Olin

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January 21,2000

Mr. William Wertz
New York State Dept. of Environmental. Conservation
Division of Solid Waste Management
50 Wolf Road
Albany, New York 12233

re: Quarterly Report: Olin Chemicals
Buffalo Ave. Facility, Niagara Falls, NY

Dear Mr. Wertz:

This is the ninth Quarterly report, as required by Olin's Administrative Order on Consent (AOC) for our Niagara Falls Plant, (Index #R9-4171-94-08, Site Registry #9-32-051A, and B). The timeframe for this report covers the period from October 1 through December 31, 1999.

Operation / Maintenance issues :

- O&M Documentation: Details of the implementation of routine maintenance tasks and trouble shooting activities are included in the monthly memoranda from Olin's consultant, Law Engineering and Environmental Services, included as ***Attachment 1***. While the monthly O&M reports document details of all issues, the most significant O&M issues are described below:

- Transducer relocation. Per our discussion, we have initiated the transfer of transducers from the RW casings to the piezometer set in the casings. This will allow remote OMNX reading of actual water levels at the RW's without well loss anomalies in the data. The relocation has been done in 3 of the 5 wells. RW1,2 and 3 transducers have been moved during maintenance. RW4 and RW5 transducers will be moved upon their next well maintenance episode. We will track the correlation between remotely monitored level via OMNX and actual levels measured in the field.
- RW1 and 2 clogging: We have changed our acid drip from sulfuric acid to hydrochloric acid. The HCl will attack piping scale more aggressively.

- Transducer calibration: Transducers are now calibrated monthly for more accurate level readings.
- Production well down and repaired: The main production well pump at Plant 1 has failed and been repaired and replaced during the fourth quarter of 1999. The down dates were from November 5 through December 16. NYSDEC was notified of the pump being down by email of Monday Nov 8, 1999 (M.J. Bellotti to W. Wertz), included in ***Attachment 2***.
- DNAPL monitoring program: Initial checks showed no DNAPL volume. No DNAPL was extracted during fourth quarter from the RW wells. A sheen was identified in three of the RW wells (RW3,4 and 5). Any detected future DNAPL will be removed per protocols listed in the Q3-99 quarterly report. Approximately 5 ounces of DNAPL were detected and removed from well OBA10A, east of Gill Creek. DNAPL had been detected at this well during the Remedial Investigation. This well is likely influenced by the discharge sewer from the Solvent site. This discharge sewer, immediately adjacent to well OBA10A, is being remediated under Solvent site order, with removal scheduled for Spring 2000. This well will be checked for DNAPL per the project protocol. Documentation is included in ***Attachment 1***.
- Target drawdown levels. Target drawdown levels have been established for all recovery wells, as detailed in monthly reports in ***Attachment 1***. These will assist in tracking and correlation between remotely monitored level via OMNX and actual level measured in field, per NYSDEC request.

Monitoring Program Modification:

As noted below, the 2000 monitoring program will include a modified parameter list to reflect Olin's request and NYSDEC granting of the elimination of selected parameters for groundwater analysis. The parameters barium, copper, cyanide, lead, zinc, methanol and semivolatile compounds (trichlorophenol) are removed from the analytical parameter list; volatile organic compounds, mercury and BHC's remain on the list.

Olin requested a modification of our monitoring program beginning in year 2000. The request was twofold.

- Olin requested a reduction in analytical parameters, keeping the significant parameter groups of VOC's, BHC's and mercury. The remaining parameter groups have a two-year baseline, and would be suspended until the significant parameter groups approach remedial endpoint. At that time, Olin would reinstate the suspended parameter groups to ensure their compliance with remedial standards. NYSDEC agreed to this part of the request. Olin will initiate the modified parameter list with 2000 sampling.
- Olin requested a reduction of piezometric measurement frequency from monthly to quarterly, with the non-measured months having verified by OMNX readings from transducers in the Recovery Wells. Meeting pre-determined target levels would ensure that capture is being achieved. NYSDEC desired that Olin continue manual monthly measurements for

another six months, tracking the capture effectiveness with the OMNX automated measurement of target levels. The request may be made again at that time, pending appropriate correlation of automated data control with manual levels, and pending continued hydraulic capture.

- Olin's letter of request and the NYSDEC response letter are included in ***Attachment 3.***

NYSDEC Issues: In the response letter , NYSDEC commented on several site related issues:

- Operation of RW1 "has not been satisfactory". Olin addresses this concern as follows: This well has presented the greatest difficulty re: maintenance because it receives high pH groundwater stream, and is in a lower yielding part of the B-zone aquifer. These factors combine to create the most serious scaling problems. We are addressing the scaling problems in 2000 by converting the acid drip the HCl, which will attack scale more aggressively than sulfuric acid and by more frequent mechanical well cleaning. We are considering cycling the pump operation to allow a portion of the 24 hour pump cycle to remain off, allowing the acid more residence time in the well casing. Any such change will have capture efficiency as a requirement.
- Well efficiency: "It is necessary to compare well levels with the level of the piezometer set in the well casing to monitor well efficiency." Olin addresses this concern by making these checks and documenting them in monthly O&M reports, which are included as an attachment to this Quarterly Report.
- OMNX system reliability: "OMNX is not providing reliable representations of water levels." Olin addresses this concern by implementing monthly calibration of transducers which provide OMNX readings, and the relocation of transducers to the piezometers in the well casing, as noted above.
- Target Groundwater elevations: "There is a disparity between target groundwater elevations and measured groundwater elevations." Olin addresses this concern by clarifying the misnomer of target elevations. Earlier "target elevations" represented the lowest intake point of each pump. Olin realizes that this terminology may have been confusing, and has corrected it. Target levels referred to in the December 1999 monthly O&M reports and future O&M reports correctly list target levels as the desired drawdown level in each well.

Hydraulic capture:

Attachment 4 includes piezometric maps for each hydraulic zone for October, November and December, 1999 and plus hydraulic cross sections. Historic and current piezometric levels are included electronically on the diskette in ***Attachment 5***, per request from NYSDEC.

- The piezometric plots indicate that we are achieving capture in the A-zone. This is measured by monitoring the cones of depression around each of the five recovery wells, by comparison of the elevation of Gill Creek relative to A-zone groundwater levels west of Gill Creek, and by observation of a dry zone between the northern recovery wells (RW-1 and 2) and Buffalo Avenue. Capture has been about 95% complete for this quarter, with the A-zone piezometric level near PR-4 being slightly higher than Gill Creek. This could be attributable to the limited pumping efficiency in RW1 and 2, since, when RW1 and 2 were pumping at higher rates, full capture had been achieved. As noted above, the capture efficiency is being addressed.
- B-zone capture is being achieved at the northern end of Plant 2, as data from the new piezometers indicate a gradient toward the recovery wells (RW1 and 2) from Buffalo Avenue. B-zone capture is being achieved along Gill Creek, as evidenced by the piezometric contours. The Gill Creek stage measurements have added to the certainty of this conclusion, as it is consistently greater than B-zone wells west of Gill Creek.
- For October and November, C and CD zone groundwater flow and capture was consistent with prior measurements, with flow being predominantly westward toward the Olin production well. For December, the contours indicated a more northward flow, probably reflective of the Production well being down.

Groundwater sampling and analysis:

The second 1999 semiannual sampling was conducted in November, 1999. Results are tabulated and included on the diskette in ***Attachment 5***.

Extracted groundwater volume and contaminant mass:

The volume of pumped groundwater for the fourth quarter of 1999 was approximately 6.4 million gallons. The total volume of groundwater extracted and treated since system startup is approximately 27.8 million gallons.

The Recovery Well flow data, recovery well header contaminant concentrations and estimated mass removed for the third quarter of 1999 are included in **Attachment 6**. A summary table of extracted groundwater and contaminant mass is presented below:

Summary: Contaminant Mass and Groundwater Extracted

Quarter	organics lb	mercury lb	pesticides lb	g.w. extracted gal
Startup/Q1-98 [est]	27.81	0.02	0.2	210,000
Q2-98	154.5	0.1	1.3	1,175,799
Q3-98	595.5	0.6	4.9	2,583,159
Q4-98	1273.1	0.1	5.2	4,054,996
Q1-99	817.3	0.05	8.5	4,233,521
Q2-99	1034.7	0.05	7.1	3,991,584
Q3-99	1188.2	0.1	8.7	5,219,207
Q4-99	976.3	0.02	6.9	6,366,935
TOTAL	**6,067**	**1**	**43**	**27,835,201**

We believe that we have made significant progress since system startup. We will continue to improve the system and monitor its effectiveness. Please direct any questions or comments to me at 423/336-4587.

Sincerely,

Michael J. Bellotti

Michael J. Bellotti

OLIN CORPORATION

List of Attachments

Attachment 1:
Monthly Operation and Maintenance Status Reports: 4Q-99

Attachment 2
Email: M.J. Bellotti to W. Wertz re: notification of Production well down: Nov. 8-99

Attachment 3:
Olin letter of request and NYSDEC letter of response re: monitoring program modification

Attachment 4:
Piezometric maps: fourth quarter: 1999

Attachment 5:
Data diskette: groundwater monitoring data.
Files:

- Olin_NF_GW_data_99s2.xls
- Olin_NF_Piez_data

Attachment 6
Recovery well flow, header contaminant concentration data and contaminant mass removed

cc:
Stanley Radon - NYSDEC Buffalo
Kelly McIntosh: Conestoga-Rovers & Associates: Niagara Falls, NY
Vickie Ray: Olin Charleston
Armand Damesimo: Olin Niagara Falls, NY
Dale Carpenter: USEPA: Region II, New York, NY
Rick Marotte: Law Engineering: Kennesaw, GA
Monica L. Fries Esq.- Husch & Eppenberger: St. Louis, MO

LAW

LAWGIBB Group Member

MEMORANDUM

To: Mike Bellotti @ Olin-Charleston; Don Greer, Karl Rasch, Ben Brayley, and Armand Damesimo @ Olin-Niagara; John Martin, and Rick Marotte @ LAW.

From: Anna Moomaw

Date: December 6, 1999

Subject: Monthly O&M Status Update for Ground-Water Collection and Treatment System

In continuing efforts to keep everyone informed, this memo addresses the status of the O&M issues for the ground-water collection and treatment system. This memo follows from the monthly status update memo issued 11/2/99.

System Status

The following table presents general treatment system data obtained from OMNX and during field monitoring for the month of November.

Ground-Water Collection and Treatment System Status					
	RW-1	RW-2	RW-3	RW-4	RW-5
Pumping Systems (Data from 11/1/99-11/30/99)					
Average Flow Rate (gpm)	0	1.4	5.0	17.0	21.3
End of Month Flow Rate (gpm)	0	1.3	0	15.6	19.3
New Target Flow Rate (gpm)	**1-3**	**1-6**	**6-20**	**18-20**	**8-20**
Avg GW Elev. (OMNX) (ft above MSL)	558	Transducer Off-line	556	558	554
End of Period GW Elev. (OMNX) (ft above MSL)	Faulty input signal	Transducer Off-line	Faulty input signal	558	551
OMNX Low-High Level Set Points for Automatic Pump Off-On (ft above MSL)	**551-558**	**548-558**	**550-558**	**546-558**	**549-558**
Comments	Out of service. Mechanical well cleaning scheduled	Transducer stuck in well. Mechanical well cleaning scheduled	Out of service. Mechanical well cleaning scheduled	None	None

Target flow rates are being achieved for RW-4 and RW-5.

Ground-Water Collection and Treatment System Status					
Well Screen Losses (The well screen loss is defined as the difference between the well piezometer outside the casing and the water level inside the casing)					
	RW-1	RW-2	RW-3	RW-4	RW-5
November 1, 1999 Data					
GW Elevation at Piezometer (ft above MSL)	558.7	548.7	557.7	558.0	552.8
GW Elevation at RW (ft above MSL)	558.7	553.1	557.7	558.0	552.7
Difference (ft)	0	-4.4	0	0	0.1
Comments	None	Needs mech. cleaning (Previous difference: 10/7 1.6; 9/17 1.1; 8/30 0)	None	None	None

Well Maintenance

Maintenance activities were conducted at RW-3 on November 20 to examine the transducer and clean, repair, or replace it as needed. Due to encrustation in the well, the equipment could not be replaced into the well. Because of this, a mechanical cleaning is needed for RW-3 as soon as possible. Because RW-1 and RW-2 are significantly encrusted in spite of multiple acid treatments, these wells will also be mechanically cleaned. Mechanical well cleaning is scheduled for December 15, 16, and 17 for wells RW-3, RW-2, and RW-1.

Transducers

The transducer in RW-2 has not been removed. If it still cannot be removed when the rest of the equipment is removed for mechanical cleaning, the drillers will knock it loose with their equipment during the mechanical cleaning. The transducers for RW-1 and RW-3 show faulty input signals. These will be examined and cleaned, repaired, or replaced as needed when the wells are mechanically cleaned.

Transducer Calibrations

The transducers were re-calibrated through OMNX on November 17 as follows:

Transducer Calibration (Water Level Data from: Nov. 1, 1999)						
Well ID	Well Elevation	OMNX Elevation	Difference	OMNX Zero	Adjusted Zero	Notes
RW-1	558.69	557.46	1.23	549.2	550.43	
RW-2	553.09	0	553.09	549.7	-	Not Adjusted- Transducer not in service
RW-3	557.71	549.45	8.26	549.5	557.76	Not Adjusted- Faulty input reading
RW-4	557.96	558.4	-0.44	547.2	546.76	
RW-5	552.72	555.59	-2.87	549.4	546.53	

The transducers will be re-calibrated monthly and after each well cleaning event.

Attachment: Monthly Flow and Groundwater Level Data

LAW

LAWGIBB Group Member

MEMORANDUM

To: Mike Bellotti @ Olin-Charleston; Don Greer, Karl Rasch, Ben Brayley, and Armand Damesimo @ Olin-Niagara; Andy Clark , and Rick Marotte @ LAW.

From: Anna Moomaw

Date: November 2, 1999

Subject: Monthly O&M Status Update for Ground-Water Collection and Treatment System

In continuing efforts to keep everyone informed, this memo addresses the status of the O&M issues for the ground-water collection and treatment system. This memo follows from the monthly status update memo issued 10/1/99.

System Status

The following table presents general treatment system data obtained from OMNX and during field monitoring for the month of October.

Ground-Water Collection and Treatment System Status					
	RW-1	RW-2	RW-3	RW-4	RW-5
Pumping Systems (Data from 10/1/99-10/31/99)					
Average Flow Rate (gpm)	0.0	0.9	11.5	19.4	20.9
End of Month Flow Rate (gpm)	0.0	1.2	8.9	17.6	19.8
New Target Flow Rate (gpm)	**1-3**	**1-6**	**6-20**	**18-20**	**8-20**
Avg GW Elev. (OMNX) (ft above MSL)	558	Transducer Off-line	554	558	554
End of Period GW Elev. (OMNX) (ft above MSL)	558	Transducer Off-line	549	559	560
OMNX Low-High Level Set Points for Automatic Pump Off-On (ft above MSL)	**551-558**	**548-558**	**550-558**	**546-558**	**549-558**
Comments	Repairs in progress	Transducer stuck in well. Repairs in progress.	None	None	None

With the exception of RW-1, the system is functioning well and target flow rates are being achieved.

Ground-Water Collection and Treatment System Status					
Well Screen Losses (The well screen loss is defined as the difference between the well piezometer outside the casing and the water level inside the casing)					
	RW-1	RW-2	RW-3	RW-4	RW-5
October 7, 1999 Data					
GW Elevation at Piezometer (ft above MSL)	559	550.2	558	558	553
GW Elevation at RW (ft above MSL)	559	548.6	558	558	553
Difference (ft)	0	1.6	0	0	0
Comments	None	Fouling is occurring (Previous: 9/17-diffnc = 1.1; 8/30-diffnc= 0)	None	None	None

Flow Rates

Since the mechanical well cleanings, flow rates from RW-3, RW-4, and RW-5 have remained higher than in the months prior to cleaning. The system flow for the month of October is the highest to date. RW-1 and RW-2 have experienced significant solids build-up which has reduced the flow rates from these wells. The following activities are planned for November to reduce plugging and improve the flow rates from these wells:

1) The plant will turn off the pumps for RW-1 and RW-2, and using a PVC pipe and a funnel, will add approximately one gallon of muriatic acid to each of these wells. After adding the muriatic acid, the pumps will be left off at least overnight to give the acid time to work before re-initiating pumping.

2) The plant will increase the continuous acid flow rate to RW-1 and RW-2 by approximately 20% to 50%. Law/CRA will take samples of the water for alkalinity, calcium, and pH the next time samples are collected, and will re-evaluate the acid feed rate based on the new analytical data and the continuous acid feed rate which is being used.

3) RW-1 and RW-2 pumps will be cycled on and off after the initial acid surge has been done and a steady rate can be achieved again. If this cycling appears to help after a week or so, Law will add a timer to the OMNX program to cycle the pumps automatically.

Transducers

The transducers in RW-1, RW-3, RW-4, and RW-5 have been replaced and are operating properly. The transducer in RW-2 has not been replaced as the existing transducer remains stuck in the well due to excessive build-up. Currently, there is no room for a second transducer in the well. The plant will try to dissolve the build-up with strong acid (muriatic acid) and remove the transducer. If the muriatic acid soak does not help, the plant will break the old transducer loose with a piece of steel or pipe. The transducer in RW-2 should not be replaced until the fouling in

this well has been brought under control by the continuous acid feed and muriatic acid treatments to avoid immediately fouling the new transducer.

New Procedures

Transducer Calibrations

In addition to recording the level in each recovery well monthly, CRA will also record the level readings from OMNX for each RW at the time the RW level data is collected. This instrument data versus measured data will be used to maintain calibration of the transducers. Once sufficient calibration data is collected, the calibration frequency will be adjusted as needed.

Monitoring for DNAPL

The presence/absence of DNAPL will be checked by CRA monthly at all RW wells. This procedure will be done quarterly concurrent with the monthly monitoring, starting in the last quarter of 99. This check will be done by installing dedicated tubing to the bottom of the piezometers adjacent to each RW well, and removing approximately one gallon of liquid per check per well. Each sample will be visually inspected for possible presence of DNAPL. Any DNAPL observed in the check sample will be removed. Should more than one gallon of DNAPL be observed, additional liquid will be extracted until all DNAPL is removed (to a practical degree). Removed DNAPL will be disposed appropriately. Removed ground-water will be transferred to the clarifier. DNAPL check results will be included in O&M reports for the month of the check, and will be thus included in Olin's quarterly reports to NYSDEC.

LAW

LAWGIBB Group Member

MEMORANDUM

To: Mike Bellotti @ Olin-Charleston; Don Greer, Karl Rasch, Ben Brayley, and Armand Damesimo @ Olin-Niagara; John Martin, and Rick Marotte @ LAW.

From: Anna Moomaw

Date: January 9, 2000

Subject: Monthly O&M Status Update for Ground-Water Collection and Treatment System for December 1999

In continuing efforts to keep everyone informed, this memo addresses the status of the O&M issues for the ground-water collection and treatment system. This memo follows from the monthly status update memo issued 12/6/99.

System Status

The following table presents general treatment system data obtained from OMNX and during field monitoring for the month of December.

Ground-Water Collection and Treatment System Status					
	RW-1	RW-2	RW-3	RW-4	RW-5
Pumping Systems (Data from 12/1/99-12/31/99)					
Average Flow Rate (gpm)	0.0	0.45	9.1	17.4	19.7
End of Month Flow Rate (gpm)	0.0	0.0	21.5	17.3	21.2
Maximum achievable flow rate of pump (to date) (gpm)	*4.2*	*6.6*	*21.8*	*24.1*	*22.6*
Newly Developed Target Drawdown Level (ft above MSL) at PZ	**559**	**556**	**558.3**	**558.1**	**557.5**
Avg GW Elev. (OMNX) (ft above MSL)	558.4	Transducer Off-line	563.9	558.0	550.7
End of Period GW Elev. (OMNX) (ft above MSL)	558.4	Transducer Off-line	555.5	557.8	549.4
New OMNX Low-High Level Set Points for Auto. Pump Off-On (ft above MSL)	*551.8 - 558*	*551.2 - 555*	*550.6 - 557.3*	*546.5 - 557.1*	*548.7 – 556.5*
Comments	Mechanical well cleaning performed. Additional maintenance performed to initiate pumping (Jan).	Mechanical well cleaning performed. Pipes backflushed with acid (Jan). New transducer to be installed.	Out of service first part of month. Mechanical well cleaning performed. Transducer to be re-calibrated.	None	None

Ground-Water Collection and Treatment System Status					
Well Screen Losses (The well screen loss is defined as the difference between the well piezometer outside the casing and the water level inside the casing)					
	RW-1	RW-2	RW-3	RW-4	RW-5
December 2, 1999 Data					
Target Drawdown Level (ft above MSL) at PZ	**559**	**556**	**558.3**	**558.1**	**557.5**
GW Elevation at Piezometer (ft above MSL)	558.83	565.61	558.25	558.18	558.11
GW Elevation at RW (ft above MSL)	558.86	556.03	558.21	557.98	551.67
Difference (ft)	0.03	9.58	0.04	0.20	6.44
Comments	Flow = 0 at time of reading	Needed mech. cleaning (performed mid-Dec.)	Flow = 0 at time of reading	None	Flow rate is still good; Monitor difference – if repeatable result, clean well in spring
The attached spreadsheet includes a table for the manual water level data collected in 1999 for the recovery wells and piezometers for reference.					

Well Maintenance

Maintenance activities were conducted at RW-3 on November 20 to examine the transducer and clean, repair, or replace it as needed. Due to encrustation in the well, the equipment could not be replaced into the well. Because of this, a mechanical cleaning was needed for RW-3. Because RW-1 and RW-2 were also significantly encrusted, these wells also needed mechanical cleaning. Mechanical well cleaning was completed in mid-December. The following describes the activities completed by the drillers:

- RW-3 cleaning was completed on Wednesday, Dec 15.
- On Thursday, the plan was to clean RW-2, but there were still problems with removal of the piping from this well. The plant had to do additional work to help clear RW-2, including using more HCl and additional force to remove equipment, and Nothnagle went on to clean RW-1. RW-1 cleaning was completed on Dec. 16.
- On Friday, the drillers went back to RW-3 to remove sediment which had collected in the bottom several feet of the well.
- On Monday, Dec. 20, RW-2 cleaning was completed.
- HCl was used to soak the piezometer at RW-2 due to an apparent blockage. On Tuesday morning, the drillers cleaned the piezometer.

HCl is now being used for the continuous acid feed systems at the recovery wells since sulfuric acid was determined to be less effective for reducing scaling at the wells. The HCl does appear to be more effective based on lab tests and field observations during mechanical cleanings.

Total Flow and Pumping Rates

Increased pumping rates are now being achieved at RW-3; the pump has been operating at approximately 21.5 gpm since the well was cleaned and re-started. RW-1 and RW-2 are operating again as of January 5, 2000. RW-4 and RW-5 are still operating at an acceptable flow rate. Despite the maintenance activities, an overall treatment system flow rate of approximately 46.7 gpm was achieved for December 1999.

Target Drawdown Levels

Bell Wertz of NYSDEC would like us to track OMNX level measurements from the recovery well piezometers along with the manual measurements from these wells for at least six months. If the data track closely, he would be inclined to agree to a reduction in the frequency of manual well level data collection activities, which would result in a project cost savings. In months where manual data are not collected, level data from the piezometers would be compared to a set of established target drawdown levels to demonstrate whether hydraulic capture has been achieved. For this methodology to be acceptable, we must also be able to demonstrate that we can keep the transducers in the piezometers operating properly, keep them in calibration, and respond timely and effectively to well fouling issues. In 2000, we anticipate that three complete sets of mechanical well cleanings will be performed.

Since we have maintained hydraulic capture through November 1999, the maximum water level recorded for each piezometer throughout this period has been set as the target level. The water levels are effected by episodic recharge events and seasonal recharge cycles. Thus, we anticipate achieving the target levels by a fair margin throughout most of the year, while at high water table periods they will be approached. This should provide for hydraulic capture.

The following updated configuration for OMNX setpoints was initiated on January 9, 2000 in anticipation of the new operating strategy discussed above:

	Lo-Lo Setpoint *Bottom of Probe in Piezometer (3 ft. off well bottom)*	**Lo Setpoint** *Lo-Lo Setpoint plus 1 foot*	**Hi Setpoint** *Hi-Hi Setpoint minus 1 foot*	**Hi-Hi Setpoint** *Target Drawdown Elevation*
RW-1	550.8	551.8	558	559
RW-2	550.2	551.2	555	556
RW-3	549.6	550.6	557.3	558.3
RW-4	545.5	546.5	557.1	558.1
RW-5	547.7	548.7	556.5	557.5

Transducer Calibrations

The transducers are to be re-calibrated monthly and after each well cleaning event. CRA did not collect the data for the December transducer calibration following the well cleanings. They have been reminded to collect the data during the next monthly data collection event. Calibration data will also need to be collected after the remaining recovery well transducers have been relocated to their respective piezometers.

Monthly Status Update
For December 1999

Transducers

The relocation of transducers from recovery wells to piezometers has begun. During the well cleanings, the transducers for RW-2 and RW-3 were removed to their respective piezometers. The RW-1, RW-4, and RW-5 transducers still need to be re-located. The transducer for RW-2 is scheduled to be replaced in January.

A table of daily transducer data has been added to the attached spreadsheet, which compares the daily level readings to stated target drawdown levels. For days which target levels are not achieved, a reason is indicated in the "Notes" column. In the month of December, RW-1 and RW-5 target drawdown was achieved every day. For RW-3, the target drawdown was not achieved on days that the pump was out of service due to maintenance (18 days). Due to a faulty input signal from the transducer, RW-3 readings indicated exceedances for an additional 5 days. Plant maintenance is troubleshooting this transducer. At RW-4, the target level was exceeded on 4 days. The RW-4 pump was operating at approximately 17 gpm continuously during this period.

Sampling for Inorganics

Sample collected at RW-2 (November 3) indicated 78.3 mg/L calcium and 344 mg/L alkalinity. pH data was collected at the wells as follows:

Well	Date	pH
RW-1	11/19/1999	10.45
RW-2	11/03/99	8.52
RW-3	11/03/99	7.83
RW-4	11/03/99	6.64
RW-5	11/03/99	6.89

Based on this data, the *minimum* flow rate of HCl to RW-2 should be 0.1 gallons per day per gpm of flow. Sample from RW-1 was not collected for these constituents as requested. Because RW-3 has also recently shown signs of increased scaling, we have asked CRA to collect samples for calcium and alkalinity, and collect pH data, at each of the recovery wells during the next monthly data collection event so that we can reevaluate acid flow rates for all the wells.

A sample of pipe scale was submitted to Quanterra on December 15, 1999 for analysis of calcium, magnesium, iron, manganese, sulfates, sulfides, and phosphates. Silicon and carbonates analyses were also requested, but could not be performed due to inadequate sample volume. Analytical results are anticipated in mid-January.

DNAPL Checks

For November, no DNAPL was noted in RW-1, RW-2, or RW-3. "Trace amounts" were detected in RW-4 and RW-5.

In December, the following observations were noted:

Well	Volume Purged	DNAPL Presence	Quantity Recovered	Comments
RW-1	1 gallon	No	-	dark brown, cloudy
RW-2	1 gallon	No	-	dark brown, cloudy, sediment
RW-3	1 gallon	No	-	dark brown to black, cloudy, sediment, iridescent sheen
RW-4	1 gallon	No	-	dark brown to black, cloudy, sediment, iridescent sheen
RW-5	1 gallon	No	-	dark brown to black, cloudy, sediment, iridescent sheen
OBA-10A *	1 gallon	Yes	4-5 oz.	chemical odor

* - additional observation performed in conjuction with Monthly DNAPL observations at Olin's request.

Air Stripper Influent/Effluent Sampling

November sampling of the air stripper influent and effluent was delayed due to a blockage in the influent sampling port. The blockage has since been removed and sampling was re-scheduled for concurrent with December 1999 water level collection activities. Complete analytical data has not been received for this sampling event.

Attachment: Monthly Flow and Groundwater Level Data excel spreadsheet

Print Date: 1/10/00

Olin - Niagara Falls
OMNX Systems Check
Summary of Total Flow, Average System Flow Rates, and Average Ground-Water Elevations

Period	Total Flow (gal/month)	Total Quarterly Flow (gal)	Average Flow Rate (gpm)						Flow Contribution Per Well (gal/month)					Notes
			RW-1	RW-2	RW-3	RW-4	RW-5	Total	RW-1	RW-2	RW-3	RW-4	RW-5	
Dec-97	60,000		0.1	0.0	0.4	0.4	0.4	1.3	4,720	810	19,098	18,902	16,471	1,3
4th Qtr 97		**60,000**												
Jan-98	60,000		0.1	0.0	0.4	0.4	0.4	1.3	4,720	810	19,098	18,902	16,471	1,3
Feb-98	45,000		0.1	0.0	0.4	0.4	0.3	1.1	3,540	607	14,323	14,176	12,353	1,3
Mar-98	45,000		0.1	0.0	0.3	0.3	0.3	1.0	3,540	607	14,323	14,176	12,353	1,3
1st Qtr 98		**150,000**												
Apr-98	365,297		0.7	0.1	2.7	2.7	2.3	8.5	28,735	4,931	116,271	115,080	100,280	1,3
May-98	334,862		0.6	0.1	2.4	2.4	2.1	7.5	26,341	4,520	106,584	105,492	91,925	2,3
Jun-98	475,640		0.9	0.1	3.5	3.5	3.0	11.0	37,415	6,421	151,393	149,841	130,570	2,3
2nd Qtr 98		**1,175,799**												
Jul-98	921,665		1.6	0.3	6.6	6.5	5.7	20.6	72,501	12,441	293,359	290,353	253,011	2,3
Aug-98	526,034		0.1	0.6	3.7	3.8	3.4	11.6	5,554	26,894	169,255	172,032	152,300	2, 4
Sep-98	1,135,460		2.4	2.5	7.0	7.1	7.1	26.0	104,479	107,966	306,316	309,076	307,623	2, 4
3rd Qtr 98		**2,583,159**												
Oct-98	1,252,945		0.4	1.1	6.8	10.1	9.7	28.1	18,288	48,816	302,400	451,872	431,568	2, 4
Nov-98	1,408,950		2.2	0.7	5.0	14.4	10.5	32.8	94,806	31,590	213,858	618,408	450,288	2, 4
Dec-98	1,393,101		0.3	1.0	4.5	15.4	9.8	31.1	15,642	44,072	203,121	691,082	439,185	2, 4
4th Qtr 98		**4,054,996**												
Jan-99	1,295,192		0.02	0.41	3.6	17.2	7.8	29.0	860	18,178	162,181	767,148	346,826	2, 4
Feb-99	1,362,751		2.9	3.1	4.2	18.0	5.6	33.8	117,795	123,770	171,019	725,571	224,596	2, 4
Mar-99	1,575,578		3.0	5.1	4.1	18.7	4.4	35.3	134,877	229,745	181,540	833,892	195,524	2, 4
1st Qtr 99		**4,233,521**												
Apr-99	1,419,313		2.8	5.5	3.0	18.2	3.3	32.8	123,042	237,750	129,803	785,958	142,761	2, 4
May-99	1,394,656		2.6	4.8	2.3	17.8	3.7	31.2	116,709	213,374	102,340	796,659	165,574	2, 4
Jun-99	1,177,615		2.6	1.6	2.0	17.3	3.6	27.3	112,803	70,596	87,762	748,818	157,637	2, 4
2nd Qtr 99		**3,991,584**												
Jul-99	1,195,224		1.2	2.8	3.1	14.9	4.8	26.8	53,137	122,975	140,305	663,996	214,812	2, 4
Aug-99	1,847,659		0.0	5.0	6.2	20.3	9.8	41.4	863	222,431	278,727	908,309	437,328	2, 4
Sep-99	2,176,325		1.4	3.6	7.3	20.2	17.8	50.4	59,270	157,635	316,791	872,352	770,276	2, 4
3rd Qtr 99		**5,219,207**												
Oct-99	2,349,293		0.0	0.9	11.5	19.4	20.9	52.7	876	41,248	511,135	863,843	932,191	2, 4
Nov-99	1,934,640		0.0	1.4	5.0	17.0	21.3	44.8	853	60,535	217,495	736,290	919,468	2, 4
Dec-99	2,083,001		0.0	0.5	9.2	17.4	19.7	46.7	844	20,114	408,615	774,596	878,832	2, 4
4th Qtr 99		**6,366,935**												
Average	**1,113,408**		**1.1**	**1.7**	**4.2**	**11.3**	**7.1**	**25.4**	**45,688**	**72,353**	**185,484**	**497,873**	**312,009**	
Total	**27,835,200**								**1,142,209**	**1,808,835**	**4,637,109**	**12,446,824**	**7,800,223**	
1999 Average	**1,650,937**		**1.4**	**2.9**	**5.2**	**18.0**	**10.2**	**37.7**	**60,161**	**126,529**	**225,643**	**789,786**	**448,819**	
1999 Total	**19,811,246**								**721,929**	**1,518,350**	**2,707,712**	**9,477,430**	**5,385,825**	

1. Estimated total flow
2. Monthly flow totalizer data
3. Average % for totalized flow for Dec-97 through Jul-98.
4. % flow calculated from monthly totalizer data
- Data not available.

Bellotti, Mike CHAS

From: Bellotti, Mike CHAS
Sent: Monday, November 08, 1999 10:07 AM
To: 'NYSDEC Wertz, Bill'
Cc: Brayley, Ben H NIAG; Damesimo, Armand NIAG
Subject: Niagara Falls pump-down notification

Bill:
This is to notify you that the Plant Production wells at our Niagara Falls facility, are down for pump repair. These are the wells that are located in Plant 1, and which control C and C/D zone flow, as well as westernmost A and B zone flow. The wells have been down as of Friday, November 5, and our work crews are currently working to get them back on line. I will let you know as soon as repairs are completed and they are back on line. I will document the down-time in my next quarterly report.

Mike Bellotti

Olin

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

October 4, 1999

Mr. William Wertz
New York State Dept. of Environmental. Conservation
Division of Solid Waste Management
50 Wolf Road
Albany, New York 12233

re: Monitoring Program: Olin Chemicals
Buffalo Ave. Facility, Niagara Falls, NY

Dear Mr. Wertz:

This is to request a modification in the current monitoring program for Olin's Niagara Falls Facility, currently being implemented to verify the effectiveness of our active remediation system.

The remedial system will have been online for two years as of December, 1999. As we approach the two years on-line timeframe, we look back at the first two years of operation. In that timeframe, we have the system running under control, and, while there are maintenance issues, there are no maintenance surprises. The system is being run on a routine basis with routine maintenance and occasional trouble-shooting. Hydraulic capture has been achieved. Our groundwater monitoring data have given us a good characterization of the groundwater quality.

Having achieved an operational status in which the system runs routinely and well, Olin believes that, at this time, it is appropriate to request a modification of some monitoring tasks, as performed over the first two years of operation.

Olin requests that, beginning in the first quarter of yr2000, the frequency of piezometric monitoring be reduced from monthly to quarterly. If this request is granted, we will provide control of capture effectiveness, during the two months per quarter in which full piezometric data are not taken, by closely monitoring the drawdown target level in each recovery well via our automated OMNX system. This will ensure that the head level in each recovery well is kept at a level which has historically provided hydraulic capture, as measured by sitewide piezometric readings. Of course, the quarterly piezometric readings and plots will serve as a direct indicator of groundwater capture. We believe that we have reached a level of confidence in our system maintenance to produce higher flows on a consistent basis. Note that the installation of acid and Calsperse drip systems and the physical well cleaning in 1999 has enhanced the yield and total flows from the system. The table below summarizes the increases in system flow totals. The detailed well yield and flow data are included in each quarterly report.

Summary: Groundwater Volume Removed

Quarter	groundwater extracted gal	annual total gal
Startup/Q1-98 [est]	210,000	
Q2-98	1,175,799	
Q3-98	2,583,159	
Q4-98	4,054,996	8,023,954
Q1-99	4,233,521	
Q2-99	3,991,584	
Q3-99	5,219,207	
	year to date	13,444,312
TOTAL	**21,468,266**	

Olin requests that, beginning in the yr2000, the parameters barium, copper, cyanide, lead, zinc, methanol and the semivolatile compound trichlorophenol be removed from the analytical parameter list. This removal would be done with the understanding that, at such time as the remedial system approaches it's end point, these parameters may be re-instated to ensure full remediation compliance.

Results to date for all of these parameters are included on the attached diskette. As the data show, none of these parameters represents a significant portion of the contamination onsite.

- Trichlorophenol has been detected at only one well at 14 ug/l
- Methanol was detected in several wells upon system startup , but has not been detected since then.
- Barium has not been detected at levels greater than the MCL in any sample to date (total and dissolved).
- Copper has not been detected at levels greater than the MCL in any sample to date (total and dissolved).
- Cyanide has had 5 detected MCL exceedences in all samples to date, each of which were at or less than 1 mg/l.
- Lead (dissolved) has had 4 MCL exceedences in all samples to date, each of which were on the order of far less than one mg/l.
- Zinc (total and dissolved) has had one MCL exceedence in all samples to date.

We believe that the elimination of these parameters would not adversely affect the tracking of system effectiveness. Of course, Olin will continue to sample for the contaminants of primary concern: mercury, pesticides and volatile organic compounds.

We believe that we have made significant progress since system startup in running the remediation system efficiently and effectively. We will continue to improve the system and monitor its effectiveness. Kindly respond at your earliest convenience, so that we may plan our monitoring program for the year 2000.

Please direct any questions or comments to me at 423/336-4587. Thank you.

Sincerely,

Michael J. Bellotti

Michael J. Bellotti

OLIN CORPORATION

New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials
Bureau of Radiation & Hazardous Site Management, Room 460
50 Wolf Road, Albany, New York 12233-7240
Phone: (518) 457-9253 • **FAX:** (518) 457-9240
Website: www.dec.state.ny.us

John P. Cahill
Commissioner

December 22, 1999

Mr. Michael J. Bellotti, P.G.
Senior Associate Hydrogeologist
Olin Chemicals
P.O. Box 248
Lower River Road
Charleston, TN. 37310

Dear Mr. Bellotti:

Re: Groundwater Collection System Performance Monitoring Report

The New York State Department of Environmental Conservation (Department) has reviewed the "Quarterly Report, Olin Chemicals Buffalo Ave. Facility" which was submitted by Olin in July 1999 and a similar report which was submitted in October 1999. The reports cover the operation of the remedial system from April 1, 1999 through September 30, 1999. Overall, it appears that Olin has made progress in improving the reliability and effectiveness of the remedial system in 1999, however, the Department remains concerned with certain aspects of the operation of the system. The Department has the following comments on the reports:

1. Operation of RW-1 has not been satisfactory. Although Olin made substantial progress in keeping the well in operation earlier in 1999, data from July, August and September indicate that further maintenance of the well and its associated transport components is required. Olin should monitor the future performance of the well closely, and should take any measures necessary to keep the well operating effectively.

2. Based upon the information presented in the reports, it appears that the recovery well efficiencies decrease dramatically if mineralization of the well components impedes flow to the wells. Olin should continue to measure the efficiency of each pumping well by comparing the water level in the well with the water level in the adjacent piezometer on a monthly basis. Olin should modify Appendix G of the "Corrective Measures Implementation Site Operations and Maintenance Plan to include "Standard Operating Conditions" related to the well efficiency. (As an example, head differences in excess of .5 feet might require inspection and evaluation of the well; head differences in excess of 1 foot might require well maintenance.)

3. Based upon the information presented in the reports, it appears that the OMNX system is not providing reliable representations of the water levels in the wells in which OMNX

probes are installed. Olin should take actions to improve the accuracy of the OMNX system measurements.

4. There appears to be a substantial disparity between the "Target Groundwater Elevations" which Olin has established for each of the recovery wells and the measured groundwater elevations (either by hand or OMNX) associated with the respective wells. A tabulation and plots of those differences is enclosed for Olin's review. Please explain.

In addition to reviewing the quarterly report discussed above, the Department has also considered Olin's letter of October 4, 1999 in which the company requests a reduction in the frequency of potentiometric surface monitoring from monthly to quarterly, and requests the temporary removal of certain parameters from the chemical monitoring program. The Department has the following comments on those requests:

1. As noted above, the OMNX system has not been shown to provide accurate representations of the potentiometric surface. The monthly hydraulic monitoring program should continue. Should Olin so desire, the Department will reconsider a change in the program if Olin can demonstrate, using monthly data from the first six months of 2000, that an alternative monitoring program could provide an acceptably reliable measure of system performance. In addition, Olin should consider repositioning the OMNX probes so as to record the potentiometric surface in the recovery well piezometer rather than in the recovery well itself.

2. Because the compounds which Olin has proposed for temporary removal from the chemical monitoring program have not been frequently detected in Olin's wells, they are currently not useful for tracking the performance of the remedial system. Therefore, Olin may temporarily remove barium, copper, cyanide, lead, zinc, methanol and trichlorophenol from the program. Those parameters must be included in any future monitoring package associated with the proposed termination of the recovery system or one of it's wells.

Should you have any questions regarding these issues, please call me at (518) 457-9253.

Sincerely,

William E. Wertz, Ph.D.
Senior Engineering Geologist
Bureau of Hazardous Waste Facilities
Division of Solid & Hazardous Materials

enclosures

cc: J. Strassburg, Olin
J. Reidy, EPA Region II

Groundwater Collection System Status (4/1/99-4/30/99)					
	RW-1	RW-2	RW-3	RW-4	RW-5
Target GW Elevation	**552**	**549**	**551**	**550**	**550**
Average GW Elevation	NM	NA	552	551	547
Elevation Difference (Average - Target)	NA	NA	**1**	**1**	**-3**
Measured GW Elevation	NM	555	551	549	551
Elevation Difference (Measured - Target)	NA	**6**	**0**	**-1**	**1**
Plotted GW Elevation B Zone 4/8/99	NM	554.8	550.8	551.6	551.6

Groundwater Collection System Status (5/1/99-5/31/99)					
	RW-1	RW-2	RW-3	RW-4	RW-5
Target GW Elevation	**552**	**549**	**551**	**550**	**550**
Average GW Elevation	NM	547	551	551	547
Elevation Difference (Average - Target)	**NA**	**-2**	**0**	**1**	**-2**
Measured GW Elevation	551	552	551	552	553
Elevation Difference (Measured - Target)	**1**	**3**	**0**	**2**	**3**
Plotted GW Elevation B-Zone 5/17/99	551.1	552	551	552.3	553.4

Groundwater Collection System Status (6/1/99-6/30/99)					
	RW-1	RW-2	RW-3	RW-4	RW-5
Target GW Elevation	**552**	**549**	**551**	**550**	**550**
Average GW Elevation	NM	547	553	551	549
Elevation Difference (Average - Target)	**NA**	**-2**	**2**	**1**	**-1**
Measured GW Elevation	551	550	552	553	553
Elevation Difference (Measured - Target)	**-1**	**1**	**1**	**3**	**3**
Plotted GW Elevation B-Zone 6/4/99	551.1	548.9	552.3	553.01	553.4

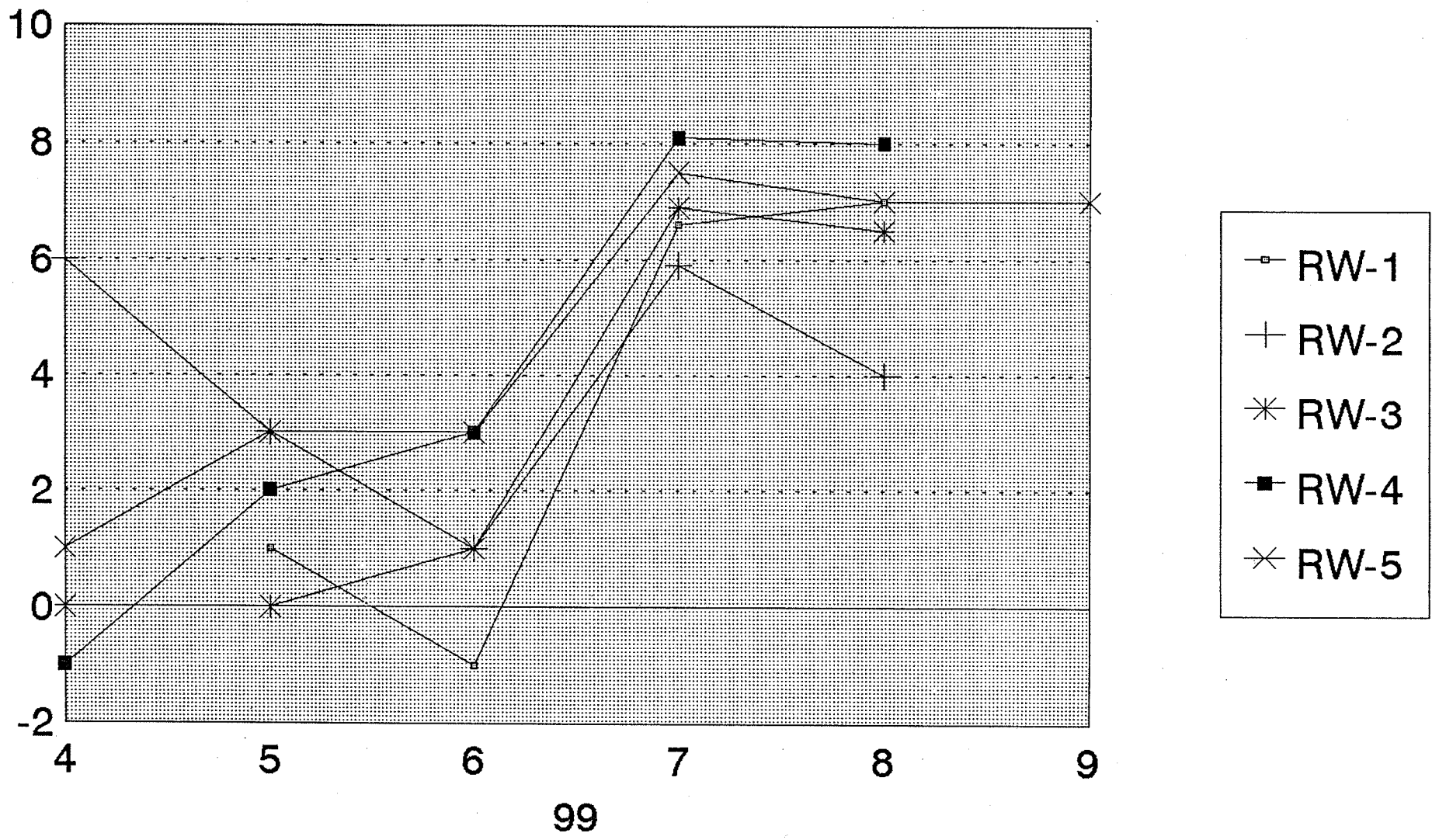
Groundwater Collection System Status (7/1/99-7/31/99)					
	RW-1	RW-2	RW-3	RW-4	RW-5
Target GW Elevation	**552**	**549**	**551**	**550**	**550**
Average GW Elevation	NM	547	557	547	552
Elevation Difference (Average - Target)	**NA**	**-2**	**6**	**-3**	**2**
Measured GW Elevation	558.6	554.9	557.9	558.1	557.5
Elevation Difference (Measured - Target)	**6.6**	**5.9**	**6.9**	**8.1**	**7.5**
Plotted GW Elevation B-Zone 7/23/99	558.5	554.9	557.9	558.1	557.5

Groundwater Collection System Status (8/1/99-8/30/99)					
	RW-1	RW-2	RW-3	RW-4	RW-5
Target GW Elevation	**552**	**549**	**551**	**550**	**550**
Average GW Elevation	NM	NM	558	549	NM
Elevation Difference (Average - Target)	**NM**	**MN**	**7**	**-1**	**NM**
Measured GW Elevation	559	553	557.5	558	557
Elevation Difference (Measured - Target)	**7**	**4**	**6.5**	**8**	**7**
Plotted GW Elevation B-Zone 8/30/99	558.9	553	557.5	558.1	556.9

Groundwater Collection System Status (9/1/99-9/30/99)					
	RW-1	RW-2	RW-3	RW-4	RW-5
Target GW Elevation	**552**	**549**	**551**	**550**	**550**
Average GW Elevation	555	NM	557	558	555
Elevation Difference (Average - Target)	**3**	**NM**	**6**	**8**	**5**
Measured GW Elevation	Not provided in report				
Elevation Difference (Measured - Target)					
Plotted GW Elevation	556.4	551.4	557.5	558	554.3

Measured vs Target Groundwater Elevation

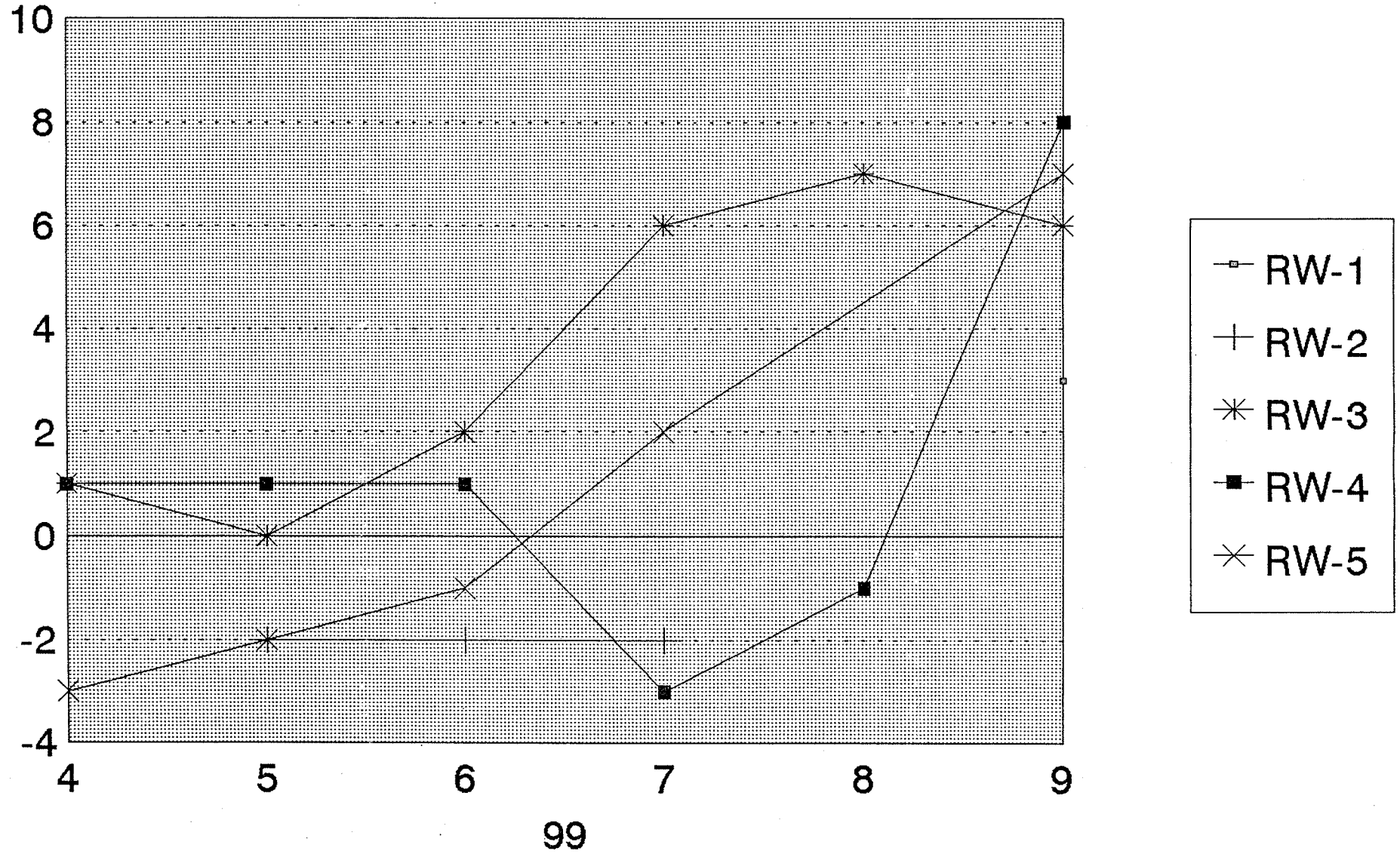
Measured GW Elevation Difference from Target

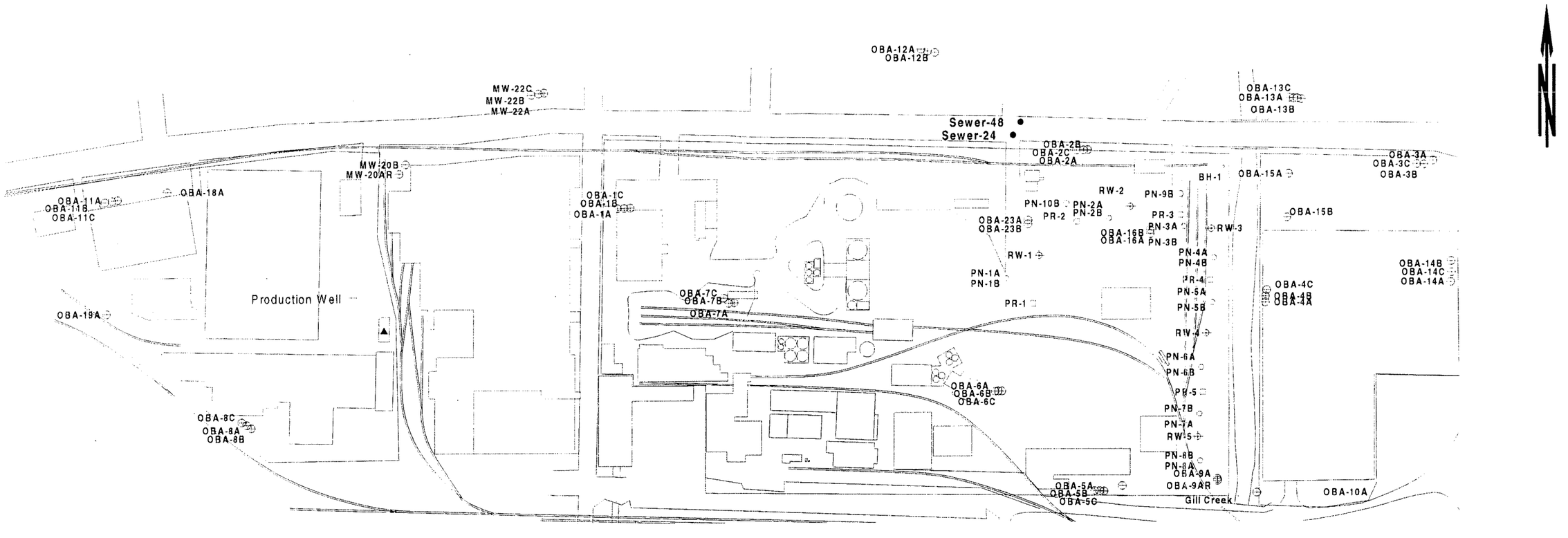


Measured at pumping well

Measured vs Target Groundwater Elevation

OMNX Avg GW Elevation Difference from Target





LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL
- ⊕ WATER QUALITY MONITORING WELLS
- ◌ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS
- □ PASSIVE RELIFF WELLS
- ● SEWER INVERT ELEVATION
- ——— PROPERTY LINE

0 200 400

Scale 1 inch = 200 feet

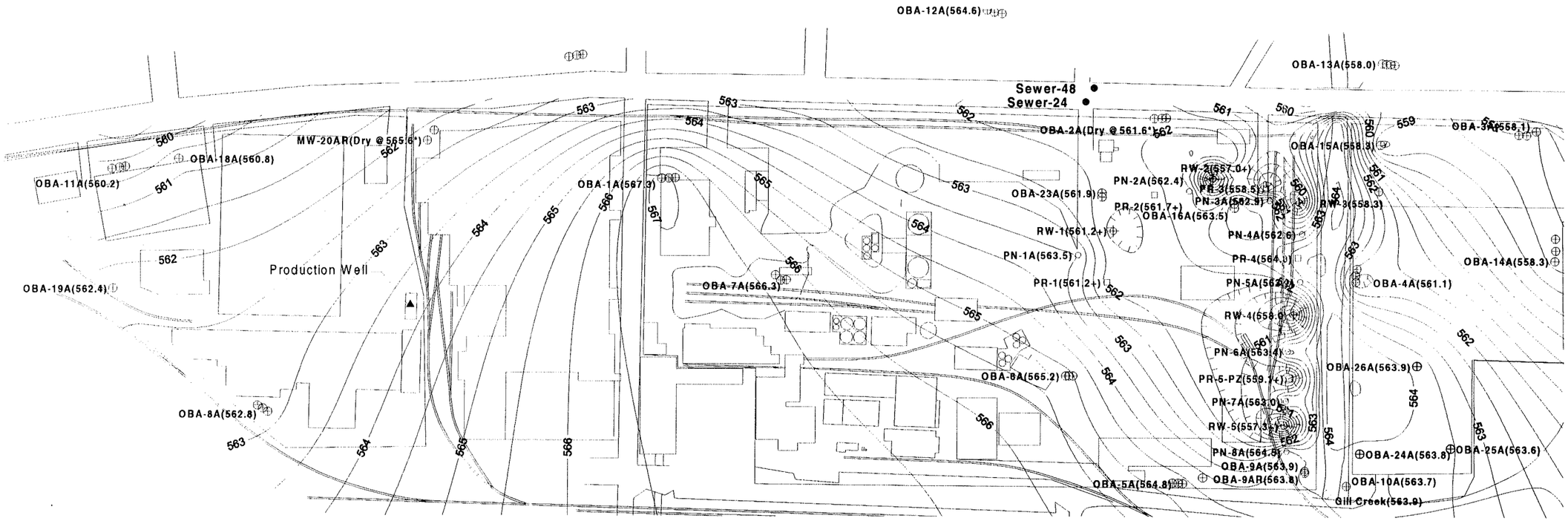
OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

BASE MAP

Job No.: 12000-8-0030

Figure 0



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT
- ——— PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)
- ESTIMATED DRY AREA IN ZONE A

Well	Average Flow Rate(gpm)*
RW-1	0.6
RW-2	2.0
RW-3	8.2
RW-4	20.2
RW-5	22.1

*: Averaged using daily flow rates since previous monthly field measurements.

0 200 400

Scale 1 inch = 200 feet

NOTE

*: Well dry, elevation of bottom of A-Zone used in contouring.
+: Bottom of A-Zone elevation used in contouring.
▲: Water Elevation not obtained from Olin Production Well.
●: Buffalo Avenue Sewer invert is assumed to be a groundwater sink. The piezometric surface is estimated as the bottom of the A-zone. The bottom of the A-zone along Buffalo Avenue was estimated from borings OBA-1A, OBA-2A, OBA-3A, and OBA-11A.

Three water level measurements were obtained in Gill Creek throughout the day at 9:44am (564 feet), 12:03pm (563.9 feet), and 17:08pm (563.4 feet). The Gill Creek elevation (563.9 feet) coinciding with the time water level measurements were obtained in the piezometers along Gill Creek was used in contouring in A zone.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1999.

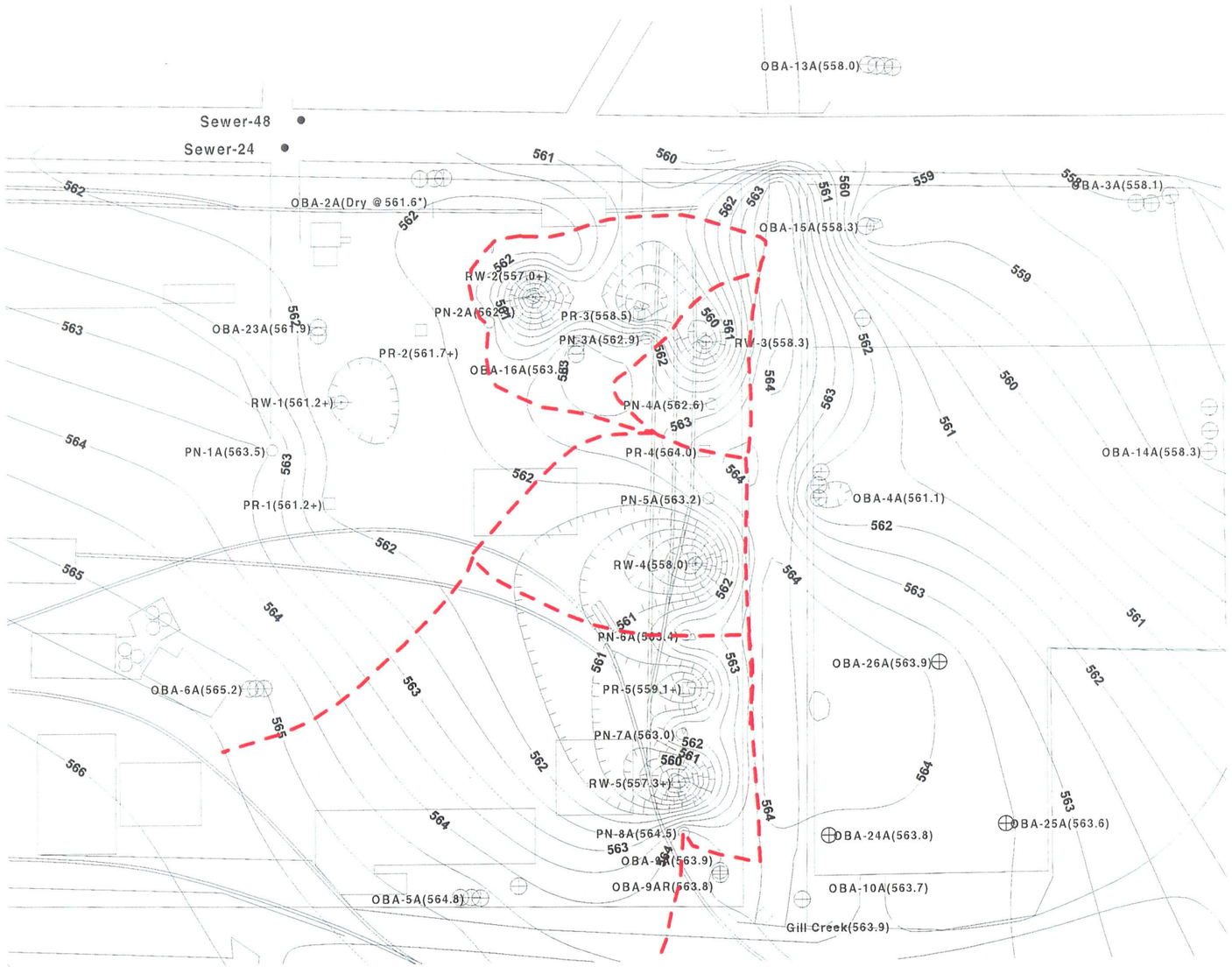
OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

POTENTIOMETRIC SURFACE -- A ZONE (OCTOBER 7, 1999)

Job No.: 12000-8-0030

Figure 1



Well	Average Flow Rate(gpm)*
RW-1	0.6
RW-2	2.0
RW-3	8.2
RW-4	20.2
RW-5	22.1

*: Averaged using daily flow rates since previous monthly field measurements.

LEGEND

- GILL CREEK MONITORING POINT
- OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- WATER QUALITY MONITORING WELLS
- A/B ZONE PIEZOMETER NESTS
- GROUND WATER RECOVERY WELLS
- PASSIVE RELIEF WELLS
- SEWER INVERT
- PROPERTY LINE
- 565 — ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)
- ESTIMATED CAPTURE ZONE BOUNDARY
- ESTIMATED DRY AREA IN ZONE A

0 120 240

Scale 1 inch = 120 feet

NOTE

*: Well dry, elevation of bottom of A-Zone used in contouring.
+: Bottom of A-Zone elevation used in contouring.
●: Buffalo Avenue Sewer invert is assumed to be a groundwater sink. The piezometric surface is estimated as the bottom of the A-zone. The bottom of the A-zone along Buffalo Avenue was estimated from borings OBA-1A, OBA-2A, OBA-3A, and OBA-11A.

Three water level measurements were obtained in Gill Creek throughout the day at 9:44 am (564 feet), 12:03 pm (563.9 feet), and 17:08 pm (563.4 feet). The Gill Creek elevation (563.9 feet) coinciding with the time water level measurements were obtained in the piezometers along Gill Creek was used in contouring in A zone.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1995. CAPTURE ZONE BOUNDARY WAS DRAWN BASED THE FLOW PATHLINES GENERATED BY GWPATH.

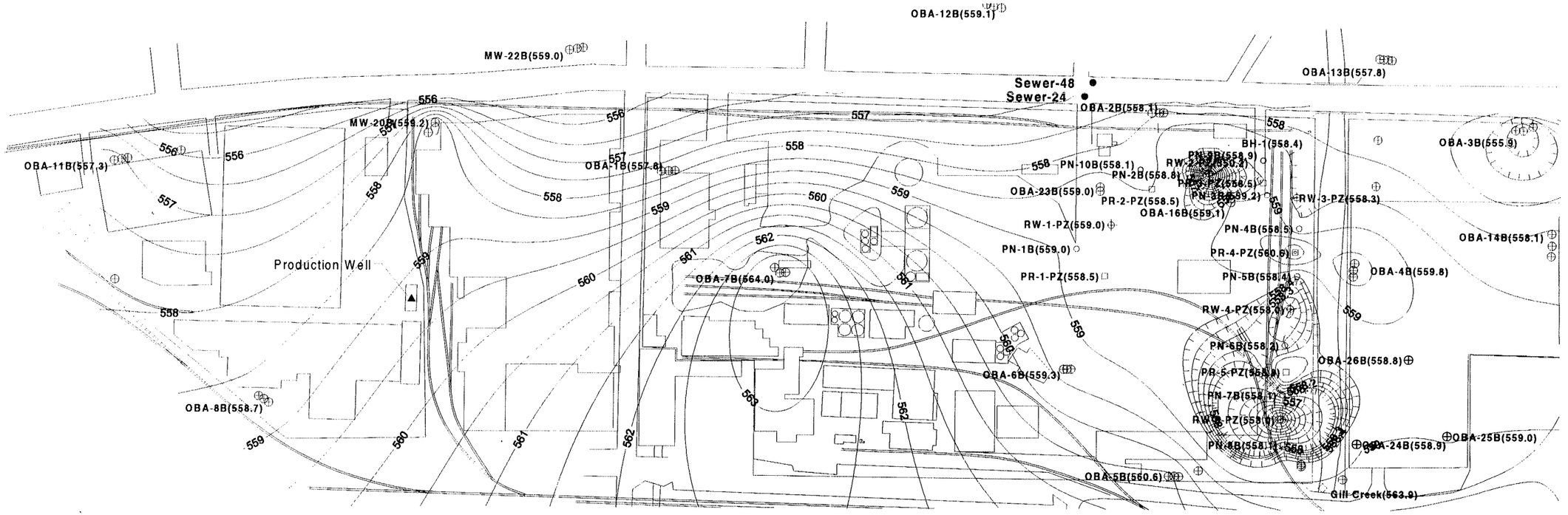
OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

ESTIMATED CAPTURE ZONE AND POTENTIOMETRIC SURFACE -- A ZONE (OCTOBER 7, 1999)

Job No.: 12000-8-0030

Figure 1A



0 200 400

Scale 1 inch = 200 feet

LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- Φ GROUND WATER RECOVERY WELLS
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT ELEVATION
- ——— PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)

Well	Average Flow Rate(gpm)*
RW-1	0.6
RW-2	2.0
RW-3	8.2
RW-4	20.2
RW-5	22.1

*: Averaged using daily flow rates since previous monthly field measurements.

NOTE

▲: Olin Production Well.
●: Buffalo Avenue Sewer invert is assumed to be a ground-water sink. The piezometric surface is not known. The ground water contours were estimated based on the sewer invert elevation. PN-2B elevation used as dummy points north of RW-2.

Three water level measurements were obtained in Gill Creek throughout the day at 9:44am (564 feet), 12:03pm (563.9 feet), and 17:08pm (563.4 feet). The Gill Creek elevation was not used in contouring the B zone but is included on the map for comparative purposes.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1999.

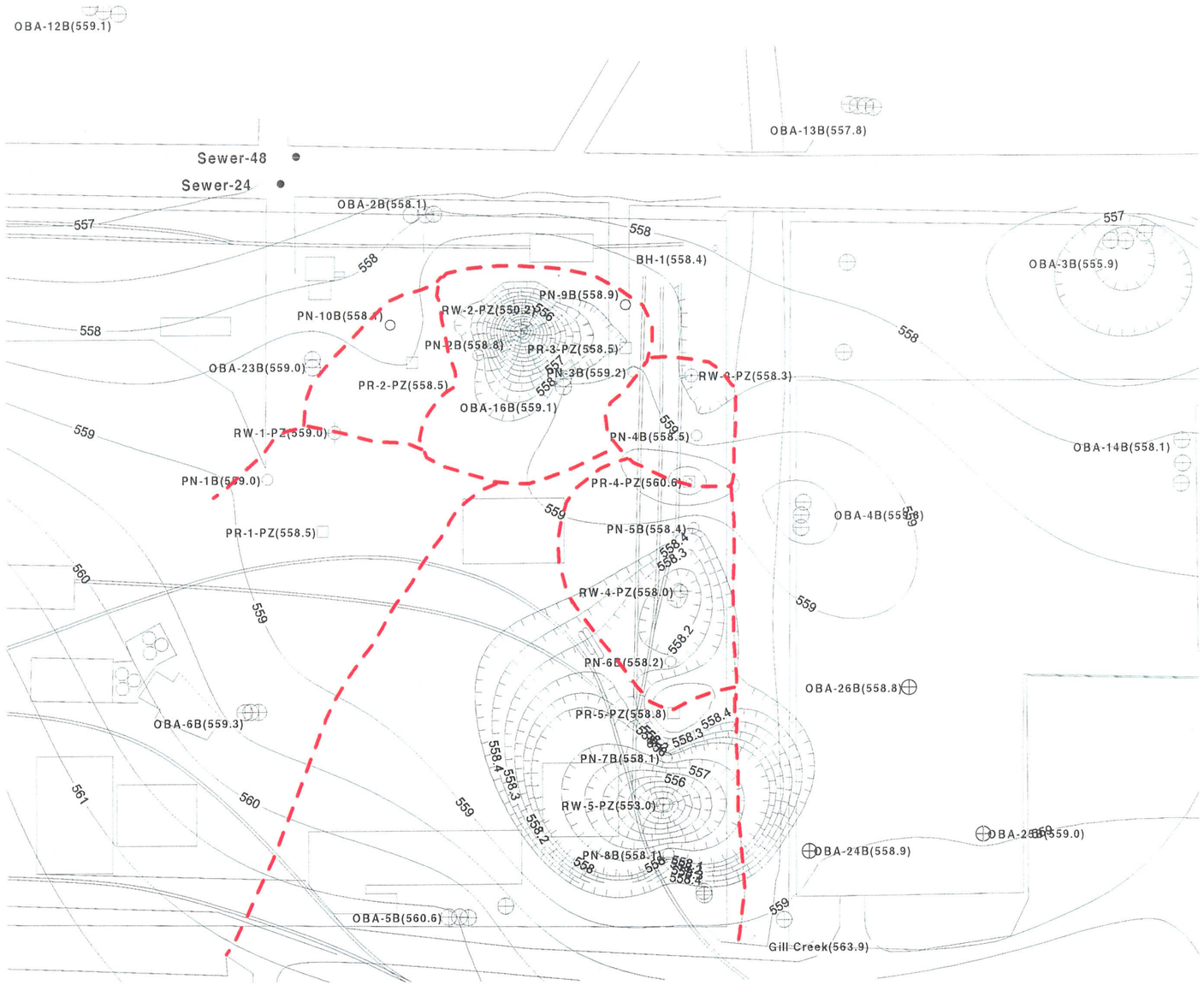
OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

POTENTIOMETRIC SURFACE -- B ZONE (OCTOBER 7, 1999)

Job No.: 12000-8-0030

Figure 2



Well	Average Flow Rate(gpm)*
RW-1	0.2
RW-2	2.0
RW-3	8.2
RW-4	20.2
RW-5	22.1

*: Averaged using daily flow rates since previous monthly field measurements.

N

LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊖ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS (FLOW RATE FROM OMNX SYSTEM)
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT ELEVATION
- ——— PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)
- - - - ESTIMATED CAPTURE ZONE BOUNDARY

0 120 240

Scale 1 inch = 120 feet

NOTE

*: Elevation not used in contouring.
▲: Olin Production Well.
●: Buffalo Avenue Sewer invert is assumed to be a ground-water sink. The piezometric surface is not known. The ground water conturs were estimated based on the sewer invert elevation. PN-2B elevation used as dummy points north of RW-2.

Three water level measurements were obtained in Gill Creek throughout the day at 9:44 am (564 feet), 12:03 pm (563.9 feet), and 17:08 pm (563.4 feet). The Gill Creek elevation was not used in contouring the B zone but is included on the map for comparative purposes.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1999. CAPTURE ZONE BOUNDARY WAS DRAWN BASED THE FLOW PATHLINES GENERATED BY GWPATH.

OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

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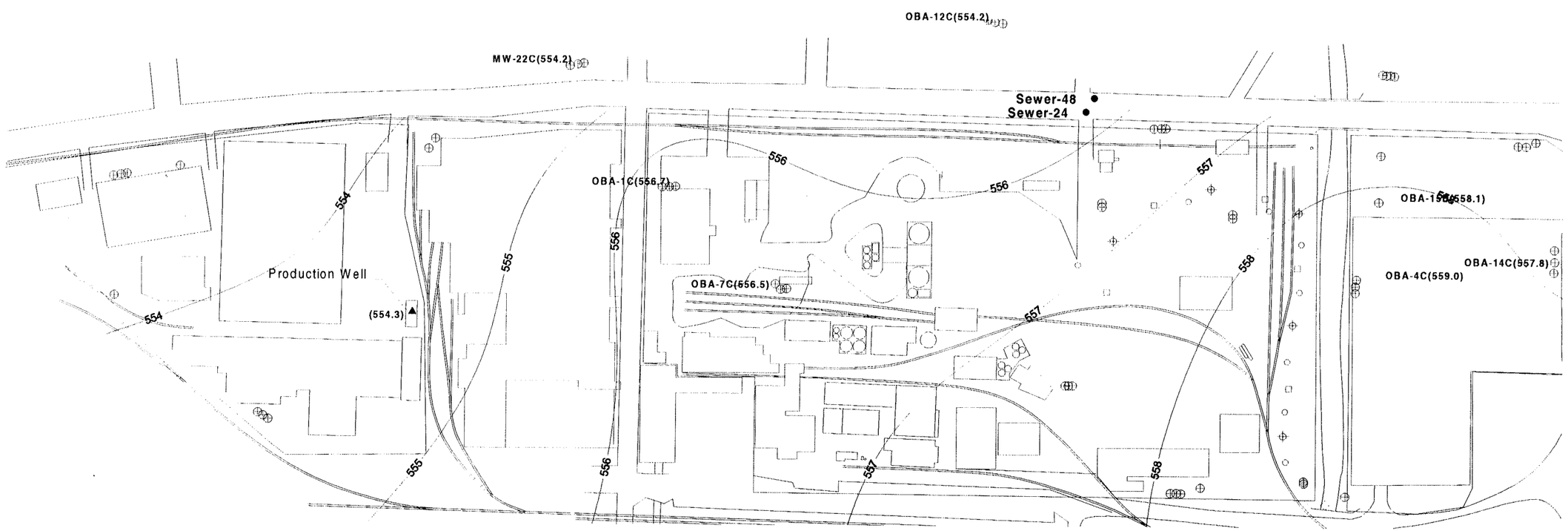
LAWGIBB Group Member

ESTIMATED CAPTURE ZONE AND
POTENTIOMETRIC SURFACE -- B ZONE
(OCTOBER 7, 1999)

Job No.: 12000-8-0030

Figure 2A



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- Φ GROUND WATER RECOVERY WELLS (FLOW RATE FROM OMNX SYSTEM)
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT
- PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 1 FEETS)

Well	Average Flow Rate(gpm)
Olin Production Well	595

0 200 400
Scale 1 inch = 200 feet

NOTE

▲: Water Elevation not obtained from Olin Production Well. Water elevation estimated from pumping rate of 595 gpm on October 7, 1999 using Figure 4-17 from Phase I RFI.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1995.

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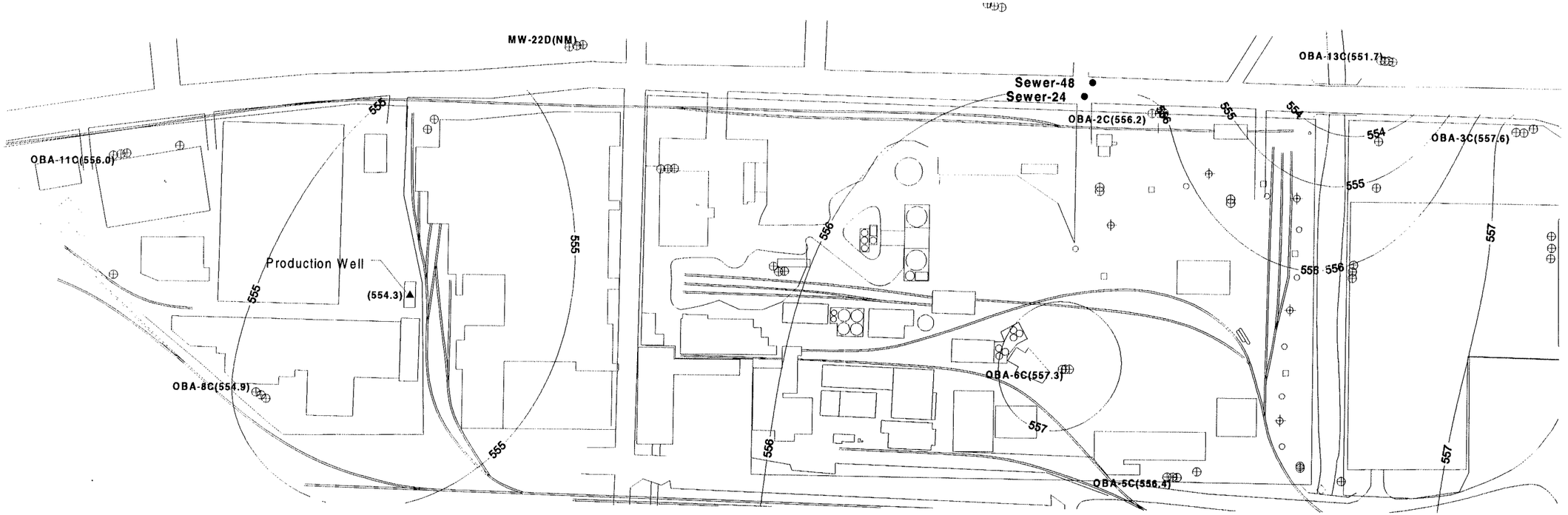
POTENTIOMETRIC SURFACE -- C ZONE
(OCTOBER 7, 1999)

Job No.: 12000-8-0030

Figure 3



N

LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS (FLOW RATE FROM OMNX SYSTEM)
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT
- ——— PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 1 FEETS)

Well	Average Flow Rate(gpm)
Olin Production Well	595

0 200 400

Scale 1 inch = 200 feet

NOTE

▲: Water Elevation not obtained from Olin Production Well. Water elevation estimated from pumping rate of 595 gpm on October 7, 1999 using Figure 4-17 from Phase I RFI.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1995.

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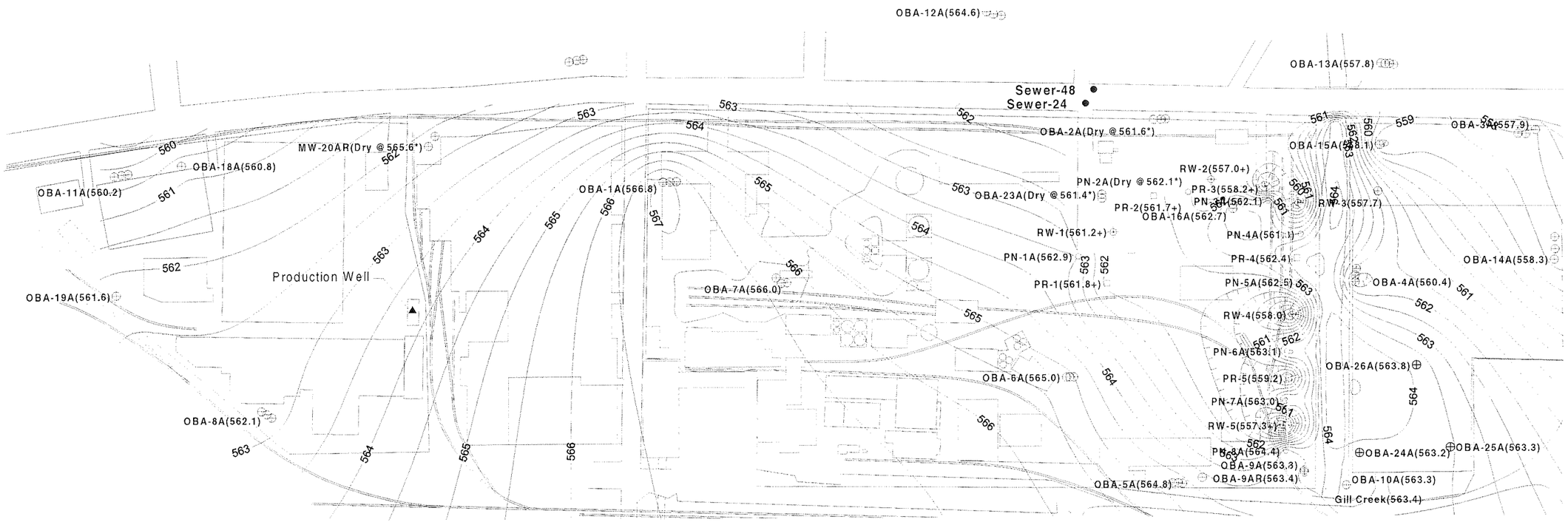
POTENTIOMETRIC SURFACE -- CD ZONE (OCTOBER 7, 1999)

Job No.: 12000-8-0030

Figure 4



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊝ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊙ GROUND WATER RECOVERY WELLS
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT
- PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)
- ESTIMATED DRY AREA IN ZONE A

Well	Average Flow Rate(gpm)*
RW-1	0.0
RW-2	0.9
RW-3	12.3
RW-4	19.3
RW-5	20.7

*: Averaged using daily flow rates since previous monthly field measurements.

0 200 400

Scale 1 inch = 200 feet

NOTE

*: Well dry, elevation of bottom of A-Zone used in contouring.
+: Bottom of A-Zone elevation used in contouring.
▲: Water Elevation not obtained from Olin Production Well.
●: Buffalo Avenue Sewer invert is assumed to be a groundwater sink. The piezometric surface is estimated as the bottom of the A-zone. The bottom of the A-zone along Buffalo Avenue was estimated from borings OBA-1A, OBA-2A, OBA-3A, and OBA-11A.

Three water level measurements were obtained in Gill Creek throughout the day at 10:00am (563.2 feet), 12:30pm (563.4 feet), and 15:10pm (563.3 feet). The Gill Creek elevation (563.4 feet) coinciding with the time water level measurements were obtained in the piezometers along Gill Creek was used in contouring in A zone.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1999.

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NIAGARA FALLS, NEW YORK

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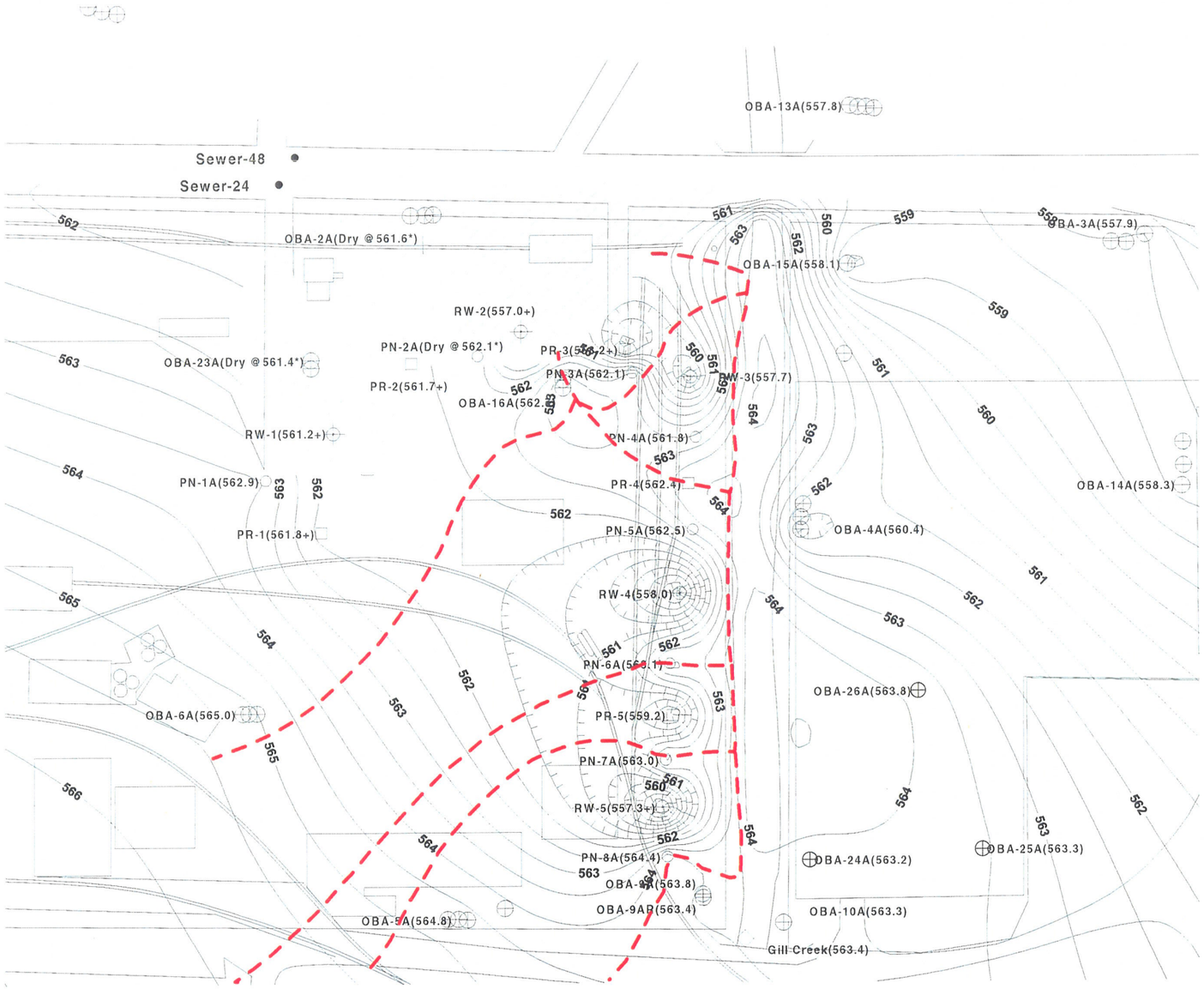
POTENTIOMETRIC SURFACE -- A ZONE (NOVEMBER 1, 1999)

Job No.: 12000-8-0030

Figure 5



Well	Average Flow Rate(gpm)*
RW-1	0.0
RW-2	0.9
RW-3	12.3
RW-4	19.3
RW-5	20.7

*: Averaged using daily flow rates since previous monthly field measurements.

LEGEND

- GILL CREEK MONITORING POINT
- OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- WATER QUALITY MONITORING WELLS
- A/B ZONE PIEZOMETER NESTS
- GROUND WATER RECOVERY WELLS
- PASSIVE RELIEF WELLS
- SEWER INVERT
- PROPERTY LINE
- 565 — ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)
- ESTIMATED CAPTURE ZONE BOUNDARY
- ESTIMATED DRY AREA IN ZONE A

0 120 240

Scale 1 inch = 120 feet

NOTE

*: Well dry, elevation of bottom of A-Zone used in contouring.
+: Bottom of A-Zone elevation used in contouring.
●: Buffalo Avenue Sewer invert is assumed to be a groundwater sink. The piezometric surface is estimated as the bottom of the A-zone. The bottom of the A-zone along Buffalo Avenue was estimated from borings OBA-1A, OBA-2A, OBA-3A, and OBA-11A.

Three water level measurements were obtained in Gill Creek throughout the day at 10:00 am (563.22 feet), 12:30 pm (563.4 feet), and 15:10 pm (563.3 feet). The Gill Creek elevation (563.4 feet) coinciding with the time water level measurements were obtained in the piezometers along Gill Creek was used in contouring in A zone.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1995. CAPTURE ZONE BOUNDARY WAS DRAWN BASED THE FLOW PATHLINES GENERATED BY GWPATH.

OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

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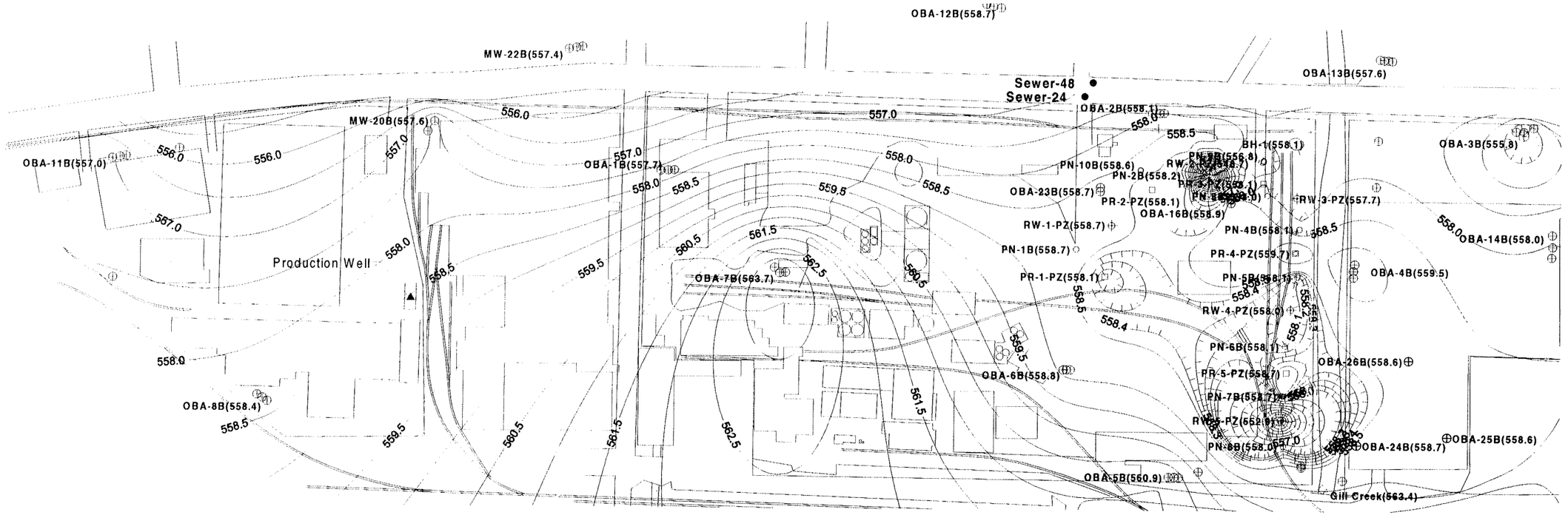
LAWGIBB Group Member

ESTIMATED CAPTURE ZONE AND POTENTIOMETRIC SURFACE -- A ZONE (NOVEMBER 1, 1999)

Job No.: 12000-8-0030

Figure 5A



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT ELEVATION
- ——— PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)

Well	Average Flow Rate(gpm)*
RW-1	0.0
RW-2	0.9
RW-3	12.3
RW-4	19.3
RW-5	20.7

*: Averaged using daily flow rates since previous monthly field measurements.

NOTE

▲: Olin Production Well.
●: Buffalo Avenue Sewer invert is assumed to be a ground-water sink. The piezometric surface is not known. The ground water contours were estimated based on the sewer invert elevation. PN-2B elevation used as dummy points north of RW-2.

Three water level measurements were obtained in Gill Creek throughout the day at 10:00am (563.2 feet), 12:30pm (563.4 feet), and 17:10pm (563.3 feet). The Gill Creek elevation was not used in contouring the B zone but is included on the map for comparative purposes.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1999.

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POTENTIOMETRIC SURFACE -- B ZONE
(NOVEMBER 1, 1999)

Job No.: 12000-8-0030

Figure 6

Well	Average Flow Rate(gpm)*
RW-1	0.0
RW-2	0.9
RW-3	12.3
RW-4	19.3
RW-5	20.7

*: Averaged using daily flow rates since previous monthly field measurements.

LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊖ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS (FLOW RATE FROM OMNX SYSTEM)
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT ELEVATION
- PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)
- ESTIMATED CAPTURE ZONE BOUNDARY

0 120 240

Scale 1 inch = 120 feet

NOTE

*: Elevation not used in contouring.
▲: Olin Production Well.
●: Buffalo Avenue Sewer invert is assumed to be a ground-water sink. The piezometric surface is not known. The ground water conturs were estimated based on the sewer invert elevation.
PN-2B elevation used as dummy points north of RW-2.

Three water level measurements were obtained in Gill Creek throughout the day at 10:00 am (563.2 feet), 12:30 pm (563.4 feet), and 15:10 pm (563.3 feet). The Gill Creek elevation was not used in contouring the B zone but is included on the map for comparative purposes.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1999. CAPTURE ZONE BOUNDARY WAS DRAWN BASED THE FLOW PATHLINES GENERATED BY GWPATH.

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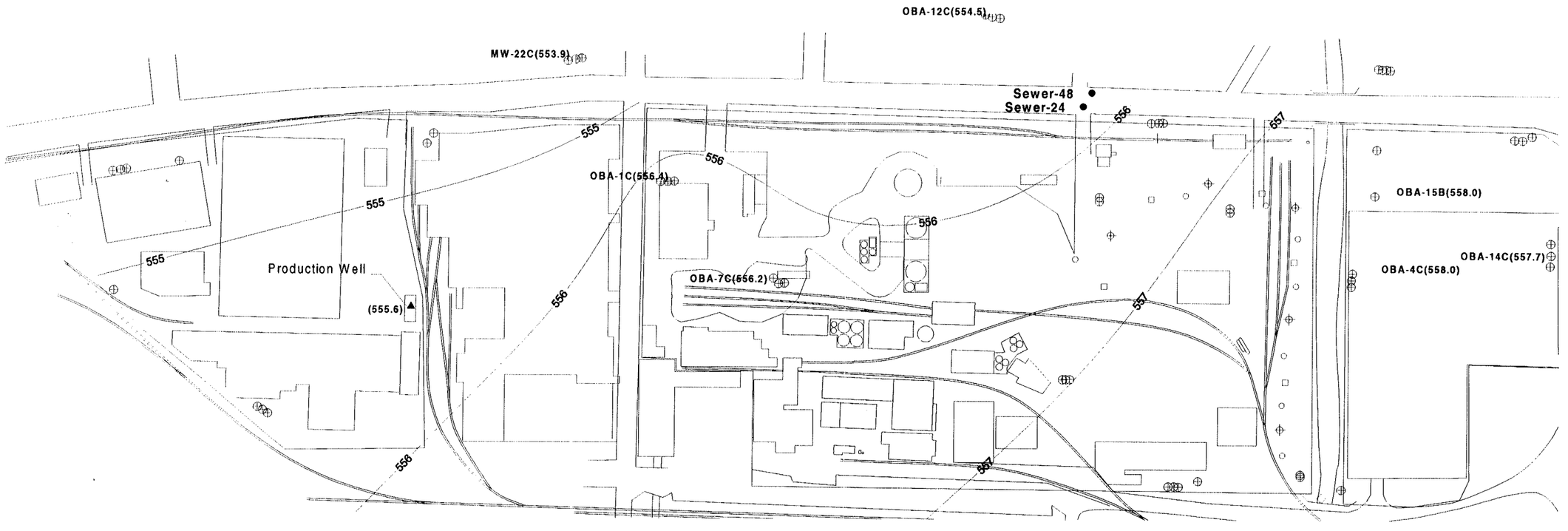
ESTIMATED CAPTURE ZONE AND POTENTIOMETRIC SURFACE -- B ZONE (NOVEMBER 1, 1999)

Job No.: 12000-8-0030

Figure 6A



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS (FLOW RATE FROM OMNX SYSTEM)
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT
- ——— PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 1 FEET)

Well	Average Flow Rate(gpm)
Olin Production Well	385

0 200 400
Scale 1 inch = 200 feet

NOTE

▲: Water Elevation not obtained from Olin Production Well. Water elevation estimated from pumping rate of 385 gpm on November 1, 1999 using Figure 4-17 from Phase I RFI.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1995.

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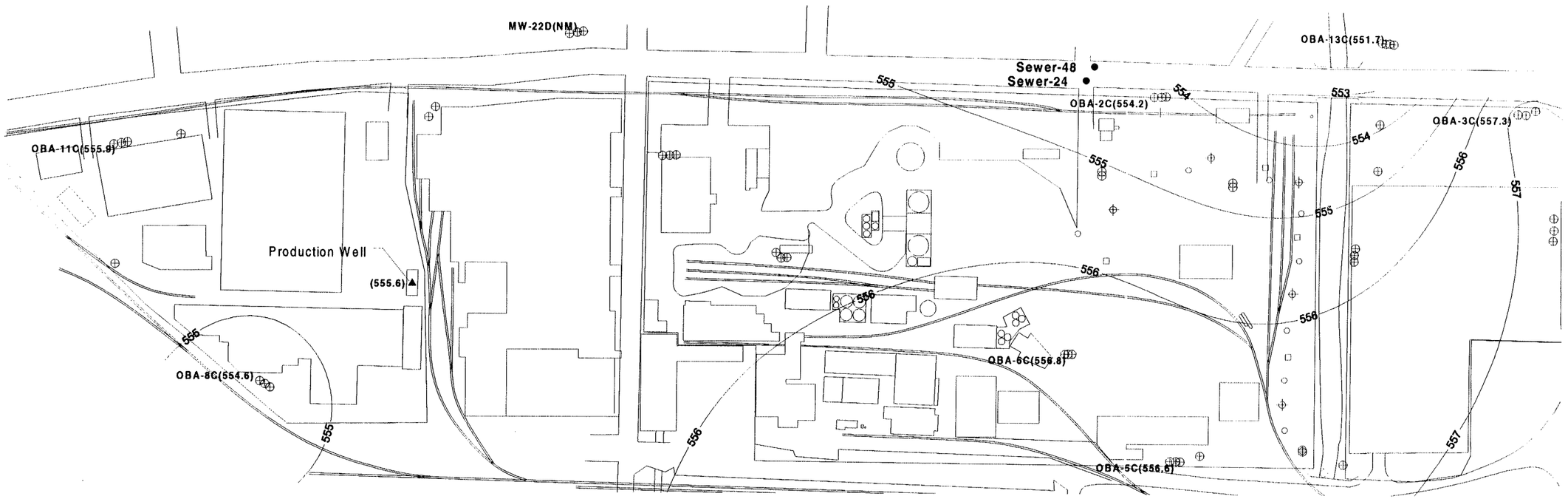
POTENTIOMETRIC SURFACE -- C ZONE
(NOVEMBER 1, 1999)

Job No.: 12000-8-0030

Figure 7



N

LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS (FLOW RATE FROM OMNX SYSTEM)
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT
- PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 1 FEET)

Well	Average Flow Rate(gpm)
Olin Production Well	385

0 200 400

Scale 1 inch = 200 feet

NOTE

▲: Water Elevation not obtained from Olin Production Well. Water elevation estimated from pumping rate of 385 gpm on November 1, 1999 using Figure 4-17 from Phase I RFI.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1995.

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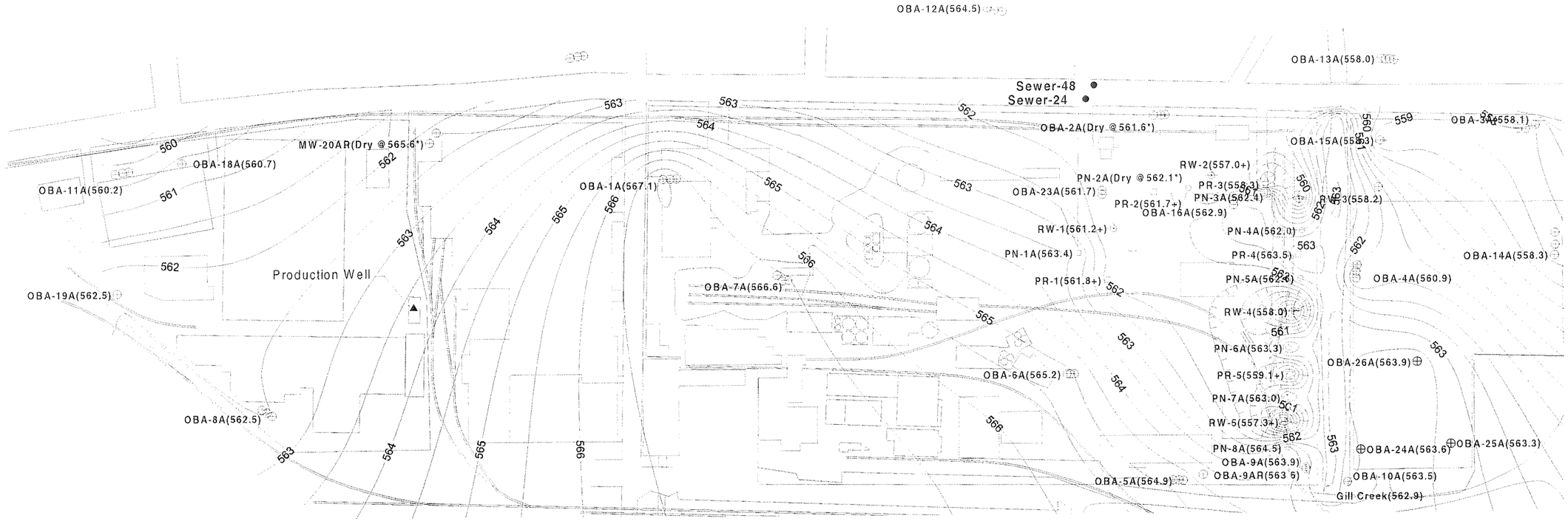
POTENTIOMETRIC SURFACE -- CD ZONE
(NOVEMBER 1, 1999)

Job No.: 12000-8-0030

Figure 8



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊙ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊙ GROUND WATER RECOVERY WELLS
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT
- PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)
- ESTIMATED DRY AREA IN ZONE A

Well	Average Flow Rate(gpm)*
RW-1	0.0
RW-2	1.4
RW-3	5.3
RW-4	17.0
RW-5	21.3

* : Averaged using daily flow rates since previous monthly field measurements.

0 200 400

Scale 1 inch = 200 feet

NOTE

* : Well dry, elevation of bottom of A-Zone used in contouring.
+ : Bottom of A-Zone elevation used in contouring.
▲ : Water Elevation not obtained from Olin Production Well.
● : Buffalo Avenue Sewer invert is assumed to be a groundwater sink. The piezometric surface is estimated as the bottom of the A-zone. The bottom of the A-zone along Buffalo Avenue was estimated from borings OBA-1A, OBA-2A, OBA-3A, and OBA-11A.

Three water level measurements were obtained in Gill Creek throughout the day at 10:07am (562.9 feet), 12:50pm (562.9 feet), and 15:25pm (562.7 feet). The Gill Creek elevation (562.9 feet) coinciding with the time water level measurements were obtained in the piezometers along Gill Creek was used in contouring in A zone.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1999.

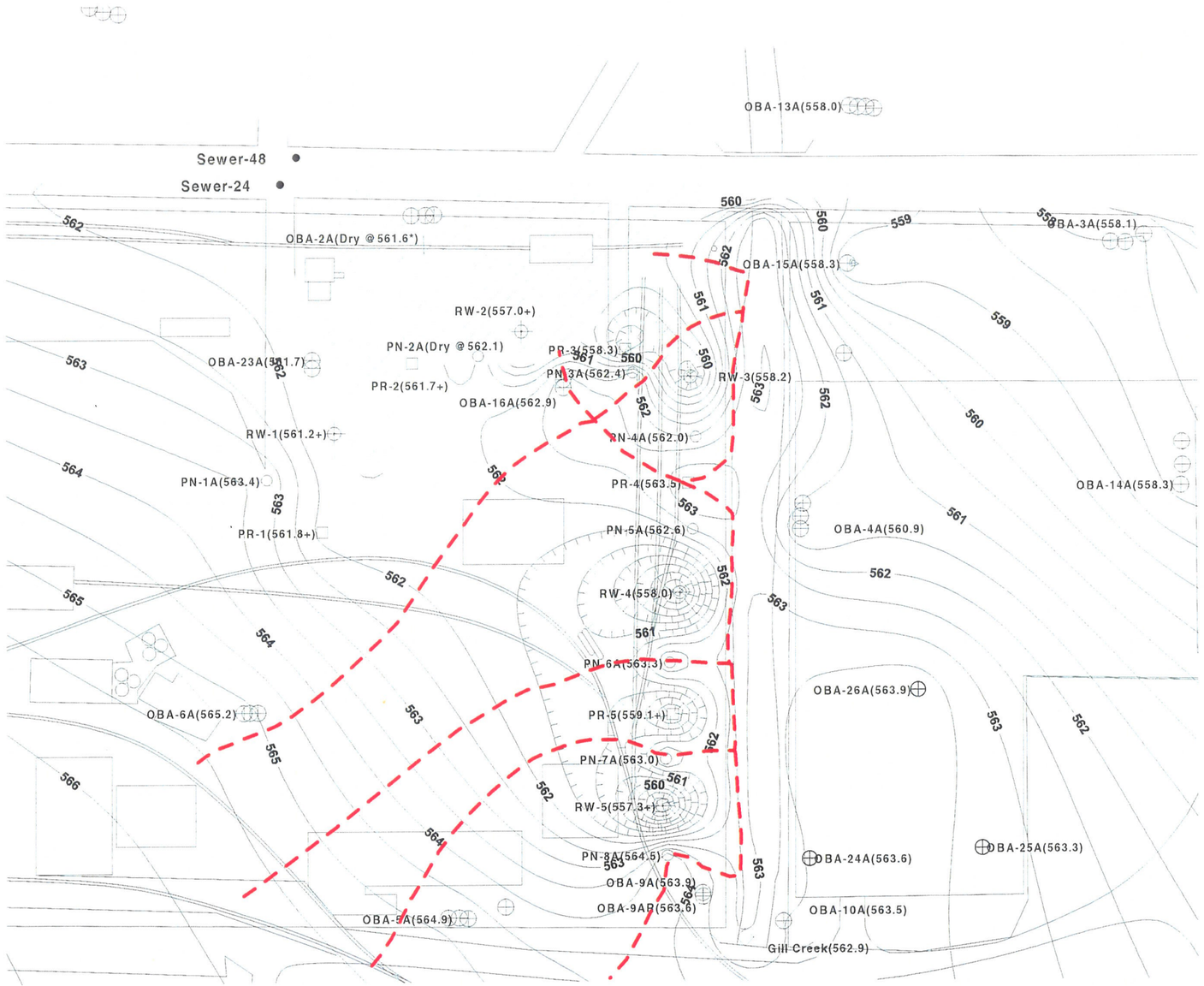
OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

POTENTIOMETRIC SURFACE -- A ZONE
(DECEMBER 2, 1999)

Job No.: 12000-8-0030

Figure 9



Well	Average Flow Rate(gpm)*
RW-1	0.0
RW-2	1.4
RW-3	5.3
RW-4	17.0
RW-5	21.3

*: Averaged using daily flow rates since previous monthly field measurements.

LEGEND

- GILL CREEK MONITORING POINT
- OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- WATER QUALITY MONITORING WELLS
- A/B ZONE PIEZOMETER NESTS
- GROUND WATER RECOVERY WELLS
- PASSIVE RELIEF WELLS
- SEWER INVERT
- PROPERTY LINE
- 565 — ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)
- ESTIMATED CAPTURE ZONE BOUNDARY
- ESTIMATED DRY AREA IN ZONE A

0 120 240

Scale 1 inch = 120 feet

NOTE

*: Well dry, elevation of bottom of A-Zone used in contouring.
+: Bottom of A-Zone elevation used in contouring.
●: Buffalo Avenue Sewer invert is assumed to be a groundwater sink. The piezometric surface is estimated as the bottom of the A-zone. The bottom of the A-zone along Buffalo Avenue was estimated from borings OBA-1A, OBA-2A, OBA-3A, and OBA-11A.

Three water level measurements were obtained in Gill Creek throughout the day at 10:07 am (562.9 feet), 12:50 pm (562.9 feet), and 15:25 pm (562.7 feet). The Gill Creek elevation (562.9 feet) coinciding with the time water level measurements were obtained in the piezometers along Gill Creek was used in contouring in A zone.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1995. CAPTURE ZONE BOUNDARY WAS DRAWN BASED THE FLOW PATHLINES GENERATED BY GWPATH.

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NIAGARA FALLS, NEW YORK

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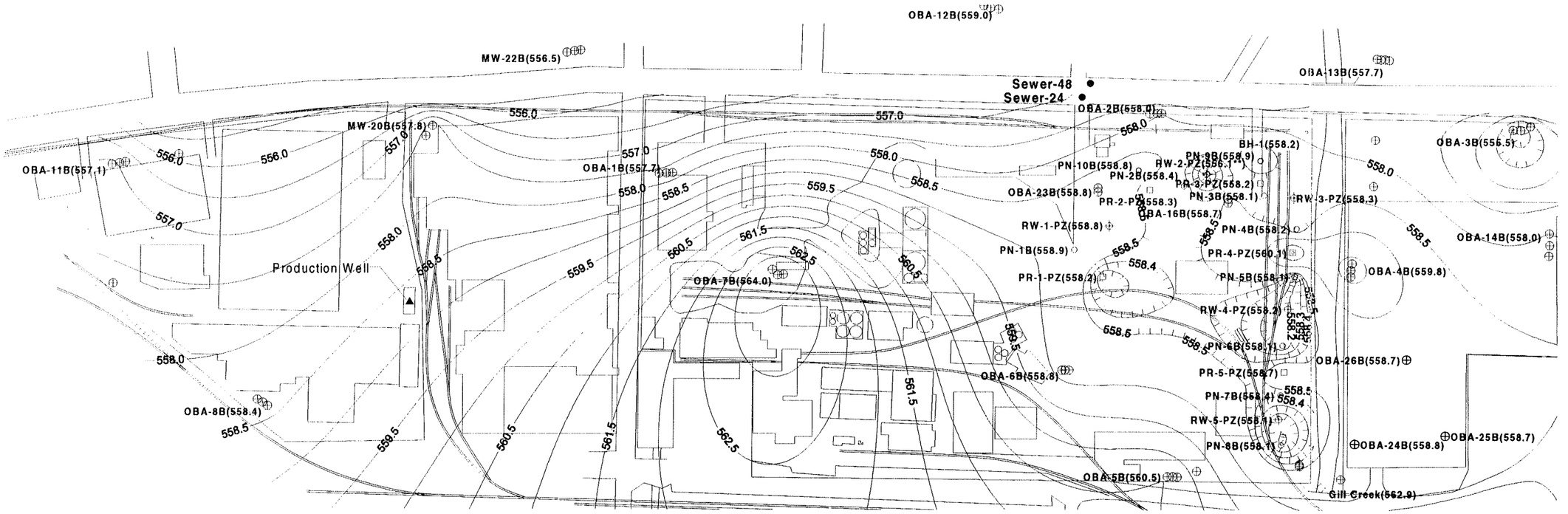
ESTIMATED CAPTURE ZONE AND POTENTIOMETRIC SURFACE -- A ZONE (DECEMBER 2, 1999)

Job No.: 12000-8-0030

Figure 12



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT ELEVATION
- ——— PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)

Well	Average Flow Rate(gpm)*
RW-1	0.0
RW-2	1.4
RW-3	5.3
RW-4	17.0
RW-5	21.3

*: Averaged using daily flow rates since previous monthly field measurements.

NOTE

**: RW-2-PZ was set at 556.1ft due to obstacle inside well.
▲: Olin Production Well.
●: Buffalo Avenue Sewer invert is assumed to be a ground-water sink. The piezometric surface is not known. The ground water contours were estimated based on the sewer invert elevation. PN-2B elevation used as dummy points north of RW-2.

Three water level measurements were obtained in Gill Creek throughout the day at 10:07am (562.9 feet), 12:50pm (562.9 feet), and 15.25pm (562.7 feet). The Gill Creek elevation was not used in contouring the B zone but is included on the map for comparative purposes.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1999.

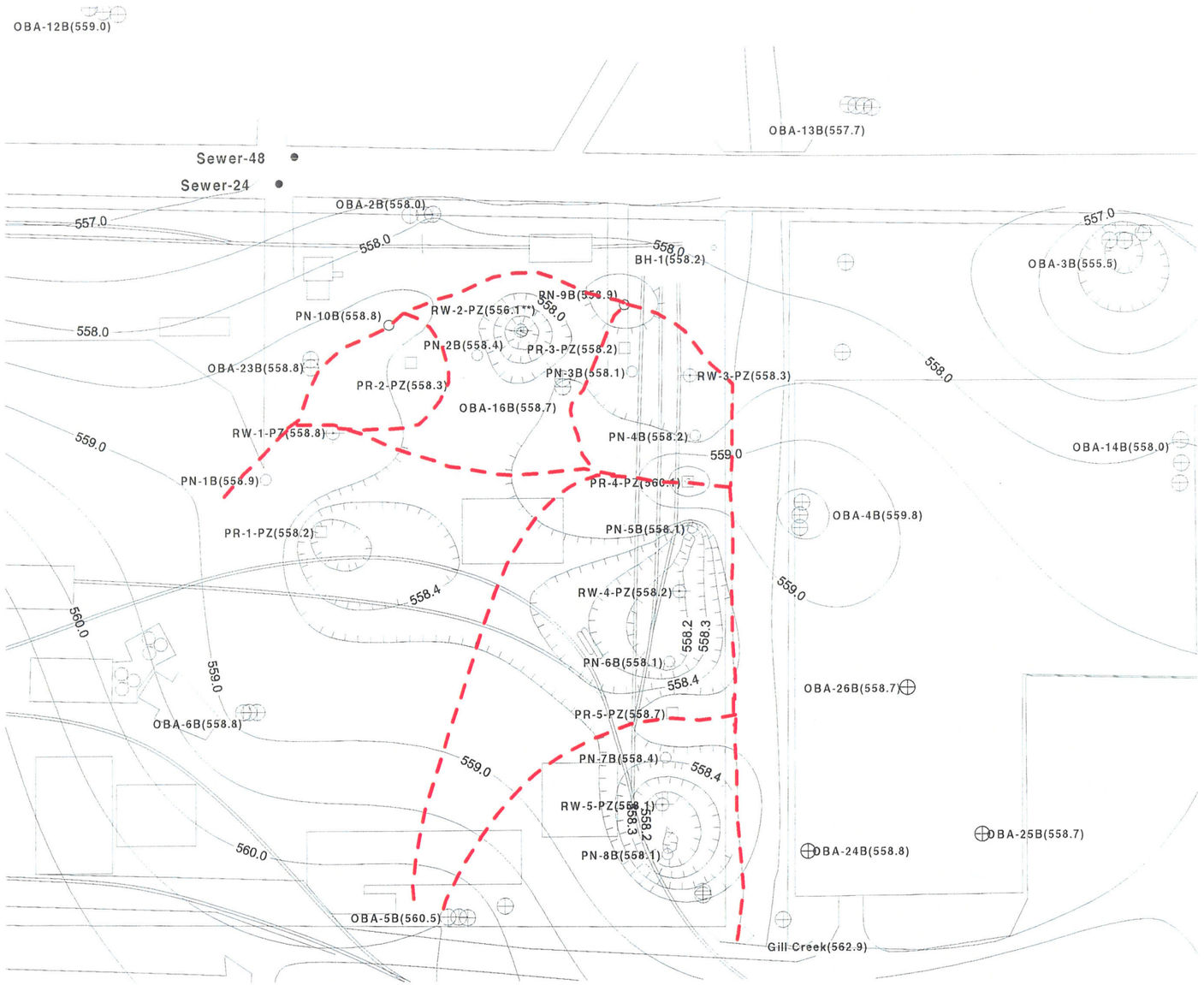
OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

POTENTIOMETRIC SURFACE -- B ZONE
(DECEMBER 2, 1999)

Job No.: 12000-8-0030

Figure 10



Well	Average Flow Rate(gpm)*
RW-1	0.0
RW-2	1.4
RW-3	5.3
RW-4	17.0
RW-5	21.3

*: Averaged using daily flow rates since previous monthly field measurements.

LEGEND

- GILL CREEK MONITORING POINT
- OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- WATER QUALITY MONITORING WELLS
- A/B ZONE PIEZOMETER NESTS
- GROUND WATER RECOVERY WELLS (FLOW RATE FROM OMNX SYSTEM)
- PASSIVE RELIEF WELLS
- SEWER INVERT ELEVATION
- PROPERTY LINE
- 565 — ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 0.5 FEET)
- ESTIMATED CAPTURE ZONE BOUNDARY

0 120 240

Scale 1 inch = 120 feet

NOTE

*: Elevation not used in contouring.
**: RW-2-PZ was set at 556.1 due to obstacle inseide well.
▲: Olin Production Well.
●: Buffalo Avenue Sewer invert is assumed to be a ground-water sink. The piezometric surface is not known. The ground water conturs were estimated based on the sewer invert elevation. PN-2B elevation used as dummy points north of RW-2.

Three water level measurements were obtained in Gill Creek throughout the day at 10:07 am (562.9 feet), 12:50 pm (562.9 feet), and 15:25 pm (562.7 feet). The Gill Creek elevation was not used in contouring the B zone but is included on the map for comparative purposes.

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1999. CAPTURE ZONE BOUNDARY WAS DRAWN BASED THE FLOW PATHLINES GENERATED BY GWPATH.

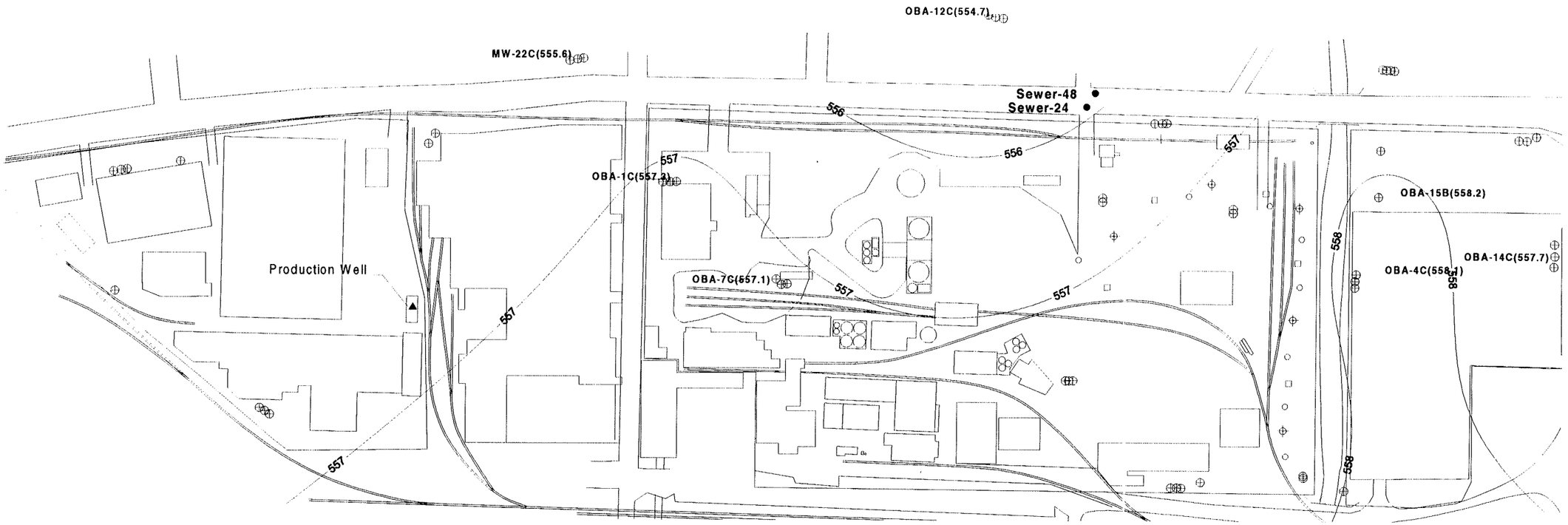
OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

ESTIMATED CAPTURE ZONE AND POTENTIOMETRIC SURFACE -- B ZONE (DECEMBER 2, 1999)

Job No.: 12000-8-0030

Figure 13



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS (FLOW RATE FROM OMNX SYSTEM)
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT
- ——— PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 1 FEETS)

Well	Average Flow Rate(gpm)
Olin Production Well	Not Operating

0 200 400

Scale 1 inch = 200 feet

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1995.

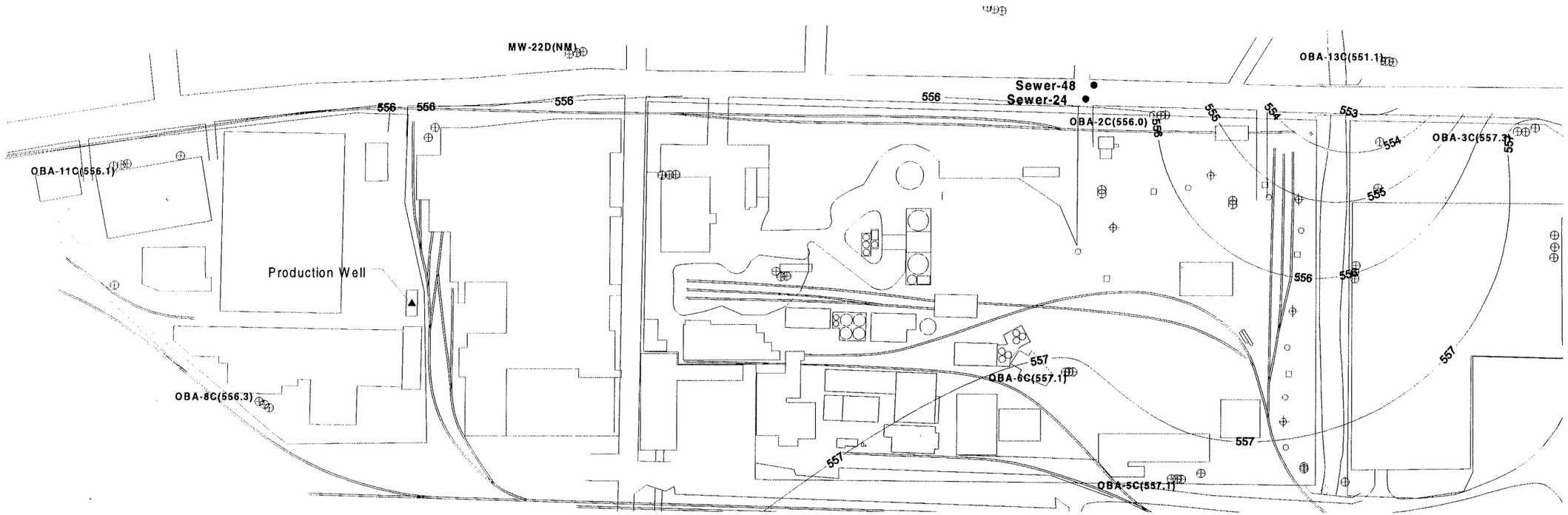
OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

POTENTIOMETRIC SURFACE -- C ZONE
(DECEMBER 2, 1999)

Job No.: 12000-8-0030

Figure 11



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL (FLOW RATE FROM DUPONT)
- ⊙ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- ⊕ GROUND WATER RECOVERY WELLS (FLOW RATE FROM OMNX SYSTEM)
- □ PASSIVE RELIEF WELLS
- ● SEWER INVERT
- ——— PROPERTY LINE
- 565 ESTIMATED GROUND-WATER CONTOUR LINES (CONTOUR INTERVAL: 1 FEETS)

Well	Average Flow Rate(gpm)
Olin Production Well	Not Operating

0 200 400

Scale 1 inch = 200 feet

POTENTIOMETRIC SURFACE CONTOUR GENERATED USING SURFER FOR WINDOWS BY GOLDEN SOFTWARE, INC. 1995.

OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

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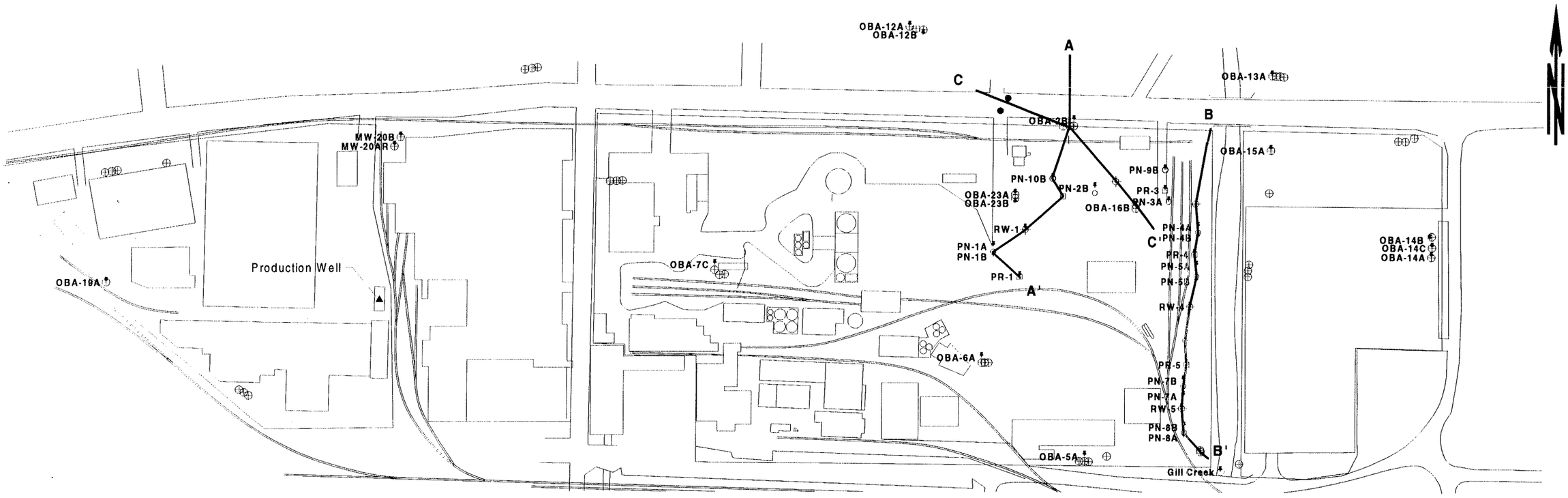
LAWGIBB Group Member

POTENTIOMETRIC SURFACE -- CD ZONE
(DECEMBER 2, 1999)

Job No.: 12000-8-0030

Figure 12



LEGEND

- ◇ GILL CREEK MONITORING POINT
- ▲ OLIN PRODUCTION WELL
- ⊕ WATER QUALITY MONITORING WELLS
- ○ A/B ZONE PIEZOMETER NESTS
- Φ GROUND WATER RECOVERY WELLS
- □ PASSIVE RELIFF WELLS
- ● SEWER INVERT ELEVATION
- ——— PROPERTY LINE
- A ——— A' HYDRAGEOLOGIC CROSS SECTION

0 200 400

Scale 1 inch = 200 feet

OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

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LAWGIBB Group Member

CROSS SECTION LOCATION MAP

Job No.: 12000-8-0030

Figure A4-1

A
North

A'
South

Buffalo Avenue

OBA-2A
OBA-2B
OBA-2C
Ground Surface
PN-10B
PR-2
RW-1
PN-1A
PN-1B
PR-1

Fill:
Brown-black gravel
sand and silt
with some clay, coal
and brick fragments

Clay(CL):
Brown-tan and
Brown-gray mottled
with little silt

Top of Dolostone

A-ZONE

B-ZONE

B-ZONE FRACTURES

Fractured

B-ZONE

C-ZONE

48" Sewer
Invert

24" Sewer
Invert

561.6
558.0
556.0
558.8
558.3
558.9
563.4
558.9
558.2

BT

ELEVATION (FT)

570
566
562
558
554
550
546
542
538

SCALE
IN FEET
4
0
40
Vertical Exaggeration 10x

Down to 520 3

NOTE

▽ : Ground-Water elevation measured on 12/2/99.

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Hydrogeologic Cross Section AA'

Job Number 12000-8-0030

Figure A4-2

B North

B'
South

BH-1

Ground Surface

RW-3

PN-4A PN-4B

PR-4

PN-5A PN-5B

RW-4

PN-6A PN-6B

PR-5

PN-7A PN-7B

RW-5

PN-8A PN-8B

OBA-9AR

ELEVATION (FT)

570
566
562
558
554
550
546
542
538

Gravel

Fill:
Brown, gray and black
sand and silt and
trace clay with brick fragments,
clinkers, and some gravel

Gray Fine
Sand and Clay

Top of Dolostone

A-ZONE

B-ZONE

B-ZONE FRACTURES

Gill Creek
Water Level
562.9

Clayey Sand with
Brick Dolostone fragments

Soft Black
Silty
Clay

558.2
558.2
562.0
BT
558.4
563.5
562.6
BT
558.1
558.0
563.3
BT
558.1
559.0
558.4
BT
563.0
564.5
BT
558.1
563.6
BT
551.7

4
SCALE
IN FEET
0
40
Vertical Exaggeration 10x

NOTE

▽ : Ground-Water elevation measured on 12/2/99

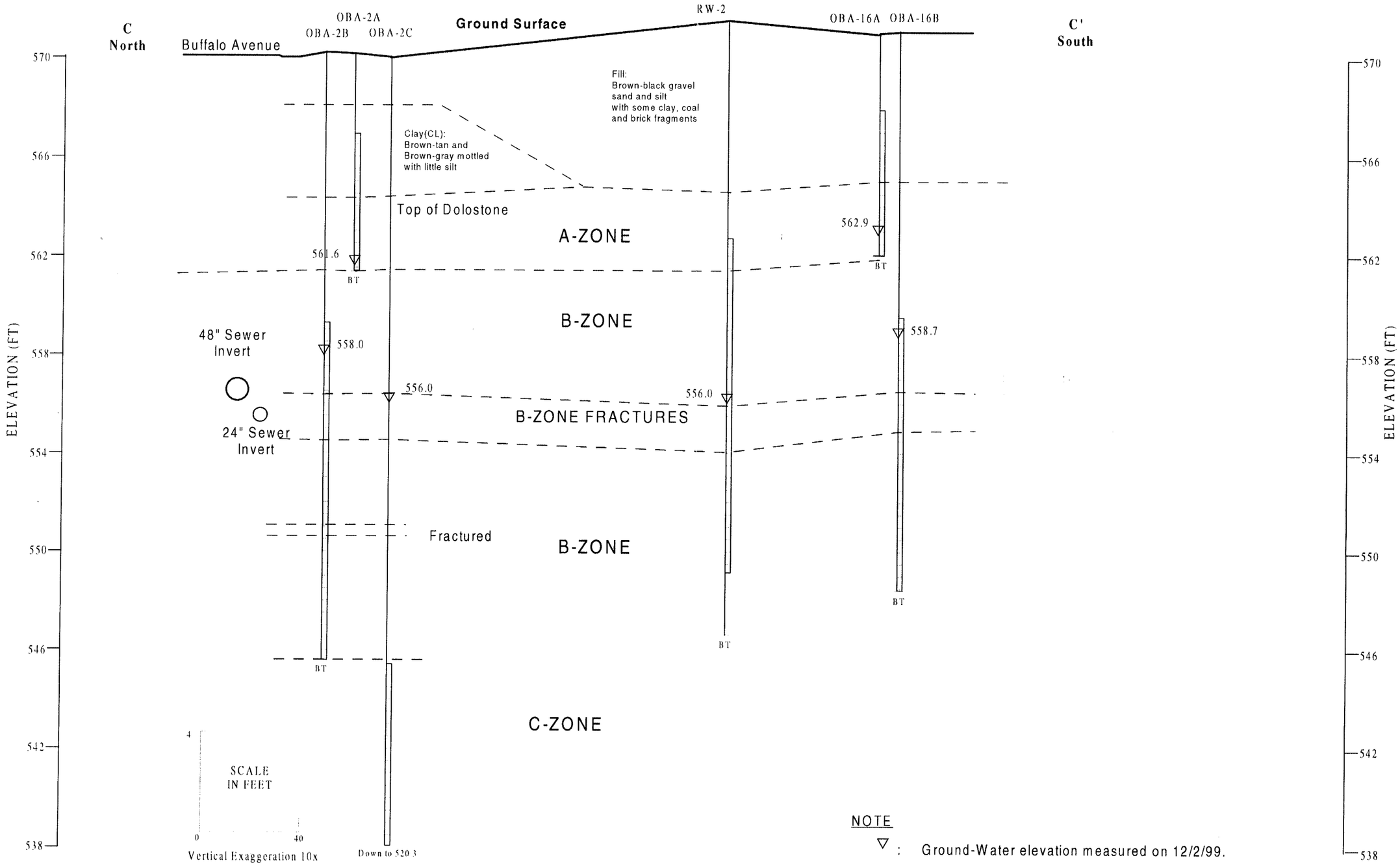
OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

Hydrogeologic Cross Section BB'

Job Number 12000-8-0030

Figure A4-3



NOTE

▽ : Ground-Water elevation measured on 12/2/99.

OLIN CHEMICAL
NIAGARA FALLS, NEW YORK

LAW
LAWGIBB Group Member

Hydrogeologic Cross Section CC'

Job Number 12000-8-0030

Figure A4-4

Olin Niagara Falls
Plant 2 Area Remediation

Summary: Contaminant Mass and Groundwater Extracted

Quarter	organics		mercury		pesticides		g.w. extracted	
	lb	Ann. Tot.	lb	Ann. Tot.	lb	Ann. Tot.	gal	Ann. Tot.
Startup/Q1-98 [est]	27.81		0.02		0.2		210,000	
Q2-98	154.5		0.1		1.3		1,175,799	
Q3-98	595.5		0.6		4.9		2,583,159	
Q4-98	1273.1	2,051	0.1	0.8	5.2	12	4,054,996	8,023,954
Q1-99	817.3		0.05		8.5		4,233,521	
Q2-99	1034.7		0.05		7.1		3,991,584	
Q3-99	1188.2		0.1		8.7		5,219,207	
Q4-99	976.3		0.02		6.9		6,366,935	
		4,017		0.22		31		19,811,247
TOTAL	**6067**		**1**		**43**		**27,835,201**	

Olin Niagara Falls Plant Site: Plant 2 Area Remediation
Groundwater Contaminant Mass Removed

ORGANICS

Q4-99

WELL	conc [A] mg/l	conv liter / gal	conv lb /mg	conversion lb/gallon	flow gal/qtr	MASS lb/qtr
RW1	8.3	3.8	2.20E-06	0.00006947	2,572	0.18
RW2	7.4	3.8	2.20E-06	0.00006170	121,897	7.52
RW3	0.2	3.8	2.20E-06	0.00000163	1,137,245	1.85
RW4	7.6	3.8	2.20E-06	0.00006345	2,374,729	150.68
RW5	35.8	3.8	2.20E-06	0.00029887	2,730,491	816.06
TOTAL						**976.3**

MERCURY

Q4-99

WELL	conc [A] mg/l	conv liter / gal	conv lb /mg	conversion lb/gallon	flow gal/qtr	MASS lb/qtr
RW1	0.016	3.8	2.20E-06	0.00000013	2,572	0.00
RW2	0.007	3.8	2.20E-06	0.00000006	121,897	0.01
RW3	0.0003	3.8	2.20E-06	0.00000000	1,137,245	0.00
RW4	0.0007	3.8	2.20E-06	0.00000001	2,374,729	0.01
RW5	0.0000	3.8	2.20E-06	0.00000000	2,730,491	0.00
TOTAL						**0.02**

PESTICIDES

Q4-99

WELL	conc [A] mg/l	conv liter / gal	conv lb /mg	conversion lb/gallon	flow gal/qtr	MASS lb/qtr
RW1	0.019	3.8	2.20E-06	0.00000016	2,572	0.00
RW2	0.080	3.8	2.20E-06	0.00000067	121,897	0.08
RW3	0.008	3.8	2.20E-06	0.00000007	1,137,245	0.08
RW4	0.179	3.8	2.20E-06	0.00000149	2,374,729	3.55
RW5	0.140	3.8	2.20E-06	0.00000117	2,730,491	3.19
TOTAL						**6.9**

[A] = TOTAL OF PARAMETER GROUP IN QUARTERLY GRAB SAMPLE FROM DISCHARGE HEADER

Olin Niagara Falls Recovery Wells:

Extracted GW Quality: 4Q-99

Location ID	Parameter Name	Result	Qualifier	param group total	Detection Limit	SampleType	Units
RW-1	BARIUM		ND		0.2	Normal	MG/L
RW-1	BARIUM		ND		0.2	Normal	MG/L
RW-1	COPPER		ND		0.025	Normal	MG/L
RW-1	COPPER		ND		0.025	Normal	MG/L
RW-1	LEAD		ND		0.003	Normal	MG/L
RW-1	LEAD		ND		0.003	Normal	MG/L
RW-1	ZINC		ND		0.02	Normal	MG/L
RW-1	ZINC		ND		0.02	Normal	MG/L
RW-1	MERCURY	0.016		**0.016**	0.001	Normal	MG/L
RW-1	MERCURY	0.013			0.001	Normal	MG/L
RW-1	METHANOL (METHYL ALCOHOL)		ND		1	Normal	MG/L
RW-1	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	9.7			0.5	Normal	UG/L
RW-1	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	9.2			0.5	Normal	UG/L
RW-1	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)		ND		0.5	Normal	UG/L
RW-1	GAMMA BHC (LINDANE)		ND	**18.9**	0.5	Normal	UG/L
RW-1	1,1,1-TRICHLOROETHANE		ND		170	Normal	UG/L
RW-1	1,1,2,2-TETRACHLOROETHANE		ND		170	Normal	UG/L
RW-1	1,1,2-TRICHLOROETHANE		ND		170	Normal	UG/L
RW-1	1,1-DICHLOROETHENE		ND		170	Normal	UG/L
RW-1	1,2,4-TRICHLOROBENZENE	4600			170	Normal	UG/L
RW-1	1,2-DICHLOROBENZENE	260			170	Normal	UG/L
RW-1	1,3-DICHLOROBENZENE	350			170	Normal	UG/L
RW-1	1,4-DICHLOROBENZENE		ND		170	Normal	UG/L
RW-1	BENZENE		ND		170	Normal	UG/L
RW-1	CARBON TETRACHLORIDE		ND		170	Normal	UG/L
RW-1	CHLOROBENZENE		ND		170	Normal	UG/L
RW-1	CHLOROMETHANE		ND		330	Normal	UG/L
RW-1	cis-1,2-DICHLOROETHYLENE	300			170	Normal	UG/L
RW-1	METHYLENE CHLORIDE		ND		170	Normal	UG/L
RW-1	TETRACHLOROETHENE (PCE)	900			170	Normal	UG/L
RW-1	trans-1,2-DICHLOROETHENE		ND		170	Normal	UG/L
RW-1	TRICHLOROETHYLENE (TCE)	1900			170	Normal	UG/L
RW-1	VINYL CHLORIDE		ND		330	Normal	UG/L
RW-1	2,4,6-TRICHLOROPHENOL		ND	**8310**	10	Normal	UG/L
RW-1	CYANIDE	0.013			0.01	Normal	MG/L

Olin Niagara Falls Recovery Wells:

Extracted GW Quality: 4Q-99

Location ID	Parameter Name	Result	Qualifier	param group total	Detection Limit	SampleType	Units
RW-2	BARIUM		ND		0.2	Normal	MG/L
RW-2	BARIUM		ND		0.2	Normal	MG/L
RW-2	COPPER		ND		0.025	Normal	MG/L
RW-2	COPPER		ND		0.025	Normal	MG/L
RW-2	LEAD		ND		0.003	Normal	MG/L
RW-2	LEAD		ND		0.003	Normal	MG/L
RW-2	ZINC		ND		0.02	Normal	MG/L
RW-2	ZINC		ND		0.02	Normal	MG/L
RW-2	MERCURY	0.0031			0.0002	Normal	MG/L
RW-2	MERCURY	0.0072		**0.0072**	0.0004	Normal	MG/L
RW-2	METHANOL (METHYL ALCOHOL)		ND		1	Normal	MG/L
RW-2	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	35			5	Normal	UG/L
RW-2	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	5.8			5	Normal	UG/L
RW-2	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	6.1			5	Normal	UG/L
RW-2	GAMMA BHC (LINDANE)	33		**79.9**	5	Normal	UG/L
RW-2	1,1,1-TRICHLOROETHANE		ND		170	Normal	UG/L
RW-2	1,1,2,2-TETRACHLOROETHANE		ND		170	Normal	UG/L
RW-2	1,1,2-TRICHLOROETHANE		ND		170	Normal	UG/L
RW-2	1,1-DICHLOROETHENE		ND		170	Normal	UG/L
RW-2	1,2,4-TRICHLOROBENZENE	990			170	Normal	UG/L
RW-2	1,2-DICHLOROBENZENE		ND		170	Normal	UG/L
RW-2	1,3-DICHLOROBENZENE		ND		170	Normal	UG/L
RW-2	1,4-DICHLOROBENZENE	180			170	Normal	UG/L
RW-2	BENZENE		ND		170	Normal	UG/L
RW-2	CARBON TETRACHLORIDE		ND		170	Normal	UG/L
RW-2	CHLOROBENZENE		ND		170	Normal	UG/L
RW-2	CHLOROMETHANE		ND		330	Normal	UG/L
RW-2	cis-1,2-DICHLOROETHYLENE	540			170	Normal	UG/L
RW-2	METHYLENE CHLORIDE	170			170	Normal	UG/L
RW-2	TETRACHLOROETHENE (PCE)	1500			170	Normal	UG/L
RW-2	trans-1,2-DICHLOROETHENE		ND		170	Normal	UG/L
RW-2	TRICHLOROETHYLENE (TCE)	4000			170	Normal	UG/L
RW-2	VINYL CHLORIDE		ND		330	Normal	UG/L
RW-2	2,4,6-TRICHLOROPHENOL		ND	**7,380**	10	Normal	UG/L
RW-2	CYANIDE		ND		0.01	Normal	MG/L

Olin Niagara Falls Recovery Wells:

Extracted GW Quality: 4Q-99

Location ID	Parameter Name	Result	Qualifier	param group total	Detection Limit	SampleType	Units
RW-3	BARIUM		ND		0.2	Normal	MG/L
RW-3	BARIUM		ND		0.2	Normal	MG/L
RW-3	COPPER		ND		0.025	Normal	MG/L
RW-3	COPPER		ND		0.025	Normal	MG/L
RW-3	LEAD		ND		0.003	Normal	MG/L
RW-3	LEAD		ND		0.003	Normal	MG/L
RW-3	ZINC	0.027			0.02	Normal	MG/L
RW-3	ZINC	0.026			0.02	Normal	MG/L
RW-3	MERCURY	0.00028		**0.00028**	0.0002	Normal	MG/L
RW-3	MERCURY		ND		0.0002	Normal	MG/L
RW-3	METHANOL (METHYL ALCOHOL)		ND		1	Normal	MG/L
RW-3	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	0.72			0.25	Normal	UG/L
RW-3	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	7.4			0.25	Normal	UG/L
RW-3	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)		ND		0.25	Normal	UG/L
RW-3	GAMMA BHC (LINDANE)	0.32		**8.44**	0.25	Normal	UG/L
RW-3	1,1,1-TRICHLOROETHANE		ND		2	Normal	UG/L
RW-3	1,1,2,2-TETRACHLOROETHANE		ND		2	Normal	UG/L
RW-3	1,1,2-TRICHLOROETHANE		ND		2	Normal	UG/L
RW-3	1,1-DICHLOROETHENE		ND		2	Normal	UG/L
RW-3	1,2,4-TRICHLOROBENZENE	100			2	Normal	UG/L
RW-3	1,2-DICHLOROBENZENE	15			2	Normal	UG/L
RW-3	1,3-DICHLOROBENZENE	9			2	Normal	UG/L
RW-3	1,4-DICHLOROBENZENE	12			2	Normal	UG/L
RW-3	BENZENE		ND		2	Normal	UG/L
RW-3	CARBON TETRACHLORIDE		ND		2	Normal	UG/L
RW-3	CHLOROBENZENE		ND		2	Normal	UG/L
RW-3	CHLOROMETHANE		ND		4	Normal	UG/L
RW-3	cis-1,2-DICHLOROETHYLENE	3.7			2	Normal	UG/L
RW-3	METHYLENE CHLORIDE		ND		2	Normal	UG/L
RW-3	TETRACHLOROETHENE (PCE)	25			2	Normal	UG/L
RW-3	trans-1,2-DICHLOROETHENE		ND		2	Normal	UG/L
RW-3	TRICHLOROETHYLENE (TCE)	30			2	Normal	UG/L
RW-3	VINYL CHLORIDE		ND		4	Normal	UG/L
RW-3	2,4,6-TRICHLOROPHENOL		ND	**194.7**	10	Normal	UG/L
RW-3	CYANIDE		ND		0.01	Normal	MG/L

Olin Niagara Falls Recovery Wells:

Extracted GW Quality: 4Q-99

Location ID	Parameter Name	Result	Qualifier	param group total	Detection Limit	SampleType	Units
RW-4	BARIUM		ND		0.2	Normal	MG/L
RW-4	BARIUM		ND		0.2	Normal	MG/L
RW-4	COPPER		ND		0.025	Normal	MG/L
RW-4	COPPER		ND		0.025	Normal	MG/L
RW-4	LEAD		ND		0.003	Normal	MG/L
RW-4	LEAD		ND		0.003	Normal	MG/L
RW-4	ZINC	0.079			0.02	Normal	MG/L
RW-4	ZINC	0.084			0.02	Normal	MG/L
RW-4	MERCURY	0.00073		**0.00073**	0.0002	Normal	MG/L
RW-4	MERCURY		ND		0.0002	Normal	MG/L
RW-4	METHANOL (METHYL ALCOHOL)		ND		1	Normal	MG/L
RW-4	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	89			5	Normal	UG/L
RW-4	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	7.6			5	Normal	UG/L
RW-4	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	12			5	Normal	UG/L
RW-4	GAMMA BHC (LINDANE)	70		**178.6**	5	Normal	UG/L
RW-4	1,1,1-TRICHLOROETHANE		ND		170	Normal	UG/L
RW-4	1,1,2,2-TETRACHLOROETHANE	270			170	Normal	UG/L
RW-4	1,1,2-TRICHLOROETHANE		ND		170	Normal	UG/L
RW-4	1,1-DICHLOROETHENE		ND		170	Normal	UG/L
RW-4	1,2,4-TRICHLOROBENZENE	1500			170	Normal	UG/L
RW-4	1,2-DICHLOROBENZENE		ND		170	Normal	UG/L
RW-4	1,3-DICHLOROBENZENE		ND		170	Normal	UG/L
RW-4	1,4-DICHLOROBENZENE	200			170	Normal	UG/L
RW-4	BENZENE		ND		170	Normal	UG/L
RW-4	CARBON TETRACHLORIDE		ND		170	Normal	UG/L
RW-4	CHLOROBENZENE		ND		170	Normal	UG/L
RW-4	CHLOROMETHANE		ND		330	Normal	UG/L
RW-4	cis-1,2-DICHLOROETHYLENE	720			170	Normal	UG/L
RW-4	METHYLENE CHLORIDE		ND		170	Normal	UG/L
RW-4	TETRACHLOROETHENE (PCE)	2500			170	Normal	UG/L
RW-4	trans-1,2-DICHLOROETHENE		ND		170	Normal	UG/L
RW-4	TRICHLOROETHYLENE (TCE)	2400			170	Normal	UG/L
RW-4	VINYL CHLORIDE		ND		330	Normal	UG/L
RW-4	2,4,6-TRICHLOROPHENOL		ND	**7,590**	10	Normal	UG/L
RW-4	CYANIDE		ND		0.01	Normal	MG/L

Olin Niagara Falls Recovery Wells:

Extracted GW Quality: 4Q-99

Location ID	Parameter Name	Result	Qualifier	param group total	Detection Limit	SampleType	Units
RW-5	BARIUM		ND		0.2	Normal	MG/L
RW-5	BARIUM		ND		0.2	Duplicate	MG/L
RW-5	BARIUM		ND		0.2	Normal	MG/L
RW-5	BARIUM		ND		0.2	Duplicate	MG/L
RW-5	COPPER		ND		0.025	Duplicate	MG/L
RW-5	COPPER		ND		0.025	Normal	MG/L
RW-5	COPPER		ND		0.025	Normal	MG/L
RW-5	COPPER		ND		0.025	Duplicate	MG/L
RW-5	LEAD		ND		0.003	Normal	MG/L
RW-5	LEAD		ND		0.003	Duplicate	MG/L
RW-5	LEAD		ND		0.003	Normal	MG/L
RW-5	LEAD		ND		0.003	Duplicate	MG/L
RW-5	ZINC		ND		0.02	Duplicate	MG/L
RW-5	ZINC		ND		0.02	Normal	MG/L
RW-5	ZINC		ND		0.02	Duplicate	MG/L
RW-5	ZINC		ND		0.02	Normal	MG/L
RW-5	MERCURY		ND		0.0002	Duplicate	MG/L
RW-5	MERCURY		ND	0	0.0002	Normal	MG/L
RW-5	MERCURY		ND		0.0002	Normal	MG/L
RW-5	MERCURY		ND		0.0002	Duplicate	MG/L
RW-5	METHANOL (METHYL ALCOHOL)		ND		1	Normal	MG/L
RW-5	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	69			5	Duplicate	UG/L
RW-5	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	72			5	Duplicate	UG/L
RW-5	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	5.1			5	Normal	UG/L
RW-5	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	5.4			5	Duplicate	UG/L
RW-5	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	11			5	Normal	UG/L
RW-5	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	10			5	Normal	UG/L
RW-5	GAMMA BHC (LINDANE)	55			5	Duplicate	UG/L
RW-5	GAMMA BHC (LINDANE)	52		139.75	5	Normal	UG/L
RW-5	1,1,1-TRICHLOROETHANE		ND		1000	Duplicate	UG/L
RW-5	1,1,1-TRICHLOROETHANE		ND		1000	Normal	UG/L
RW-5	1,1,2,2-TETRACHLOROETHANE	3700			1000	Duplicate	UG/L
RW-5	1,1,2,2-TETRACHLOROETHANE	3900			1000	Normal	UG/L
RW-5	1,1,2-TRICHLOROETHANE		ND		1000	Duplicate	UG/L
RW-5	1,1,2-TRICHLOROETHANE		ND		1000	Duplicate	UG/L
RW-5	1,1-DICHLOROETHENE		ND		1000	Normal	UG/L
RW-5	1,1-DICHLOROETHENE		ND		1000	Normal	UG/L
RW-5	1,2,4-TRICHLOROBENZENE		ND		1000	Normal	UG/L
RW-5	1,2,4-TRICHLOROBENZENE		ND		1000	Duplicate	UG/L
RW-5	1,2-DICHLOROBENZENE		ND		1000	Duplicate	UG/L
RW-5	1,2-DICHLOROBENZENE		ND		1000	Duplicate	UG/L
RW-5	1,3-DICHLOROBENZENE		ND		1000	Normal	UG/L
RW-5	1,3-DICHLOROBENZENE		ND		1000	Duplicate	UG/L
RW-5	1,4-DICHLOROBENZENE		ND		1000	Normal	UG/L
RW-5	1,4-DICHLOROBENZENE		ND		1000	Duplicate	UG/L
RW-5	BENZENE		ND		1000	Normal	UG/L
RW-5	BENZENE		ND		1000	Duplicate	UG/L
RW-5	CARBON TETRACHLORIDE		ND		1000	Normal	UG/L
RW-5	CARBON TETRACHLORIDE		ND		1000	Duplicate	UG/L

Olin Niagara Falls Recovery Wells:

Extracted GW Quality: 4Q-99

RW-5	CHLOROBENZENE		ND		1000	Normal	UG/L
RW-5	CHLOROBENZENE		ND		1000	Duplicate	UG/L
RW-5	CHLOROMETHANE		ND		2000	Normal	UG/L
RW-5	CHLOROMETHANE		ND		2000	Duplicate	UG/L
RW-5	cis-1,2-DICHLOROETHYLENE	4200			1000	Normal	UG/L
RW-5	cis-1,2-DICHLOROETHYLENE	4300			1000	Normal	UG/L
RW-5	METHYLENE CHLORIDE		ND		1000	Normal	UG/L
RW-5	METHYLENE CHLORIDE		ND		1000	Duplicate	UG/L
RW-5	TETRACHLOROETHENE (PCE)	12000			1000	Normal	UG/L
RW-5	TETRACHLOROETHENE (PCE)	12000			1000	Duplicate	UG/L
RW-5	trans-1,2-DICHLOROETHENE		ND		1000	Normal	UG/L
RW-5	trans-1,2-DICHLOROETHENE		ND		1000	Duplicate	UG/L
RW-5	TRICHLOROETHYLENE (TCE)	19000			1000	Normal	UG/L
RW-5	TRICHLOROETHYLENE (TCE)	20000			1000	Duplicate	UG/L
RW-5	VINYL CHLORIDE		ND		2000	Duplicate	UG/L
RW-5	VINYL CHLORIDE		ND		2000	Normal	UG/L
RW-5	2,4,6-TRICHLOROPHENOL		ND		10	Normal	UG/L
RW-5	2,4,6-TRICHLOROPHENOL		ND	**35,750**	10	Normal	UG/L
RW-5	CYANIDE	0.018			0.01	Duplicate	MG/L
RW-5	CYANIDE	0.075			0.01	Duplicate	MG/L