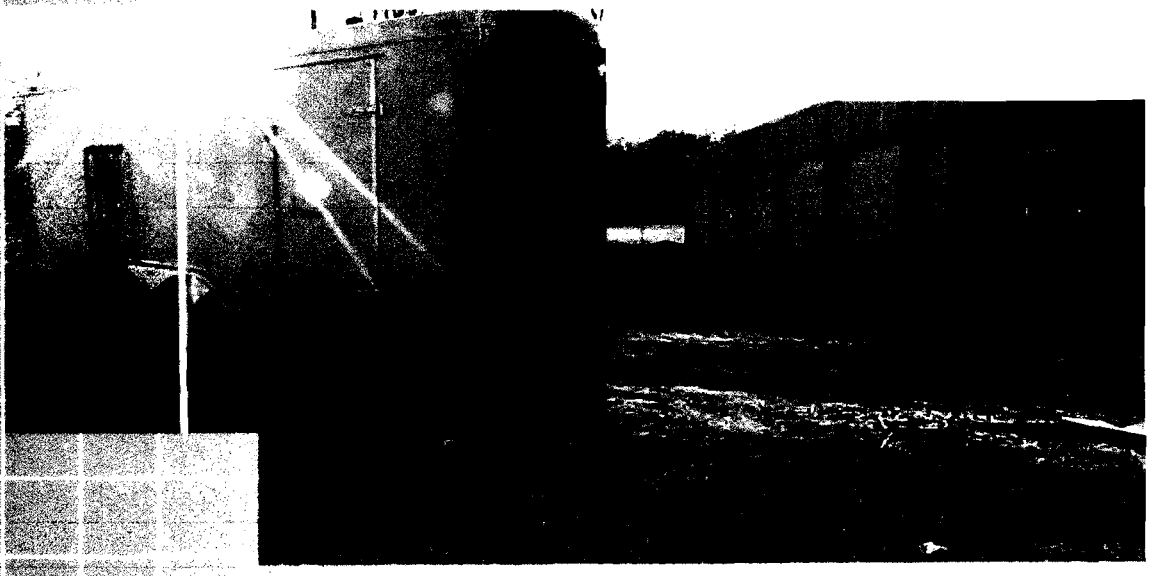
NEW YORK STATE DEPARTMENT OF TRANSPORTATION

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 October through December 2001

January 2002

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

24 January 2002
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 #12 (October through December 2001)

Dear Mr. Menard:

Lawler, Matusky & Skelly Engineers LLP (LMS) is pleased to submit the subject report for your use. This report represents the twelfth 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 soil vapor extraction and air sparge systems are currently both operational. The air sparge system was taken off-line on November 8 in anticipation of groundwater sampling, which was completed on January 23 and 24, 2002. The soil vapor extraction system was taken off-line on January 18 for the same purpose. Both systems will be restarted before the end of January. The autodialer was removed in November and sent to the manufacturer for repair; it was replaced in December and it is currently operating normally.

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

Very truly yours,

George G. Gattullo

cc: David Wohlbach, NYSDOT (6 copies)
Mauricio Roma, Environmental Analysis Bureau (1 copy)

ONE BLUE HILL PLAZA • P.O. BOX 1509 • PEARL RIVER, NY 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: October 2001

10/1/01 –Handex and Healey electric on site to examine air sparge blower. Determined that cause of recent failures has been due to supply problems from power company.

10/4/01 –LMS on site to verify system operation (autodialer not working). Well SP-3 had pressure, but no flow. Verizon was on site later in day to investigate phone line and reported no problem with phone line to panel box..

10/12/01 –LMS on site to verify system operation (autodialer not working). Found AS down and "E16" message on inverter (momentary power failure). Restarted system without incident. Checked phone-line w/tester: no service to phone panel on south wall of DOT office. Verified tester functionality by testing line to DOT office—tester is functioning properly.

10/19/01 – LMS on site to verify system operation (autodialer not working). Found AS down and "E09" message on inverter (Defective power supply – insufficient voltage). Restarted system without incident. Checked service to phone panel with modular telephone—tests confirmed results from 10/12. Furthermore, office phone number is correct, as listed, and functioning. Checked other lines in panel box—all not active. Problem with autodialer phone line is definitely on TelCo side of panel, or before.

10/22/01 –LMS on site to meet with Verizon. System functioning properly, except for autodialer. Cause of autodialer non-operation was determined to be twofold: overloaded (burned-out) ground breaker in telephone panel, and malfunction of autodialer equipment. Verizon repaired problem at the telephone panel. Damage was most likely the result of a power overload to the ground breaker. Possible causes of this are lightening strike or electrical short circuit in the AS/SVE system. It is evident that the power surge came from the AS/SVE system, since there was no damage to the other (NYSDOT) telephone circuit in the same panel box. If the damage was due to lightening, it would indicate inadequate lightening protection at the system trailer.

10/31/01 –LMS on site to verify operation. System down on high SVE temp alarm. Restarted system w/out incident.

MAINTENANCE THIS MONTH:
None.

SPARE PARTS USED:
None.

SPARE PARTS ORDERED:
None.

SITE PHONE NUMBER: (914) 428-8130

TYPICAL OPERATING PARAMETERS:

Air Sparging (Total Flow = 30 CFM)

	Pressure	Flow
	(psi)	(scfm)
SP 1	7	17
SP 2	7	15
SP 3	7	0
SP 4	Not Operating	

Vapor Extraction (Total Flow = 218 CFM)

	Vacuum	
	(in.-H_2O)	
VE 1	15	
VE 2	16	
VE 3	12	
VE 4	13	

OUTSTANDING ISSUES AND ACTIONS:

- Autodialer system malfunction has been identified. Verizon portion has been repaired, but repairs to autodialer hardware will be implemented in the coming month.

- 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

Lawler, Matusky & Skelly Engineers LLP

MONTHLY OPERATION AND MAINTENANCE REPORT

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

MONTH: November/December 2001

11/02/01 – LMS was on site to meet with representatives from NYSDOT, NYCDEP, and NYSDEC to discuss and demonstrate operation of the AS/SVE system. After the meeting, George Gattullo and Rob DeGiorgio from LMS reviewed system shut-down and start-up procedures with Mauricio Roma of NYSDOT.

11/08/01 – LMS was on site to shut down AS system in preparation for groundwater sampling in January. The SVE system remains operational.

11/19/01 – LMS was on site to troubleshoot the autodialer in conjunction with RACO customer service (via telephone). RACO directed LMS personnel in the diagnosis. It was confirmed that the unit suffered electrical damage. The unit was removed and shipped to RACO for repair.

12/06/01 – LMS on-site to install repaired Autodialer and install a phone line surge suppressor (Belkin model No. Mastercube F5C594-TEL). The surge suppressor comes with a $10,000 warranty. Installation was successful and the autodialer is fully operational. SVE system remains running (6964.3 hours). Upon installation, it was clear a surge had taken place; a scorch mark can be seen on the panel behind the autodialer.

MAINTENANCE THIS MONTH:
Reinstalled autodialer that was factory repaired; blown phone line circuits.

Extraction blower inlet filter element replaced based on visual inspection.

SPARE PARTS USED:
Extraction blower inlet filter element part Solsberg #851.

SPARE PARTS ORDERED:
None.

SITE PHONE NUMBER: (914) 428-8130

TYPICAL OPERATING PARAMETERS:

Air Sparging (Total Flow = 0 CFM)

	Pressure	Flow
	(psi)	(scfm)
SP 1	0	0
SP 2	0	0
SP 3	0	0
SP 4		

Vapor Extraction (Total Flow = 218 CFM)

	Vacuum	
	(in.-H_2O)	
VE 1	15	
VE 2	14	
VE 3	10	
VE 4	11	

OUTSTANDING ISSUES AND ACTIONS:

- The SVE will continue to operate until two days prior to the next groundwater sampling event, which is scheduled for the end of January, 2002. Both the AS and SVE systems will be restarted subsequent to groundwater sampling.

- 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

Lawler, Matusky & Skelly Engineers LLP

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

DECEMBER 2001

LIST OF TABLES, FIGURES, AND ATTACHMENTS

LIST OF TABLES

LIST OF FIGURES

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ATTACHMENTS

TABLES

TABLE 1 (Page 1 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 11/8/00 (ppbv)	Formula Weight (g/mole)	($\mu g/m^3$)	Loading (lb/hr) (assume Q = 218 ft^3/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
1,1,2,2-Tetrachloroethane	ND	168	ND	ND

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

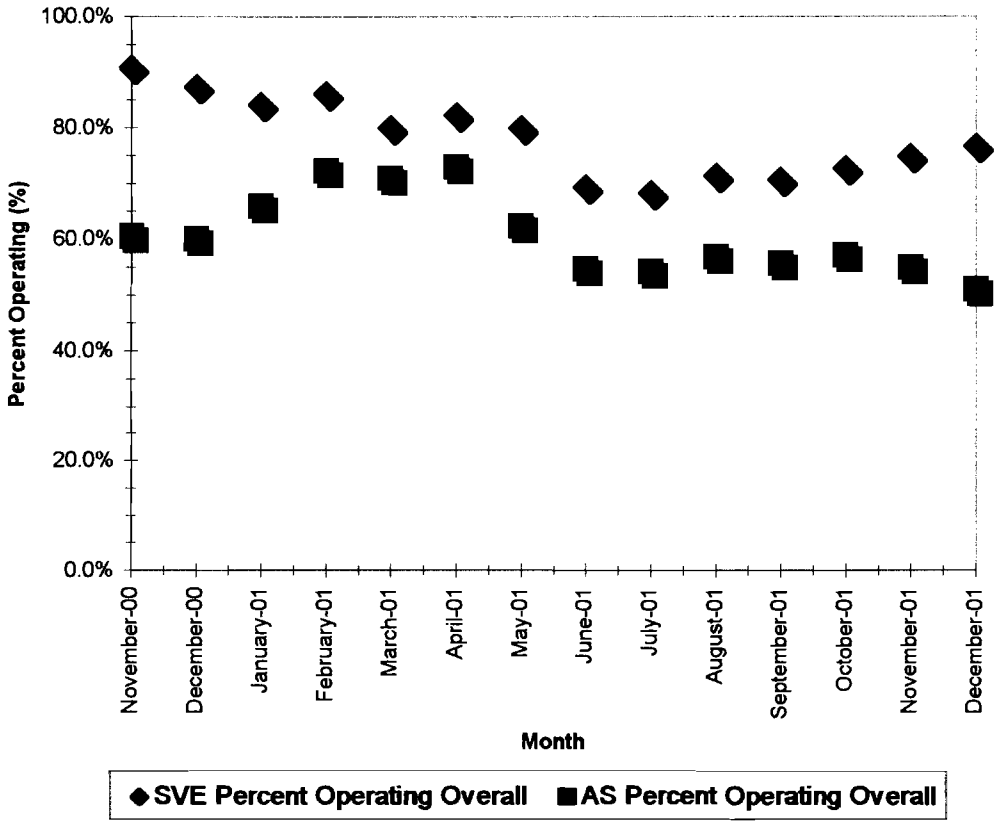
Location Collected LMS Sample ID Lab Sample ID Date Sampled	SVE AB13459 00110156-01 11/8/00 (ppbv)	Formula Weight (g/mole)	(µg/m³)	Loading (lb/hr) (assume Q = 218 ft³/min)
Isopropylbenzene	ND	120.19	ND	ND
1,2,3-Trichloropropane	ND	147.43	ND	ND
Bromobenzene	ND	157.01	ND	ND
n-Propylbenzene	ND	120.19	ND	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 (µg/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 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	82.1%	73.0%	91.6%	84.1%
May-01	3,781	3,173	5,088	79.9%	62.4%	68.3%	0.0%
June-01	3,781	3,173	5,808	69.4%	54.6%	0.0%	0.0%
July-01	4,229	3,548	6,552	68.3%	54.2%	60.2%	50.5%
August-01	4,950	4,143	7,296	71.3%	56.8%	96.9%	79.9%
September-01	5,407	4,460	8,016	70.6%	55.6%	63.5%	44.1%
October-01	6,104	5,003	8,760	72.7%	57.1%	93.7%	73.0%
November-01	6,824	5,210	9,480	74.8%	55.0%	100.0%	28.8%
December-01	7,568	5,210	10,224	76.7%	51.0%	100.0%	0.0%



Notes:

(a) Due to a malfunction in the SVE elapsed timer in February, 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

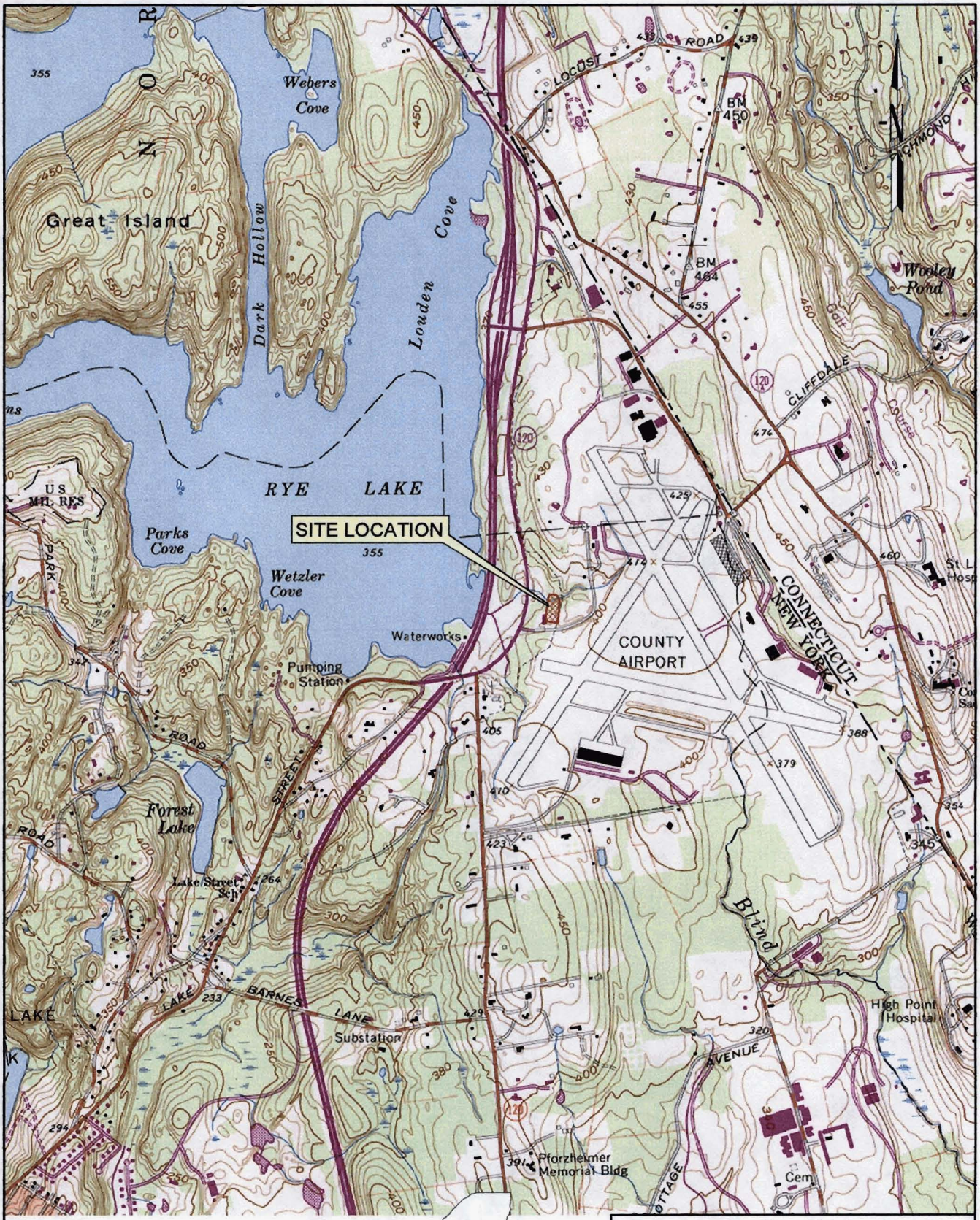


Figure 1

Site Location

HARRISON SUBRESIDENCY
NYSDOT PIN A98906.701

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

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

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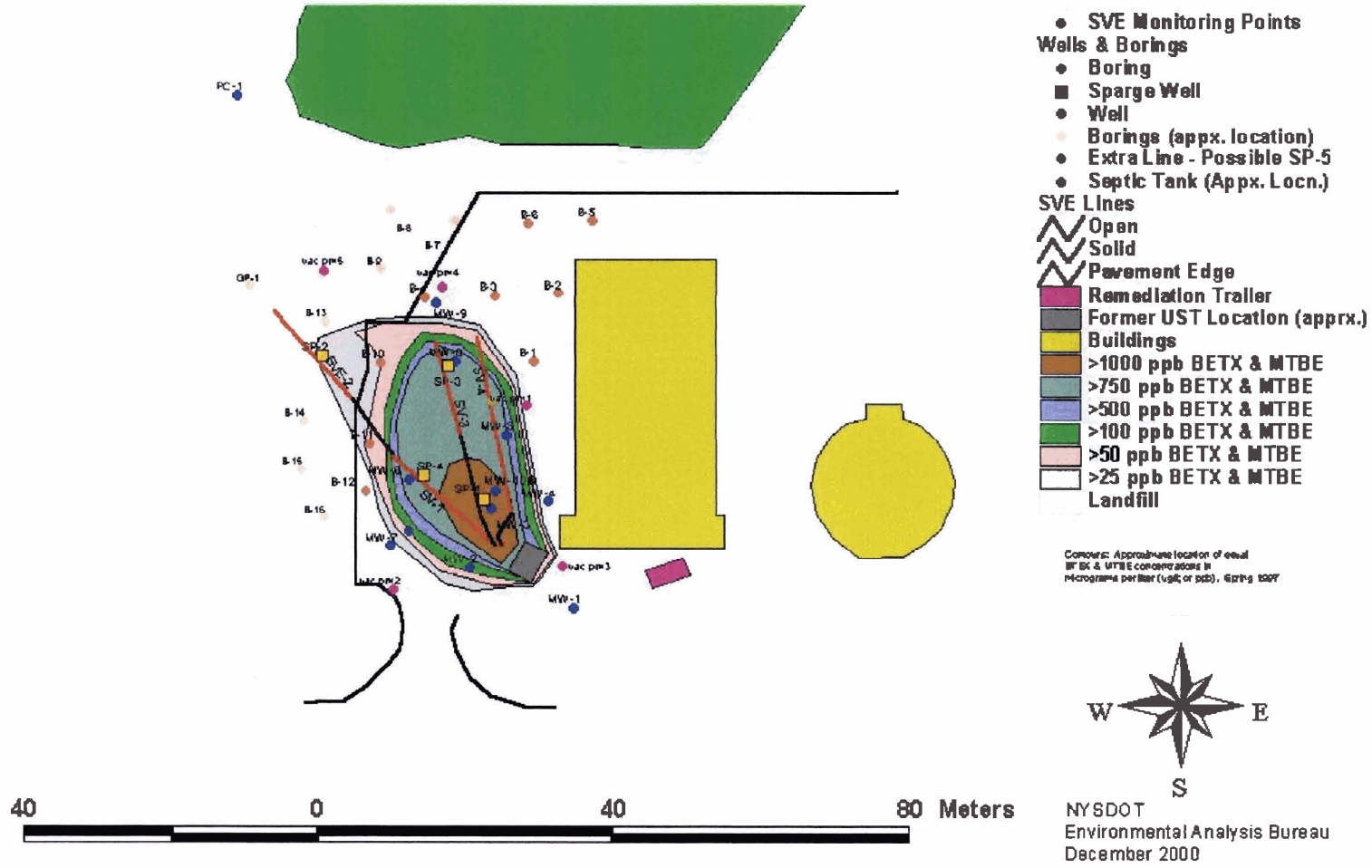
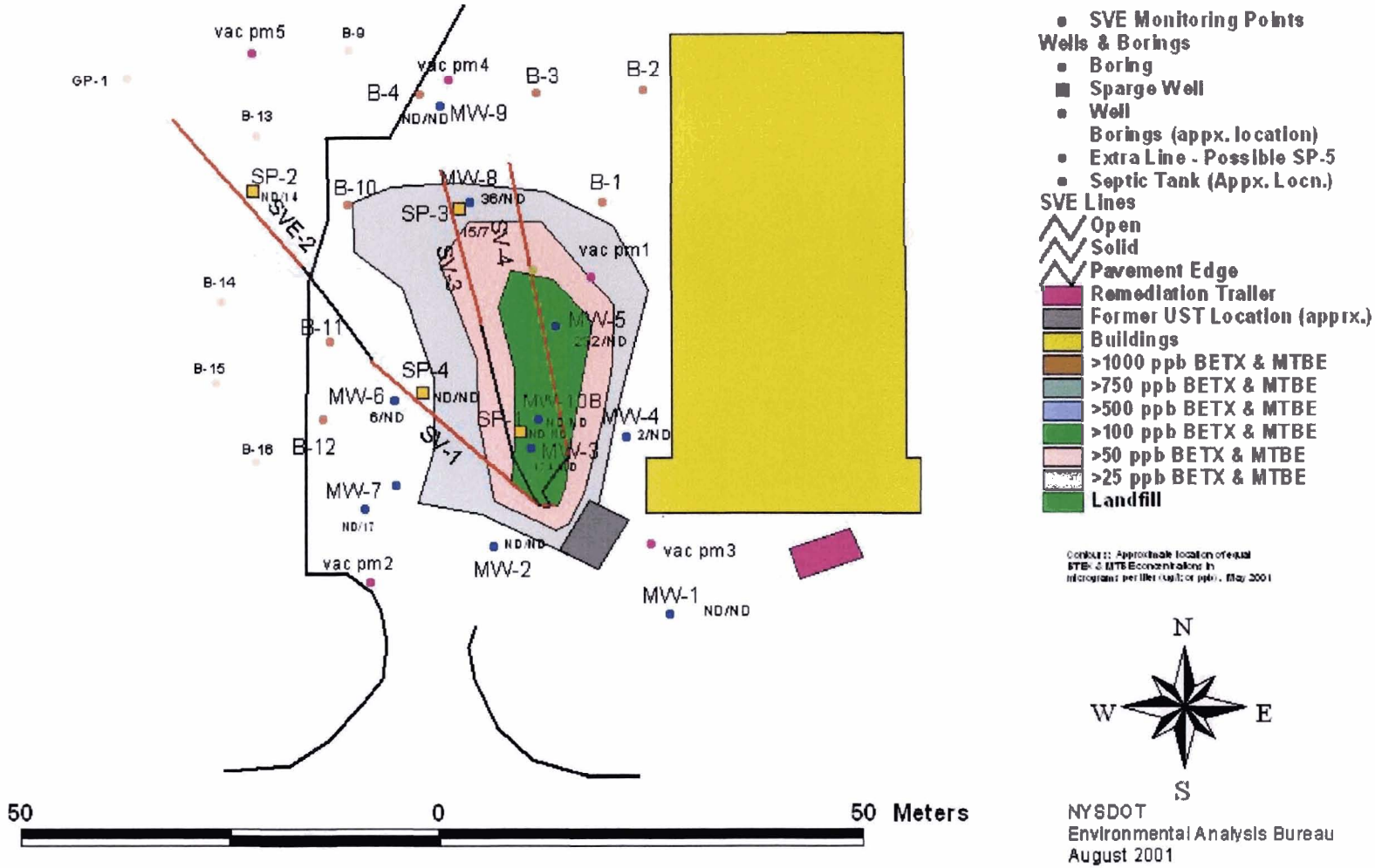


LMS Lawler, Matusky & Skelly Engineers LLP One Blue Hill Plaza • Pearl River, New York 10965 ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS	**Petroleum (BTEX & MTBE) Contaminant Plume at the Water Table (Spring 1997)** **Wells, Borings, and Soil Vapor Extraction Lines** **Harrison Subresidency, Westchester County**	**Figure 2A**



LMS Lawler, Matusky & Skelly Engineers LLP
One Blue Hill Plaza • Pearl River, New York 10965
ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS

Petroleum (BTEX & MTBE) Contaminant Plume at the Water Table (May 2001)
Wells, Borings, and Soil Vapor Extraction Lines
Harrison Subresidency, Westchester County

Figure 2B

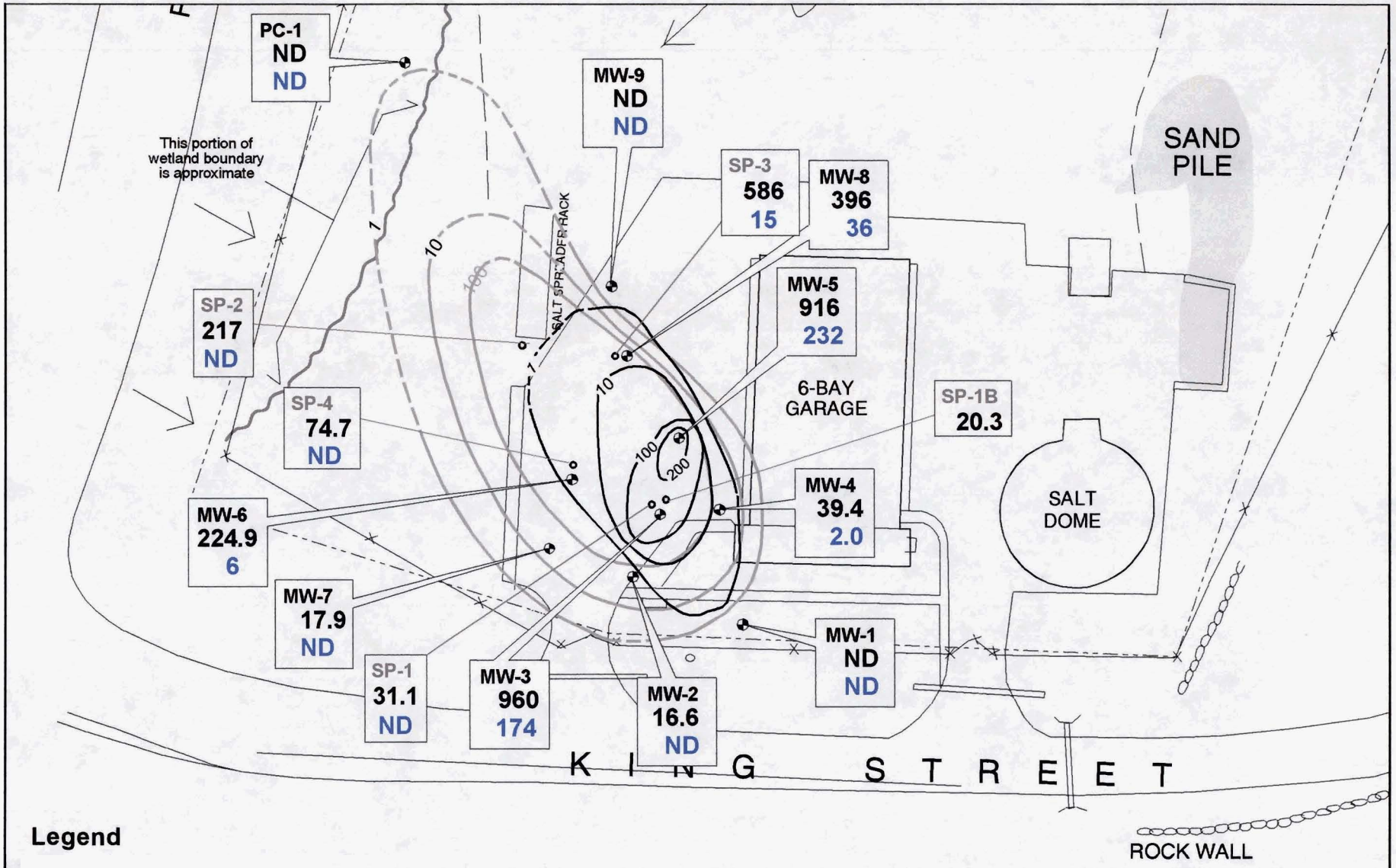


Figure 3

Total BTEX 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)

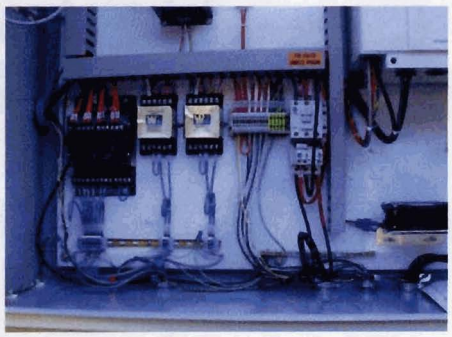
Haulmark	Grizzly
Model	#G816B2
OVERALL	
Length	19'17"
Width	100"
Height	103"
INTERIOR	
Length	16'4"
Width	96"
Height	78"
Platform Height	19"
Tire Size	ST205/R15 15"
Payload Cap.	4280 (avg.)
Double Rear doors	
Side door	
Color	white

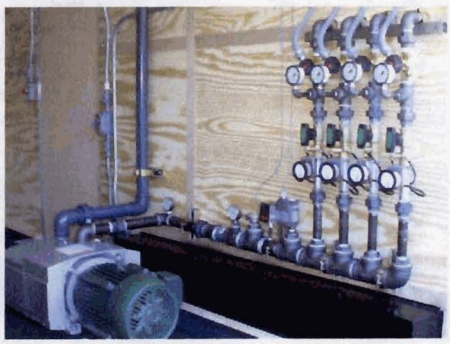
AIR SPARGING SYSTEM

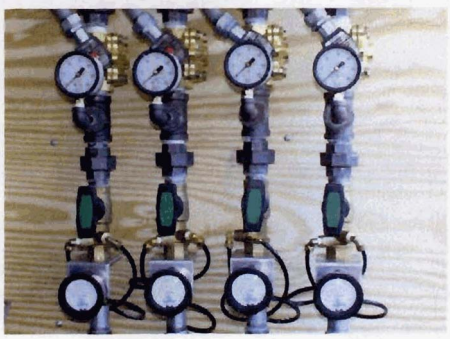
Blower	Becker KDT
Model #	3.140
HP	12
Voltage	230 V/3 phase
Converter	VFD
Max. pressure	22 psig
Max. flow	90 scfm
Max. temp.	125 F
Noise level	84 max. dBA
Outlet size	1 ½ " bsp

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

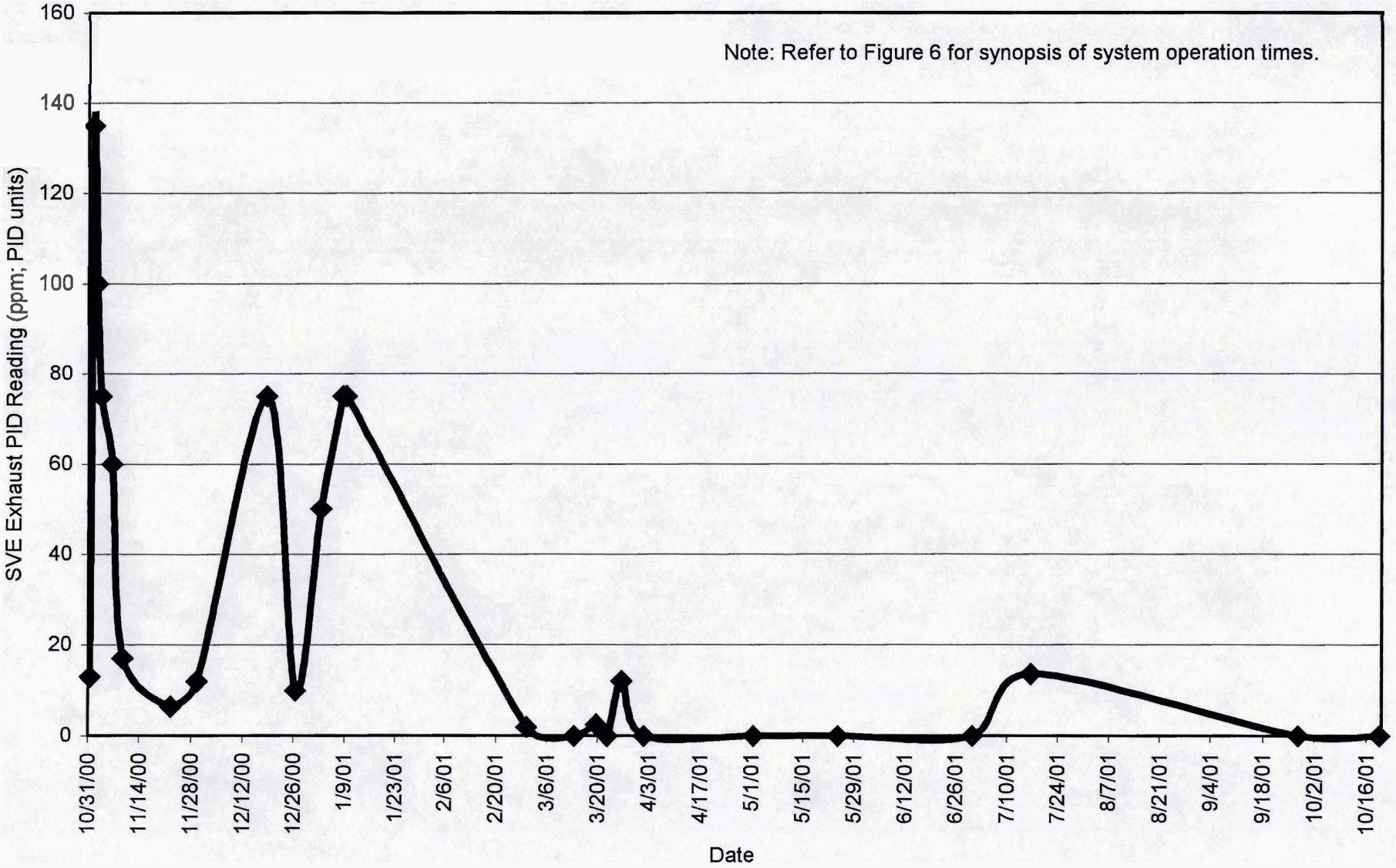


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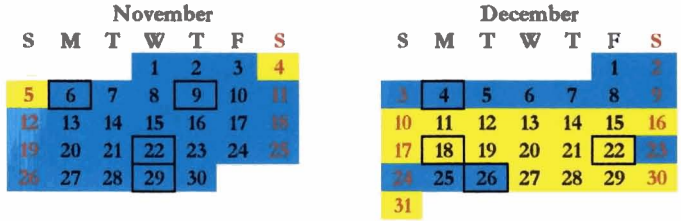
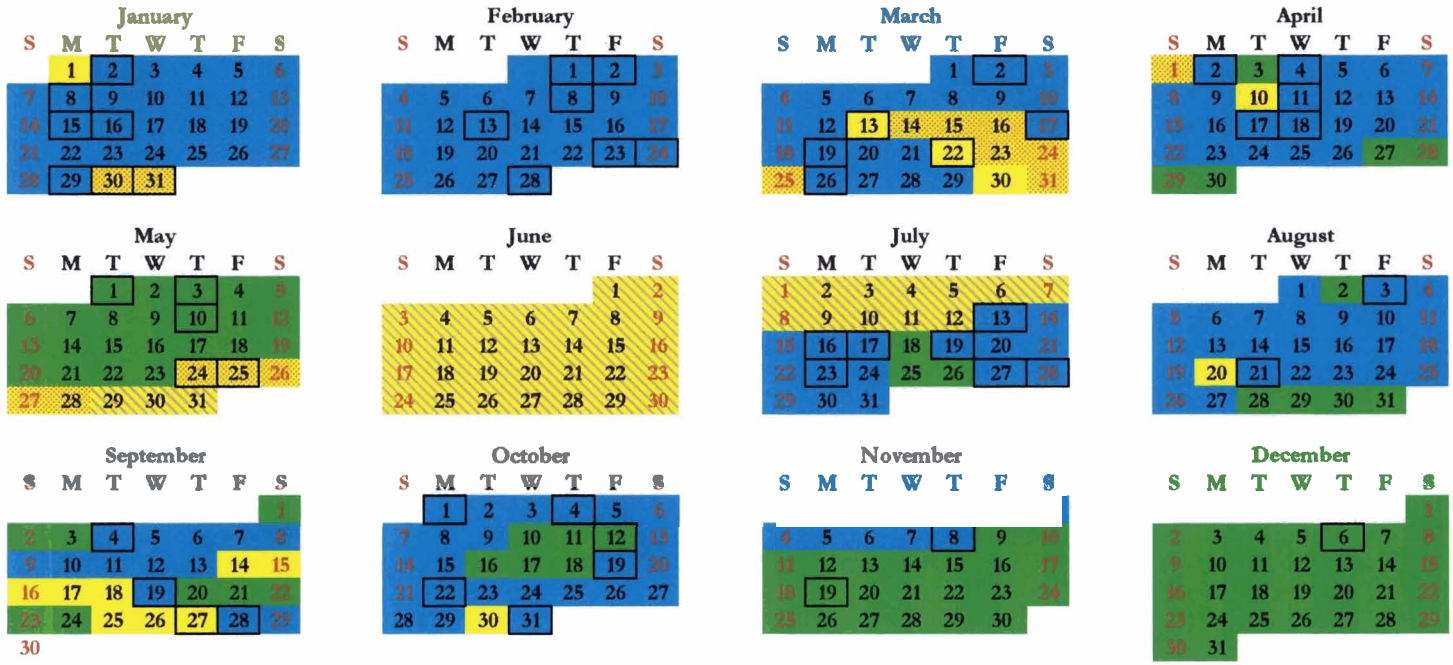
FIGURE 6
OPERATING CALENDAR
Harrison Subresidency

YEAR 2000



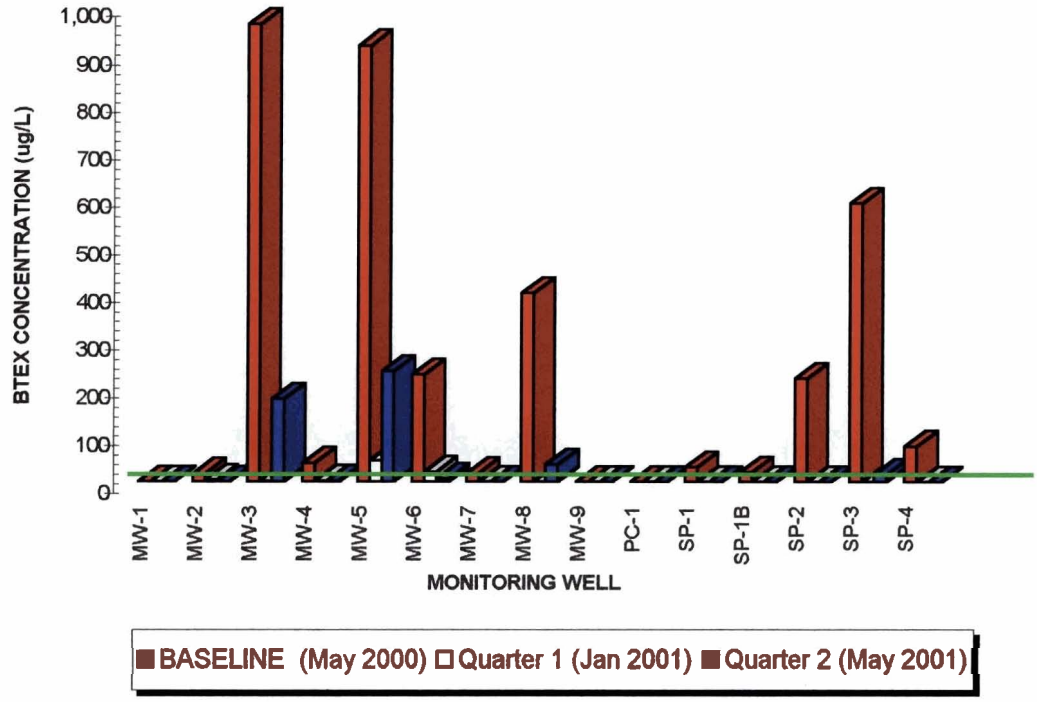
YEAR 2001

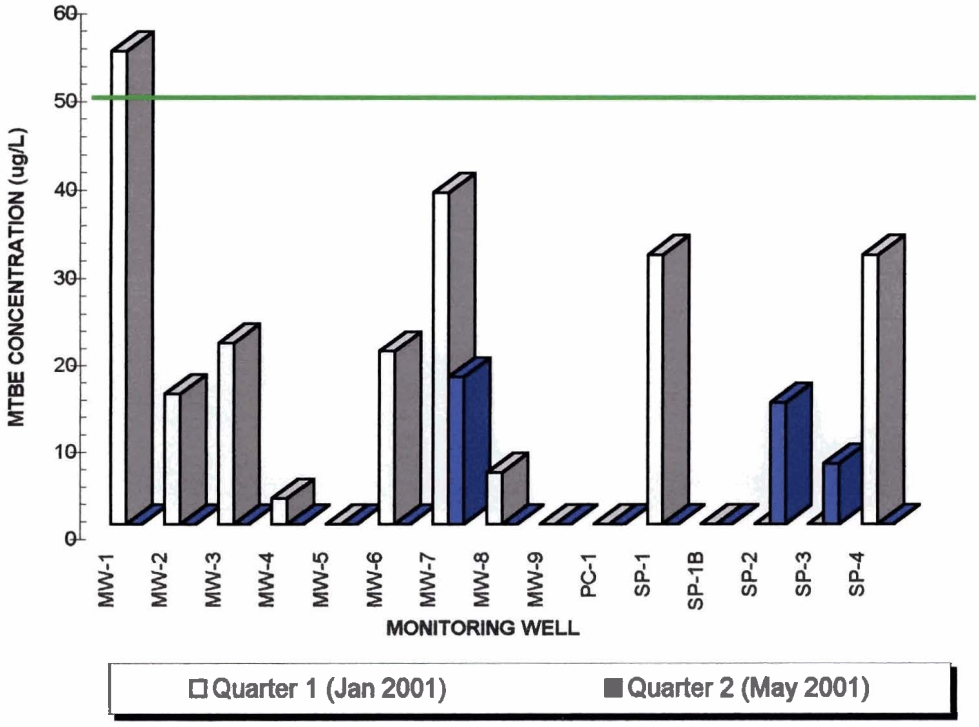


Legend

- Up time
- Unplanned downtime
- Unplanned downtime, warranty issues
- Planned downtime; quarterly sampling or maintenance
- Planned or Unplanned AS system down time; SVE running
- Site Visits

FIGURE 7
GROUNDWATER MONITORING - SECOND QUARTER RESULTS (MAY 2001)
Harrison Subresidency





Target effluent goal (50 ug/L for BTEX and MTBE)

Note: Baseline data for MTBE not shown due anomalies resulting from discrepancies in laboratory methodology.

ATTACHMENT A

Lawler, Matusky & Skelly Engineers LLP

Environmental Science & Engineering Consultants

ATTACHMENT A
INSPECTION REPORT SHEET
Harrison Subresidency

OCTOBER 2001 (Page 1 of 1)

	Date: **10/12/01 RD** Weather:	Date: **10/19/01 GG** Weather: 48F rising	Date: **10/22/01 GG** Weather: 75F Sunny	Date: **10/31/01 RD** Weather:
SVE hours /time	5689 @ 1830	5847.6 @ 0745	5924.3 @ 1235	[b]6104.0
AS hours/time	[a]4667 @ 1830	[a]4746.6 @ 0745	4823.3 @ 1235	[b]5002.9
AS POT setting (before/after)	5.7	5.7	5.7	

Air Sparging Flow Rate (CFM)	VS	cfm	VS	cfm	VS	cfm	VS	cfm
SP-1	NR	14	75	18	75	16	75	12
SP-3	NR	0	75	0	75	0	75	0
SP-4	-	-	-	-	-	-	-	-
SP-2	NR	12	75	12	75	18.5	75	16

Air Sparging Pressure (PSI)	psi	psi	psi	psi
SP-1	7.5	7	6	7.5
SP-3	7.5	7.5	6.5	7.5
SP-4	-	-	-	-
SP-2	7.5	7	6	7.5
Air Sparging Blower Outlet	Not Read	Not Read	5	Not Read

SVE Velocity (ft/min)	ft/min	ft/min	ft/min	ft/min
VE-1	Not Read	Not Read	Not Read	Not Read
VE-2	Not Read	Not Read	Not Read	Not Read
VE-3	Not Read	Not Read	Not Read	Not Read
VE-4	Not Read	Not Read	Not Read	Not Read

SVE Vacuum (in W.C.)	VS	in W.C.	VS	in W.C.	VS	in W.C.	VS	in W.C.
VE-1	100	Not Read	100	15	100	17	100	15
VE-2	100	Not Read	100	18	100	14	100	15
VE-3	100	Not Read	100	12	100	11	100	10
VE-4	100	Not Read	100	13	100	12	100	10
SVE Blower Inlet	Not Read		41		40		Not Read	
Vacuum at SVE Knockout Pot	Not Read		23		23		Not Read	

Pressure Monitoring Points (in W.C.)	in W.C.	in W.C.	in W.C.	in W.C.
PM-1	Not Read (Startup)	Not Read (Startup)	Not Read	Not Read (Startup)
PM-2	Not Read (Startup)	Not Read (Startup)	Not Read	Not Read (Startup)
PM-3	Not Read (Startup)	Not Read (Startup)	Not Read	Not Read (Startup)
PM-4	Not Read (Startup)	Not Read (Startup)	Not Read	Not Read (Startup)
PM-5	Not Read (Startup)	Not Read (Startup)	Not Read	Not Read (Startup)
Air Sparging Temperature (°C)	Not Read (Startup)	Not Read (Startup)	42	Not Read (Startup)
SVE Exhaust Temperature (°C)	Not Read	42	47	Not Read
SVE Exhaust PID Reading	Not Read	0	Not Read	Not Read
Knockout Pot Water Level (in.)	0	0	0	0
Date of Last AS Filter Change	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

VS = Valve Setting, % open (e.g., 0, 25, 50, 75, 100) GG = George Gattullo; RD = Rob Degiorgio PID: H-Nu P101, LMS#001 Anemoter: Dwyer 471

Comments:

a - Air Sparge system not operating on arrival. 10/19: PID is LMS#003. Troubleshoot autodialer--inconclusive

b - AS/SVE System not operating on arrival.