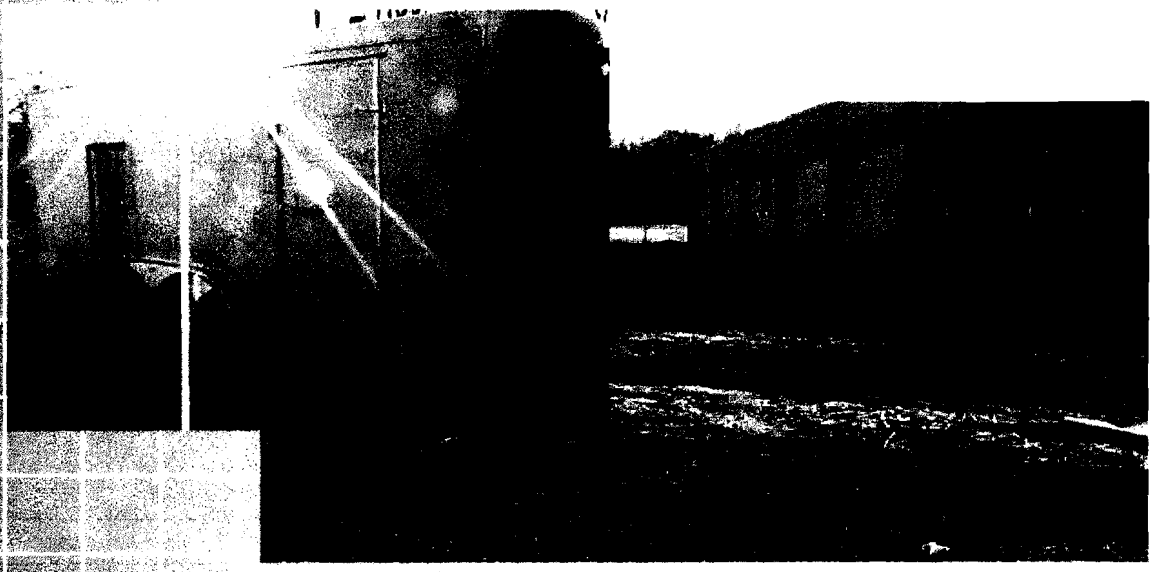
NEW YORK STATE DEPARTMENT OF TRANSPORTATION

Albany, New York

Harrison Subresidency
Town of Harrison
Westchester County, New York

D008873
PIN 8807.31.301

Air Sparging and Soil Vapor Extraction System



Operation and Maintenance Report for April 2001

May 2001

LMS **LAWLER, MATUSKY & SKELLY ENGINEERS** LLP
Environmental Science & Engineering Consultants
One Blue Hill Plaza • Pearl River, New York 10965

Lawler, Matusky & Skelly Engineers LLP

Environmental Science & Engineering Consultants

May 25, 2001
Project No. 446-173

Mr. John LaBarge
Acting Director, Consultant Management Bureau
NYS Dept. of Transportation
1220 Washington Avenue
Albany, NY 12232

Attn: Greg Menard

Re: **D008873, PIN 8007.31.301**
Harrison Petroleum Spill – Remediation
Town of Harrison, Westchester County, New York
Air Sparging/Soil Vapor Extraction System
Monthly Operations & Maintenance Report #6 (April 2001)

Dear Mr. Menard:

Lawler, Matusky & Skelly Engineers LLP (LMS) is pleased to submit the subject report for your use. This report represents the sixth in a series of twelve scheduled reports. The purpose of this report is to present the information necessary to assess the operation of the air sparging/soil vapor extraction system, to track the progress of the remediation, and to make recommendations to increase operating efficiency or lower operating costs.

The SVE system experienced about 92% up time for the month of April 2001. Vapor extraction leg VE-2 (and consequentially air sparge leg SP-2) was intentionally taken off line periodically in response to the high water resulting from heavy rainfalls. The AS system went down on April 27, due to a blower motor overload, resulting in about 84% up time for the AS system for the month of April. The problem was determined to be seized blower. The AS is still down at this time, awaiting a replacement blower from Bisco. Thus far, this work has been treated as a warranty issue by Handex.

Some settling has been noted in the asphalt pavement covering the system trenches. Handex has been notified of this problem and has visited the site to assess the extent of the problem. They are in the process of generating a repair schedule and scope of work with the paving subcontractor who performed the work.

To take advantage of the air sparge malfunction, the next scheduled groundwater sampling event was moved up from the July timeframe discussed previously, and is being conducted presently. This work is being performed in conjunction with the septic tank leachfield investigation, which was approved by DOT on May 17, 2001.

If you have any questions, please call Ruth Fritsch or me at 845-735-8300.

Very truly yours,

George G. Gattullo

cc: Mauricio Roma, NYSDOT (1 copy)
David Wohlbach, NYSDOT (5 copies)

ONE BLUE HILL PLAZA • PEARL RIVER, NEW YORK 10965
(845) 735-8300 • FACSIMILE (845) 735-7466 • WEBSITE: WWW.LMSENG.COM

MONTHLY OPERATION AND MAINTENANCE REPORT

NYSDOT – HARRISON SUBRESIDENCY D008873
TOWN OF HARRISON – WESTCHESTER, NY PIN 8007.31.301

MONTH: April 2001

4/2/01- LMS arrived on site to restart SVE system after planned shut down in response to high groundwater levels. Drained moisture separator. Restarted SVE. Left AS off until water table recedes further.

4/4/01- LMS arrived on site to monitor SVE system and to restart AS system. Pressure and flows in system are with anticipated ranges. Pressure monitoring points will be monitored after the AS system has been in operation for a few days. LMS observed that the concrete pad to pressure monitoring point PM-2 appears to have been struck by plow during snow removal. Upon further inspection the well looks to be undamaged. Repair does not seem warranted at this time. Auto-dialer was reprogrammed.

4/11/01- LMS arrived on site in response to high water alarm from system auto-dialer on 4/10. The high water condition was caused by recent heavy rainfall. System was not operating and moisture separator was full on arrival. Drained moisture separator and restarted system, except for legs SP-2 and VE-2, which will remain off until the water table recedes and weather conditions improve.

4/17/01- LMS arrived on site to resume operation of legs SP-2 and VE-2. Operation was resumed without incident.

4/18/01-LMS arrived on site to monitor system and check pressure and flows in system. System operating normally. Drained approximately twelve inches of water from SVE moisture separator.

MAINTENANCE THIS MONTH:
None.

SPARE PARTS USED:
None.

SPARE PARTS ORDERED:
None.

TYPICAL OPERATING PARAMETERS:

Air Sparging (Total Flow = 16 CFM)

	Pressure	Flow
	(psi)	(scfm)
SP 1	10	7.5
SP 2	6	7
SP 3	20	<4
SP 4	Not Operating	

Vapor Extraction (Total Flow = 218 CFM)

	Vacuum	
	(in.-H_2O)	
VE 1	17	
VE 2	14	
VE 3	12	
VE 4	13	

OUTSTANDING ISSUES AND ACTIONS:

- The AS system blower ceased to operate at the end of April and the malfunction was discovered by LMS at the beginning of May. The blower, which had seized and was still under warranty, and was removed by Handex and sent to BISCO for replacement. An apparent malfunction in the auto-dialer is under investigation, but has not yet been diagnosed. The new AS blower has not yet been received.
- Pavement over the system trenches was discovered to have settled significantly in places. LMS and Handex are currently coordinating repairs under warranty. A schedule will be presented to DOT shortly.

- Was quarterly well sampling conducted? Yes _ No X
  If yes, date: _____

  Since no groundwater sampling was conducted this month, the groundwater monitoring well data summaries are not included in this month's report

M0NTHLY OPERATION AND MAINTENANCE REPORT
AIR SPARGING / SOIL VAPOR EXTRACTION SYSTEM
HARRISON SUBRESIDENCY, WESTCHESTER, NEW YORK

APRIL 2001

LIST OF TABLES, FIGURES, AND ATTACHMENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF TABLES, FIGURES, AND ATTACHMENTS (continued)

ATTACHMENTS

TABLES

SVE CONCENTRATIONS AND LOADINGS AT SYSTEM STARTUP
(11 November 2000)
Harrison Subresidency

Location Collected LMS Sample ID Lab Sample ID Date Sampled	SVE AB13459 00110156-01 11/08/2000 (ppbv)	Formula Weight (g/mole)	(µg/m³)	Loading (lb/hr) (assume Q = 218 ft³/min)
Volatile Organic Compounds (ug/L)				
Dichlorodifluoromethane	ND	120.92	ND	ND
Chloromethane	ND	50.5	ND	ND
Vinyl Chloride	ND	62.5	ND	ND
Bromomethane	ND	95	ND	ND
Chloroethane	ND	64.5	ND	ND
Trichlorofluoromethane	ND	137.37	ND	ND
Acetone	ND	58.08	ND	ND
1,1-Dichloroethene	ND	97	ND	ND
Methylene Chloride	ND	87.9	ND	ND
trans-1,2-Dichloroethene	ND	96.94	ND	ND
MTBE	ND	88.15	ND	ND
1,1-Dichloroethane	ND	99	ND	ND
2-Butanone	ND	72.11	ND	ND
cis-1,2-Dichloroethene	ND	96	ND	ND
2,2-Dichloropropane	ND	112.99	ND	ND
Chloroform	ND	119	ND	ND
Bromochloromethane	ND	129.38	ND	ND
1,1,1-Trichloroethane	ND	133.4	ND	ND
1,1-Dichloropropene	ND	110.97	ND	ND
1,2-Dichloroethane	ND	98.96	ND	ND
Carbon Tetrachloride	ND	154	ND	ND
Benzene	ND	78.1	ND	ND
Trichloroethene	ND	131.39	ND	ND
1,2-Dichloropropane	ND	113	ND	ND
Dibromomethane	ND	173.83	ND	ND
Bromodichloromethane	ND	163.83	ND	ND
trans-1,3-Dichloropropene	ND	111	ND	ND
4-Methyl-2-Pentanone	ND	100.16	ND	ND
cis-1,3-Dichloropropene	ND	111	ND	ND
Toluene	0.60	92.1	2.30	0.0019
trans-1,3-Dichloropropene	ND	110.97	ND	ND
1,1,2-Trichloroethane	ND	133	ND	ND
2-Hexanone	ND	100.16	ND	ND
1,3-Dichloropropane	ND	112.99	ND	ND
Dibromochloromethane	ND	208.28	ND	ND
Tetrachloroethylene	ND	166	ND	ND
1,2-Dibromoethane	ND	187.86	ND	ND
Chlorobenzene	ND	113	ND	ND
1,1,1,2-Tetrachloroethane	ND	168	ND	ND
Ethylbenzene	1.4	106	6.17	0.0050
m/p-Xylene	3.4	106	ND	ND
Styrene	ND	104	ND	ND
O-Xylene	0.77	106	3.39	0.0028
Bromoform	ND	252.73	ND	ND

TABLE 1 (Page 2 of 2)

SVE CONCENTRATIONS AND LOADINGS AT SYSTEM STARTUP
(11 November 2000)
Harrison Subresidency

Location Collected LMS Sample ID Lab Sample ID Date Sampled	SVE AB13459 00110156-01 11/08/2000 (ppbv)	Formula Weight (g/mole)	($\mu g/m^3$)	Loading (lb/hr) (assume Q = 218 ft^3/min)
1,1,2,2-Tetrachloroethane	ND	168	ND	ND
Isopropylbenzene	ND	120.19	ND	ND
1,2,3-Trichloropropane	ND	147.43	ND	ND
Bromobenzene	ND	157.01	ND	ND
n-Propylbenzene	ND	120.19	ND	ND
2-Chlorotoluene	ND	126.59	ND	ND
4-Chlorotoluene	ND	126.59	ND	ND
1,3,5-Trimethylbenzene	1.5	120	7.48	0.0061
tert-Butylbenzene	ND	134.22	ND	ND
1,2,4-Trimethylbenzene	4.2	120	20.95	0.0171
sec-Butylbenzene	ND	134.21	ND	ND
1,3-Dichlorobenzene	ND	147	ND	ND
1,4-Dichlorobenzene	ND	147	ND	ND
p-Isopropylbenzene	ND	120.19	ND	ND
1,2-Dichlorobenzene	ND	147	ND	ND
n-Butylbenzene	ND	134.22	ND	ND
1,2-Dibromo-3-Chloropropane	ND	236.33	ND	ND
1,2,4-Trichlorobenzene	ND	181	ND	ND
Naphthalene	ND	128.17	ND	ND
Hexachlorobutadiene	ND	261	ND	ND
1,2,3-Trichlorobenzene	ND	181.45	ND	ND
Total VOCs:	11.87			0.0329
Tentively Indentified Compounds, TIC ($\mu g/L$)				
2-Methyl-Butane	38.0	72.15	113.98	0.0930
Pentane	33.6	72.15	100.78	0.0823
2-Methyl-Pentane	46.9	86.18	168.03	0.1371
Hexane	49.8	86.18	178.41	0.1456
Methyl Cyclopentane	34.3	84.16	120.00	0.0979
2-Methyl-Hexane	34.7	100.2	144.54	0.1180
3-Methyl-Hexane	32.0	100.2	133.29	0.1088
Heptane	29.4	10.2	12.47	0.0102
Methyl-Cyclohexane	35.9	98.19	146.54	0.1196
1,5-Dimethylcyclopentene	33.5	96.17	133.93	0.1093

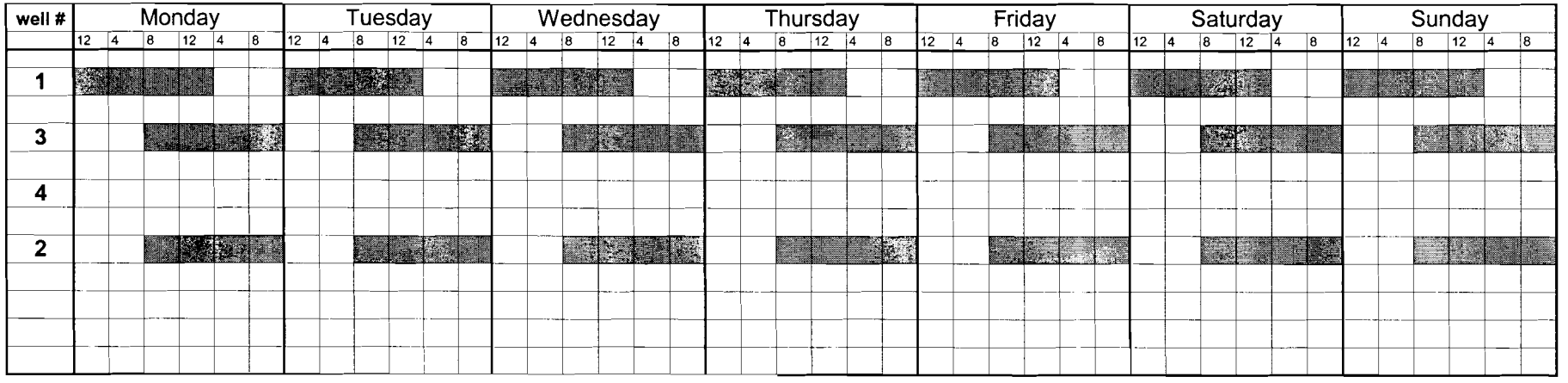
ND - Not detected at analytical reporting limit.

TABLE 3

AIR SPARGE WELL PULSING TIMER SETTING

NYSDOT Harrison Subresidency

timer set on: 2/24/01



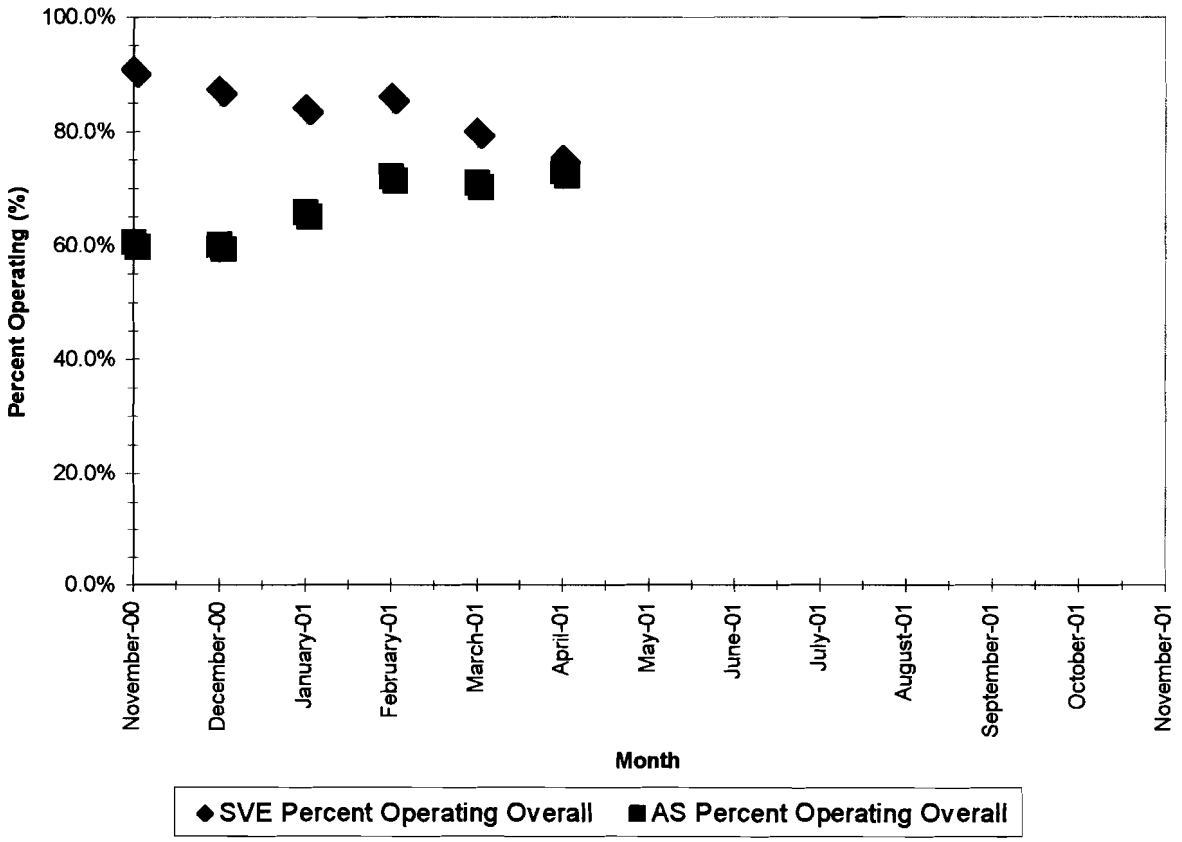
LEGEND:

= sparge air on

TABLE 4

CUMULATIVE SYSTEM RUNTIME
Harrison Subresidency

Month	SVE Cumulative Hours Running (approx.)	AS Cumulative Hours Running (approx.)	Cumulative Hours Available	OVERALL		MONTH	
				SVE Percent Operating Overall	AS Percent Operating Overall	SVE Percent Operating - Month	AS Percent Operating - Month
November-00	654	436	720	90.8%	60.6%	90.8%	60.6%
December-00	1,280	879	1,464	87.4%	60.0%	84.1%	59.5%
January-01	1,858	1,454	2,208	84.1%	65.8%	77.6%	77.2%
February-01	2,122 (a)	2,076	2,880	86.1% (b)	72.1%	92.6% (b)	92.6%
March-01	2,613	2,567	3,624	80.0%	70.8%	66.0%	66.0%
April-01	3,273	3,173	4,344	75.3%	73.0%	91.6%	84.1%
May-01			5,088				
June-01			5,808				
July-01			6,552				
August-01			7,296				
September-01			8,016				
October-01			8,760				
November-01			9,480				



Notes:
(a) Due to a malfunction in the SVE elapsed timer in Febrary, this value is not representative of the actual hours of operation.
(b) This value is calculated using an estimated value for SVE elapsed time..

FIGURES

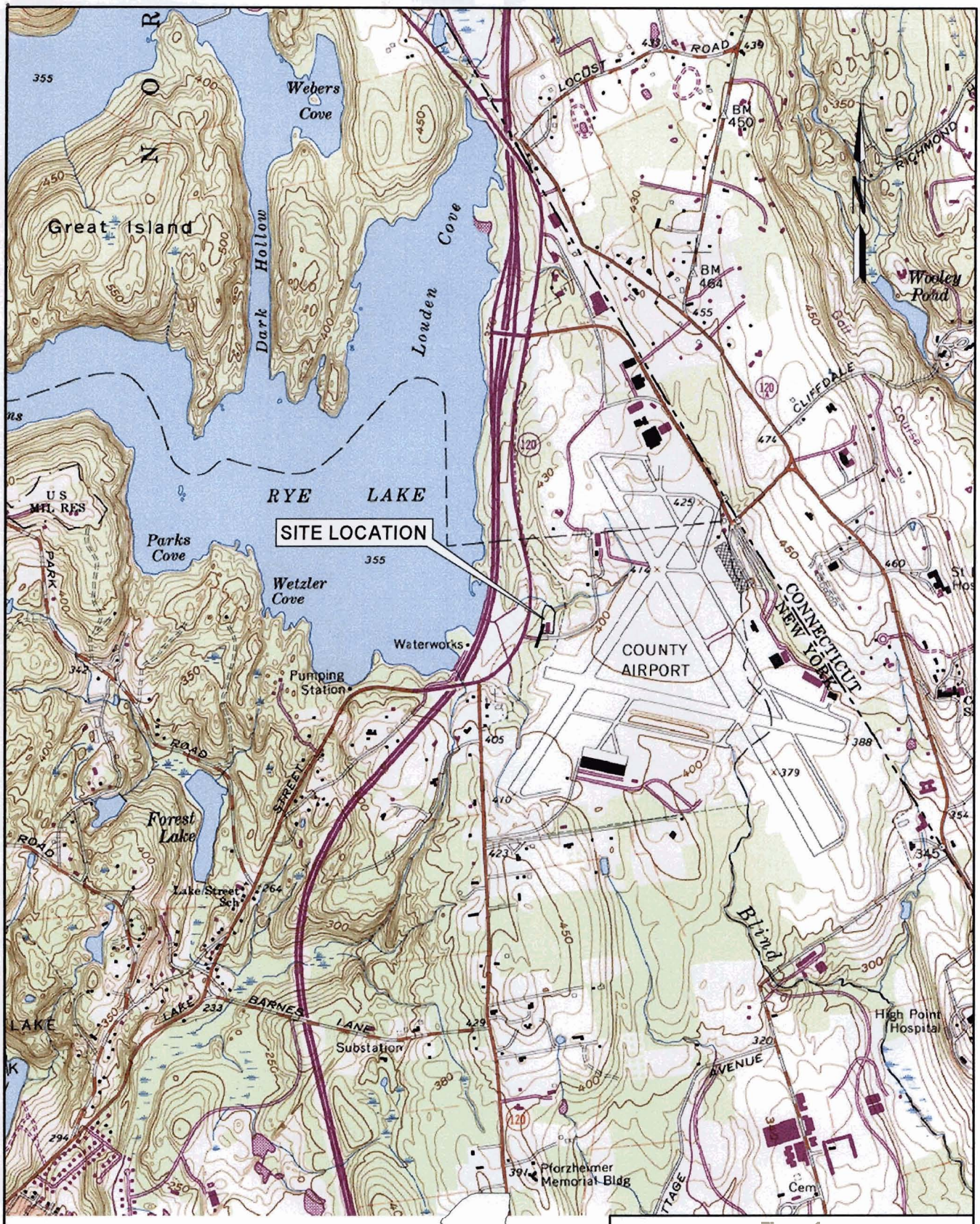


Figure 1

Site Location

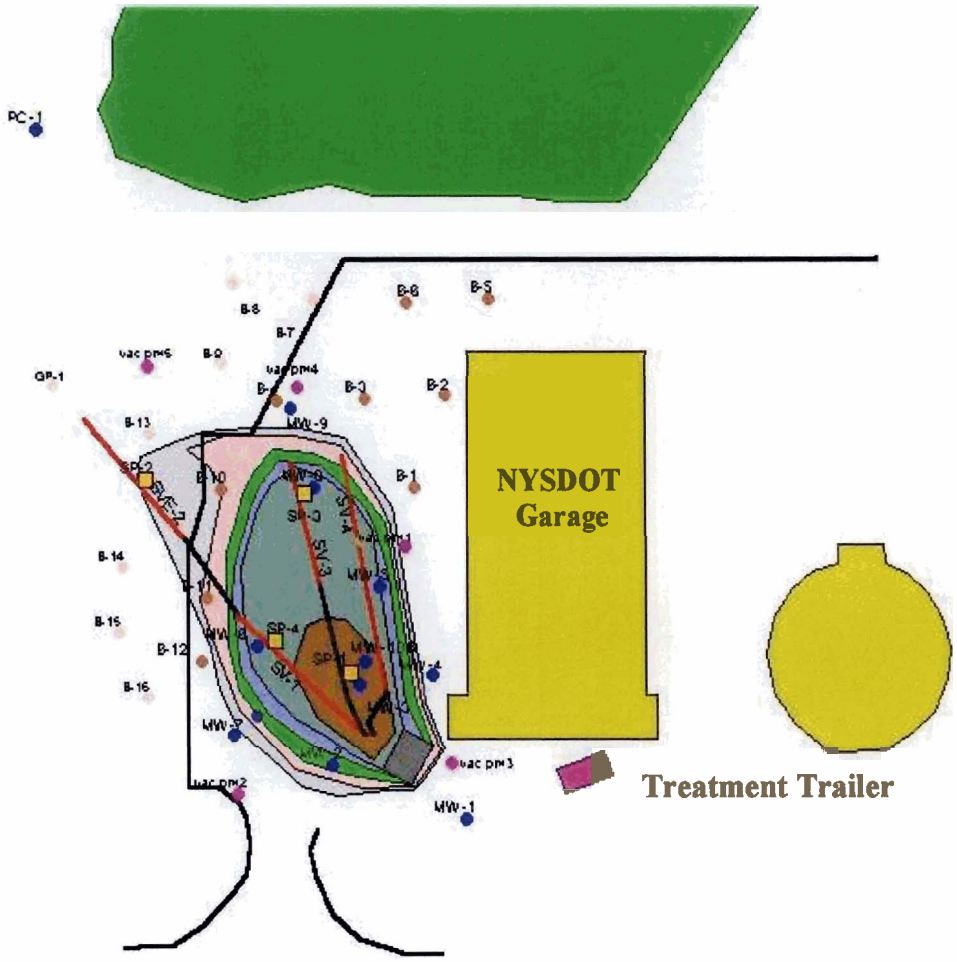
Harrison Subresidency
POST-CLOSURE QUARTERLY MONITORING
NYSDOT PIN 8806.51.101

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

Map source: USGS 7.5 minute quadrangle map, Glenville Conn. NY, 1960
Photorevised 1971.

\446\156...\graphics\156-usgs.dsf

Figure 2
Harrison Subresidency, Westchester County
Petroleum (BTEX & MTBE) Contaminant Plume at the Water Table (Spring 1997)
Wells, Borings, and Soil Vapor Extraction Lines



- SVE Monitoring Points

Wells & Borings

- Boring
- Sparge Well
- Well

Borings (appx. location)

- Extra Line - Possible SP-5
- Septic Tank (Appx. Locn.)

SVE Lines

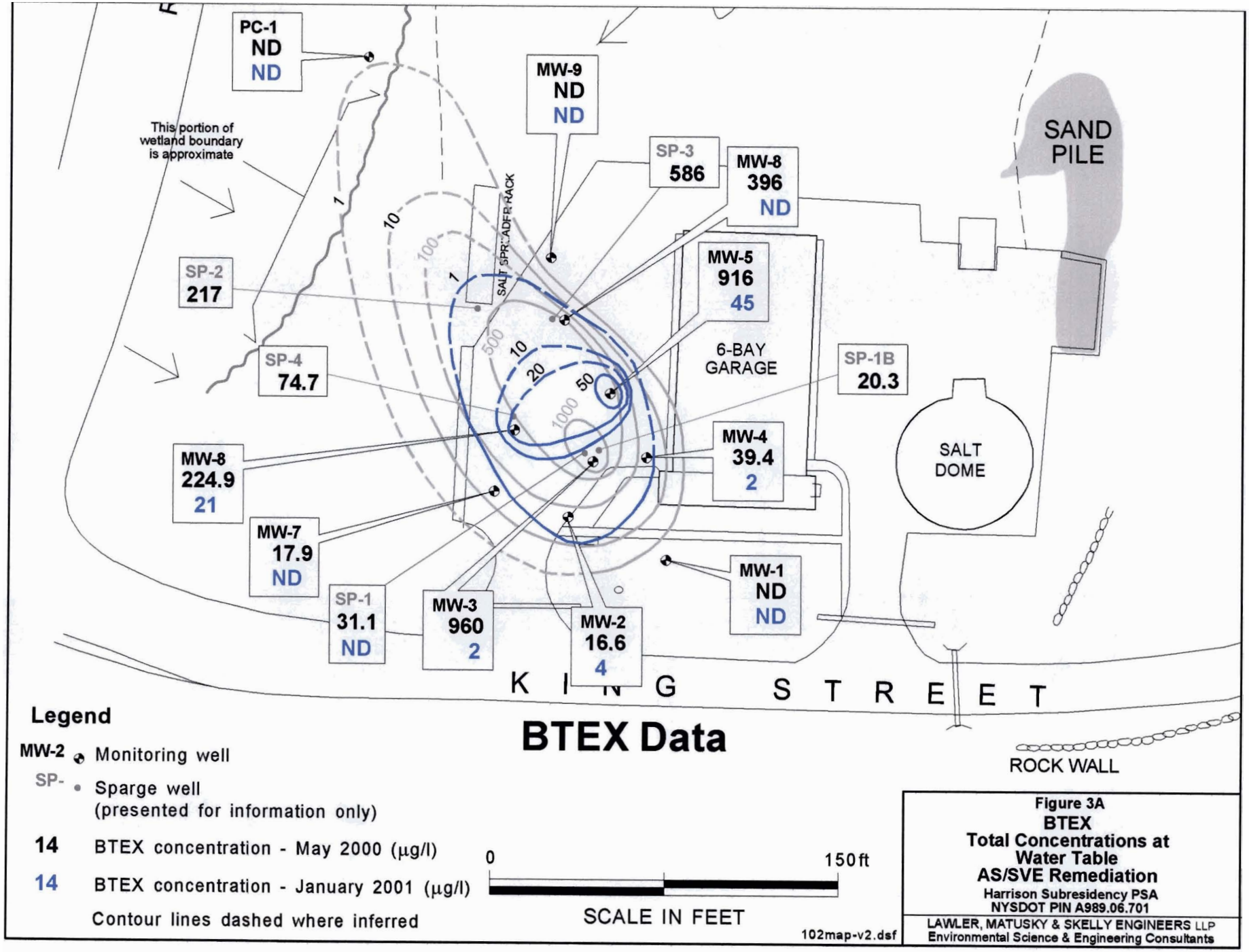
- Open
- Solid
- Pavement Edge
- Remediation Trailer
- Former UST Location (apprx.)
- Buildings
- >1000 ppb BETX & MTBE
- >750 ppb BETX & MTBE
- >500 ppb BETX & MTBE
- >100 ppb BETX & MTBE
- >50 ppb BETX & MTBE
- >25 ppb BETX & MTBE
- Landfill

Contours: Approximate location of equal BTEX & MTBE concentrations in micrograms per liter (ug/l; or ppb). Spring 1997

N
W E
S

40 0 40 80 Meters

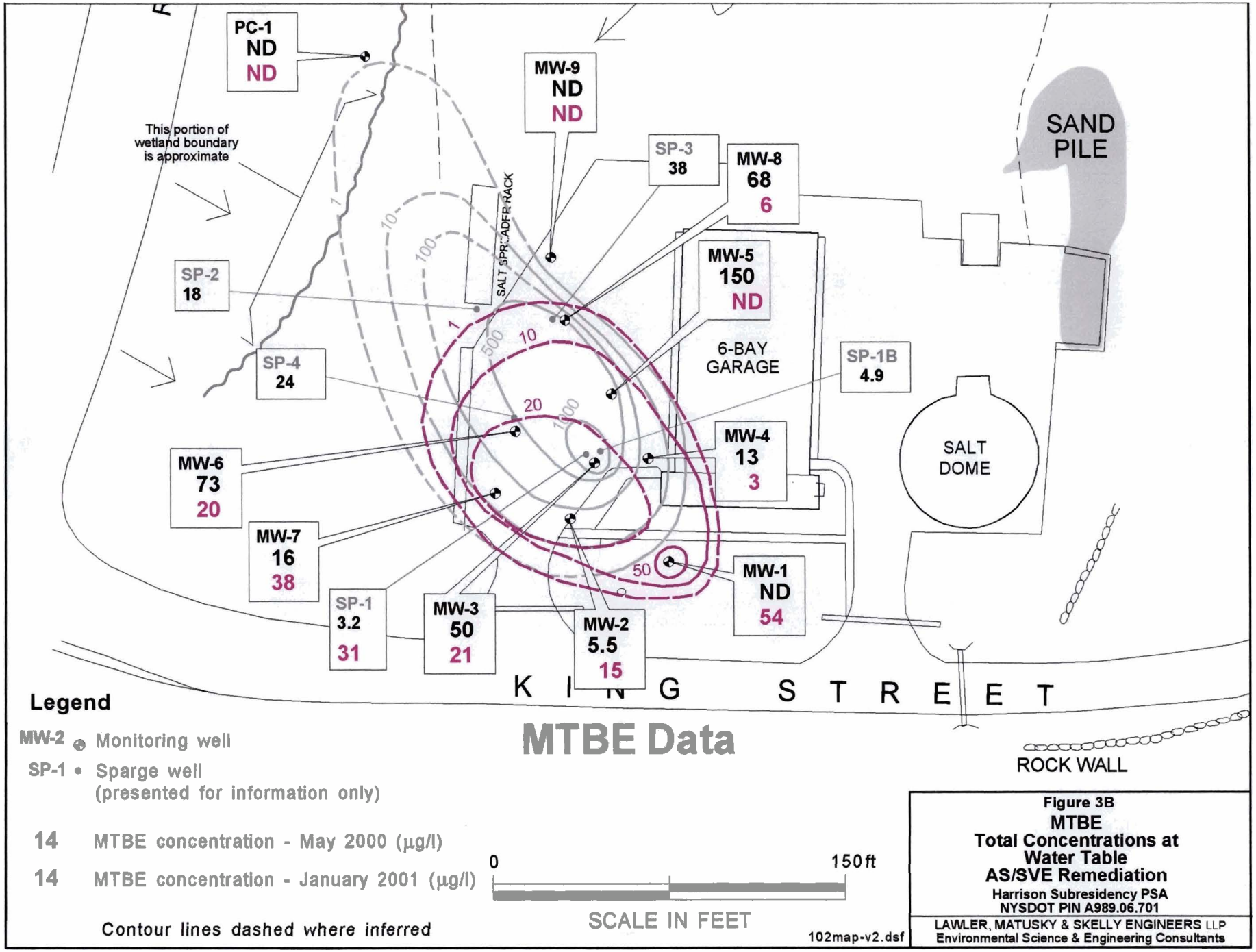
NYSDOT
Environmental Analysis Bureau
December 2000



BTEX Data

Figure 3A
BTEX
Total Concentrations at Water Table
AS/SVE Remediation
Harrison Subresidency PSA
NYSDOT PIN A989.06.701

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Environmental Science & Engineering Consultants

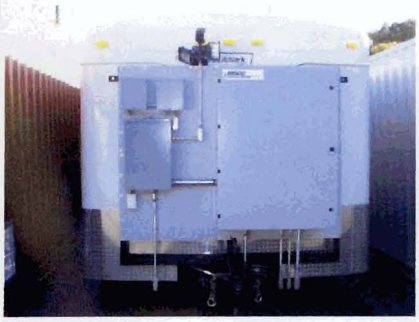


MTBE Data

Figure 3B
MTBE
Total Concentrations at Water Table
AS/SVE Remediation
Harrison Subresidency PSA
NYSDOT PIN A989.06.701

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Environmental Science & Engineering Consultants

FIGURE 4
AS/SVE EQUIPMENT SPECIFICATIONS AND LAYOUT
Harrison Subresidency



NYSDOT HARRISON SUBRESIDENCY

D008873 CPIN 8007.31.301

AIR SPARGING AND SOIL VAPOR EXTRACTION SYSTEM SPECIFICATIONS

TRAILER (Class 1 , Div. 2)

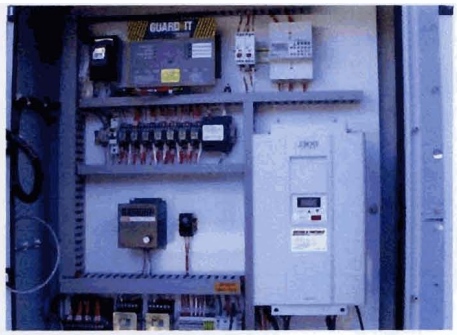
Haulmark	Grizzly
Model	#G816B2
OVERALL	
Length	19'17"
Width	100"
Height	103"
INTERIOR	
Length	16'4"
Width	96"
Height	78"
Platform Height	19"
Tire Size	ST205/R15 15"
Payload Cap.	4280 (avg.)
Double Rear doors	
Side door	
Color	white

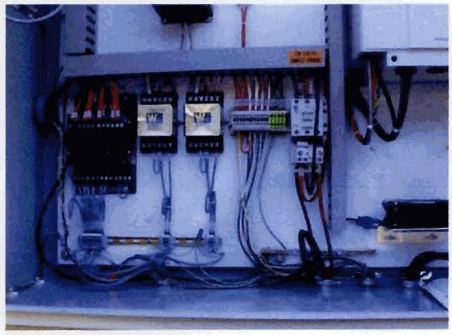
AIR SPARGING SYSTEM

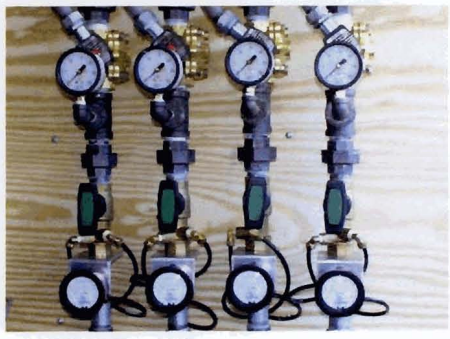
Blower	Becker KDT
Model #	3.140
HP	12
Voltage	230 V/3 phase
Converter	VFD
Max. pressure	22 psig
Max. flow	90 scfm
Max. temp.	125 F
Noise level	84 max. dBA
Outlet size	1 ½ " bsp

SOIL VAPOR EXTRACTION

Blower	Gast
Model #	R6P155Q-50
HP	5.5
Voltage	230 V/1 phase
Max. vacuum	85" w.c.
Max. flow	280 scfm
Max. temp.	100 F
Noise level	81 max. dBA
Moisture sep.	60 gal.







LMS

FIGURE 5
SVE EXHAUST PID READINGS FOR THE YEARS 2000-2001
Harrison Subresidency

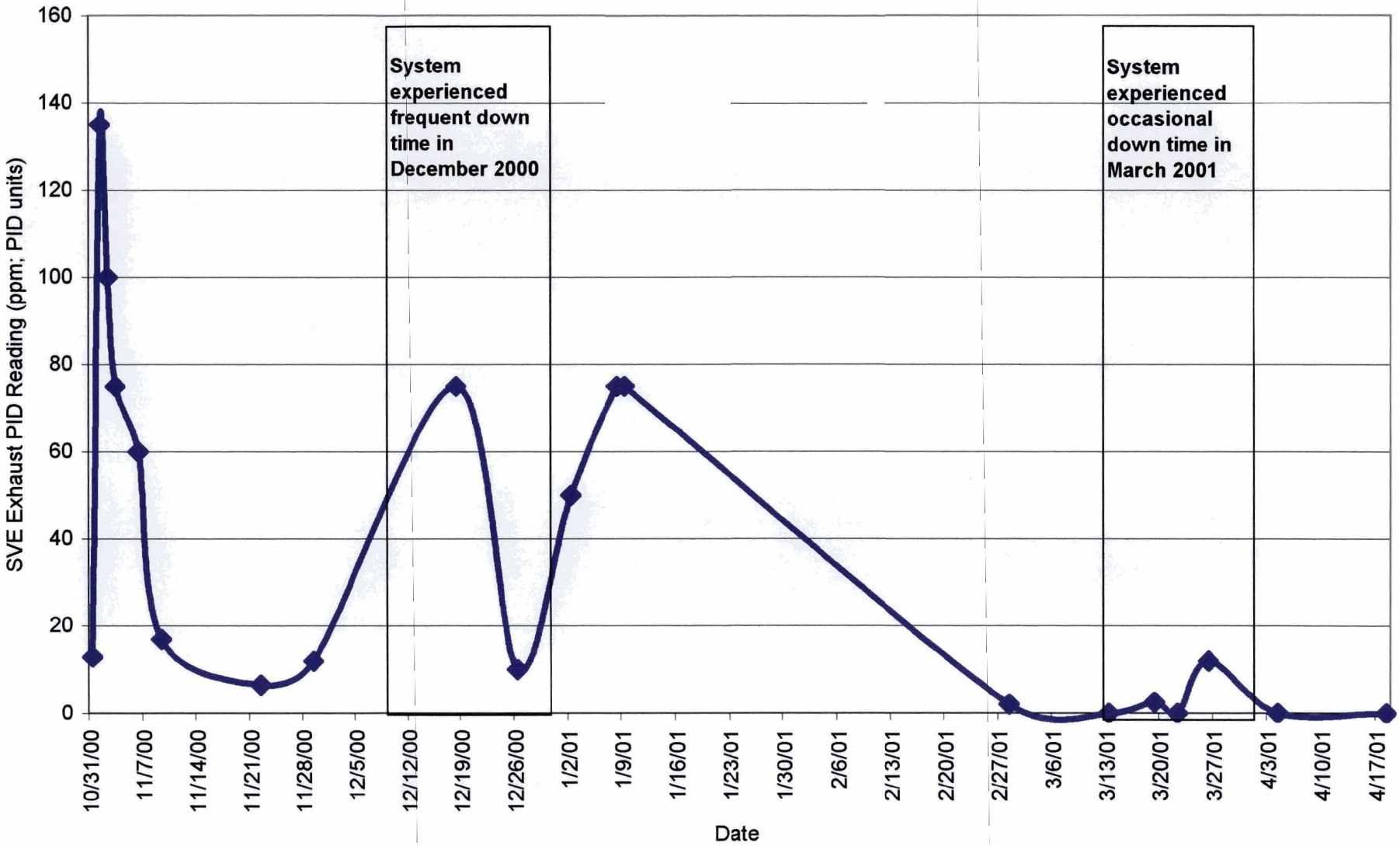
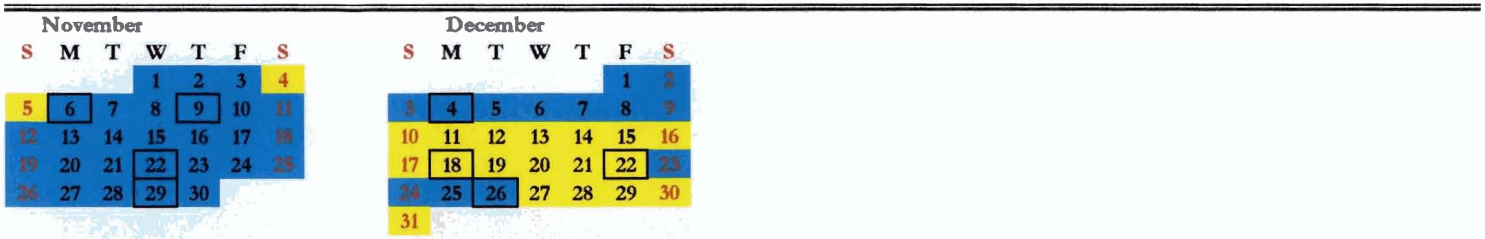
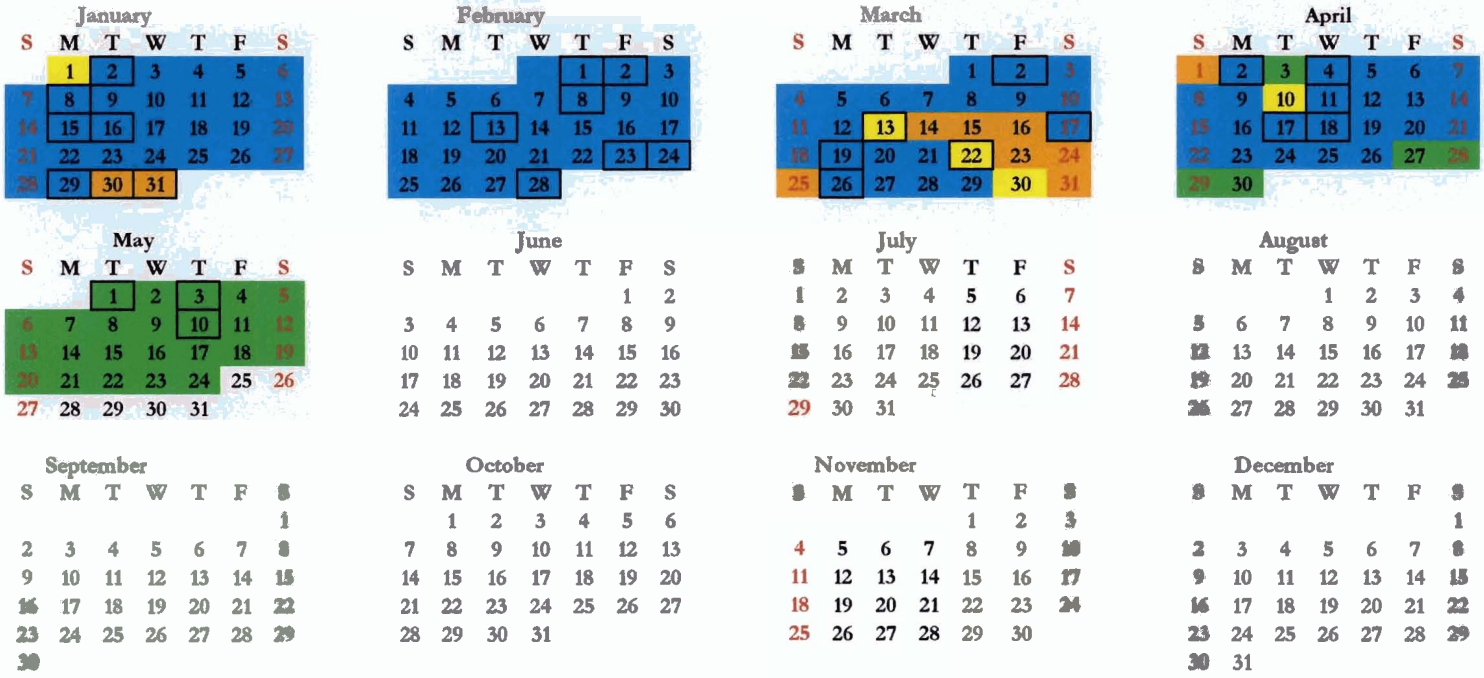


FIGURE 6
OPERATING CALENDAR

Harrison Subresidency
YEAR 2000



YEAR 2001

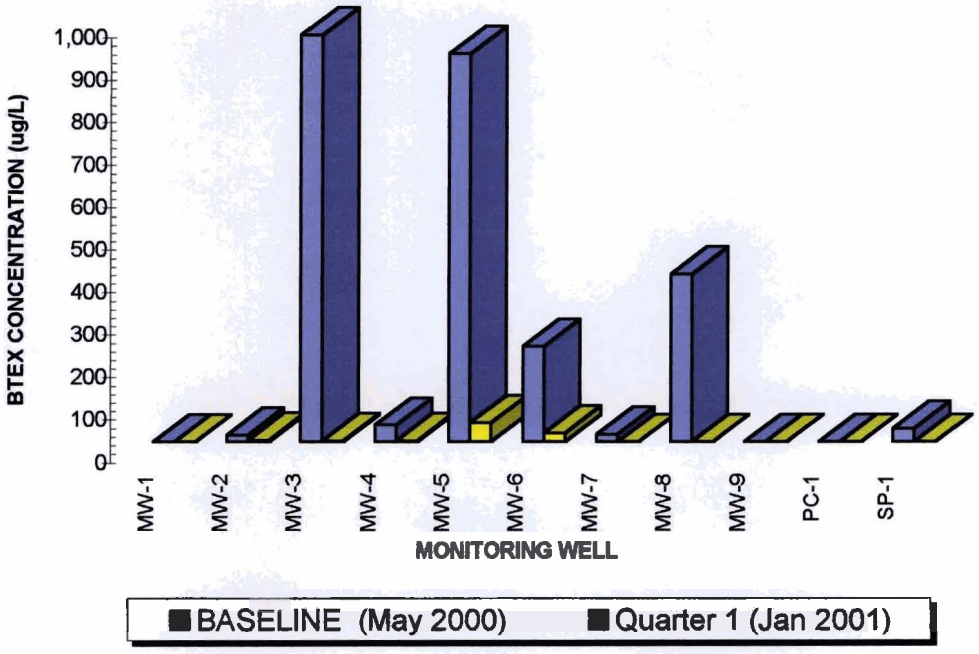


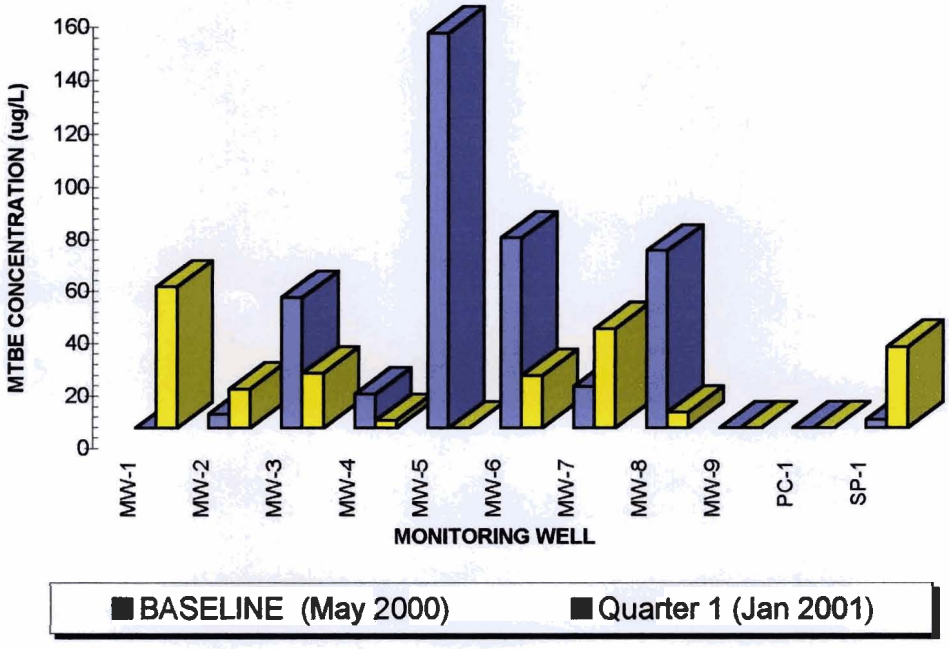
Legend

- Planned downtime; quarterly sampling or maintenance
- Unplanned downtime
- Up time
- Planned or Unplanned AS system down time; SVE up and running
- Site Visits

FIGURE 7
GROUNDWATER MONITORING - QUARTER ONE RESULTS (JAN 2001)

NEW YORK STATE DEPARTMENT OF TRANSPORTATION
HARRISON SUBRESIDENCY, WESTCHESTER, NY - DO008873, PIN 8807.31.301





Lawler, Matusky & Skelly Engineers LLP

ATTACHMENT A

Lawler, Matusky & Skelly Engineers LLP
Environmental Science & Engineering Consultants

Name: George Gattullo / Mike Pantliano | Velocity Meter Model No.: Dwyer 471 Thermo-Anemometer
PID Model No.: H-Nu P101/001 | Pressure Gauge Model No.: Magnahelic 0 to 0.250 WC

	Weath 35 F		Weather: 50's		Weather: 50's		Weather:		Weather: 50's	
	fair		sunny,warm		cloudy				Sunny, Windy	
	Date: 4/2/01(GG)		Date: 4/4/01(MVP)		Date: 4/11/01(MVP)		Date: 4/17/01 MVP		Date: 4/18/01 MVP	
SVE hours /time	2612.8 @ 1035		2659.9@1000		2791.7@0900		Not Read		2963.6@1300	
AS hours/time	2566.9 @ 1035		2567.1@1000		2698.9@0900		Not Read		2870.7@1300	
Air Sparging Flow Rate (CFM)	VS		VS		VS		VS		VS	
SP-1		Not Operating	50	6.5	50	7.5	50	Not Read	50	8
SP-3			75	<4	75	<4	75	Not Read	75	< 4
SP-4			-	-	-	-	-	Not Read	-	-
SP-2			25	8	0	-	25	Not Read	25	5
Air Sparging Pressure (PSI)										
SP-1			11.5		12		Not Read		7.5	
SP-3			20		21.5		Not Read		20	
SP-4			-		-		Not Read		-	
SP-2			8.5		-		Not Read		7	
Air Sparging Blower Outlet			21		23.5		Not Read		19	
SVE Velocity (ft/min)	VS		VS		VS		VS		VS	
VE-1	100	Not Read	100	Not Read	100	Not Read	100	Not Read	100	1,400
VE-2	100	Not Read	100	Not Read	100	Not Read	100	Not Read	100	3,400
VE-3	100	Not Read	100	Not Read	100	Not Read	100	Not Read	100	2,900
VE-4	100	Not Read	100	Not Read	100	Not Read	100	Not Read	100	3,600
SVE Vacuum (in W.C.)										
VE-1	24		25		28		Not Read		17	
VE-2	23		23.5		-		Not Read		14	
VE-3	19		19		20		Not Read		12	
VE-4	18		19		20		Not Read		13	
SVE Blower Inlet	Not Read		46		50		Not Read		40	
Vacuum at SVE Knockout Pot (in W.C.)	Not Read		30.5		34.5		Not Read		24	
Pressure Monitoring Points (in W.C.)										
PM-1	Not Read		Not Read		Not Read		Not Read		Not Read	
PM-2	Not Read		Not Read		Not Read		Not Read		Not Read	
PM-3	Not Read		Not Read		Not Read		Not Read		Not Read	
PM-4	Not Read		Not Read		Not Read		Not Read		Not Read	
PM-5	Not Read		Not Read		Not Read		Not Read		Not Read	
Air Sparging Temperature (°C)	Not Read		39		18		Not Read		54	
SVE Exhaust Temperature (°C)	Not Read		40		28		Not Read		44	
SVE Exhaust PID Reading	Not Read		0		Not Read		Not Read		0	
Knockout Pot Water Level (in.)	0		0		Full/0		Not Read		12	
Date of Last AS Filter Change	2/13/01		2/13/01		2/13/01		2/13/01		2/13/01	
Date of Last SVE Filter Change	3/26/01		3/26/01		3/26/01		3/26/01		3/26/01	
Highest Vicinity Ambient PID Reading	Not Read		0		Not Read		Not Read		Not Read	
Location										

VS - Valve Setting, % (e.g., 0, 25, 50, 75, 100)

Comments: 4/2: Restart system--SVE only. 4/4: Restart AS. 4/11: Restart system (SVE went down on 4/10) except for SP-2 and VE-2. 4/17: Restart SP-2 and VE-2.