procedures have been prepared. These include:

A - Drilling Procedures
B - Monitoring Well Construction Procedures
C - Water Sampling Procedures

The field program will be under the overall direction of the geologist in charge. Detailed supervision of the field work will be the responsibility of the field geologist. In particular, the field geologist will have the following responsibilities.

- Supervision of all drilling work and well construction
- Maintenance of the boring log for each boring
- Collection, labeling, and identification of formation samples, including rock cores.
- Conducting in cooperation with the driller, required in situ falling head tests and pumping tests.
- Performance of the water sampling program.
- Maintenance of pertinent notes in his/her field notebook and on daily field memos.

Health and safety procedures as set forth by the site Health and Safety Plan will be adhered to for all field operations.

A. Drilling Procedures

General Procedures

A qualified drilling subcontractor will be selected to provide all the equipment materials and skilled labor necessary to advance the test borings to the depths specified by the field geologist.

Order of Drilling Wells	All wells will be drilled in numerical sequence from what is considered the upgradient location (least contaminated) to the downgradient (most contaminated) with the upgradient boring being labeled "B-1".
Method of Drilling	Minimum of 4" ID hollow stem augers. If formational materials preclude the use of augers rotary drilling methods will be employed (e.g. for coring of bedrock).
Formational Sampling	Samples will be collected at a minimum of every 5 feet in the borings and at each lithographic change noted. A D&M sampler will be used to obtain one sample from each major layer in each boring. Other samples will be obtained with a standard split spoon sampler. Bedrock will be sampled continuously by coring with an NX double tube core barrel. All sampling equipment will be thoroughly cleaned after obtaining each sample. The cleaning method employed will be dependent upon the type of contaminant suspected to be present at that location.
Measurements	The depth to the water level in each boring being drilled should be measured each morning and just prior to installation of any monitoring devices into a boring. The depth of the boring should be measured and recorded on the boring log upon reaching final depth.

Decontamination Requirements	All downhole equipment and above hole equipment that may come in contact with subsurface materials will be steam cleaned at the drilling location prior to initiating any drilling and between each boring and at the conclusion of the drilling program. The steam cleaning rinse water will be allowed to discharge to the ground surface at the well site. Care will be taken to assure this water does not come in contact with any surface water source.
Site Cleanup	All drill cuttings remaining after well installation will be removed for proper disposal. All debris, paper, etc. will be removed and all depressions resulting from drilling operations will be filled in.

Drilling Procedures for Bedrock Boring

1. Sample formation every 5 feet and at every major lithologic change.

2. Drill and sample the unconsolidated formations until bedrock is encountered.

3. Ream the hole to at least 6 inches in diameter.

4. Make ready an appropriate length of steel casing by cleaning.

5. Place enough volclay pellets in the hole to make a layer of about one-foot thickness at the bottom of the boring.

6. Place the steel casing in the hole, and bottom it snugly into the bentonite. Once the casing is set, it should not be lifted until the completion of the well.

7. Circulate the drilling fluid; drill a few inches below the bottom of the volclay layer and circulate for a few minutes to clean the boring of most of the bentonite. Clean out this part of the boring by circulating clean water.

8. Drill into the bedrock the required depth using the NX double-tube core barrel.

9. Store the rock cores in specially constructed wooden rock-core boxes, for inspection and description by the field geologist.

10. Measure water level in boring.

11. Construct well in the boring

Drilling Procedures for Soil Borings

1. Sample formation every 5 feet and at every major lithologic change.

2. Drill to the depth estimated.

3. Measure water level in boring.

4. Construct well in boring.

Procedure for Abandoning a Boring

A cement slurry containing about 5 lbs. bentonite and one bag of cement per 8 to 10 gallons of water should be pumped into the hole to the ground surface.

B. MONITORING WELL CONSTRUCTION PROCEDURES

General Specifications and Procedures

Casing and Well Screen:	2-inch I.D. Schedule 40 PVC with flush screw joints or 2-inch I.D. stainless steel with flush screw joints.
Screen Slot Size:	Based upon materials encountered in boring.
Storage of Casing and Screen:	The casing and screen lengths will not be stored directly on the ground. The well string shall be prepared on a clean plastic sheet spread out over level ground.
Cleaning of Casing and Screen:	Casing and screen shall be cleaned before installing in the boring.
Bottom Cap and Blank Casing:	A length of blank casing of about two feet complete with a bottom cap shall be placed below the well screen in all cases.
Gravel Pack:	The gravel pack material will be 90 percent by weight larger than the screen size and should have a uniformity coefficient of 2.5 or less.
Placement of the Gravel Pack:	The gravel pack should be emplaced so that it extends to three feet above the top of the well screen. This should be confirmed by measuring down the annular space with a weighted tape or with a measured small-diameter pipe. The volume of gravel pack material emplaced should be compared with the volume computed as required, based on the screen diameter and length. The gravel pack may be poured directly down the annular space provided the well is pressurized and an upward flow of pure water is maintained in the annular space by introducing the water at a low rate through the well casing which would enter the annular space through the well screen openings.

Bentonite Seal:

A bentonite seal shall be placed in the annular space above the gravel pack in each well by emplacing 1/4-inch diameter volclay pellets in the annular space during which time the low flow rate up the annular space in maintained. This bentonite seal should be at least 2 feet thick. The bentonite shall be compacted with a donut shaped weight that slides over the well casing.

Well Development:

Each well should be developed for about 30 minutes to one hour using an air-lift surging method. Appropriate piping should be assembled for the discharge water so as to discharge it and dispose of it in a manner to limit contamination of the surrounding area. The discharge during development should be estimated by using a 5-gallon bucket and a stop watch. In the course of development, if a well turns out to have a very low specific capacity, it may prove necessary to add some clean water in order to remove as many fines as possible from the vicinity of the well screen. Development should be continued until all but a trace amount of fines and suspended solids appear in the discharge water. Following development, the air line hose or pipe and associated fittings should be thoroughly cleaned and then rinsed.

Grouting Annular Space:

A bentonite-cement grout (5 lbs. bentonite and one bag of cement to 8-10 gallons of water) will be pumped into the annular space to fill the space from the top of the volclay bentonite seal to the ground surface.

Protective Casing:

A length of 6-inch I.D. steel casing with a lockable cap should be placed over the well casing in each case to protect it. It should be set about one foot into the bentonite cement grout in the annular space, and should stick up above ground about 2 to 3 feet.

Well Labeling: The full number of each monitoring well should be painted on the protective casing and cap.

Surveying: A level survey will be performed in which the elevation of the top of the inside casing of each well will be determined 0.01 ft. and the reference point marked.

The Construction site makes it impossible to prescribe one single Deep or Shallow well construction configuration. Therefore a generic well construction configuration for both deep and shallow wells has been developed.

Deep Well Construction

1. Place well screen so as to screen entire thickness of lower sand and gravel layer (if it exists), unless the layer exceeds 20 feet in thickness; the well screen should extend about two feet into the top of bedrock.

2. If a clay layer immediately overlies the bedrock and the overlying surficial sand and gravel is less than 30 feet, place the screen in only the upper five feet of bedrock.

3. If no significant clay/lacustrine layer exists and if the surficial sand and gravel layer is greater than 20 feet thick place screen in lower 15 to 20 feet of the sand and gravel layer, extending also two feet into bedrock.

4. If no significant clay/lacustrine layer exists and if the surficial sand and gravel layer is less than 20 feet in thickness screen entire saturated thickness, in addition to about 5 feet above the summer static water level and about two feet into the underlying bedrock.

5. After installation of the well screen and casing, and the gravel pack, emplace volclay pellets to form a 2 to 4 foot thick seal in the annular space above the gravel pack. Use 1/4-inch diameter pellets and maintain a low flow rate up the annular space during emplacement so as to insure that they settle in place evenly around the annular space. Measure the depth to the top of the seal.

6. Using a bentonite-cement grout (described in the foregoing section), pump grout into the annular space so as to grout up to the top of the clay layer.

7. Jack the 6-inch casing out of the hole.

8. Develop the well and complete it as described under the foregoing section.

Shallow Well Construction

1. Place the well screen so that it extends from the top of any clay layer (if it exists) to about 5 feet above the summer static water level, unless the saturated thickness is greater than 20 feet, in which case the screen should be placed opposite the upper 20 feet of the saturated part of the unit, extending as well about 5 feet above the summer static water level. In the case of shallower wells less than 20 feet deep, place screen from bottom of hole to within 5 feet of land surface. For very shallow water table, the top of screen should be two feet above the estimated high water table or no closer than two feet to the land surface.

2. Emplace the volclay pellets as described above for the deep wells. A one-foot thick bentonite seal should be adequate.

3. Develop and complete the well as described under General Specifications Procedures.

C. GROUNDWATER SAMPLING PROCEDURES

Following the installation of the well, individual groundwater samples will be collected according to the procedures included below from each well for analyses. These samples will be collected using a positive displacement sampling device made entirely from stainless steel and teflon. This procedure will permit us to collect a sample that is more representative of the aquifer water and to limit the possibility of degassing and volatilization. The well storage water will be evacuated with a submersible pump or air lift system whereby the air is not permitted to come in direct contact with the aquifer. The sampling pump will be cleaned between wells by immersion into a solvent, followed by a distilled deionized water rinse. A quantity of each of these will be pumped through the pump and teflon tubing.

As a part of our ongoing QA program, field blanks, consisting of distilled deionized water from the discharge of the pump following cleaning will be taken between selected wells to monitor the effectiveness of the cleaning procedures. Two typed of trip blanks will also be taken. The first type consists of a sample bottle filled with distilled, deionized water that will be capped and accompany the samples at all times. The second type will consist of a sample bottle filled with distilled, deionized water and set aside open to the atmosphere, during the sampling of the wells. The purpose of these trip blanks is to evaluate the potential for atmospheric contamination, and to assure that proper sample bottle preparation and handling techniques have been employed.

The samples collected from these sampling efforts will be analyzed for indicator parameters identified during the Phase I.

WATER SAMPLING PROCEDURES.

1. Open well and trip blank and record initial static water levels.

2. Wash down pump:
    - For organics use hexane followed by methanol and finally distilled water
    - Collect wash solvents and rinse in a bucket, etc. (a 5 gal. container w/ a large funnel works well)
    - Wash pump inside and outside

3. Install pump in well: Use stainless steel pump and teflon tubing
    - Each well should have its own tubing. Tubing should be cleaned and thoroughly rinsed between sampling events.
    - Pump should have a check valve, preventing water having been in internal contact with the pump and the tubing from draining back into the well.

4. Pump at least two exchanges of water

- Care should be taken so as not to over pump, whereby excessive concentrations are drawn into the well. The number of exchanges pumped should be based upon the soil typed, flow patterns and aquifer properties of each well.

5. Take a sample:

- From pump discharge: Insert discharge tube to bottom of jar. Withdraw tube ahead of the sample so that aeration and turbulence is minimized.

- Some samples must be filtered in the field. This should be done prior to filling the sample container.

- For volatile organics samples should not be taken from the pump discharge. Aeration from the pump will destroy organic volatiles.

6. Immediately perform field tests such as temperature, pH, specific conductivity and D.O.

7. Refrigerate samples at 4^{o}C.

8. Cap well and trip blank.

9. Wash all equipment.

NOTES: - The sampling procedures should reflect the sample parameters. Those parameters subject to change with changes in pH, D.O. may need to be sampled using stainless steel bailers.

- Some sample parameters require filtering in the field.

- For accountability and traceability of the samples, two forms are included which are examples of what we presently use.

EQUIPMENT BLANKS:

- Wash pump with solvents, collecting solvent rinse. Care must be taken in the selection of solvents, so damage to the pump will not occur. Rinse with distilled water.

- Take a sample of "clean" water,

- Turn on pump, sample first "slug" of water from the pump

- Pump volume equivalent to amount typically pumped from the well. DO NOT recirculate the water.

- Take sample from pump at end of pumping period

- Refrigerate samples.

APPENDIX E

QUALITY ASSURANCE

APPENDIX E

OUTLINE OF QUALITY ASSURANCE PROCEDURES

1.0 GROUND-WATER SAMPLING

1.1 General Requirements

(a) Obtain representative ground-water quality samples
  (1) Wells located properly
  (2) Sampling zone defined
  (3) Well constructed properly
  (4) Well developed properly
(b) Select sampling method in accordance with analyses of interest and well characteristics, see Figure B.1.
(c) Sampling procedures should not materially alter sample, see Figure B.2.
(d) Storage/shipment procedure must not alter sample

1.2 Procedures for Monitoring Well Development

(a) Perform prior to each sampling effort
(b) Measure water level
(c) Determine volume of water stored in casing
(d) Remove three to five volumes of water from well
  (1) Bail
  (2) Pump
(e) Insure that device does not introduce contaminants into well
(f) Measure water level recovery
(g) Sample after complete recovery
(h) Perform in-situ tests
  (1) Flow direction & velocity (Flow Meter®)
  (2) Quality (Hydrolab®)
  (3) Permeability
(i) Insure that in-place testing does not contaminate well prior to sample acquisition

1.3 Sampler Construction Material

A major point to consider is the type of contaminants anticipated in the ground-water system. A sampling device should be constructed of inert materials that will not alter the trace concentrations of chemical parameters. Sampler construction materials are listed in order of preference.

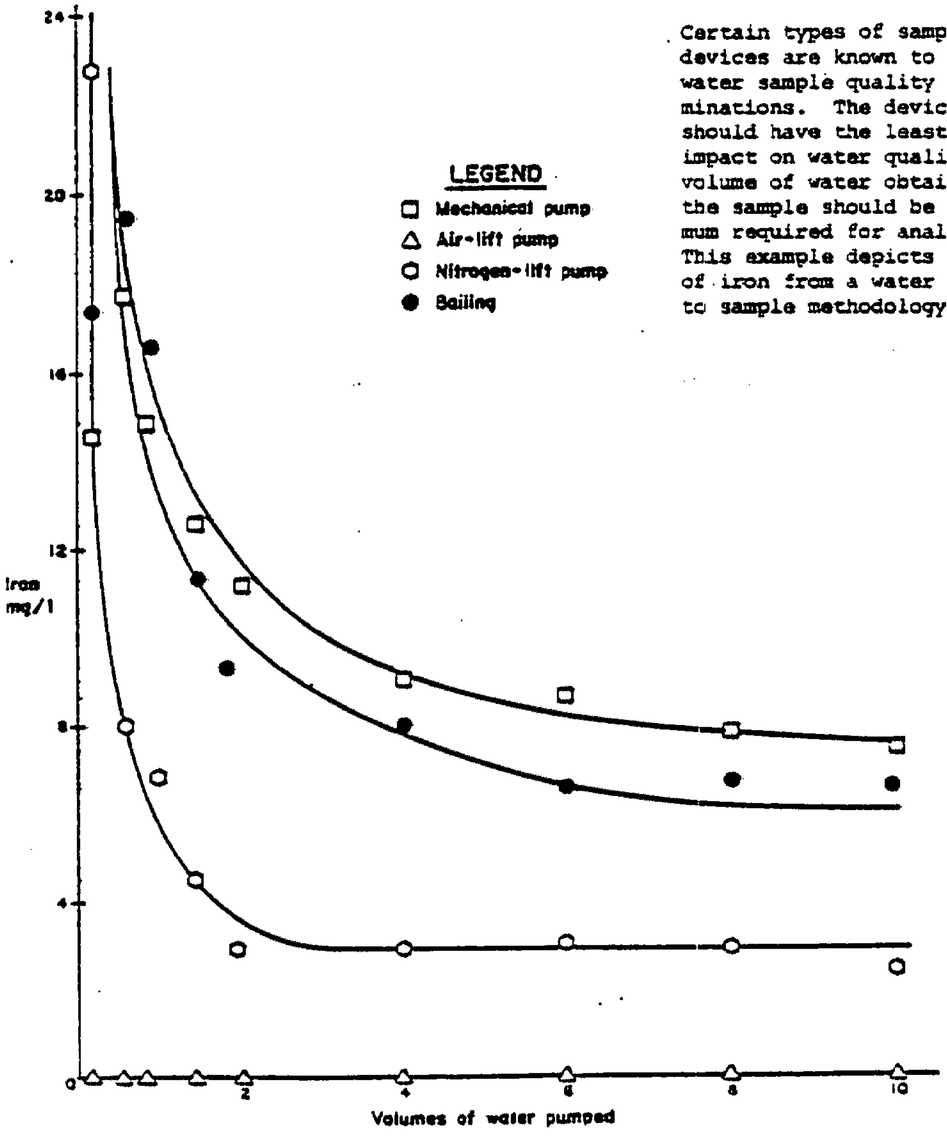
Sampler Construction Materials:

(a) Glass
(b) Teflon®

FIGURE E.1

Effects of Various Sampling Methodologies on Water Quality

Certain types of sampling devices are known to impact water sample quality determinations. The device selected should have the least negative impact on water quality. The volume of water obtained for the sample should be the minimum required for analysis. This example depicts the loss of iron from a water sample due to sample methodology.



SOURCE: "Monitoring Well Sampling and Preservation Techniques," Proceedings of the Sixth Annual Research Symposium / Disposal of Hazardous Waste, March, 1980.

FIGURE E.2
SAMPLING EQUIPMENT SELECTION

Diameter Casing	Bailer	Peristaltic Pump	Vaccum Pump	Airlift	Diaphragm "Trash" Pump	Submersible Diaphragm Pump	Submersible Electric Pump	Submersible Electric Pump w/Packer
1.25-Inch								
Water level <20 ft.		X	X	X	X			
Water level >20 ft.				X				
2-Inch								
Water level <20 ft.	X	X	X	X	X	X	X	
Water level >20 ft.	X			X		X	X	
4-Inch								
Water level <20 ft.	X	X	X	X	X	X	X	X
Water level >20 ft.	X			X		X	X	X
6-Inch								
Water level <20 ft.				X	X		X	X
Water level >20 ft.				X			X	X
8-Inch								
Water level <20 ft.				X	X		X	X
Water level >20 ft.				X			X	X

(c) Stainless Steel
(d) PVC
(e) Other dense plastics

Note: Do not use rubber or synthetic rubber such as that used in packers or older bladder pumps.

1.4 Sampling

1.4.1 Typical Ground-Water Sampling Devices

- (a) Bailers
  - Kemmerer
  - Tube
- (b) Suction Lift Pump
  - Peristaltic
  - Hand operated diaphragm
- (c) Submersible Pump
- (d) Air-lift Device
- (e) Tomson Pump (all glass)
- (f) Gas Operated Bladder Pump
- (g) Gas Driven Piston Pump
- (h) Specialized Organic Material Samplers
  - Grab Sampler
  - Continuous Sampler
  - Microbiological Sampler
  - Soil-Water Sampler

Detailed discussion of the above listed sampling devices is given in the Manual of Ground-Water Sampling Procedures, pp. 45-54.

1.4.4 Specialized Organic Material Samplers

(a) Grab Sampler (at well head) for non-volatile organics may be used with peristaltic pumps (ground-water depth 20 ft)®or non-contaminating submersible pumps. A Teflon bailer may be used for volatile organic sample acquisition.

(b) Continuous Sampler (at well head) uses a peristaltic pump (shallow conditions) or a non-contaminating submersible pump to force a continuous stream of water through a fixing column using selected adsorbents to concentrate organic materials.

(c) Microbiological Sampler (at well head) uses a vacuum pumping system to draw water samples from shallow depths. Samples to be tested for microbial agents may be collected in a flask; samples to be tested for viruses of pathogenic bacteria may be collected on filters installed in the system.

(d) Soil-Water Sampler (unsaturated zone) can be used to obtain small unsaturated zone samples drawn through a collection trap in shallow applications.

A detailed discussion of these devices and their utilization is presented in the Manual of Ground-Water Sampling Procedures, pp 53-60.

1.5 Field Tests and Sample Preservation

1.5.1 Field Testing

Many parameters are relatively stable. Others such as pH, temperature, etc., will begin to alter immediately upon collection. In order to mitigate this unwanted modification of water quality, testing of sensitive parameters must be performed in the field. Testing may be performed at the well head following sample removal or in-situ by use of a Hydrolab or similar down-hole device.

Samples requiring more complicated analysis procedures must be preserved and transported to a laboratory. Preservation must be performed in the field, contingent upon analytical parameters of interest. Laboratory analyses should be performed as soon as possible in accordance with EPA Guidelines.

1.5.2 Sample Preservation

1.5.2.1 General typical preservatives currently employed, actions and applications are given:

Preservative	Action	Applicable to:
$HgCl_2$	Bacterial Inhibitor	Nitrogen forms, phosphorus forms
Acid (HNO_3)	Metals solvent, prevents precipitation	Metals
Acid (H_2SO_4)	Bacterial Inhibitor	Organic samples (COD, oil and grease, organic carbon)
	Salt formation with organic bases	Ammonia, amines
Alkali (NaOH)	Salt formation with volatile compounds	Cyanides, organic acids

Preservative	Action	Applicable to:
Refrigeration	Bacterial Inhibitor	Acidity - alkalinity, organic materials, BOD, color, odor, organic P, organic N, carbon, etc., biological organism (coliform, etc.)

1.5.2.2 Organic Parameters

The general method of preserving samples for organic analysis is to exclude air, pack in ice, and transport promptly. Specific recommendations are furnished in the Manual of Ground Water Sampling Procedures, p. 62.

1.5.2.3 Microbiological Parameters

Due to the complicated nature of this type of sampling, reference is made to the Manual of Ground-Water Sampling Procedures, p. 62.

1.5.2.4 Sampling and Preservation Requirements

The following Table B.1, presented from the Manual of Ground-Water Quality Sampling Procedures, pp 63-66, is included to provide specific collection and preservation data in accordance with the analyses of interest. It may be quickly observed that numerous variations occur in volume of sample required per test, type of container, preservative, and holding time. Preservation techniques must be chosen to be consistent with the selected analyses.

TABLE E.1.

RECOMMENDATION FOR SAMPLING AND PRESERVATION OF SAMPLES ACCORDING TO MEASUREMENT[a]

Measurement	Vol. Req. (ml)	Container[b]	Preservative	Holding Time[c]
Physical Properties				
Color	50	P, G	Cool, 4°C	24 Hrs.
Conductance	100	P, G	Cool, 4°C	24 Hrs.[d]
Hardness	100	P, G	Cool, 4°C HNO_3 to pH<2	6 Mos.[e]
Odor	200	G only	Cool, 4°C	24 Hrs.
pH	25	P, G	Det. on site	6 Hrs.
Residue				
Filterable	100	P, G	Cool, 4°C	7 Days
Non-Filterable	100	P, G	Cool, 4°C	7 Days
Total	100	P, G	Cool, 4°C	7 Days
Volatile	40	P, G	Cool, 4°C	7 Days
Settleable Matter	1000	P, G	None Req.	24 Hrs.
Temperature	1000	P, G	Det. on site	No Holding
Turbidity	100	P, G	Cool, 4°C	7 Days
Metals				
Dissolved	200	P, G	Filter on site HNO_3 to pH<2	6 Mos.[e]
Suspended	200		Filter on site	6 Mos.
Total	100	P, G	HNO_3 to pH<2	6 Mos.[e]
Mercury				
Dissolved	100	P, G	Filter on site HNO_3 to pH<2	38 Days (Glass) 13 Days (Hard Plastic)
Total	100	P, G	HNO_3 to pH<2	38 Days (Glass) 13 Days (Hard Plastic)

TABLE E.1 (Continued)

Measurement	Vol. Req. (ml)	Container[b]	Preservative	Holding Time[c]
Inorganics, Non-Metallics				
Acidity	100	P, G	None Req.	24 Hrs.
Alkalinity	100	P, G	Cool, 4°C	24 Hrs.
Bromide	100	P, G	Cool, 4°C	24 Hrs.
Chloride	50	P, G	None Req.	7 Days
Chlorine	200	P, G	Det. on site	No Holding
Cyanides	500	P, G	Cool, 4°C NaOH to pH 12	24 Hrs.
Fluoride	300	P, G	None Req.	7 Days
Iodide	100	P, G	Cool, 4°C	24 Hrs.
Nitrogen				
Ammonia	400	P, G	Cool, 4°C H_2SO_4 to pH<2	24 Hrs.
Kjeldahl, Total	500	P, G	Cool, 4°C H_2SO_4 to pH<2	24 Hrs.[f]
Nitrate plus Nitrite	100	P, G	Cool, 4°C H_2SO_4 to pH 2	24 Hrs.[f]
Nitrate	100	P, G	Cool, 4°C	24 Hrs.
Nitrite	50	P, G	Cool, 4°C	48 Hrs.
Dissolved Oxygen				
Probe	300	G only	Det. on site	No Holding
Winkler	300	G only	Fix on site	4-8 Hrs.
Phosphorus	50	P, G	Filter on site Cool, 4°C	24 Hrs.
Ortho-phosphate, Dissolved				
Hydrolyzable	50	P, G	Cool, 4°C H_2SO_4 to pH<2	24 Hrs.[f]
Total	50	P, G	Cool, 4°C H_2SO_4 to pH<2	24 Hrs.[f]

TABLE E.1 (Continued)

Measurement	Vol. Req. (ml)	Container[b]	Preservative	Holding Time[c]
Total, Dissolved	50	P, G	Filter on site Cool, 4°C H_2SO_4 to pH<2	24 Hrs.[f]
Silica	50	P only	Cool, 4°C	7 Days
Sulfate	50	P, G	Cool, 4°C	7 Days
Sulfide	500	P, G	2 ml zinc acetate	24 Hrs.
Sulfite	50	P, G	Det. on site	No Holding
Routine Organics				
BOD	1000	P, G	Cool, 4°C	24 Hrs.
COD	50	P, G	H_2SO_4 to pH<2	7 Days[f]
Oil & Grease	1000	G only	Cool, 4°C H_2SO_4 or HCL to pH<2	24 Hrs.
Organic Carbon	25	P, G	Cool, 4°C H_2SO_4 or HCL to pH<2	24 Hrs.
Phenolics	500	G only	Cool, 4°C H_3PO_4 to pH<4 1.0 g $CuSO_4$/1	24 Hrs.
MBAS	250	P, G	Cool, 4°C	24 Hrs.
NTA	50	P, G	Cool, 4°C	24 Hrs.

a. A general discussion on sampling of water and industrial wastewater may be found in ASTM, Part 31, p. 72-82 (1976) Method D-3370.

b. Plastic (P) or Glass (G). For metals polyethylene with a polypropylene cap (no liner) is preferred.

c. It should be pointed out that holding times listed above are recommended for properly preserved samples based on currently available data. It is recognized that for some sample types, extension of these times may be possible while for other

TABLE E.1 (Continued)

types, these times may be too long. Where shipping regulations prevent the use of the proper preservation technique or the holding time is exceeded, such as the case of a 24-hr composite, the final reported data for these samples should indicate the specific variance procedures.

d. If the sample is stabilized by cooling, it should be warmed to 25°C for reading, or temperature correction made and results reported at 25°C.

e. Where HNO_3 cannot be used because of shipping restrictions, the sample may be initially preserved by icing and immediately shipped to the laboratory. Upon receipt in the laboratory, the sample must be acidified to a pH <2 with HNO_3 (normally 3 ml 1:1 HNO_3/liter is sufficient). At the time of analysis, the sample container should be thoroughly rinsed with 1:1 HNO_3 and the washings added to the sample (volume correction may be required).

f. Data obtained from National Enforcement Investigations Center-Denver, Colorado, support a four-week holding time for this parameter in Sewerage Systems. (SIC 4952).

2.0 SAMPLING SUBSURFACE SOLIDS (Earth Materials)

2.1 General

The sampling and testing of earth materials may be necessary to augment a ground-water quality study as contamination typically occurs in the unsaturated zone first, before entering the saturated zone. Several reasons exist for solids testing:

(a) Study effects of alteration
(b) Determine actual extent of contamination - not just in saturated zones
(c) Obtain accurate evaluation of microbial populations that may alter pollutants
(d) Solids provide best samples of aquifer microorganisms (samples obtained from saturated zone).

2.2 Sampling Procedures

Sampling of subsurface solids may be conducted by split spoon by Standard Penetration Test (ASTM D-1586-67) equipped with non-contaminating soil sample retainer or by undisturbed methods (ASTM D-1587-67). In any event, sampling, sample extrusion, preservation, shipment and testing must be accomplished in a sterile environment.

Due to the complex nature of the task, the possibility of introducing cross-contamination and the difficulty involved in sample processing, reference is made to the Manual of Ground-Water Sampling Procedures, pp. 72-79, which provides detailed guidelines for soil sample handling.

3.0 SAMPLE RECORDS AND CHAIN-OF-CUSTODY

3.1 General

The maintenance of complete sample records is critical to the monitoring process. The following is a basic guideline for development of sample records and chain-of-custody procedures:

3.2 Sample Records

(a) Sample description--type (ground water, surface water), volume;

(b) Sample source--well number, location;

(c) Sampler's identity--chain of evidence should be maintained; each time transfer of a sample occurs, a record including signatures of parties involved in transfer should be made. (This procedures has legal significance.);

(d) Time and date of sampling;

(e) Significant weather conditions;

(f) Sample laboratory number;

(g) Pertinent well data--depth, depth to water surface, pumping schedule, and method;

(h) Sampling method--vacuum, bailer, pressure;

(i) Preservatives, (if any)--type and number (e.g., NaOH for cyanide, H_3PO and $CuSO_4$ for phenols, etc.);

(j) Sample containers--type, size, and number (e.g., three liter glass-stoppered bottles, one gallon screw-cap bottle, etc.);

(k) Reason for sampling--initial sampling of new landfill, annual sampling, quarterly sampling, special problem sampling in conjunction with contaminant discovered in nearby domestic well, etc.;

(l) Appearance of sample--color, turbidity, sediment, oil on surface, etc.;

(m) Any other information which appears to be significant--(e.g., sampled in conjunction with state, county, local regulatory authorities; samples for specific conductance value only; sampled for key indicator analysis; sampled for extended analysis; resampled following engineering corrective action, etc.);

(n) Name and location of laboratory performing analysis;

(o) Sample temperature upon sampling;

(p) Thermal preservaton--(e.g., transportation in ice chest);

(q) Analytical determinations (if any) performed in the field at the time of sampling and results obtained--(e.g., pH, temperature, dissolved oxygen, and specific conductance, etc.);

(r) Analyst's identity and affiliation.

3.3 Chain-of-Custody

(a) As few people as possible should handle the sample.

(b) Samples should be obtained by using standard field sampling techniques, if available.

(c) The chain-of-custody records should be attached to the sample container at the time the sample is collected, and should contain the following information: sample number, date and time taken, source of the sample (include type of sample and name of firm), the preservative and analysis required, name of person taking sample, and the name of witness. The prefilled side of the card should be signed, timed, and dated by the person sampling. The sample container should then be sealed, containing the regulatory agency's designation, date, and sampler's signature. The seal should cover the string or wire tie of the chain of custody record, so that the record or tag cannot be removed and the container cannot be opened without breaking the seal. The tags and seals should be filled out in legible handwriting. When transferring the possession of samples, the transferee should sign and record the date and time on the chain-of-custody record. Custody transfers, if made to a sample custodian in the field, should be recorded for each individual sample. To prevent undue proliferation of custody records, the number of custodians in the chain of possession should be as few as possible. If samples are delivered to the laboratory when appropriate personnel are not there to receive them, the samples should be locked in a designated area within the laboratory so that no one can tamper with them.

(d) Blank samples should be collected in containers, with and without preservatives, so that the laboratory analysis can be performed to show that there was no container contamination.

(e) A field book or log should be used to record field measurements and other pertinent information necessary to refresh the sampler's memory in the event he later becomes a witness in an enforcement proceeding. A separate set of field notebooks should be maintained for each survey and stored in a safe place where they can be protected and accounted for at all times. A standard format should be established to minimize field entries and should include the types of information listed above. The entries should then be signed by the field sampler. The responsibility for preparing and retaining field notebooks during and after the survey should be assigned to a survey coordinator or his designated representative.

(f) The field sampler is responsible for the care and custody of the samples collected until properly dispatched to the receiving laboratory or turned over to an assigned custodian. He must assure that each container is in his physical possession or in his view at all times or stored in a locked place where no one can tamper with it.

(g) Photographs can be taken to establish exactly where the particular samples were obtained. Written documentation on the back of the photograph should include the signature of the photographer, the time, date, and site location.

(h) Each laboratory should have a sample custodian to maintain a permanent log book in which he records for each sample the person delivering the sample, the person receiving the sample, date and time received, source of sample, sample number, method of transmittal to the lab, and a number assigned to each sample by the laboratory. A standardized format should be established for log-book entries. The custodian should insure that heat-sensitive or light-sensitive samples or other sample materials having unusual physical characteristics or requiring special handling are properly stored and maintained. Distribution of samples to laboratory personnel who are to perform analyses should be made only by the custodian. The custodian should enter into the log the laboratory sample number, time, date, and the signature of the person to whom the samples were given. Laboratory personnel should examine the seal on the container prior to opening and should be prepared to testify that their examination of the containers indicated that it had not been tampered with or opened.