Olin

P.O. BOX 248, 1186 LOWER RIVER ROAD, NW, CHARLESTON, TN 37310-0248
(423) 336-4000 FAX (423) 336-4183

FEB

February 13, 1998

Mr. James Craft
Engineering Geologist
New York State Department of Environmental Conservation
Region 8 Office - Division of Hazardous Waste Remediation
6274 East Avon - Lima Road
Avon, New York 14414-9519

Re: Olin Rochester RI/FS Quarterly Report No. 17
Olin Chemicals (Site #628018a) 100 McKee Rd, Rochester, NY

Dear Mr. Craft:

This is the seventeenth quarterly report of progress on the Olin Rochester RI/FS, covering the period from October 1, 1997 through December 31, 1997.

Surface water and seep sampling:

- Second quarter sampling at the Barge Canal was done at eight locations: the original three locations near the groundwater plume, and at one upstream and one downstream locations. The quarry outfall and one nearby canal point were also sampled to monitor the chloropyridine input to the canal and its level of dilution near the input point. One quarry seep point (QS4, the historically most contaminated location) was also sampled. The inflow to the north quarry pond was also sampled. This is the point which receives most runoff from the quarry wall seep before the water is pumped from the quarry to the quarry outfall at the Barge Canal.
- The fourth quarter results indicated the presence of chloropyridines at the one canal location, SW-2, at the Buffalo Road bridge, at an estimated 2 ug/l. This level is estimated since it falls below the practical quantitation limit for chlorpyridine analysis. The quarry seep contained approximately 1200 ug/l of chloropyridines, consistent with prior levels. The quarry outfall contained an estimated total of 11 ug/l chloropyridines indicating a continued decreasing level. No chloropyridines were detected at the monitoring point 100 feet from the quarry outfall, or at the quarry north pond inflow.

- Canal monitoring results are documented in ***attachment 1 .***

groundwater monitoring:

- Piezometric plots were developed for December, 1997. Plots and piezometric data are included as ***attachment 2***.
- Olin installed and sampled three deep aquifer monitor wells to more precisely define the pathway taken by the chloropyridine plume as it moves from the Olin plant to its discharge point at the Dolomite Products quarry.
- Analytical data from these new wells indicates that the northernmost two wells contained chloropyridine compounds, while the southtenmost well showed no detected chloropyridines. BR122D and BR123D showed chloropyridines at approximately 150 and 280 ug/l respectively. BR124D, the southernmost well did not show any detected chloropyridines. These data support the conclusion that the groundwater plume discharges to the quarry and has a defined southern limit. We will re-sample these wells to confirm the results.
- Well BR 121D was refurbished and resampled. This well had been plugged by soil and rocks via apparent vandalism earlier in 1997. The second sampling confirmed the initial sampling, showing 1 ug/l estimated chloropyridines.
- Well BR116D at the Pfaudler property was also sampled for comparison to prior trends. This well showed approximately 390 ug/l chloropyridines, a result consistent with prior samplings.
- A data report is included in ***attachment 3***.

Feasibility Study Issues:

Olin has requested that NYSDEC join us to participate in a work session to evaluate FS options and alternatives. We believe that this will allow us to find common technical criteria by which to determine the most appropriate remedial strategy for our site. A work session has been planned for February 27, 1998.

Olin will continue to communicate progress and issues with NYSDEC. Please direct any questions to me at 423 / 336-4587.

Sincerely,

Michael J Bellotti

Michael J. Bellotti
Olin Corporation

Attachments

List of Attachments:

1] ABB report: Fourth Quarter 1997 Erie Barge Canal Water and Quarry Sampling Results

2] Piezometric Plots and supporting data: Decenber - 1997

3] ABB report: December, 1997 Groundwater Sampling Results

cc:
Mr. Joseph Ryan
New York State Department of Environmental Conservation
Division of Environmental Enforcement
600 Delaware Avenue
Buffalo, New York 14202-1073

Mr. Joseph White
New York State Department of Environmental Conservation
Division of Hazardous Waste Remediation
50 Wolf Road
Albany, New York 12433-1010

Mr. Steven Shost
New York State Department of Health
Bureau of Environmental Exposure Investigation
2 University Place
Albany, New York 12203

Mr. William Norman: Olin Rochester, NY
Ms. Laura Tew: Olin Charleston, TN
Ms. Monica L. Fries Esq.: Husch & Eppenberger, St. Louis, MO
Mr. Thomas Eschner: ABB, Portland, ME

ASEA BROWN BOVERI

January 26, 1998

Mr. Michael Bellotti
Olin Chemical Corporation
P.O. Box 248, Lower River Road
Charleston, TN 37310

Subject: **Olin Rochester Site - Fourth Quarter 1997**
Erie Barge Canal Water and Quarry Sampling Results

Dear Mr. Bellotti:

Enclosed are the sampling results for the fourth quarter 1997 (December) water samples collected from the Erie Barge Canal (Canal) and the Dolomite Products Company quarry (quarry) as part of the on-going quarterly monitoring program for the Olin Rochester site. The sampling program, analytical procedure, data review findings, and validated data for the December 1997 monitoring event are discussed below.

Sampling

Nine canal and quarry surface water samples were collected by and submitted to Recra Environmental, Inc. (Recra) for selected pyridine analysis on December 4, 1997. The locations sampled during this quarter are listed below. Location QI-1, quarry pond inflow, is located on the eastern side of the northern quarry pond, and represents surface water as it enters the pond.

Canal Samples	Quarry Samples
SW-1	QS-4 (Quarry Seep)
SW-2	QO-2 (Quarry Outfall)
SW-3	QO-2S1 (100 ft south of QO-2)
SW-6	QI-1 (Quarry Pond Inflow)
SW-12	

The locations of these samples are shown on the figures in Attachment 1.

Analytical Procedures and Data Review

All water samples were analyzed and reviewed in accordance with 1991 New York State Category B Analytical Services Protocols (ASP91) for the Olin suite of selected pyridines (pyridine, 2-chloropyridine, 3-chloropyridine, 4-chloropyridine, 2,6-dichloropyridine, and p-fluoroaniline). The reporting limit for the selected pyridines is 10 micrograms per liter (µg/L).

A preliminary review of the quality control sample results associated with the analytical results was performed for data quality assurance purposes. Sample results were reviewed for holding time compliance; instrument calibration; surrogate standard recoveries; blank contamination; and matrix

511 Congress Street
Portland, Maine 04112-7050
Telephone (207) 775-5401
Fax (207) 772-4762

spike blank (MSB) and matrix spike/matrix spike duplicate (MS/MSD) accuracy and precision. The results of the data review are discussed in the quality control section of this letter. Overall, the data quality appears to be very good based on the information reviewed.

Analytical Results

The results from the December 1997 canal and quarry monitoring event are presented in Attachment 2. Samples which were observed to contain one or more of the selected pyridines are summarized below; all results are expressed in µg/L.

Sample ID	2,6-DCPYR	2-CPYR	3-CPYR	4-CPYR
QO-2	2 J	9 J	ND	ND
QS-4	170 J	1000	3 J	1 J
SW-2	ND	2 J	ND	ND

Notes: J = Estimated value below reporting limit, but greater than zero.
CPYR = chloropyridine
2,6-DCPYR = 2,6-dichloropyridine

Canal surface water analysis indicated the results for the fourth quarter of 1997 were generally consistent with concentrations observed historically for the locations sampled. Only one location sampled (SW-2) in the Canal contained 2-chloropyridine. Historical results for samples collected from this location indicate trace concentrations (values above zero but below the laboratory quantitation limit) of this contaminant have been observed in the past. None of the Olin suite of selected pyridines were observed in the other canal locations sampled during the fourth quarter.

Results reported for the sample collected from the quarry seep (QS-4) continue to show elevated selected pyridine results relative to canal concentrations; however, results observed this quarter continue to indicate a decreasing trend in concentrations for the detected pyridines. Previous sampling of the quarry seep showed that concentrations of chloropyridines in groundwater from the quarry seep decreased to the north, away from QS-4. No chloropyridines were detected in the quarry pond inflow sample (QI-1). This sample represents a composited sample of the water flowing into the northern quarry pond.

Quality Control

As part of the December 1997 Canal and quarry water sampling program, one matrix spike/matrix spike duplicate (MS/MSD) sample and a field blank sample were collected as quality control samples. Overall, quality control results were acceptable, and no qualifying statements were necessary, except as noted below.

1. Positive 2-chloropyridine and 2,6-dichoropyridine results reported for QO-2 were qualified as estimated (J) and are considered biased high because recoveries observed for these compounds were observed above QC limits in the matrix spike blank and the MS/MSD analysis performed using QO-2.

Conclusions

Results from the fourth quarter 1997 canal surface water sampling program indicated the lack of the Olin suite of selected pyridines in four of the five surface water samples (SW-1, SW-3, SW-6 and SW-12) collected from established sampling locations along the Canal (see Figure 1). Chemical results reported for the quarry seep sample indicate a continued decrease in selected pyridine concentrations was observed.

No chloropyridines were detected in the quarry pond inflow sample (QI-1). This sample represents the water flowing into the northern quarry pond and is a mixture of groundwater from along the quarry seep. The concentrations of chloropyridines in the quarry outfall (QO-2) are estimated concentrations below the reporting limit of 10 µg/L.

The next quarterly sampling event is scheduled for February 1998.

If you have any questions or comments on the material described in this letter, please do not hesitate to contact me at (207) 828-3437.

Sincerely,

ABB ENVIRONMENTAL SERVICES, INC.

Thomas R. Eschner, R.G.
Project Manager/Principal Hydrogeologist

TRE/jpc
Attachments: Sample Location Maps - Attachment 1
Laboratory Data Summary Tables - Attachment 2
Chain of Custody Forms - Attachment 3

cc: N. Breton
J. Connolly
file 10.1

ATTACHMENT 1

SAMPLE LOCATION MAPS

T:\7311-34\7311F501 C&P 4/1/97

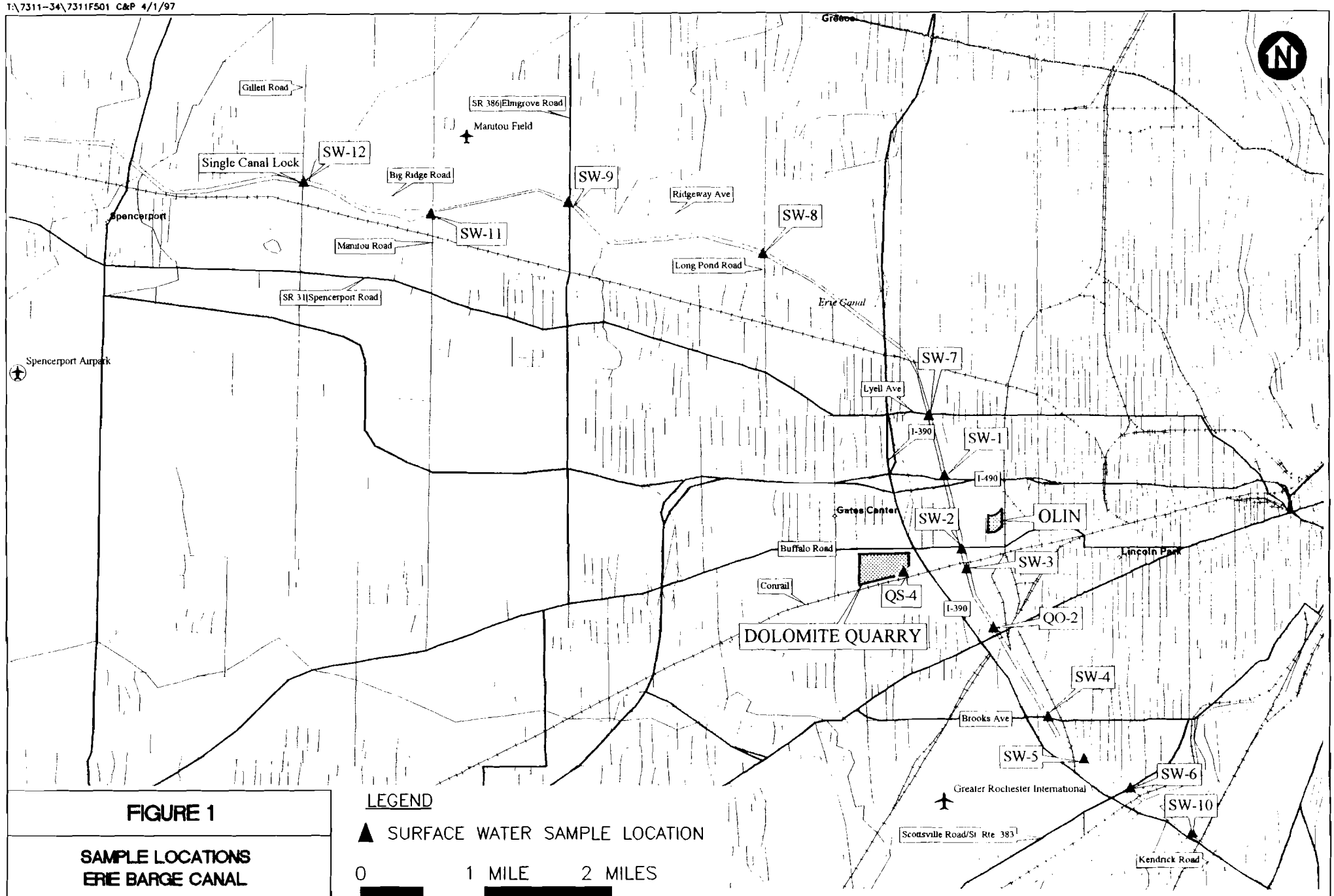


FIGURE 1

SAMPLE LOCATIONS
ERIE BARGE CANAL

OLIN CHEMICALS
ROCHESTER, N.Y.

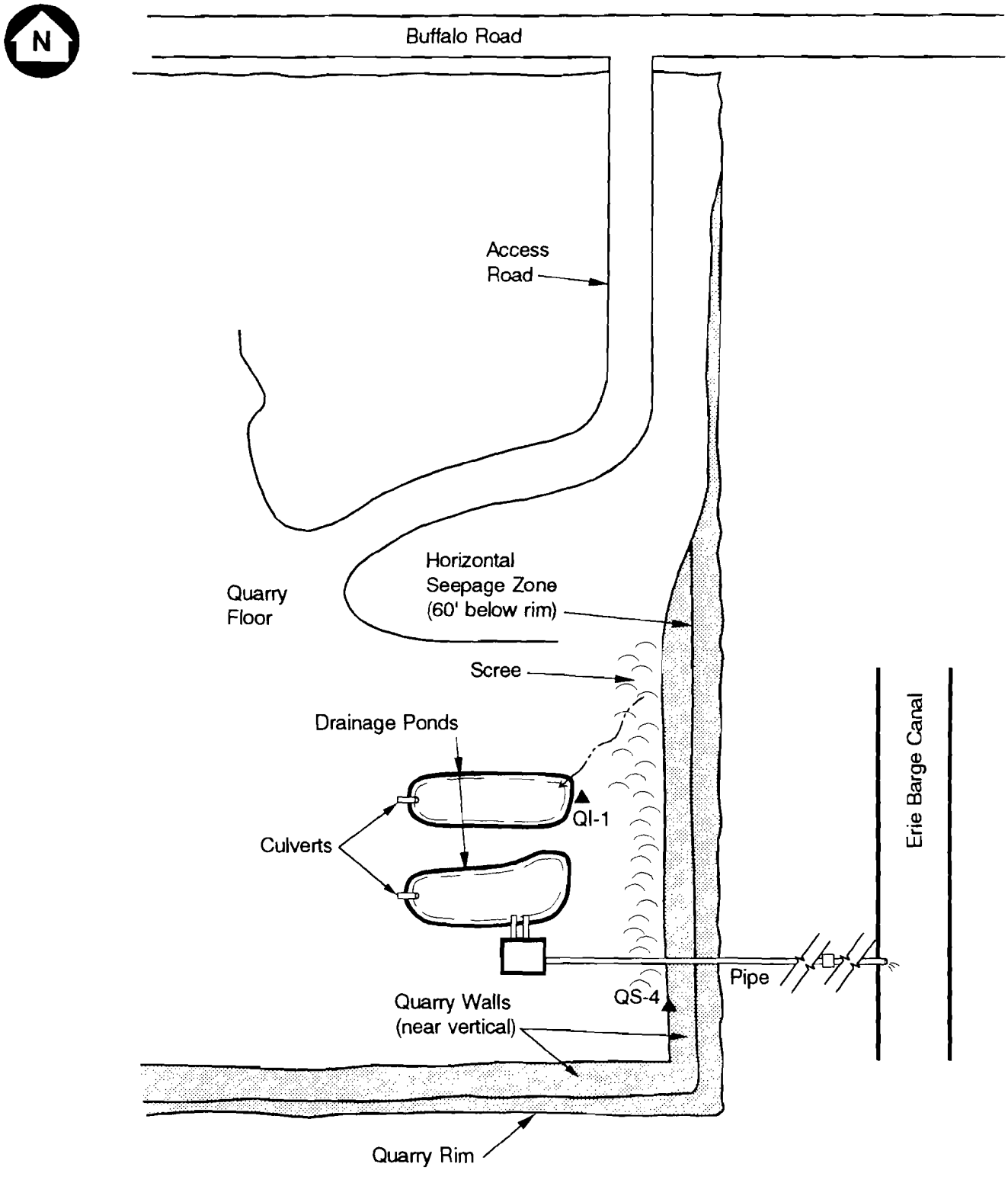
LEGEND

▲ SURFACE WATER SAMPLE LOCATION

0 1 MILE 2 MILES

SCALE: 1"=1 MILE

SOURCE: DeLorme Mapping 1995



Legend

QS-4 ▲ Seep Sample Location

QI-1 ▲ Pond Inflow Sample Location

Not to Scale

FIGURE 2

SAMPLE LOCATIONS
DOLOMITE PRODUCTS
QUARRY

OLIN CHEMICALS
PHASE II RI REPORT ADDENDUM
ROCHESTER, NEW YORK

W9801019

ATTACHMENT 2

LABORATORY DATA SUMMARY TABLES

Olin Chemicals
Rochester, NY
December 1997 Sampling Event

Selected Pyridine ASP91 Analysis (ug/L)

LOCATION		QI-1	QO-2	QO-2S1	QS-4	SW-1	SW-12	SW-2	SW-3
LAB ID		A7450407	A7450408	A7450409	A7450406	A7450401	A7450405	A7450402	A7450403
LABORATORY		Recra	Recra	Recra	Recra	Recra	Recra	Recra	Recra
DATE SAMPLED		12/4/97	12/4/97	12/4/97	12/4/97	12/4/97	12/4/97	12/4/97	12/4/97
SAMPLE TYPE		FS	FS	FS	FS	FS	FS	FS	FS
PARAMETER (ug/L)	RL								
2,6-Dichloropyridine	10	10 U	2 J	10 U	170 J	10 U	10 U	10 U	10 U
2-Chloropyridine	10	10 U	9 J	10 U	1000	10 U	10 U	2 J	10 U
3-Chloropyridine	10	10 U	10 U	10 U	3 J	10 U	10 U	10 U	10 U
4-Chloropyridine	10	10 U	10 U	10 U	1 J	10 U	10 U	10 U	10 U
p-Fluoroaniline	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyridine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

NOTES:

FS = Field Sample

RB = Rinse Blank

U = Compound was analyzed, but not detected at or above associated numerical value.

J = Estimated Value

ASP91 = New York State Analytical Services Protocol

Olin Chemicals
Rochester, NY
December 1997 Sampling Event

Selected Pyridine ASP91 Analysis (ug/L)

LOCATION		SW-3 FD	SW-6	FIELD BLANK
LAB ID		A7450403	A7450404	A7450410
LABORATORY		Recra	Recra	Recra
DATE SAMPLED		12/4/97	12/4/97	12/4/97
SAMPLE TYPE		FD	FS	RB
PARAMETER (ug/L)	**RL**			
2,6-Dichloropyridine	10	10 U	10 U	10 U
2-Chloropyridine	10	10 U	10 U	10 U
3-Chloropyridine	10	10 U	10 U	10 U
4-Chloropyridine	10	10 U	10 U	10 U
p-Fluoroaniline	10	10 U	10 U	10 U
Pyridine	10	10 U	10 U	10 U

ATTACHMENT 3

CHAIN OF CUSTODY FORMS

RECRA LABNET, a division of Recra Environmental, Inc.

CHAIN OF CUSTODY RECORD

PROJECT NO	SITE NAME
5A5762	OLIN ROCH RI

SAMPLERS (SIGNATURE): Jeff Lahn / J. Ricicus

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	1L AMBER PYRIDINE (solid)						REMARKS
1	12-4-97	1200		X	SW-1	2	2						
2		1340			SW-2	2	2						
3		1320			SW-3	4	4						FIELD DUPLICATE
4		1140			SW-6	2	~~2~~			JJ			~~MS/MSD~~
5		1240			SW-12	2	2						
6		1015			QS-4	2	2						
7		1025			QI-1	2	2						
8		1100			QO-2	5	5						MS/MSD
9		1120			QO-2SI *	2	2						* ~~Read only 1X1L amber~~ 12/4/97
10	↓	1115		↓	FIELD BLANK	2	2						
						25							

RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)
Jeff Lahn	12-4-97 1530				
RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE / TIME	REMARKS	
				Cooler # 3	

Distribution: Original accompanies shipment copy to coordinator field files

0034

Piezometric Data: Olin Rochester Dec-97

WELL	EASTING	NORTHING	GW_ELEV ft-msl	ZONE
B-1	744301	1150506	528.47	Overburden
B-10	744886	1149653	528.69	Overburden
B-11	744958	1149723	531	Overburden
B-13	744317	1149548	DRY @ 13.00 FT.	Overburden
B-14	744465	1149561	525.62	Overburden
B-15	744578	1149562	524.41	Overburden
B-16	744751	1149566	not meas	Overburden
B-17	744642	1149803	528.59	Overburden
B-2	744303	1150347	528.96	Overburden
B-3	744304	1150205	529.64	Overburden
B-4	744302	1150056	529.07	Overburden
B-5	744302	1149926	529.15	Overburden
B-7	744381	1149579	524.28	Overburden
B-8	744512	1149578	524.28	Overburden
B-9	744692	1149582	526.99	Overburden
C-1	744828	1150148	531.36	Overburden
C-2A	744825	1149858	530.14	Overburden
C-3	744699	1150147	530.98	Overburden
C-4	744754	1149978	DRY @ 9.22 FT.	Overburden
C-5	744579	1149734	524.6	Overburden
E-1	744965	1149750	529.9	Overburden
E-2	744968	1149924	533.58	Overburden
E-3	744962	1150203	531.72	Overburden
E-4	744961	1150392	DRY @ 2.95 FT.	Overburden
E-5	744943	1150532	533.95	Overburden
EC-1	743581	1149215	521.06	Overburden
EC-2	743457	1148724.9	DRY @ 12.80 FT.	Overburden
MW-103	745135.42	1150219.29	531.84	Overburden
MW-104	744588.18	1149096.45	529.29	Overburden
MW-105	744167.08	1149328.34	DRY @ 18.95 FT.	Overburden
MW-106	744058.26	1149765.85	524.98	Overburden
MW-107	743670.06	1150479.14	525.47	Overburden
MW-108	743664.22	1150065.58	525.81	Overburden
MW-114	745139.13	1148999.32	526.14	Overburden
MW-2	744460.19	1150564.06	530.97	Overburden
MW-3	744309.06	1150635.55	530.09	Overburden
MW-G6	744200.58	1150806.6	530.77	Overburden
MW-G8	744005.21	1150589.41	527.21	Overburden
MW-G9	743626.16	1150700.55	530.85	Overburden
N-1	744797	1150534	534.06	Overburden
N-2	744663	1150532	533.48	Overburden
N-3	744537	1150522	531.94	Overburden
PZ-101	744226.08	1150063.43	528.33	Overburden
PZ-108	744967	1149660	530.56	Overburden
S-1	744465	1149578	525.61	Overburden
S-2	744584	1149579	532.01	Overburden
S-3	744759	1149597	527.42	Overburden
S-4	744907	1149680	529.26	Overburden
W-1	744301	1150498	527.48	Overburden
W-2	744304	1150251	527.29	Overburden
W-3	744307	1150142	532.16	Overburden
W-4	744308	1149987	531.85	Overburden
W-5	744304	1149730	528.09	Overburden
W-6	744313	1149578	526.3	Overburden

Piezometric Data: Olin Rochester Dec-97

BR-105D	744183.87	1149325.68	503.13	Deep Bedrock
BR-111D	743206.81	1149846.76	502.09	Deep Bedrock
BR-112D	743357.43	1149253	502.45	Deep Bedrock
BR-113D	743458.97	1148704.29	502.47	Deep Bedrock
BR-116D	744019.01	1147297.57	501.82	Deep Bedrock
BR-117D	741010.87	1147606.85	495.03	Deep Bedrock
BR-118D	740974.5	1147291.51	496.21	Deep Bedrock
BR-119D	740851.35	1146669.93	498.32	Deep Bedrock
BR-120D	740188.52	1146929.38	497.43	Deep Bedrock
BR-121D	739994.56	1147353.28	496.51	Deep Bedrock
BR-122D	742965.57	1148062.15	500.84	Deep Bedrock
BR-123D	743551.83	1147218.89	501.1	Deep Bedrock
BR-124D	744244.66	1146161.23	499.82	Deep Bedrock
BR-2D	744803	1149850	526.91	Deep Bedrock
BR-3D	744595	1149728	455.55	Deep Bedrock
BR-1	744790	1150533	530.29	Bedrock
BR-101	744667.01	1150160.39	531.75	Bedrock
BR-102	744318.49	1150208.75	516.28	Bedrock
BR-103	745135.04	1150224.7	529.58	Bedrock
BR-104	744593.99	1149095.97	528.66	Bedrock
BR-105	744174.6	1149326.99	511.36	Bedrock
BR-106	744046.17	1149764.09	507.12	Bedrock
BR-107	743671.08	1150473.93	not meas	Bedrock
BR-108	743660.52	1150057.89	511.75	Bedrock
BR-111	743206.54	1149839.08	506.7	Bedrock
BR-112A	743367.38	1149224.41	515.91	Bedrock
BR-113	743457.71	1148716.61	502.61	Bedrock
BR-114	745138.77	1148994.04	524.34	Bedrock
BR-116	744009.16	1147280.72	513.85	Bedrock
BR-117	741024.65	1147585.02	513.31	Bedrock
BR-118	740953.73	1147306.56	513.99	Bedrock
BR-2	744818	1149860	478.21	Bedrock
BR-2A	744828.14	1149853.14	529.91	Bedrock
BR-3	744582	1149728	526.49	Bedrock
BR-4	744961	1149899	532.18	Bedrock
BR-5	744962	1150215	531.27	Bedrock
BR-5A	744954	1150217	532.42	Bedrock
BR-6	744603	1149602	526.54	Bedrock
BR-6A	744583.18	1149605.23	517.04	Bedrock
BR-7	744322	1149662	519.39	Bedrock
BR-7A	744327.98	1149658.77	501.96	Bedrock
BR-8	744325	1149928	529.29	Bedrock
BR-9	744318.63	1150210.4	505.29	Bedrock
CANAL	743273.65	1149049.08	502.54	Bedrock
NESS-E	744349.2	1148802.75	500.24	Bedrock
NESS-W	743964.28	1148805.43	513.04	Bedrock
PZ-102	744225.66	1149951.16	520.3	Bedrock
PZ-103	744237.71	1149791.36	527.75	Bedrock
PZ-104	744318.3	1149460.33	522.29	Bedrock
PZ-105	744448.43	1149588.39	523.66	Bedrock
PZ-106	744800.61	1149711.4	527.5	Bedrock
PZ-107	744851.4	1149632.87	527.01	Bedrock

LEGEND

OLIN PROPERTY

500 — BEDROCK GROUNDWATER ELEVATION CONTOUR (MSL)

BR-114D — BEDROCK WELL ('D' DESIGNATES DEEP WELL)

(500.0) — PIEZOMETRIC ELEVATION AT DEEP BEDROCK WELL

MW — OVERBURDEN WELL

INTERPRETED GROUNDWATER FLOW DIRECTION (DEEP BEDROCK GROUNDWATER SYSTEM)

NOTES:

1. WATER LEVELS MEASURED DECEMBER 3, 1997
2. DASHED CONTOURS REFLECT LOWER DATA DENSITY

N

ERIE BARGE CANAL

I-390

HOWARD ROAD

BUFFALO ROAD

LETTINGTON DRIVE

McKEE ROAD

FIRTH RIXSON

OLIN

KODAK

AID TO HOSPITALS

KODAK

CUMBERLAND FARMS PETROLEUM TERMINAL

NESS

GENERAL RAIL SIGNAL CO.

PFAUDLER

DOLOMITE PRODUCTS QUARRY

MORIE WELL

BR-107, BR-9, BR-108, BR-111, BR-111D (502.09), BR-103, BR-20, BR-68, BR-106, MW-PZ-106, BR-105D (503.13), BR-105, BR-112, BR-112D (502.45), BR-104, BR-114, BR-113, BR-113D (502.47), 12-6 (NM), 8-6 (NM), 7-6 (NM), OW-105 (NM), 11-6 (NM), RW-1 (NM), 9-6 (NM), 10-6 (NM), 13-4 (NM), OW-102A (NM), BR-122D (500.84), OW-103 (NM), BR-117D (495.03), BR-117, BR-118, BR-118D (496.21), BR-121D (496.51), BR-120D (497.43), BR-119D (498.32), BR-123D (501.10), BR-116, BR-116D (501.82), BR-124D (499.82)

496 498 500 502

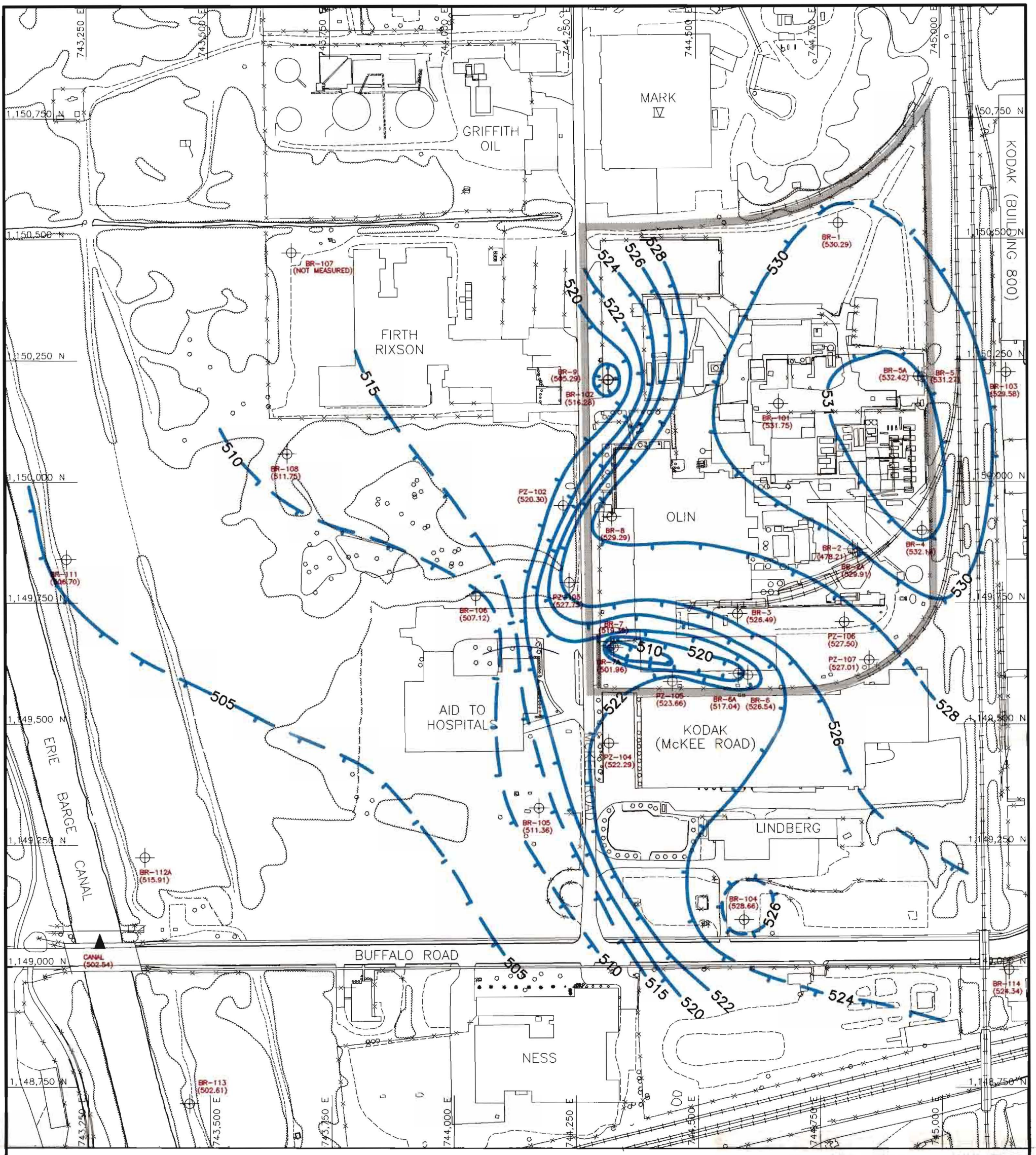
Scale in Feet
0 500 1000

Source:
USGS Topographic Quadrangle 7.5-Minute Series; Rochester West, N.Y., 1971 (Photorevised 1978).

DECEMBER 1997
DEEP BEDROCK GROUNDWATER
INTERPRETED PIEZOMETRIC CONTOURS

OLIN CHEMICALS
ROCHESTER, N.Y.

J:\7311-52\7311F006.DWG 2-5-98



LEGEND

- OUTLINE OF OLIN PROPERTY BOUNDARY
- 525 — BEDROCK GROUNDWATER ELEVATION CONTOUR (MSL)
- INTERPRETED GROUNDWATER FLOW DIRECTION (SHALLOW BEDROCK SYSTEM)
- BR-113 (502.61) — PIEZOMETRIC ELEVATION AT WELL OR PIEZOMETER (MSL)
- CANAL (502.54) — PIEZOMETRIC ELEVATION AT SURFACE WATER MEASUREMENT POINT

NOTE:

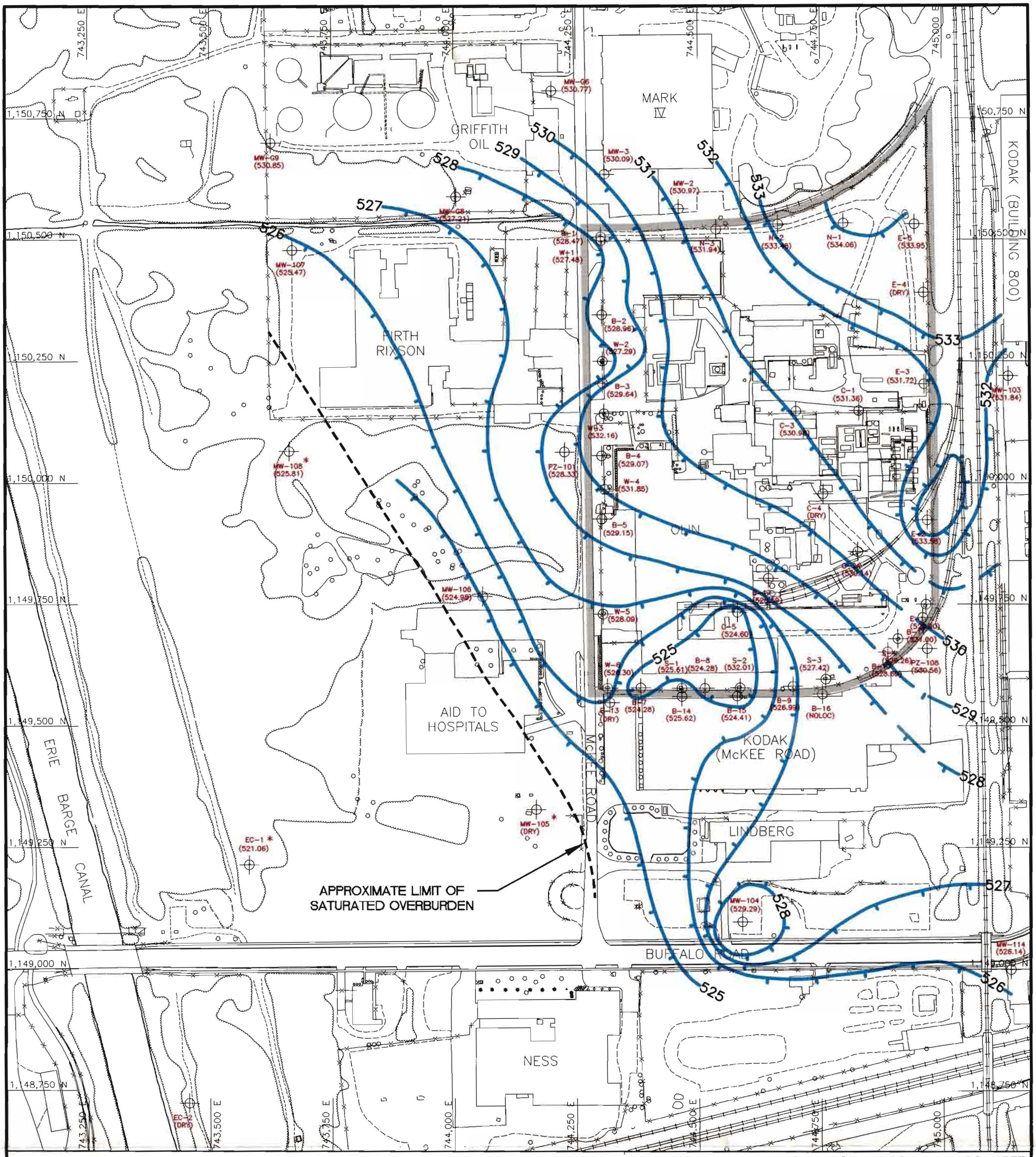
1. WATER LEVELS MEASURED ON DECEMBER 3, 1997
2. CONTOUR INTERVALS VARY.

SCALE: 1" = 200'

DECEMBER 1997 BEDROCK GROUNDWATER INTERPRETED PIEZOMETRIC CONTOURS

OLIN CHEMICALS
ROCHESTER, N.Y.

J:\7311-52\7311F002.DWG 2-12-98



LEGEND

- OUTLINE OF OLIN PROPERTY BOUNDARY
- 525 — OVERBURDEN GROUNDWATER ELEVATION CONTOUR (MSL)
- 525.76 — PIEZOMETRIC ELEVATION AT WELL OR PIEZOMETER (MSL)
- 520.25* — PIEZOMETRIC ELEVATION AT WELL SCREENED IN OVERBURDEN AND SHALLOW BEDROCK; WATER LEVEL IS BELOW BEDROCK SURFACE.
- INTERPRETED GROUNDWATER FLOW DIRECTION

NOTE:

1. WATER LEVELS MEASURED ON DECEMBER 3, 1997
2. CONTOURS ARE INTERPRETIVE. SOME MEASUREMENTS HAVE BEEN DISCOUNTED WHERE THEY APPEAR ANOMALOUS.

DECEMBER 1997 OVERBURDEN GROUNDWATER INTERPRETED PIEZOMETRIC CONTOURS

OLIN CHEMICALS
ROCHESTER, N.Y.

J:\7311-52\7311F004.DWG 2-12-98

ASEA BROWN BOVERI

February 6, 1998

Mr. Michael Bellotti
Olin Chemicals Corporation
PO Box 248, Lower River Road
Charleston, TN 37310

Subject: Olin Rochester Site - December 1997 Groundwater Sampling Results

Dear Mr. Bellotti:

This letter presents the results of chemical analysis and describes the sampling, analytical methodology, and analytical quality control for groundwater sampling conducted in December 1997 as follow up to the Phase II Remedial Investigation for the Olin Chemicals (Olin) Rochester site. Groundwater sampling results are enclosed for the samples collected from selected bedrock wells located on the Pfaudler and Dolomite Products Company (Dolomite) quarry properties, and the newly installed wells located opposite the Pfaudler property along the Erie Barge Canal (canal).

Sampling

Groundwater samples were collected from the bedrock wells for analysis for selected pyridines, intrinsic remediation parameters, and volatile organic compounds (VOCs) on December 18 and December 19, 1997. Samples were collected by Recra Environmental, Inc. (Recra) and submitted to Recra and ABB Environmental Services, Inc. (ABB-ES) treatability laboratory for analysis. The locations of these sampling points are shown in Figure 1, and the analytical program for these wells is tabulated below.

			ANALYTICAL PROGRAM		
WELL	**LOCATION**	**ZONE**	**Pyridines**	**VOCs**	**Intrinsic**
BR-116D	Pfaudler	BRD	X	X	X
BR-121D	Dolomite quarry	BRD	X	X	X
BR-122D	Canal	BRD	X	X	X
BR-123D	Canal	BRD	X	X	X
BR-124D	Canal	BRD	X	X	X

NOTES:

BRD = deep bedrock
Pyridines & VOCs: ASP 95 methodology
Intrinsic Remediation parameters: 40 CFR Part 136 and 8015 Modified

ABB Environmental Services, Inc.

511 Congress Street
Portland, Maine 04112-7050
Telephone (207) 775-5401
Fax (207) 772-4762

Quarry well BR-121D on Dolomite property, which had been vandalized during the spring of 1997, was repaired and redeveloped in November 1997. Canal wells BR-122D through BR-124D were installed in November 1997 to delineate the southern boundary of contaminated groundwater migrating towards the quarry.

Analytical Procedures and Data Review

All groundwater samples were analyzed for the Olin suite of selected pyridines (pyridine, 2-chloropyridine, 3-chloropyridine, 4-chloropyridine, 2,6-dichloropyridine, and p-fluoroaniline), VOCs, and intrinsic remediation parameters. Intrinsic remediation parameters are indicator parameters and dissolved gases that can be used to evaluate the physical, chemical, and biological processes that act to reduce mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These parameters had been sampled during March or May 1997 for 20 other off-site wells, and reported in Quarterly Report No. 15, dated September 18, 1997.

Selected pyridines and volatile organics were analyzed in accordance with the 1995 New York State Category B Analytical Services Protocols (ASP 95-2 and ASP 95-1). Intrinsic remediation parameters were analyzed to support the off-site groundwater feasibility study (FS), and included the following: ammonia, chloride, nitrate, sulfate, sulfide, total alkalinity, total organic carbon, and total and soluble iron (Recra); and methane, ethane, ethene, and carbon dioxide (ABB-ES' treatability laboratory). USEPA CFR Part 136 "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act" methodology were used for the parameters analyzed at Recra, whereas the USEPA SW-846 modified method 8015 procedure was used by the ABB-ES laboratory for the dissolved gases.

A preliminary review of the quality control sample results associated with the analytical results was performed for data quality assurance purposes. Sample results were reviewed for holding time compliance, surrogate standard recoveries, blank contamination, matrix spike blank/matrix spike blank duplicate (MSB/MSBD) and matrix spike/matrix spike duplicate (MS/MSD) accuracy and precision, and field duplicate precision. Overall, the data quality appears to be very good based on the quality control items reviewed. The results of the data review are discussed in the quality control section of this letter.

Analytical Results

The validated results from the December 1997 monitoring event were tabulated and are provided in Attachment 1. A summary of analytical findings are presented below by compound class.

Selected Pyridines. Selected pyridines were detected in groundwater sampled from all the wells with the exception of groundwater collected along the canal from BR-124D, the southernmost of the three newly-installed wells. Selected pyridines detected include 2,6-dichloropyridine, 2-chloropyridine, and 4-chloropyridine. Selected pyridine concentrations ranged from estimated low level parts per billion (ppb) to several hundred ppb, with the lowest concentrations observed in the quarry well BR-121D and highest concentrations detected in well BR-116D (Pfaudler property) and BR-123D (opposite BR-116D along the canal).

VOCs. Low concentrations (detected below or slightly above the quantitation limit) of VOCs were detected from three of the five wells sampled during December 1997. Groundwater collected from BR-116D on the Pfaudler property and two wells located along the canal (BR-122D and BR-123D) contained both chlorinated (e.g., 1,1-dichloroethane, chloroethane) and aromatic volatiles (e.g., benzene). Groundwater collected from BR-123D also contained estimated amounts of trichloroethene and tetrachloroethene (2 ug/L each). VOCs detected in the groundwater collected from the Pfaudler property well in December 1997 were generally consistent with concentrations detected in the past; however, several VOCs identified in previous sampling events were not detected in December.

Intrinsic Remediation Parameters. Groundwater samples were tested for a suite of parameters to aid in the off-site FS currently being conducted at the site. The intrinsic remediation parameters will be evaluated as part of the FS to determine whether conditions are favorable for biodegradation. Generally, results for most of the wells sampled in this event were similar. Concentrations for most of the measured parameters observed in the sample from canal well BR-124D, however, were substantially higher than in the majority of other wells.

Quality Control

As part of the December 1997 off-site groundwater sampling program, two trip blank samples (one for each day of sampling), MS/MSD samples, field duplicate sample pair, and a field blank were collected as quality control samples. All analytical holding times were met, field duplicate precision was met, and no target compounds were reported in the trip blanks or field blank. With exceptions noted below, QC findings noted during data review were favorable and did not require any qualifying statements.

- Matrix spike blank and matrix spike/matrix spike duplicate analyses for the selected pyridine analysis indicated poor recovery (less than 10 percent) for p-fluoroaniline, and high recovery for 2-chloropyridine, 3-chloropyridine, and 2,6-dichloropyridine. All non-detected sample results for p-fluoroaniline were rejected (R), and positive results for the pyridines noted above were qualified as estimated (J).

  Total iron was observed below the matrix spike recovery limit during metals analysis. All associated total iron sample results were qualified as estimated (J).

In summary, results qualified as estimated (J) by either the laboratory or during data review are not considered to have a negative impact on data usability. Results qualified during data review as rejected (R), however, are not considered usable (compound may or may not be present).

Conclusions

Results from the December 1997 off-site canal, Dolomite quarry, and Pfaudler property groundwater sampling event indicate that concentrations of the selected pyridines were consistent with historical results observed in the Pfaudler property well (BR-116D) and Quarry well (BR-121D). Concentrations of pyridines and VOCs detected in the sample collected from BR-123D, just opposite from BR-116D, were comparable to groundwater concentrations detected at BR-116D.

Pyridines and VOCs were absent from groundwater collected further south along the canal in BR-124D. Results from this well corroborate the understanding that contamination migrates west toward the quarry, rather than continuing south.

Intrinsic remediation parameter results indicate that groundwater from BR-124D contained the highest concentrations for the majority of parameters, most being one or more orders of magnitude

greater than those observed in the other wells. Concentrations observed in the other wells were generally comparable to each other.

If you have any questions or comments on the material described in this letter, please feel free to contact me at (207) 828-3437.

Sincerely,

ABB ENVIRONMENTAL SERVICES, INC.

Thomas R. Eschner, R.G.
Project Manager/Principal Hydrogeologist

TRE/jpc

Attachments: Figure 1 - Off-Site Groundwater Monitoring Well Locations
Attachment 1 - Laboratory Data Summary Table
Attachment 2 - Chain of Custody Forms

cc: J. Connolly
N. Breton

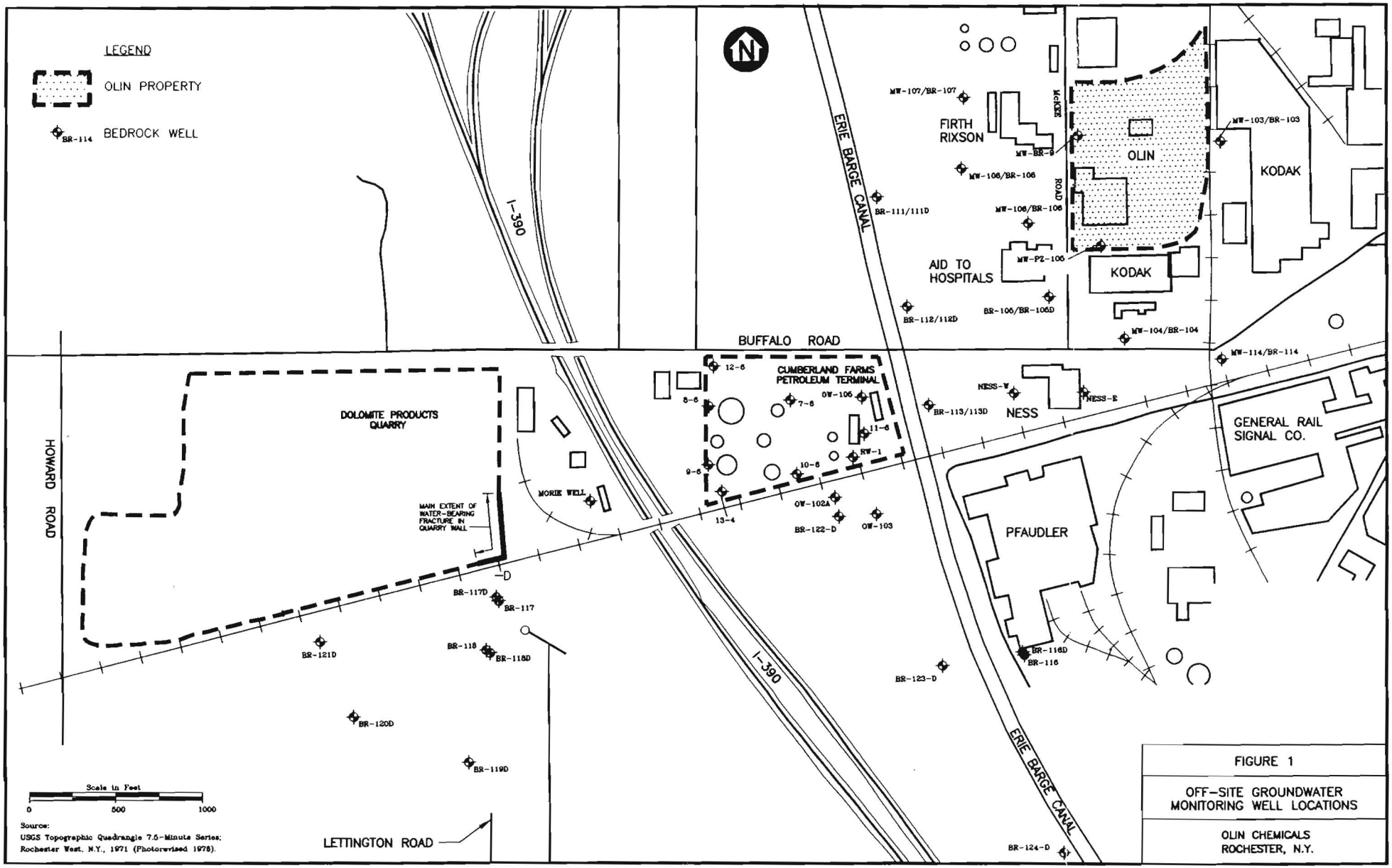


FIGURE 1

OFF-SITE GROUNDWATER MONITORING WELL LOCATIONS

OLIN CHEMICALS
ROCHESTER, N.Y.

T:\7311-34\7311F106.DWG 1-23-96

ATTACHMENT 1

LABORATORY DATA SUMMARY TABLE

Olin Chemicals
Rochester, NY
December 1997 Groundwater Sampling Event

December 1997 Groundwater Monitoring Results

LOCATION		BR-116D	BR-121D	BR-122D	BR-122D FD	BR-123D	BR-124D	FIELD BLANK
LABORATORY ID		A7475702	A7475703	A7475502	A7475502FD	A7475503	A7475504	A7475704
DATE SAMPLED		12/19/97	12/19/97	12/18/97	12/18/97	12/18/97	12/18/97	12/19/97
TYPE		FS	FS	FS	FD	FS	FS	FB
1,1,1-Trichloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10	4 J	10 U	21	20	8 J	10 U	10 U
1,1-Dichloroethene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (Total)	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10	14	10 U	15	14	10	10 U	10 U
Bromodichloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10	2 J	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	5 J	4 J	10 U	10 U	10 U
Chloroform	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene chloride	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10	10 U	10 U	10 U	10 U	2 J	10 U	10 U
Toluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Xylenes	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10	10 U	10 U	10 U	10 U	2 J	10 U	10 U
Vinyl chloride	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tentatively Identified Compounds (TICs)								
Tert Butyl Methyl Ether (CAS No. 1634-04-4)		230 JN	ND	15 JN	16 JN	110 JN	ND	ND

Olin Chemicals
Rochester, NY
December 1997 Groundwater Sampling Event

December 1997 Groundwater Monitoring Results

LOCATION		BR-116D	BR-121D	BR-122D	BR-122D FD	BR-123D	BR-124D	FIELD BLANK
LABORATORY ID		A7475702	A7475703	A7475502	A7475502FD	A7475503	A7475504	A7475704
DATE SAMPLED		12/19/97	12/19/97	12/18/97	12/18/97	12/18/97	12/18/97	12/19/97
TYPE		FS	FS	FS	FD	FS	FS	FB
Selected Pyridines by ASP 95-2 (ug/L)								
2,6-Dichloropyridine	10	47 J	10 U	12 J	9 J	30 J	10 U	10 U
2-Chloropyridine	10	340 J	1 J	150 J	130 J	250 J	10 U	10 U
3-Chloropyridine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloropyridine	10	10 U	10 U	2 J	1 J	10 U	10 U	10 U
p-Fluoroaniline	10	R	R	R	R	R	R	10 U
Pyridine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Intrinsic Analytes (mg/L)								
Total Organic Carbon	1.0	4.7	1.6	3.2	3.8	4.0	1.1	1.0 U
Sulfide	1.0	4.8	1.2	6.4	6.8	6.8	192	1.0 U
Sulfate	1.0	117	96.5	264	257	196	2450	1.0 U
Nitrate	0.050	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Ammonia	0.050	0.870	0.100	0.680	0.660	0.850	8.100	0.050 U
Chloride	1.0	141	44.3	271	276	188	18600	1.0 U
Total Alkalinity	5.0	389	241	277	265	380	358	5.0 U
Methane	0.003	1.272	0.151	1.719	NA	4.511	7.284	0.003 U
Ethane	0.008	0.107	0.095	0.232	NA	0.943	5.080	0.008 U
Ethene	0.013	0.013 U	0.013 U	0.013 U	NA	0.013 U	0.013 U	0.013 U
Carbon Dioxide	calc.	431	255	307	NA	405	290	NA
Metals (ug/L)								
Iron - Soluble	30	97.7 B	5780 J	30 U	30 U	145	92.6 B	30 U
Iron - Total	30	712 J	4160 J	30 U	30 U	251 J	33000 J	30 U
Field Parameters								
pH		7.45	7.92	7.39	7.39	6.57	6.90	NA
Conductivity(umhos/cm)		1600	1000	1800	1800	2000	66000	NA
Temperature (deg C)		13.8	10.6	9.9	9.9	10.6	12.1	NA
Oxidation/Reduction Potential, Eh (mv)		-250.1	-153.1	-217.1	-217.1	-274.2	-354.6	NA
Dissolved Oxygen (ppm)		1.2	1	ND	ND	ND	ND	NA

Olin Chemicals
Rochester, NY
December 1997 Groundwater Sampling Event

LOCATION		Trip Blank	Trip Blank
LABORATORY ID		A7475501	A7475701
DATE SAMPLED		12/18/97	12/19/97
TYPE		TB	TB
1,1,1-Trichloroethane	10	10 U	10 U
1,1,2,2-Tetrachloroethane	10	10 U	10 U
1,1,2-Trichloroethane	10	10 U	10 U
1,1-Dichloroethane	10	10 U	10 U
1,1-Dichloroethene	10	10 U	10 U
1,2-Dichloroethane	10	10 U	10 U
1,2-Dichloroethene (Total)	10	10 U	10 U
1,2-Dichloropropane	10	10 U	10 U
2-Butanone	10	10 U	10 U
2-Hexanone	10	10 U	10 U
4-Methyl-2-pentanone	10	10 U	10 U
Acetone	10	10 U	10 U
Benzene	10	10 U	10 U
Bromodichloromethane	10	10 U	10 U
Bromoform	10	10 U	10 U
Bromomethane	10	10 U	10 U
Carbon Disulfide	10	10 U	10 U
Carbon Tetrachloride	10	10 U	10 U
Chlorobenzene	10	10 U	10 U
Chloroethane	10	10 U	10 U
Chloroform	10	10 U	10 U
Chloromethane	10	10 U	10 U
cis-1,3-Dichloropropene	10	10 U	10 U
Dibromochloromethane	10	10 U	10 U
Ethylbenzene	10	10 U	10 U
Methylene chloride	10	10 U	10 U
Styrene	10	10 U	10 U
Tetrachloroethene	10	10 U	10 U
Toluene	10	10 U	10 U
Total Xylenes	10	10 U	10 U
trans-1,3-Dichloropropene	10	10 U	10 U
Trichloroethene	10	10 U	10 U
Vinyl chloride	10	10 U	10 U
Tentatively Identified Compounds (TICs)			
Tert Butyl Methyl Ether (CAS No 1634-04-4)		ND	ND

Olin Chemicals
Rochester, NY
December 1997 Groundwater Sampling Event

LOCATION		Trip Blank	Trip Blank
LABORATORY ID		A7475501	A7475701
DATE SAMPLED		12/18/97	12/19/97
TYPE		TB	TB
Selected Pyridines by ASP 95-2 (ug/L)			
2,6-Dichloropyridine	10	NA	NA
2-Chloropyridine	10	NA	NA
3-Chloropyridine	10	NA	NA
4-Chloropyridine	10	NA	NA
p-Fluoroaniline	10	NA	NA
Pyridine	10	NA	NA
Intrinsic Analytes (mg/L)			
Total Organic Carbon	1.0	NA	NA
Sulfide	1.0	NA	NA
Sulfate	1.0	NA	NA
Nitrate	0.050	NA	NA
Ammonia	0.050	NA	NA
Chloride	1.0	NA	NA
Total Alkalinity	5.0	NA	NA
Methane	0.003	0.003 U	0.003 U
Ethane	0.008	0.008 U	0.008 U
Ethene	0.013	0.013 U	0.013 U
Carbon Dioxide	calc.	NA	NA
Metals (ug/L)			
Iron - Soluble	30	NA	NA
Iron - Total	30	NA	NA
Field Parameters			
pH		NA	NA
Conductivity(umhos/cm)		NA	NA
Temperature (deg C)		NA	NA
Oxidation/Reduction Potential, Eh (mv)		NA	NA
Dissolved Oxygen (ppm)		NA	NA

ATTACHMENT 2

CHAIN OF CUSTODY FORMS

RECRA LABNET, a division of Recra Environmental, Inc.

CHAIN OF CUSTODY RECORD

PROJECT NO	SITE NAME
SA5762	OLIN ROCH

SAMPLERS (SIGNATURE): Jeff Yohe / K. FAUST

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	1L AMBER @ PYRIDINE (0108)	80z PLASTIC TOC/NH3/NO2 (0102)	1602 PLASTIC S- (0106)	80z PLASTIC ALK (2810 HEADSPACE)	40z PLASTIC SFe (1101)	40z PLASTIC TFe (0101)	80z PLASTIC 504/Cl (0100)	40 ml VIAL UOC (0102)	REMARKS
1	12-18-97	0800		x	TRIP BLANK	2								2	
2	↓	1206		x	BR-122D	20	4	2	2	2	2	2	2	4	DUPLICATE
3		1333		x	BR-123D	10	2	2	2	1	1	1	1	2	JJ
4	↓	1445		x	BR-124D	10	2	1	1	1	1	1	1	2	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
Jeff Yohe	12-18-97 1745				
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE/TIME	REMARKS	
				Cool [illegible] 3c	

Distribution: Original accompanies shipment copy to coordinator field files

000134

RECRA LABNET, a division of Recra Environmental, Inc.

CHAIN OF CUSTODY RECORD

PROJECT NO: 5A5762

SITE NAME: OLN ROCH

SAMPLERS (SIGNATURE):

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	40ML VIAL VOC (0100)	1L AMBER PYRIDINES (0100)	8oz PLASTIC TOC/NH3/NO (0102)	16oz PLASTIC S- (0106)	8oz PLASTIC BLK CZECH HEADSPACE	4oz PLASTIC TFE (Wet)	4oz PLASTIC TFE (0101)	8oz PLASTIC SO4/Cl (0100)	REMARKS
1	12-19-97	0730		X	TRIP BLANK	2	2								
2		1039			BR-116D	30	6	6	3	3	3	3	3	3	MS/MSD
3		1324			BR-121D	10	2	2	1	1	1	1	1	1	
4	↓	1105		↓	FIELD BLANK	10	2	2	1	1	1	1	1	1	
						52									

RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)
Jeff Yohe	12-19-97 1600	P Carlson			
RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE / TIME	REMARKS	
				cooler 4°C	

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