



TOWN OF OYSTER BAY
DEPARTMENT OF PUBLIC WORKS

KARL J. LEUPOLD, P.E.
COMMISSIONER

SYOSSET, NEW YORK 11791-5699

(516) 921-7347

April 26, 1994

Mr. Robert C. Knizek, P.E.
New York State Department
of Environmental Conservation
50 Wolf Road
Albany, NY 12233

Re: Town of Oyster Bay Ambient Air and Soil Gas Survey
Second Year Annual Summary Report
Contract No. TBI 90-522

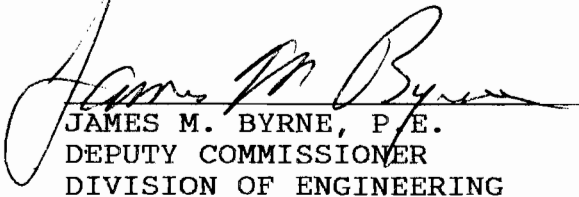
Dear Mr. Knizek:

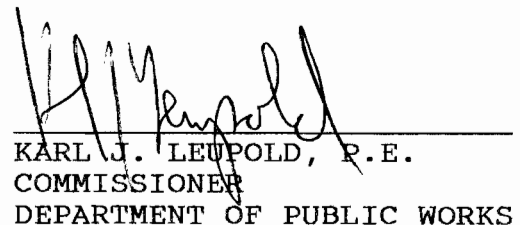
As part of the Old Bethpage Landfill Remediation Program Final Consent Decree (83CIV.5357), the Town has initiated a supplemental landfill gas monitoring program.

The Town has developed a testing program for ambient air and soil gas that meets the requirements of the Consent Decree. The test protocols have been previously transmitted to your office. This transmittal contains the second year annual summary of ambient air and soil gas testing and is herewith submitted for your review.

Should you have any questions regarding these results, please contact Michael Kwaschyn or Richard W. Lenz at (516) 677-5816.

Very truly yours,


JAMES M. BYRNE, P.E.
DEPUTY COMMISSIONER
DIVISION OF ENGINEERING


KARL J. LEUPOLD, P.E.
COMMISSIONER
DEPARTMENT OF PUBLIC WORKS

RWL/mic
Enclosure

cc: John Venditto, Esq., Town Attorney
Anthony J. Maurino, Dep. Commissioner/Env. Control
Lockwood, Kessler, & Bartlett

**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
EVALUATION OF AMBIENT
VOLATILE ORGANIC COMPOUNDS IN AIR AND SOILS
AND SOIL GAS PRESSURE READINGS FOR
1992-1993**

Second Year of Monitoring

Annual Summary

Prepared for:

Town of Oyster Bay
Department of Public Works
Syosset, New York

Prepared by:

RTP Environmental Associates, Inc.®
400 Post Avenue
Westbury, New York

MARCH 1994

**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
EVALUATION OF AMBIENT VOLATILE ORGANIC COMPOUNDS IN AIR AND SOILS
AND SOIL GAS PRESSURE READINGS FOR 1992-1993**

Second Year Of Monitoring
Annual Summary

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**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
EVALUATION OF AMBIENT VOLATILE ORGANIC COMPOUNDS IN AIR AND SOILS
AND SOIL GAS PRESSURE READINGS FOR 1992-1993**

1.0 INTRODUCTION

The Town of Oyster Bay is monitoring volatile organic compounds (VOCs) at the Oyster Bay Solid Waste Disposal Complex (OBSWDC) on a quarterly basis. The monitoring program was designed to comply with all of the requirements stipulated in the Consent Decree (83CIV5357) RAP Attachment 2. The details of the specific monitoring methods used, laboratory analysis performed and the results for all program phases including volatile organic compounds monitoring, have been presented in quarterly reports. The reports have been forwarded to the appropriate regulatory agencies, as they were completed.

This evaluation has been prepared to review the volatile organic compounds data that was collected during the second full year of monitoring. The purpose of the review is to determine if there is sufficient evidence to request relief from the quarterly monitoring schedule stated in the Consent Decree.

The OBSWDC is located in the Town of Oyster Bay, New York and is bounded on the north by Bethpage Sweethollow Road, on the west by Round Swamp Road and on the east by Winding Road. A concrete plant and the Nassau County Fireman's Training Center (NCFTC) are located along the southern border of the site. A large industrial park adjoins the northeastern border of the landfill and other significant industrial areas exist nearby to the north and west. These other industrial areas do not have common boundary with the landfill. However, they are sources of air pollutants that impact the area immediately surrounding the landfill. Therefore, several other potential sources contributing volatile organic compounds in the immediate and general vicinity of the landfill influence the concentrations being monitored by the Oyster Bay program.

To control landfill emissions, the OBSWDC has undergone significant changes over the past several years. The installation of a gas collection system along the perimeter of the landfill began in 1981 and a capping program was initiated in 1983. The capping program involved placing an impervious clay cap over the landfill. This program was completed in January, 1993. The gas collection system is scheduled for additional expansion in 1994. A thermal oxidizer was installed to combust the landfill gas collected

by the perimeter collection system. Also, a contractor is currently mining combustible gas from the landfill for energy production. All of these activities have and will continue to restrict the release of landfill gas from the OBSWDC and thereby reduce the level of air pollutant emissions related to the landfill.

As stipulated in the Consent Decree, soil gas pressure readings are performed on a quarterly basis at selected points around the OBSWDC. These values have been reported to the NYSDOL. The air emissions from the thermal oxidizer have also been tested on a quarterly and annual basis and these test results have been reported to the NYSDOL. The results have indicated that the thermal oxidizer emissions are all below the applicable ambient guideline concentrations as stipulated by the New York State Department of Environmental Conservation (NYSDEC).

2.0 ANALYSIS OF DATA

The established target compound list (TCL) for this study was based on the ability of the Volatile Organic Sampling Train (VOST) method developed by the United States Environmental Protection Agency (USEPA) to quantify various volatile organic compounds. The sampling train was modified slightly to make the unit portable for in-field use at the landfill. The sampling train and the sampling and analysis protocols along with all the details on data collection, analysis and other documentation are provided in the quarterly reports.

The sampling events were scheduled to observe concentrations during various seasons of the year with adjustments for weather conditions. As a conservative step, the sampling events took place during periods of falling atmospheric pressure. These periods would coincide with the greatest potential for releases of volatile organic compounds from the landfill. Sampling for each quarterly test occurred over a consecutive 24-hour period. Ambient monitoring during the first year of monitoring took place in July and October of 1990, February and May of 1991, and monitoring for the second year took place in October of 1992 and March, May and August of 1993.

The program target compound list is provided in Table 2.1 along with toxicity and guideline concentration values. The target compound list has been modified during the course of the monitoring effort because of changing state requirements, analytical capabilities, and continuing data review as related to the

TABLE 2.1

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES

VOC COMPOUND NAME	TOXICITY	CURRENT SGC (ug/m3)		CURRENT AGC (ug/m3)		FORMER AGC (ug/m3)
Benzene	H	30	(p)	0.12	(E,U)	100
Bromodichloromethane	H			0.02	(D)	0.03*
Bromoform	M	1,200	(t)	12	(T)	11.9*
Bromomethane						
Carbon Disulfide	M	710	(r)	7	(D)	100
Carbon Tetrachloride	H	1,300	(r)	0.07	(E,U)	100
Chlorobenzene	M	11,000	(p)	20	(E)	1,170
Chloroethane	L	630,000	(t)	63,000	(T)	52,000
Chloroform	M	980	(r)	23	(R)	167
Chloromethane	M	22,000	(d)	770	(D)	2,100
Dibromochloromethane	M			0.1	(D)	0.03*
Dibromomethane						
1,2-Dichlorobenzene (o)	M	30,000	(t)	200	(E)	1,000
1,3-Dichlorobenzene (m)	M	30,000	(a)	200	(A)	714*
1,4-Dichlorobenzene (p)	M*	110,000*		700*		
Dichlorodifluoromethane						
1,1-Dichloroethane	L	190,000	(t)	500	(E)	9,524*
1,2-Dichloroethane	M	950	(r)	0.039	(E,U)	0.2
1,1-Dichloroethene	H	2,000	(t)	0.02	(E,U)	66.7
trans-1,2-Dichloroethene	M			360	(D)	360*
1,2-Dichloropropane	M	83,000	(t)	0.15	(D)	833*
cis-1,3-Dichloropropene						
trans-1,3-Dichloropropene						
Ethylbenzene	M	100,000	(t)	1,000	(T)	1,450
Iodomethane						
Methylene Chloride	M	41,000	(t)	27	(D,U)	1,170
Styrene	M	51,000	(t)	510	(T)	716
1,1,2,2-Tetrachloroethane	M	1,600	(t)	0.02	(E,U)	23.2
Tetrachloroethene	M	81,000	(t)	1.2**	(D,U)	1,120
Toluene	L	89,000	(r)	2,000	(I)	7,500
1,1,1-Trichloroethane	L	450,000	(t)	1,000	(E)	38,000
1,1,2-Trichloroethane	M	13,000	(t)	0.06	(E,U)	150
Trichloroethene	M	33,000	(r)	0.45	(D,U)	900
Trichlorofluoromethane	L	560,000	(t)	700	(E)	
Vinyl Chloride	H	1,300	(t)	0.02	(E,U)	0.4
Xylenes (Total)	M	100,000	(t)	300	(I)	1,450***

TABLE 2.1
Continued

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

**PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES**

TENTATIVELY IDENTIFIED COMPOUNDS****	TOXICITY	CURRENT SGC (ug/m3)		CURRENT AGC (ug/m3)		FORMER AGC (ug/m3)
Acetone	L	140,000	(r)	14,000	(R)	35,600
Benzaldehyde						
2-Butanone	M	140,000	(t)	300	(E)	1967
2-Chloroethyl Vinyl Ether						
cis-1,2-Dichloroethene	M	190,000	(a)	1,900	(A)	1,880*
Freon 13	L	43,000	(a)	530	(A)	133,333*
2-Hexanone						
4-Methyl-2-Pentanone	M	48,000	(r)	480	(R)	683

FOOTNOTES:

SGC - Short-term guideline concentration (current as of June 1991).

AGC - Annual guideline concentration (current as of June 1991, former as of 1986, 9/89 Edition).

*Proposed Value.

**Tetrachloroethene AGC current as of November 22, 1991.

***1450 total for ortho and para xylenes and 1450 total for meta xylene.

****Tentatively Identified Compound (TIC) using EPA SW846 Method 8240. Six additional non-target compound GC/MS peaks with the largest analytical response were also targeted per VOST analysis.

Toxicity - H for High; M for moderate; and L for low by NYSDEC.

(a) - SGC based on NYSDEC structure-activity analogy.

(d) - SGC derived by NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(p) - SGC derived from proposed ACGIH TLV-TWA (1990-1991).

(r) - SGC derived from NIOSH REL-TWA (1988).

(t) - SGC derived from ACGIH TLV-TWA (1990-1991).

(A) - AGC based on NYSDEC structure-activity analogy.

(D) - AGC derived from NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(E) - AGC based on derivation by USEPA.

(I) - AGC based on RFC developed by USEPA - Integrated Risk Information System (IRIS), input pending.

(R) - AGC derived from NIOSH REL-TWA (1988).

(T) - AGC derived from ACGIH TLV-TWA (1990-1991).

(U) - AGC is the ambient air concentration which corresponds to an excess cancer risk of one in one million after lifetime exposure.

tentatively identified compounds being detected. The latest modification occurred during the analysis of the August 1993 sample runs. In general, the list continues to expand as more compounds are added to the standard method analyses list.

The monitoring program incorporates repositioning of sampling equipment to best define the contributions associated with the OBSWDC. Therefore, locations upwind of the complex can be compared directly to locations downwind of the complex to determine the impact of the OBSWDC on ambient concentrations.

Ambient air quality levels were monitored for a 24-hour period, at three locations downwind of the complex for the second year 1992 and 1993 sampling events. The downwind samplers have been identified by location as A2, A3 and A4. The three locations are relative positions. The samples labeled A2 and A3 are located at the same position. Sampler A2 is a high volume sampler versus sampler A3 which is a low volume sampler. High sampling rates in this program are used to improve minimum detection limits. Low sample volumes assure high concentration constituents do not invalidate an analysis. Sampler A4 is positioned along the side slope of the landfill, relative to the mean wind direction.

Table 2.2 provides data for the second year of monitoring at the A-2 sampling location. These data represent the total ambient air concentrations downwind of the landfill. The samples were collected over a 24-hour period using high sampling rates. The four independent 24-hour samples were averaged to provide an estimated annual average concentration for a location downwind of the complex. As shown, four compounds exceed current annual guideline concentrations (AGCs) specified by the NYSDEC.

Table 2.3 presents the 24-hour monitoring data for ambient air concentrations at the A1 sampler location that is positioned upwind of the complex during the second year, four quarters of testing. These values are combined to provide an average annual background concentration upwind of the landfill. These averages can be compared to the annual guideline concentrations provided by NYSDEC. As shown in Table 2.3, there are four compounds that exceed the current NYSDEC annual guideline concentrations.

A rough approximation of impact of the complex for an identified target compound can be estimated by subtracting the background concentration data presented in Table 2.3 from the value presented in Table

TABLE 2.2

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

LANDFILL AFFECTED AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE SAMPLE IDENTIFICATION*	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT AGC	FORMER AGC
	1A2	2A2	3A2	4A2	A2		
VOC COMPOUND NAME							
Benzene	1.59	1.38	0.523	0.298	1.59	0.12	100
Bromodichloromethane						0.02	0.03**
Bromoform						12	11.9**
Bromomethane							
Carbon Disulfide				0.269	0.269	7	100
Carbon Tetrachloride	0.422	0.358	0.191	0.218	0.297	0.07	100
Chlorobenzene						20	1,170
Chloroethane						63,000	52,000
Chloroform						23	167
Chloromethane	0.0745	1.22			0.647	770	2,100
Dibromochloromethane						0.1	0.03**
1,2-Dichlorobenzene (o)				0.163	0.163	200	1,000
1,3-Dichlorobenzene (m)	0.147				0.147	200	714**
1,4-Dichlorobenzene (p)		0.284	0.271		0.278	700**	
1,1-Dichloroethane						500	9,524**
1,2-Dichloroethane						0.039	0.2
1,1-Dichloroethene						0.02	66.7
trans-1,2-Dichloroethene						360	360**
1,2-Dichloropropane	0.0500				0.0500	0.15	833**
cis-1,3-Dichloropropene							
trans-1,3-Dichloropropene							
Ethylbenzene	1.18	1.52	0.824	0.173	0.924	1,000	1,450
Methylene Chloride	0.461	1.83	0.432	0.203	0.732	27	1,170
Styrene						510	716
1,1,2,2-Tetrachloroethane						0.02	23.2
Tetrachloroethene	1.37	3.35	1.11	0.731	1.54	1.2	1,120
Toluene	0.843	9.41	6.05	1.96	4.57	2,000	7,500
1,1,1-Trichloroethane	1.26	1.93	0.553	0.385	1.03	1,000	38,000
1,1,2-Trichloroethane						0.06	150
Trichloroethene	0.206	1.52	0.111		0.612	0.45	900
Trichlorofluoromethane	1.04	1.62	1.16	1.31	1.28	700	
Vinyl Chloride						0.02	0.4
Xylenes (Total)	1.27	8.22	4.12	1.58	3.80	300	1,450

Notes:

Concentrations are in micrograms per cubic meter.

Shaded areas indicate concentrations that exceed the absolute value of the standard.

For further clarification see footnotes in Appendix A.

* Sample identification format: 1A2=first quarter sample at sampler A2.

** Proposed value.

TABLE 2.3

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

BACKGROUND AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE SAMPLE IDENTIFICATION*	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT	FORMER
	1A1	2A1	3A1	4A1	A1	AGC	AGC
VOC COMPOUND NAME							
Benzene	1.52	3.12	0.667	0.242	1.39	0.12	100
Bromodichloromethane						0.02	0.03**
Bromoform						12	11.9**
Bromomethane							
Carbon Disulfide		0.0302			0.0302	7	100
Carbon Tetrachloride	0.41	0.402	0.219	0.222	0.313	0.07	100
Chlorobenzene						20	1,170
Chloroethane						63,000	52,000
Chloroform						23	167
Chloromethane	0.0686	2.21			1.14	770	2,100
Dibromochloromethane						0.1	0.03**
1,2-Dichlorobenzene (o)						200	1,000
1,3-Dichlorobenzene (m)	0.238				0.238	200	714**
1,4-Dichlorobenzene (p)		0.402	0.305		0.354	700**	
1,1-Dichloroethane						500	9,524**
1,2-Dichloroethane						0.039	0.2
1,1-Dichloroethene						0.02	66.7
trans-1,2-Dichloroethene						360	360**
1,2-Dichloropropane	0.0476				0.0476	0.15	833**
cis-1,3-Dichloropropene							
trans-1,3-Dichloropropene							
Ethylbenzene	0.790	1.51	0.952		1.08	1,000	1,450
Methylene Chloride	0.305	2.21	0.619		0.462	27	1,170
Styrene						510	716
1,1,2,2-Tetrachloroethane						0.02	23.2
Tetrachloroethene	1.71	3.82	1.90	0.605	2.01	1.2	1,120
Toluene	0.781	1.71	6.57	1.53	2.65	2,000	7,500
1,1,1-Trichloroethane	1.24	2.21	0.686	0.333	1.12	1,000	38,000
1,1,2-Trichloroethane						0.06	150
Trichloroethene	0.229	2.01	0.114		0.784	0.45	900
Trichlorofluoromethane	0.819	1.91	1.05	0.787	1.14	700	
Vinyl Chloride						0.02	0.4
Xylenes (Total)	2.57	4.02	4.95	1.03	3.14	300	1,450

Notes:

Concentrations are in micrograms per cubic meter.

Shaded areas indicate concentrations that exceed the absolute value of the standard.

For further clarification, see footnotes in Appendix A.

* Sample identification format: 1A1= first quarter at sampler A1.

** Proposed value.

2.2. The results for benzene indicate that the complex impact is 0.21 micrograms per cubic meter or approximately two times the annual guideline concentration. The other constituents do not have significant differential impacts and downwind values are lower than their respective upwind values. Values generally decrease as the distance from the respective source of the detected compounds increase. The rate of the diffusion cannot be approximated until the other specific sources of these compounds are defined.

Table 2.4 presents the non-target (tentatively identified) compounds identified at Sampler A-2. Table 2.5 identifies non-target compounds at sampler A-1. These tables also provide annual average concentrations for identified non-target compounds. As shown, the concentrations downwind of the complex for ethylmethylbenzene are well in excess of current annual guideline concentrations even after the background values have been removed. In addition, there are several more compounds that were tentatively identified downwind of the complex that were not identified in the background sampler.

The other data that was collected during the four test efforts during the second year of monitoring are presented in Appendix A. The ambient air sampler A-3 located along side the downwind sampler A-2 recorded concentrations that were generally higher than those recorded at A-2. The reason for this difference is probably attributed to constituent bypass in the high volume samples, since significant breakthrough was identified in the A-2 sample for the third quarterly test effort. To investigate the differences further, a set of SUMMA[®] canister samples were collected at the downwind A-2/A-3 location during the fourth quarter. For compounds identified by both the canister and the sorbent trap methods, the canister values generally fall in between the high and low volume results. Unfortunately, the detection level of the canister is limited, and therefore, a direct comparison is difficult. The results tend to confirm that the canister method is not as appropriate for this sampling program as the sorbent trap method. Most notable was the absence of carbon tetrachloride and tetrachloroethene in the canister analysis while these compounds were easily detected by the sorbent traps. More data should be collected using canisters to verify the values obtained to date since the EPA has been moving towards canister methods for ambient programs. As indicated by the data collected to date, several significant compounds would have gone undetected using the canister.

This second year of sampling provides further data on the ambient volatile organic compound concentrations in the vicinity of the complex for both ambient air and soil gas. In addition, data during

TABLE 2.4

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

OTHER LANDFILL AFFECTED AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT AGC	FORMER AGC
	1A2	2A2	3A2	4A2			
VOC COMPOUND NAME							
Acetone		0.203		0.225	0.214	14,000	35,600
Benzaldehyde							
2-Butanone	0.0735	0.812			0.443	300	1,967
2-Chloroethyl Vinyl Ether							
cis-1,2-Dichloroethene						1,900	1880**
Dichlorodifluoromethane			2.77	0.875	1.82		
Freon 13						530	133,333**
2-Hexanone							
4-Methyl-2-Pentanone						480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT AGC	FORMER AGC
	1A2	2A2	3A2	4A2			
VOC COMPOUND NAME							
2,3-Dihydro-1H-Indene							
2,5-Dimethylhexane							
4,6-Dimethylundecane	0.863				0.863		
2-Ethylhexanal				0.189	0.189		
Ethylmethylbenzene Isomer	3.28***	5.99***	3.72	0.885	2.30	0.1	0.03
Freon 113			0.121		0.121	90,000	90,476**
Hexachloroethane							
Hexane	0.480				0.480	420	
Methyl (methylene) Cyclohexene		0.0274			0.0274		
Methylcyclopentane	0.186				0.186	8,300	8,333**
(1-Methylethyl)Benzene							
2-Methylheptane							
2-Methylpentane	0.333				0.333	830	
2-Methylhexane							
3-Methylpentane	1.37				1.37		
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.784			0.318	0.551	90,000	90,476**
Trimethylbenzene Isomer			1.91	0.760	1.34		
Undecane							

Notes:

Concentrations are in micrograms per cubic meter.

Shaded areas indicate concentrations that exceed the absolute value of the standard.

For further clarification see footnotes in Appendix A.

* Sample identification format: 1A2=first quarter sample at sampler A2.

** Proposed value.

***Tentatively identified total (m,o,p) ethylmethylbenzene isomers. These values have not been included in the annual average.

TABLE 2.5

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

OTHER BACKGROUND AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT AGC	FORMER AGC
	1A1	2A1	3A1	4A1	A2		
VOC COMPOUND NAME							
Acetone		0.894		0.192	0.543	14,000	35,600
Benzaldehyde							
2-Butanone	0.0952	0.784			0.440	300	1,967
2-Chloroethyl Vinyl Ether							
cis-1,2-Dichloroethene						1,900	1,880**
Dichlorodifluoromethane			0.762		0.762		
Freon 13						530	133,333**
2-Hexanone							
4-Methyl-2-Pentanone		0.181	0.143		0.162	480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT AGC	FORMER AGC
	1A1	2A1	3A1	4A1	A2		
VOC COMPOUND NAME							
2,3-Dihydro-1H-Indene	0.514				0.514		
2,5-Dimethylhexane	0.495				0.495		
4,5-Dimethylundecane							
2-Ethylhexanal							
Ethylmethylbenzene Isomer	2.57***	5.13***	3.14	0.464	1.80	0.1	0.03
Freon 113			1.62		1.62	90,000	90,476
Hexachloroethane							
Hexane						420	
Methyl (methylethenyl) Cyclohexene							
Methylcyclopentane						8,300	8,333
(1-Methylethyl)Benzene							
2-Methylheptane							
2-Methylpentane						830	
2-Methylhexane	0.886				0.886		
3-Methylpentane							
1,1,2-Trichloro-1,2,2-Trifluoroethane						90,000	90,476
Trimethylbenzene isomer			2.29	0.333	1.31		
Undecane							

Notes:

Concentrations are in micrograms per cubic meter.

Shaded areas indicate concentrations that exceed the absolute value of the standard.

For further clarification, see footnotes in Appendix A.

* Sample identification format: 1A1= first quarter at sampler A1.

** Proposed value.

***Tentatively identified total (m,o,p) ethylmethylbenzene isomers. These values have not been included in the annual average.

the second year of sampling included pressure tests at various locations around the landfill. A comparison between the first and second year results show several areas of agreement, however, there are several notable differences. In general, the tests continue to confirm that benzene, tetrachloroethene, and trichloroethene concentrations are consistently over the NYSDEC ambient annual guideline values. Several other compounds observed during the first year test effort continue to appear, however at slightly lower concentration values. This net difference or decrease may in part be attributed to the capping of the landfill which was completed in January 1993. However, only three quarters of data are available for the completely capped landfill.

The exceptions and new findings are also significant. Observed levels of ethylmethylbenzene are above the ambient guideline values downwind of the landfill. This compound was recently added to the target compound list because research into the NYSDEC guidelines indicated a differentiation between isomers was required to determine if a concentration recorded at a site was in excess of the guideline. The work indicated that combined ortho and para ethylmethylbenzene isomers were reported at levels exceeding the state guidelines.

Soil gas concentrations of target constituents were also observed during the second year of testing. The soil gas concentrations observed during the second year have been presented in the quarterly reports and are reproduced in Appendix B. The observed concentrations for several compounds are in excess of the levels of ambient air guideline values specified by the NYSDEC. However, these are soil gas concentrations, and therefore, should not be compared to breathing zone guidelines. Soil gas concentrations as reported should dissipate rapidly upon entering the atmosphere.

A comparison of these data with data recorded during the first year of testing indicates many similarities. One notable exception is carbon disulfide which was identified in the first year of testing but was detected in only a few samples the second year. At present, there does not appear to be a reason for this change. The capping of the landfill should improve the soil gas collection efficiency if current extraction systems that are in place are operating. Unfortunately, only three data points were available after the capping of the landfill was completed so it was difficult to determine if a substantial decrease in gas release rates to the atmosphere had occurred.

Soil gas pressure measurements were also made during the second year of testing as prescribed in the Consent Order. The soil gas reading shows that a negative pressure gradient is being maintained at the observation points. As stated in the quarterly reports some effort should be placed into repairing or replacing one of the probes (PW2, 10 foot level) because of consistently zero pressure differentials.

3.0 SUMMARY AND CONCLUSION

In summary, the second year of collecting data on ambient air and soil gas volatile organic compound concentration and soil gas pressure readings was completed according to the monitoring plan which is in conformance with the Order of Consent. The data indicates that several compounds, most notably benzene, carbon tetrachloride, tetrachloroethene, trichloroethene, and ethylmethylbenzene have ambient air concentrations in excess of their respective state annual guideline concentrations. The benzene and combined ortho and para ethylmethylbenzene isomer values are in excess of the guideline value even though upwind or background concentration values are taken into account. Also, the ethylmethylbenzene (ortho and para) isomer concentrations identified in the last two quarters were not individually identified in the first two quarters of the second year, since ethylmethylbenzene was tentatively identified. As a tentatively identified compound, ethylmethylbenzene was detected during the last quarter of the first year of testing.

The analysis conducted in the second year also concentrated on refining the sampling techniques. To that end, canister samples were taken during the fourth quarter tests and these show some significant differences to samples taken using previously approved methods. The difference in sample loading volumes and a sample breakthrough analysis was also added to the sampling strategy. These efforts indicated that the canister methods, which are currently being promoted by the EPA, have severe limitations with respect to level of detection. This is particularly true for carbon tetrachloride and tetrachloroethene, both of which were not detected by the canister, however, using the approved modified VOST sampling technique both reported values were in excess of the state guideline values.

The program for monitoring volatile organic compounds in the vicinity of the landfill was designed and implemented prior to recent guidance documents on conducting air pathway analyses that has been issued by the NYSDEC and USEPA. Certain modifications to the monitoring program have been made as analytical capabilities have improved in order to keep the program current. In that recent guidance has

been issued (NYSDEC, August 20, 1993) for conducting air pathway analyses it would be appropriate to review the guidance and to determine what program modifications would be appropriate. The proposed program modifications can then be discussed with appropriate regulatory staff and upon consensus the program modifications, if any, can be implemented. The new guidance is based on Section 114(a) (D) of the Clean Air Act which provides a general direction on sampling emissions. The NYSDEC has taken those provisions and developed standard procedures and guideline documents that allow for a variety of techniques for measuring and evaluating air emissions, soil vapor surveys and meteorology. Those proposed changes should be incorporated into any further sampling and analysis programs.

In conclusion, the data base that has been accumulated to date is primarily for an uncapped landfill. Data collected since capping was completed is limited and needs to be verified by more sampling, especially since concentrations continue to be monitored in excess of ambient guideline values. Furthermore, the target compound list has been expanded because of continuing reviews of tentatively identified compounds being detected and enhanced analytical procedures. Therefore, compounds have been added to the target compound list. These compounds can be significant as illustrated by ethylmethylbenzene which is in excess of the current state annual guideline concentration. Based on the above, it appears prudent to continue the ambient air testing in the vicinity of the complex using the procedures currently available to address the above unresolved issues.

APPENDIX A
AMBIENT AIR CONCENTRATION DATA

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, First Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE SAMPLE IDENTIFICATION*	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	FB	TB		
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)			
Acetone							14,000	35,600
Benzene	1.62	1.69	2.29	1.51			0.12	100
Bromodichloromethane							0.02	0.03**
Bromoform							12	11.9**
Bromomethane								
2-Butanone	0.0952	0.0735		0.179			300	1,967
Carbon Disulfide							7	100
Carbon Tetrachloride	0.41	0.422		0.395			0.07	100
Chlorobenzene							20	1,170
Chloroethane							63,000	52,000
Chloroform							23	167
Chloromethane	0.0686	>0.0745		>0.132			770	2,100
Dibromochloromethane							0.1	0.03**
1,2-Dichlorobenzene (o)							200	1,000
1,3-Dichlorobenzene (m)	0.238	0.147		0.189			200	714**
1,4-Dichlorobenzene (p)							700**	
1,1-Dichloroethane							500	9,524**
1,2-Dichloroethane							0.039	0.2
1,1-Dichloroethene							0.02	66.7
trans-1,2-Dichloroethene							360	360**
1,2-Dichloropropane	0.0476	0.0500		0.0462			0.15	833**
cis-1,3-Dichloropropene								
trans-1,3-Dichloropropene								
Ethylbenzene	0.790	1.18		0.830			1,000	1,450
2-Hexanone								
4-Methyl-2-Pentanone							480	683
Methylene Chloride	0.305	0.461		0.368			27	1,170
Styrene							510	716
1,1,2,2-Tetrachloroethane							0.02	23.2
Tetrachloroethene	1.71	1.37	2.10	1.51			0.075	1,120
Toluene	>0.781	0.843	6.67	>0.698			2,000	7,500
1,1,1-Trichloroethane	1.24	1.26	3.05	1.23			1,000	38,000
1,1,2-Trichloroethane							0.06	150
Trichloroethene	0.229	0.206	4.10	0.217			0.45	900
Trichlorofluoromethane	0.819	1.04		0.840			700	
Vinyl Chloride							0.02	0.4
Xylenes (Total)	>2.57	>1.27	4.29	1.42			300	1,450

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, First Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	FB	TB		
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)			
Benzaldehyde								
2-Chloroethyl Vinyl Ether								
cis-1,2-Dichloroethene							1,900	1,880**
Freon 13							530	133,333**
Vinyl Acetate								

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	FB	TB		
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)			
2,3-Dihydro-1H-Indene	0.514							
2,5-Dimethylhexane	0.495							
4,6-Dimethylundecane		0.863						
Hexane		0.48		1.51			420	
Methylcyclopentane		0.186					8,300	8333**
(1-Methylethyl)Benzene			0.924					
2-Methylheptane				0.434				
2-Methylpentane		0.333					830	
2-Methylhexane	0.886			0.934				
3-Methylpentane		1.37	4.38					
1,1,2-Trichloro-1,2,2-Trifluoroethane		0.784					90,000	90,476**

*Sample Identification: (see Figure 2.1)

A1: High volume ambient upwind sample collected at the Battle Row Campground

A2: High volume ambient downwind sample collected 50 feet southwest of well M5

A3: Low volume ambient downwind (A2 duplicate) sample collected 50 feet southwest of well M5

A4: High volume ambient downwind sample collected 100 feet south of well M39.

FB: Field Blank

TB: Trip Blank

**Proposed Value.

All values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Shaded in values exceed current (as of 6/91) and/or previous AGC value.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.0190 ug/m3

A2 = 0.0196 ug/m3

A3 = 1.90 ug/m3

A4 = 0.0189 ug/m3

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE SAMPLE IDENTIFICATION*	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	FB	TB		
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)			
Benzene	3.12	3.85	5.07	3.49			0.12	100
Bromodichloromethane							0.02	0.03**
Bromoform							12	11.9**
Bromomethane								
Carbon Disulfide	0.0302						7	100
Carbon Tetrachloride	0.402	0.355	1.10	0.391			0.07	100
Chlorobenzene							20	1,170
Chloroethane							63,000	52,000
Chloroform							23	167
Chloromethane	2.21	1.22	2.64	1.23			770	2,100
Dibromochloromethane							0.1	0.03**
1,2-Dichlorobenzene (o)							200	1,000
1,3-Dichlorobenzene (m)							200	714**
1,4-Dichlorobenzene (p)	0.402	0.284	0.573	0.298			700**	
1,1-Dichloroethane							500	9,524**
1,2-Dichloroethane							0.039	0.2
1,1-Dichloroethene							0.02	66.7
trans-1,2-Dichloroethene							360	360**
1,2-Dichloropropane							0.15	833**
cis-1,3-Dichloropropene								
trans-1,3-Dichloropropene								
Ethylbenzene	1.51	1.52	1.54	1.13			1,000	1,450
Methylene Chloride	2.21	1.83	2.86	1.85			27	1,170
Styrene			0.319				510	716
1,1,2,2-Tetrachloroethane							0.02	23.2
Tetrachloroethene	3.82	3.35	3.63	3.29			1.2***	1,120
Toluene	>1.71	9.41	11.0	8.12			2,000	7,500
1,1,1-Trichloroethane	2.21	1.93	6.61	2.06			1,000	38,000
1,1,2-Trichloroethane							0.06	150
Trichloroethene	2.01	1.52	1.76	2.36			0.45	900
Trichlorofluoromethane	1.91	1.62	1.76	1.85			700	
Vinyl Chloride							0.02	0.4
Xylenes (Total)	>4.02	>8.22	9.69	7.50			300	1,450

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE SAMPLE IDENTIFICATION*	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	FB	TB		
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)			
Acetone	0.894	0.203	1.98	0.678			14,000	35,600
Benzaldehyde								
2-Butanone	0.784	0.812	2.09	0.843			300	1,967
2-Chloroethyl Vinyl Ether								
cis-1,2-Dichloroethene							1,900	1,880**
Freon 13							530	133,333**
2-Hexanone								
4-Methyl-2-Pentanone	0.181		0.231				480	683
Vinyl Acetate								

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE SAMPLE IDENTIFICATION*	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	FB	TB		
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)			
Methyl (methylethenyl) Cyclohexene		0.0274						
Hexane				1.85			420	

*Sample Identification: (see Figure 2.1)

A1: High volume ambient upwind sample collected at the Battle Row Campground

A2: High volume ambient downwind sample collected 20 feet southwest of the southeast landfill gate.

A3: Low volume ambient downwind (A2 duplicate) sample collected 20 feet southwest of the southeast landfill gate.

A4: High volume ambient downwind sample collected 250 feet south of well M39.

FB: Field Blank

TB: Trip Blank

**Proposed Value.

***Current AGC for tetrachloroethene as of November 1991.

All values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Shaded in values exceed the level of the current (as of June 1991 or November 1991 for tetrachloroethene) and/or previous AGC values.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.0201 ug/m3

A2 = 0.203 ug/m3, 0.0203 ug/m3 for back trap (break through analysis).

A3 = 0.220 ug/m3

A4 = 0.226 ug/m3

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE SAMPLE IDENTIFICATION*	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	FB	TB		
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)			
Benzene	0.667	0.523	2.29	NA			0.12	100
Bromodichloromethane				NA			0.02	0.03**
Bromoform				NA			12	11.9**
Bromomethane				NA				
Carbon Disulfide				NA			7	100
Carbon Tetrachloride	0.219	0.191	0.509	NA			0.07	100
Chlorobenzene				NA			20	1,170
Chloroethane				NA			63,000	52,000
Chloroform				NA			23	167
Chloromethane			175***	NA			770	2,100
Dibromochloromethane				NA			0.1	0.03**
Dibromomethane				NA				
1,2-Dichlorobenzene (o)				NA			200	1,000
1,3-Dichlorobenzene (m)				NA			200	714**
1,4-Dichlorobenzene (p)	0.305	0.271	0.342	NA			700**	
Dichlorodifluoromethane	0.762	2.77	7.02	NA				
1,1-Dichloroethane				NA			500	9,524**
1,2-Dichloroethane				NA			0.039	0.2
1,1-Dichloroethene				NA			0.02	66.7
trans-1,2-Dichloroethene				NA			360	360**
1,2-Dichloropropane				NA			0.15	833**
cis-1,3-Dichloropropene				NA				
trans-1,3-Dichloropropene				NA				
Ethylbenzene	0.952	0.824	0.965	NA			1,000	1,450
Iodomethane				NA				
Methylene Chloride	0.619	0.432	0.737	NA			27	1,170
Styrene				NA			510	716
1,1,2,2-Tetrachloroethane				NA			0.02	23.2
Tetrachloroethene	1.90	1.11	1.32	NA			1.2****	1,120
Toluene	6.57	6.05	4.30	NA			2,000	7,500
1,1,1-Trichloroethane	0.686	0.553	1.58	NA			1,000	38,000
1,1,2-Trichloroethane				NA			0.06	150
Trichloroethene	0.114	0.111	0.316	NA			0.45	900
Trichlorofluoromethane	1.05	1.16	2.11	NA			700	
Vinyl Chloride				NA			0.02	0.4
Xylenes (Total)	4.95	4.12	4.82	NA			300	1,450

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	FB	TB		
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)			
Acetone				NA			14,000	35,600
Benzaldehyde				NA				
2-Butanone			0.184	NA			300	1,967
2-Chloroethyl Vinyl Ether				NA				
cis-1,2-Dichloroethene				NA			1,900	1,880**
Freon 13				NA			530	133,333**
2-Hexanone				NA				
4-Methyl-2-Pentanone	0.143			NA			480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	FB	TB		
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)			
Ethylmethylbenzene Isomer	3.14	3.72	2.46	NA			0.1	0.03**
Freon 113	1.62	0.121		NA			90,000	90,476**
Hexachloroethane			1.58	NA				
Trimethylbenzene Isomer	2.29	1.91		NA			290	
Undecane			2.02	NA				

*Sample Identification: (see Figure 2.1)

A1: High volume ambient upwind sample collected at the Battle Row Campground (50 feet west and 30 feet south of the southeast campground gate).

A2: High volume ambient downwind sample collected 20 feet southwest of the southeast landfill gate.

A3: Low volume ambient downwind (A2 duplicate) sample collected 20 feet southwest of the southeast landfill gate.

A4: High volume ambient downwind sample collected 220 feet south of well M39.

FB: Field Blank

TB: Trip Blank

**Proposed Value.

***Suspect data (see text).

****Current ambient air Annual Guideline Concentration (AGC) for tetrachloroethene as of November 1991.

NA - Value not available for A4. The A4 sampling train malfunctioned during the test and therefore the samples from A4 were not analyzed.

All values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Shaded in values exceed the level of the current (as of June 1991 or November 1991 for tetrachloroethene) and/or previous AGC values.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.0952 ug/m3

A2 = 0.101 ug/m3, 0.0201 ug/m3 for back trap (break through analysis).

A3 = 0.175 ug/m3

A4 = NA

FB = 20 ng

TB = 20 ng

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Fourth Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE SAMPLE IDENTIFICATION(1) VOC COMPOUND NAME	24-HR AMBIENT AIR SAMPLE					BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1 (ug/m3)	A2 (ug/m3)	A3 (ug/m3)	A4 (ug/m3)	Canister (ug/m3)	FB	TB (ng)		
Benzene	<0.242	<0.289	1.28	<0.298	<0.733			0.12	100
Benzyl chloride (4)								0.02	16.7
Bromodichloromethane					NA			0.02	0.03(2)
Bromoform					NA			12	11.9(2)
Bromomethane									
Carbon Disulfide		<0.269			NA			7	100
Carbon Tetrachloride	<0.222	<0.218	0.668	<0.187				0.07	100
Chlorobenzene								20	1,170
Chloroethane								63,000	52,000
Chloroform								23	167
Chloromethane			2.07		0.715			770	2,100
3-Chloropropene (4)								7.1	10
Dibromochloromethane					NA			0.1	0.03(2)
1,2-Dibromoethane (4)								0.004	0.002
1,2-Dichlorobenzene (o)		<0.163						200	1,000
1,3-Dichlorobenzene (m)								200	714(2)
1,4-Dichlorobenzene (p)								700(2)	
Dichlorodifluoromethane (4)		<0.875			1.51				
1,1-Dichloroethane								500	9,524(2)
1,2-Dichloroethane								0.039	0.2
1,1-Dichloroethene								0.02	66.7
trans-1,2-Dichloroethene					NA			360	360(2)
1,2-Dichloropropane								0.15	833(2)
cis-1,3-Dichloropropane									
trans-1,3-Dichloropropane									
1,2-Dichloro-1,1,2,2-tetrafluoroethane (4)									
Ethylbenzene		<0.173		<0.140				1,000	1,450
1-Ethyl-2-methylbenzene					NA				
1-Ethyl-4-methylbenzene	<0.464	<0.885	0.763	<0.832	NA			0.1	0.03(2)
Hexachlorobutadiene (4)								0.05	0.8
Methylene Chloride		<0.203	0.450		<1.01			27	1,170
Styrene								510	716
1,1,2,2-Tetrachloroethane								0.02	23.2
Tetrachloroethene	<0.605	<0.731	0.826	<0.720				1.2(3)	1,120
Toluene	<1.53	<1.96	2.31	<2.26	<1.65			2,000	7,500
1,2,4-Trichlorobenzene (4)								9	133
1,1,1-Trichloroethane	<0.333	<0.385	1.14	<0.308	<1.09			1,000	38,000
1,1,2-Trichloroethane								0.06	150
Trichloroethene								0.45	900
Trichlorofluoromethane	<0.787	<1.31	5.10	<0.495	1.23			700	
1,1,2-Trichloro-1,2,2-trifluoroethane (4)		<0.318						90,000	90,476(2)
1,2,4-Trimethylbenzene (4)								290	
1,3,5-Trimethylbenzene (4)									
Vinyl Chloride								0.02	0.4
Xylenes (Total)	<1.03	<1.58	1.58	<1.42				300	1450(5)

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Fourth Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE					BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	Canister (ug/m3)	FB	TB		
VOC COMPOUND NAME	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ng)			
Acetone	<0.192	<0.225		<0.185	NA			14,000	35,600
Benzaldehyde					NA				
2-Butanone			0.802		NA			300	1,967
2-Chloroethyl Vinyl Ether					NA				
cis-1,2-Dichloroethene								1,900	1,880(2)
Freon 13					NA			530	133,333(2)
2-Hexanone					NA				
4-Methyl-2-Pentanone					NA			480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE					BLANK		CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
	A1	A2	A3	A4	Canister (ug/m3)	FB	TB		
VOC COMPOUND NAME	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ng)			
1,2,3-Trimethylbenzene	<0.333	<0.760		<0.879	NA				
2-Ethylhexanal		<0.189			NA				

(1) See Figure 2.1 for ambient air and soil gas sampling locations

A1: High volume ambient upwind sample collected 6 feet south of property line to golf course, 90 feet west of Round Swamp Road.

A2: High volume ambient downwind sample collected 180 feet southwest of the Air Stripper tower.

A3: Low volume ambient downwind (A2 duplicate) sample collected 180 feet southwest of the Air Stripper tower.

A4: High volume ambient downwind sample collected 100 feet north northwest of well M5.

FB: Field Blank

TB: Trip Blank

(2) Proposed Value.

(3) Current ambient air Annual Guideline Concentration (AGC) for tetrachloroethene as of November 1991.

(4) Ten of the SUMMA target compounds were not VOST target compounds therefore, reported values for any of the VOCs in the VOST analyses are provided as tentatively identified (see A2 dichlorodifluoromethane and 1,1,2-trichloro-1,2,2-trifluoroethane).

(5) 1450 total for ortho and para xylenes and 1450 total for meta xylene.

NA - Because of the Target Compound List discrepancy between the VOST and SUMMA canister methodologies some VOCs reported for VOST were not available (NA) for the SUMMA canister samples.

All blank values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Field and trip blanks apply only to VOST samples.

Shaded in values exceed the level of the current (as of June 1991 or November 1991 for tetrachloroethene) and/or previous AGC values.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.128 ug/m3

A2 = 0.154 ug/m3

A3 = 0.243 ug/m3

A4 = 0.131 ug/m3

Canister = 0.2 ppbv or 1.01 ug/m3 (@ <MW>=123)

FB = 20 ng

TB = 20 ng

APPENDIX B
SOIL GAS CONCENTRATION DATA

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
Second Year, First Quarter

SOIL GAS VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former	
LOWER QUANTITATION LIMIT	2.34	2.31	2.31	2.31	27.6	2.30	23.0	2.30	2.30	2.30	2.30	2.30	2.30	20.7	2.31	2.30	2.30	2.30	AGC	AGC	
VOC COMPOUND NAME																					
Benzaldehyde																					
2-Chloroethyl Vinyl Ether																				1,900	1,860*
cis-1,2-Dichloroethene																				530	133,333*
Freon 13																					
Vinyl Acetate																					

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former	
LOWER QUANTITATION LIMIT	2.34	2.31	2.31	2.31	27.6	2.30	23.0	2.30	2.30	2.30	2.30	2.30	2.30	20.7	2.31	2.30	2.30	2.30	AGC	AGC	
VOC COMPOUND NAME																					
**																					
Limonene												2.76							32.2		
2-Methylbutane		85.5							60.8							66.7			8,300		8,333
3-Methyl-5-Propylnonane																	3.80				
alpha-Pinene												8.74	53.2								
2,2,5,5- Tetramethylhexane				2.54															25.3		

All values are report in micrograms per cubic meter (ug/m3).
All blank values are less than the lower quantitation limit reported for each sample.
Values in shaded areas exceed current (as of 6/91) and/or previous AGC values.

*Proposed Value

**2,2-Dimethyl-3-Methylenebicyclo[2.2.1] heptane

OLD BETHPAGE LANDFILL
 OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
 Second Year, Second Quarter
 SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1 2.18	M2 2.17	M4 2.17	M5 2.11	M6 2.16	M9(10) 2.09	M9(20) 2.15	M9(30) 2.14	M9(40) 2.14	M13 2.15	M16 2.14	M21 2.11	M22 2.11	M28 27.6	M31 2.12	M34 2.13	M37 2.14	M39 2.24	Current AGC	Former AGC
VOC COMPOUND NAME																				
Benzene					2.48								2.32						0.12	100
Bromodichloromethane																			0.02	0.03*
Bromoform																			12	11.9
Bromomethane																				
Carbon Disulfide																			7	100
Carbon Tetrachloride																			0.07	100
Chlorobenzene																			20	1,170
Chloroethane																			63,000	52,000
Chloroform														2.42					23	167
Chloromethane																			770	2,100
Dibromochloromethane																			0.1	0.03*
1,2-Dichlorobenzene (o)																			200	1,000
1,3-Dichlorobenzene (m)																			200	714*
1,4-Dichlorobenzene (p)																			700*	
1,1-Dichloroethane																			500	9,524*
1,2-Dichloroethane																			0.039	0.2
1,1-Dichloroethene																			0.02	66.7
trans-1,2-Dichloroethene																			360	360*
1,2-Dichloropropane																			0.15	833*
cis-1,3-Dichloropropene																				
trans-1,3-Dichloropropene																				
Ethylbenzene																			1,000	1,450
Methylene Chloride																			27	1,170
Styrene																			510	716
1,1,2,2-Tetrachloroethane																			0.02	23.3
Tetrachloroethene							2.47	2.98	2.88	3.98			2.11						1.2**	1,120
Toluene													5.27						2,000	7,500
1,1,1-Trichloroethane	2.29			2.63						2.37	3.22	2.11	3.48				2.14	2.68	1,000	38,000
1,1,2-Trichloroethane																			0.06	150
Trichloroethene																			0.45	900
Trichlorofluoromethane											3.43								700	
Vinyl Chloride																			0.02	0.40
Xylenes (Total)																			300	1,450*

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

SOIL GAS VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former	
LOWER QUANTITATION LIMIT	2.18	2.17	2.17	2.11	2.16	2.09	2.15	2.14	2.14	2.15	2.14	2.11	2.11	27.6	2.12	2.13	2.14	2.24	AGC	AGC	
VOC COMPOUND NAME																					
Acetone																			14,000	35,600	
Benzaldehyde																					
2-Butanone																	8.39		300	1,967	
2-Chloroethyl Vinyl Ether																					
cis-1,2-Dichloroethene																			1,900	1,880*	
Freon 13																			530	133,333*	
2-Hexanone																					
4-Methyl-2-Pentanone																			480	683	
Vinyl Acetate																					

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former	
LOWER QUANTITATION LIMIT	2.18	2.17	2.17	2.11	2.16	2.09	2.15	2.14	2.14	2.15	2.14	2.11	2.11	27.6	2.12	2.13	2.14	2.24	AGC	AGC	
VOC COMPOUND NAME																					
alpha-Pinene					238																
***					48.6																
Dimethyloctene												2.11									
(1-Methylethyl) benzene													2.95								

All values are report in micrograms per cubic meter (ug/m3).

All blank values are less than the lower quantitation limit reported for each sample.

Values in shaded areas exceed the level of the current (as of 6/91 or 11/91 for Tetrachloroethene) and/or previous AGC values.

*Proposed Value

**Current AGC for Tetrachloroethene as of November 1991.

***1,7,7-Trimethylbicyclo[2.2.1] hept-2-ene

OLD BETHPAGE LANDFILL
 OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
 Second Year, Third Quarter
 SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current AGC	Former AGC
LOWER QUANTITATION LIMIT	2.29	11.1	2.27	2.24	2.20	2.27	2.18	2.23	2.21	2.29	2.23	2.21	2.51	2.23	2.18	2.13	2.18	2.21		
VOC COMPOUND NAME																				
Benzene																			0.12	100
Bromodichloromethane																			0.02	0.03*
Bromoform																			12	11.9
Bromomethane																			7	100
Carbon Disulfide																			0.07	100
Carbon Tetrachloride																			20	1,170
Chlorobenzene																			63,000	52,000
Chloroethane														2.34					23	167
Chloroform																			770	2,100
Chloromethane																			0.1	0.03*
Dibromochloromethane																				
Dibromomethane																			200	1,000
1,2-Dichlorobenzene (o)																			200	714*
1,3-Dichlorobenzene (m)																			700*	
1,4-Dichlorobenzene (p)																				
Dichlorodifluoromethane	2.75					3.40	8.18	12.3	2.32					4.12			17.4			
1,1-Dichloroethane									3.31										500	9,524*
1,2-Dichloroethane						18.3	17.4	5.25											0.039	0.2
1,1,1-Trichloroethane																			0.02	66.7
trans-1,2-Dichloroethene																			360	360*
1,2-Dichloropropane																			0.15	833*
cis-1,3-Dichloropropene																				
trans-1,3-Dichloropropene																				
Ethylbenzene																				
Iodomethane																			1,000	1,450
Methylene Chloride																			27	1,170
Styrene																			510	716
1,1,2,2-Tetrachloroethane																			0.02	23.3
Tetrachloroethene	4.36			11.1		6.67	8.02	4.80	342	12.6**	16.8	7.20		12.3	3.16		6.91	16.8	1.2***	1,120
Toluene		24.5																	2,000	7,500
1,1,1-Trichloroethane									19.9										1,000	38,000
1,1,2-Trichloroethane									5.18										0.06	150
Trichloroethene									2.21										0.45	900
Trichlorofluoromethane							3.93	32.4	6.62										700	
Vinyl Chloride																			0.02	0.40
Xylenes (Total)	<-6.88	<-6.69	<-6.80	<-6.71	<-6.59	<-6.80	<-6.54	<-6.70	<-6.62	<-6.88	<-6.70	<-6.64	<-7.52	<-6.69	<-6.53	<-6.38	<-6.53	<-6.64	300	1,450*

OLD BETHPAGE LANDFILL
 OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
 Second Year, Third Quarter

SOIL GAS VOST SAMPLE RESULTS
 TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former	
LOWER QUANTITATION LIMIT	2.29	11.1	2.27	2.24	2.20	2.27	2.18	2.23	2.21	2.29	2.23	2.21	2.51	2.23	2.18	2.13	2.18	2.21	AGC	AGC	
VOC COMPOUND NAME																					
Acetone																			14,000	35,600	
Benzaldehyde																					
2-Butanone		9.70**		77.2**	32.9							9.30	5.89					26.6	300	1,967	
2-Chloroethyl Vinyl Ether																					
cis-1,2-Dichloroethene																			1,900	1,980*	
Freon 13																			530	133,333*	
2-Hexanone																					
4-Methyl-2-Pentanone			3.74																480	683	

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former	
LOWER QUANTITATION LIMIT	2.29	11.1	2.27	2.24	2.20	2.27	2.18	2.23	2.21	2.29	2.23	2.21	2.51	2.23	2.18	2.13	2.18	2.21	AGC	AGC	
VOC COMPOUND NAME																					
Caryophyllene							8.18														
Cyclohexanone				28.0			8.18													240	238*
2,2-Dimethylbicyclo[2.2.1]heptane					121																
Hexachloroethane	10.7		4.64	12.3						2.98	16.8	16.6		4.57				11.0			
Methylmethyl ethylbenzene isomer													3.76								
Methylpropylnonane isomer													7.52				66.4				
4-Methylene-1-(1-methylethyl)cyclohexene													5.51								
beta-Myrcene													46.4								
alpha-Pinene																					
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon113)									41.9										90,000	90,476*	
2,2,3-Trimethylbicyclo[2.2.1]heptane isomer																	31.6				
2,2,6-Trimethyldecane																	35.9				
Undecane																		29.9			

All values are reported in micrograms per cubic meter (ug/m3).
 All blank values are less than the lower quantitation limit reported for each sample.
 Values in shaded areas exceed the level of the current (as of 6/91 or 11/91 for Tetrachloroethene) and/or previous ambient air Annual Guideline Concentration (AGC) values.
 *Proposed Value
 **Suspect data (see text).
 ***Current AGC for Tetrachloroethene as of November 1991.

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
Second Year, Fourth Quarter
SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
Benzene				NA						<1.02		<1.02							0.12	100
Benzyl chloride				NA						NA		NA							0.02	16.7
Bromodichloromethane				NA						<2.04		<2.04							0.02	0.03(1)
Bromoform				NA						<2.04		<2.04							12	11.9
Bromomethane				NA						<2.04		<2.04								
Carbon Disulfide		2.02		NA				2.18	2.18	<10.2	4.04	<10.2		6.44	4.86	3.55		2.11	7	100
Carbon Tetrachloride				NA						<2.04		<2.04							0.07	100
Chlorobenzene				NA						<1.02		<1.02							20	1,170
Chloroethane				NA						<1.02		<1.02							63,000	52,000
Chloroform			4.47	NA						<6.12		<6.12		9.62			4.51		23	167
Chloromethane				NA						<1.02		<1.02					62.2		770	2,100
3-Chloropropene				NA						NA		NA							7.1	10
Dibromochloromethane				NA						<2.04		<2.04							0.1	0.03(1)
1,2-Dibromoethane				NA						<2.04		<2.04							0.004	0.002
1,2-Dichlorobenzene (o)				NA						NA		NA							200	1,000
1,3-Dichlorobenzene (m)				NA						NA		NA							200	714(1)
1,4-Dichlorobenzene (p)				NA						NA		NA							700(1)	
Dichlorodifluoromethane(2)				NA				<1.58		NA		NA					17.4			
1,1-Dichloroethane				NA				3.17		<1.02		<1.02							500	9,524(1)
1,2-Dichloroethane				NA						<2.04		<2.04							0.039	0.2
1,1-Dichloroethene				NA						<2.04		<2.04							0.02	66.7
trans-1,2-Dichloroethene				NA						<2.04		<2.04							360	360(1)
cis-1,3-Dichloropropene				NA						<1.02		<1.02							0.15	833(1)
trans-1,3-Dichloropropene				NA						<1.02		<1.02								
1,2-Dichloro-1,1,2,2-tetrafluoroethane				NA						<1.02		<1.02								
Ethylbenzene				NA						NA		NA							1,000	1,450
1-Ethyl-2-methylbenzene				NA						<2.04		<2.04								
1-Ethyl-4-methylbenzene				NA						NA		NA							0.1	0.03
Hexachlorobutadiene				NA						NA		NA							0.05	0.8
Methylene Chloride				NA						<10.2		<10.2							27	1,170
Styrene				NA						<2.04		<2.04							510	716
1,1,2,2-Tetrachloroethane				NA						<2.04		<2.04							0.02	23.3
Tetrachloroethene	18.3	3.75	11.2	NA		9.41	6.28	81.2	186	16.3	6.38	6.10		18.3	11.40	6.69	6.32	36.1	1.2(3)	1,120
Toluene				NA						<2.04		<2.04					2.31		2,000	7,500
1,2,4-Trichlorobenzene				NA						NA		NA							9.0	133
1,1,1-Trichloroethane				NA				3.56	10.9	2.45		2.45					2.81		1,000	38,000

Second Year, Fourth Quarter
SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
1,1,2-Trichloroethane				NA						<2.04		<2.04							0.06	130
Trichloroethene(4)				NA						<1.02		<1.02							0.45	900
Trichlorofluoromethane	56.9			NA				4.46		NA		NA							700	
1,1,2-Trichloro-1,2,2-trifluoroethane(5)				NA			12.9	46.5		NA		NA							90,000	90,476(1)
1,2,4-Trimethylbenzene				NA						NA		NA								
1,3,5-Trimethylbenzene				NA						NA		NA							290	
Vinyl Chloride				NA						<1.02		<1.02							0.02	0.40
Xylenes (Total)				NA						<2.04		<2.04							300	1,450(4)

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
Acetone										22.4		11.2							14,000	35,600
Benzaldehyde										NA		NA								
2-Butanone		47.1								<2.04		<2.04					12.0		300	1,967
2-Chloroethyl Vinyl Ether										NA		NA								
cis-1,2-Dichloroethene										<2.04		<2.04							1,900	1,880(1)
Freon 13										NA		NA							530	133,333(1)
2-Hexanone										<1.02		<1.02								
4-Methyl-2-Pentanone										<1.02		<1.02							480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
1,2-Dibromo-1,1,2,2-tetrachloroethane(6)		<9.23	3.05																	
Hexachloroethane(6)		<9.23																		
alpha-Pinene													18.8							

All values are reported in micrograms per cubic meter (ug/m3).

All blank values are less than the lower quantitation limit reported for each sample.

Values in shaded areas exceed the level of the current (as of 6/91 or 11/91 for Tetrachloroethene) and/or previous ambient air Annual Guideline Concentration (AGC) values.

NA - Because of the Target Compound List (TCL) discrepancy between the SUMMA canister methodology and VOST TCL and differences between laboratories some compounds were not available for reporting. Also sample M5 was lost (not available) due to laboratory error.

- (1) Proposed Value
- (2) Dichlorodifluoromethane was tentatively identified in sample M9(40) coeluting with Xenon, therefore the level for Dichlorodifluoromethane was reported less than the total combined mass loading/concentration.
- (3) Current AGC for Tetrachloroethene as of November 1991.
- (4) Do
- (5) Tentatively Identified.
- (6) Coelution of 1,2-Dibromo-1,1,2,2-tetrachloroethane and hexachloroethane was observed in sample M2, therefore the level for each compound was reported less than the total combined mass loading/concentration.