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2000 Annual Monitoring Report
Former Burroughs-Unisys Facility
1225 Ridgeway Avenue
Rochester, New York
NYSDEC Site #8-28-075

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this report is to provide the New York State Department of Environmental Conservation (NYSDEC) with a project status report for the 2000 groundwater monitoring program at the Former Burroughs Facility located at 1225 Ridgeway Avenue, Rochester, New York.

With the successful completion of the Interim Measures, NYSDEC and Unisys entered into Administrative Order on Consent (AOC), Index #B8-0262-89-03, which outlines the scope of work to be completed at the site. The shutdown of the Groundwater/Soil Vapor Extraction (GW/SVE) treatment system occurred on March 25, 1997, as recommended in the *Focused Evaluation of Remedial Alternatives Report* (Unisys, October 15, 1997). The GW/SVE was in operation from November 1990 through March 25, 1997, and NYSDEC approved the system shut-down and selected the **groundwater monitoring only** alternative for the site. This is the fourth annual groundwater monitoring report for this site.

1.2 SITE LOCATION AND DESCRIPTION

The Former Burroughs Facility is located at 1225 Ridgeway Avenue, Rochester, New York. The location of the site is shown on Figure 1. The area surrounding the site is primarily zoned industrial/commercial. The site is bounded to the north by a large parcel owned by Eastman Kodak Company, to the east by commercial business, to the south and southwest by undeveloped parcels owned by 3M Corporation, and to the west by a parcel owned by Dimino Management, Inc.

The site plan is illustrated in Figure 2. The Ridgeway Avenue site consists of a manufacturing building, office building and a warehouse/storage building. Several businesses currently occupy these buildings under lease to Ridgeway Industrial Properties. The site is mostly covered with asphalt, concrete or buildings, with only a few small, grassy areas. The location of buildings, treatment system, roadways, and the monitoring wells and GW/SVE system are also shown on Figure 2.

1.3 SITE HISTORY

Since the beginning of industrial activity at this site in 1968, solvents have been used for manufacturing carbon copy paper, printer ribbons and other office supply products. Burroughs manufactured these products at this facility from 1976 to 1986. Although Burroughs sold the business operations in 1986 to NuKote International, similar manufacturing operations and chemical use continued at this facility. A detailed discussion of the property including ownership and lease agreements is presented in the *Remedial Investigation Report* (Unisys, 1992).

Primary solvents used in the manufacturing process included isopropyl alcohol (isopropanol or IPA), methyl ethyl ketone (2-butanone or MEK), toluene and methanol. These solvents were stored in underground storage tanks (USTs) in the northeast corner of the site. Historical records and environmental investigations revealed that between 1986 and 1992, IPA, methanol, MEK, and toluene were the only chemicals stored in the former USTs, which impacted soil and groundwater beneath the site by 1985. These are four of the five contaminants identified in the ROD as site-specific indicator compounds (SSICs), and used for the RAOs for soil and groundwater. Acetone, the fifth SSIC, was not stored at the facility. The presence of acetone has been attributed to subsurface biodegradation of IPA.

1.4 REMEDIATION STATUS

The Record of Decision (ROD) (NYSDEC, March 1994) identified a remediation plan after evaluating and approving the *Remedial Investigation/Feasibility Study* (RI/FS). NYSDEC selected enhancements and modifications (Alternative 5 in the ROD) to the Interim Remedial Measures (IRM) GW/SVE system. In cooperation with NYSDEC, Unisys presented the *Remedial Design* (RD) in response to the ROD in March 1995 (BHE, March 10, 1995).

The selected remedial alternative included continued operation of the IRM with documented modifications that included installation of five additional GW/SVE wells, and enhancements that included cycling, evaluation of pulsing, and evaluation of passive air or active water injection to assist fluid migration. The wells (SV-41 through SV-45) shown on Figure 2, were added to the existing network on May 16, 1995, and the system was restarted on May 30, 1995. After being restarted, the system operated on a cycling and pulsing schedule designed to enhance the remediation of previously identified areas impacted by volatile organic compounds (VOCs). The GW/SVE treatment system was shut-down on March 25, 1997. In the fall of 1998, the GW/SVE treatment system was decommissioned under the supervision of Day Environmental and NYSDEC. The decommissioning was reporting in the *1998 Annual Monitoring Report* (Unisys, 1998). Subsequent groundwater monitoring was documented in the *1999 Annual Monitoring Report* (Unisys, April 21, 2000), and this report.

1.5 REMEDIAL ACTION OBJECTIVES

The soil RAOs which are stated in the ROD reflect the NYSDEC-TAGM-4046 *Determination of Soil Clean Up Objectives and Clean Up Level*. The groundwater RAOs reflect criteria outlined in 10NYCRR Part 5 and 6NYCRR Part 700. For the SSICs they are as follows:

SSIC	Soil RAO (ppm)	Groundwater RAO (ppb)
Acetone	0.11	50
Isopropyl Alcohol (IPA)	0.11	50
Methanol	0.11	50
2-Butanone (MEK)	0.23	50
Toluene	1.5	5

Remedial Action Objective Soil Concentrations using TAGM 4046

2.0 2000 ACTIVITIES

As mandated by Section 27-1305 of the Environmental Conservation Law (ECL), NYSDEC maintains a Registry of all Inactive Hazardous Waste Disposal Sites. Effective January 8, 1999, the Classification for this site was changed from **Class II** to **Class IV** release site. The requirements for reclassification to a **Class IV** site means it has been properly closed but that site conditions require continued operation, maintenance, and/or monitoring. The successful remediation by the GW/SVE system denotes this site is in the **monitoring phase**. The long-term groundwater sampling program monitors a small area of groundwater downgradient of the former UST area, which contains low levels of VOCs after the remediation system was shut-down in March 1997. This post-remediation groundwater monitoring program was designed to collect the appropriate data concerning the groundwater conditions at and downgradient of the former UST basin, principally in the area of well GM-5, which is essentially the only location to detect VOCs since March 1997. The goal of the post-remediation groundwater monitoring program is to demonstrate the remedial actions and water quality conditions are protective of the soil and groundwater conditions of the state of New York.

2.1 GROUNDWATER MONITORING WELL NETWORK

In November 1998, 67 (sixty-seven) groundwater monitoring and SVE extraction points were abandoned at the site. The resulting groundwater monitoring network was reduced to 8 sampling locations in the bedrock groundwater flow system. The monitoring well completion details for these eight wells are highlighted below:

Location	Top of Casing (TOC in ft-AMSL)	Depth of Borehole (ft)	Casing Diameter (in)	Casing material	Screen Material	Screen Length (ft)	Total Well Depth (below TOC - ft)
GM-3	**505.61**	18.95	2	PVC	PVC	10	18.95
GM-3D	**505.48**	38.26	2	PVC	PVC	10	38.26
GM-5	**505.23**	16.27	2	PVC	PVC	10	16.27
GM-8	**505.45**	16.00	4	PVC	PVC	10	15.70
GM-10	**505.52**	15.00	4	PVC	PVC	10	14.32
MW-13	**505.21**	12.70	2	PVC	PVC	5	12.70
MW-13D	**505.50**	40.00	2	PVC	PVC	10	40.00
MW-13DD	**505.19**	60.50	2	PVC	PVC	10	60.50

2.2 SITE GEOLOGY

Pleistocene-age glacial lake sediments composed predominantly of brown-to-tan clayey silt with occasional fine sand overlie shale and limestone bedrock. These sediments generally range in thickness from approximately 10 to 20 feet. The Irondequoit Limestone Formation underlies the

overburden and consists of interbedded dark gray-to-black calcareous shale, and gray-to-light gray dolomite and crystalline limestone. A thin weathered portion of the Rochester Shale Formation was identified above the limestone. The shale appears to be present across most of the site with a maximum thickness of approximately five feet. Bedrock is reported to have a slight regional dip to the south. On-site, the bedrock surface slopes to the east with bedrock highs to the north and west portions of the site.

2.3 SITE HYDROGEOLOGY

Two hydrogeologic units have been identified and monitored at the site. These include a water bearing zone in the overburden clay and silt, and the bedrock aquifer comprising of the Irondequoit Formation. The bedrock aquifer is monitored by wells with screened intervals ranging from 12 to 60 feet bgs. Eight (8) monitoring wells are currently used for monitoring groundwater quality and water level measurements. The wells are shown on Figure 3. Table 1 provides the groundwater levels measurements collected in 2000.

Groundwater depths in 2000 range from a high water level of 4.32 feet bgs in the well GM-5 in April 2000, to a low water level of 44.43 feet bgs in monitoring well MW-13DD in November 2000. Groundwater monitoring for potentiometric elevations were conducted April 13, 2000, and November 21, 2000. In general, the water levels were lower this year compared to the same time period in 1999. The hydraulic gradient varied across the site during each monitoring period:

	Horizontal Gradient
April 2000	**0.019**
November 2000	**0.018**

Figure 4 depicts the groundwater contour map and flow direction in April 2000. This flow direction is consistent with the historical flow patterns measured at the site. Figure 5 depicts the November 2000, groundwater contour map which indicates a more northerly flow than the previous monitoring event, but is also consistent with the historical groundwater flow direction.

Historical measurements have indicated a steep downward hydraulic gradient in nested wells on-site. The measured vertical hydraulic gradient measurements for 2000 are presented below, consistent with historical data:

	Vertical Gradient GM-3/GM-3D	**Vertical Gradient MW-13/MW-13D**
April 2000	**0.624486**	**0.687475**
November 2000	**0.578704**	**0.698898**

Historical groundwater elevation data are presented in Appendix A. Groundwater monitoring well hydrographs are included in Appendix B.

2.4 GROUNDWATER SAMPLING

Figure 3 presents the post-remediation groundwater monitoring network. As part of the 1998 GW/SVE system demolition, the treatment plant components and 67 extraction and monitoring wells were abandoned. The wellheads of monitoring wells GM-3, GM-8, and GM-10 were modified (cut-off below grade and equipped with at-grade curb boxes) to allow their use as groundwater monitoring locations. The post-remediation groundwater level and water quality sampling locations in the post-remediation monitoring program are listed below:

	1998		1999				2000				2001			
Location	**Monthly**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**
GM-3	**X**	**X**	**X**	**X**	**X**	**X**		**X**		**X**			**X**	
GM-3D		**X**	**X**	**X**	**X**	**X**		**X**		**X**			**X**	
GM-5	**X**	**X**	**X**	**X**	**X**	**X**		**X**		**X**			**X**	
GM-8	**X**	**X**	**X**	**X**	**X**	**X**		**X**		**X**			**X**	
GW-10	**X**	**X**	**X**	**X**	**X**	**X**		**X**		**X**			**X**	
MW-13	**X**	**X**	**X**	**X**	**X**	**X**		**X**		**X**			**X**	
MW-13D	**X**	**X**	**X**	**X**	**X**	**X**		**X**		**X**			**X**	
MW-13DD		**X**	**X**	**X**	**X**	**X**		**X**		**X**			**X**	

***X** – indicates sampling location and period*

The 2000 water quality monitoring dates are listed below:

	2000	
Location	**Apr-14**	**Nov-21**
GM-3	**X**	**X**
GM-3D	**X**	**X**
GM-5	**X**	**X**
GM-8	**X**	**X**
GW-10	**X**	**X**
MW-13	**X**	**X**
MW-13D	**X**	**X**
MW-13DD	**X**	**X**

***X** – indicates sampling location and period*

Appendix A presents the historical groundwater elevation summary. Figure 4 presents the potentiometric contour map for water levels measured in April 2000, and Figure 5 depicts the potentiometric contour map for water levels measured in November 2000.

Review of potentiometric surface maps generated from 1987 through 2000 show flow in the bedrock has been consistently to the northeast with an approximate hydraulic gradient of 0.005 to 0.05. Horizontal and vertical hydraulic gradients in 2000 are consistent with the historical data trends, ranging from 0.019 to 0.018 in the bedrock aquifer in 2000. Well hydrographs, representative of groundwater fluctuations at the site are presented in Appendix B.

2.5 VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER

Historical water quality results are provided in Appendix C for all monitoring wells in the long-term groundwater monitoring program. Table 2 provides the results of the April 2000, groundwater sampling event, and Table 3 provides the results of the November 2000, groundwater sampling event. Groundwater samples have been analyzed for the SSICs beginning in 1987 through November 2000.

Figure 6 presents the April 2000, groundwater quality sampling for the long-term monitoring wells. In April 2000, there were no detection of SSICs at or above the method detection limit (MDL). Groundwater samples were analyzed for non-halogenated volatile organics by GC, purgeables, EPA Test Method 624. Figure 7 presents the November 2000, groundwater quality sampling for the long-term monitoring wells. During this sampling event GM-5 detected 170 µg/l of toluene in groundwater. Well GM-5 was the only location which detected SSICs above the laboratory method detection limit, and only during the November 2000.

Toluene has essentially been the only compound detected over the last three years (since 1998). Table 2 provides the results of the April 2000, groundwater sampling event, and Table 3 summarize the November 2000, groundwater quality sampling for SSICs at the site.

Location	Date	2- Butanone	Acetone	Isopropanol	Methanol	Toluene	Total VOCs
GM-5	**26-Jan-98**	< 50	< 50	< 100	< 1000	**24**	**24**
GM-5	**25-Feb-98**	< 50	< 50	< 100	< 1000	**79**	**79**
GM-5	**24-Mar-98**	< 50	< 50	< 100	< 1000	**270**	**270**
GM-5	**28-Apr-98**	< 20	< 20	< 180	< 110	**100**	**100**
GM-5	**27-May-98**	< 20	< 20	< 98	< 110	**35**	**35**
GM-5	**23-Jun-98**	< 67	< 67	< 98	< 110	**430**	**430**
GM-5	**30-Jul-98**	< 40	< 40	< 98	< 110	**380**	**380**
GM-5	**31-Aug-98**	< 40	**73**	< 100	< 100	**290**	**363**
GM-5	**30-Sep-98**	< 400	< 400	< 100	< 100	**600**	**600**
GM-5	**29-Dec-98**	< 100	< 40	< 100	< 100	**300**	**300**
GM-5	**03-Mar-99**	< 50	< 50	< 100	< 100	**59**	**59**
GM-5	**24-Jun-99**	< 50	< 50	< 100	< 100	**360**	**360**
GM-5	**02-Nov-99**	< 20	< 20	< 500	< 500	< 5	**0**
GM-5	**14-Dec-99**	< 100	< 40	< 100	< 100	< 5	**0**
GM-5	**14-Apr-00**	< 20	< 20	< 1000	< 1000	< 5	**0**
GM-5	**21-Nov-00**	< 20	< 20	< 1000	< 1000	**170**	**170**

A trend review of SSICs at monitoring well GM-5 indicates a continued drop in concentrations since the shutdown of the GW/SVE in March 1997 (Figure 15).

- Figure 8 depicts the acetone concentrations on a logarithmic scale with 1/2 the general MDL highlighted, which indicates the past 7 sampling rounds are less than the MDL. Statistical analysis with the Mann-Whitney U Statistical Test (Appendix D) indicates that the trend for acetone is **decreasing**.
- Figure 9 depicts the isopropanol concentrations on a logarithmic scale with 1/2 the general MDL highlighted, which indicates concentrations over roughly the past 4-years are less than the MDL. Statistical analysis with the Mann-Whitney U Statistical Test (Appendix D) indicates that the trend for isopropanol is **no trend**.
- Figure 10 depicts the methanol concentrations on a logarithmic scale with 1/2 the general MDL highlighted, which indicates concentrations over roughly the past 4-years are at or less than the MDL. Statistical analysis with the Mann-Whitney U Statistical Test (Appendix D) indicates that the trend for methanol is **no trend**.
- Figure 11 depicts the 2-butanone concentrations on a logarithmic scale with 1/2 the general MDL highlighted, which indicates the past 7 sampling rounds are at or less than the MDL. Statistical analysis with the Mann-Whitney U Statistical Test (Appendix D) indicates that the trend for 2-butanone is **no trend**.
- Figure 12 depicts the toluene concentrations on a logarithmic scale with 1/2 the general MDL highlighted, which indicates the 3 of the last 4 sampling rounds are less than the MDL. Statistical analysis with the Mann-Whitney U Statistical Test (Appendix D) indicates that the trend for toluene is **no trend**.

For the SSICs there are no **increasing trends** for the statistical analysis at the 90 % confidence interval for well GM-5. VOC concentration versus time graphs for well GM-5 are shown on Figure 13 for Total VOCs (sum of all SSIC). Groundwater quality results do not indicate a statistically significant increase in VOCs at GM-5 since the GW/SVE system was turned-off (Figure 14) in March 1997. Additionally, Figure 14 also indicates that VOC levels have not increased with the increase (rebound) in the water table at GM-5 since the remediation system was turned-off. The historical water table increase (rebound) in the former tank basin was approximately 5-feet in the center of the cone-of-depression in the former GW/SVE extraction area in 1998 - 1999. This water table increase was later followed by a general decrease in groundwater elevations in 1999 and 2000, however, no general increase in the VOC levels at GM-5 has been detected. Figure 15 presents a linear regression analysis of the toluene data depicting the diminishing concentrations in GM-5.

3.0 SUMMARY AND CONCLUSIONS

Based on extensive groundwater monitoring data (collected from 1987 through 2000), and the monitoring of the VOC plume pre- and post-remediation, it does not appear that VOCs have or ever will migrate from the former UST basin. This result was predicted in the groundwater flow model (Unisys, October, 1997). The groundwater model will be updated in 2002 to reflect current conditions.

Accordingly, the groundwater monitoring program for water levels and groundwater quality will continue on the schedule identified below:

	2001			
Location	**1Q**	**2Q**	**3Q**	**4Q**
GM-3			X	
GM-3D			X	
GM-5			X	
GM-8			X	
MW-10			X	
MW-13			X	
MW-13D			X	
MW-13DD			X	

With the scheduled reporting of annual results listed below:

2002 Annual Monitoring Report **– February 15, 2002**

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