TOWN OF OYSTER BAY
OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
SUMMARY OF LANDFILL GAS MONITORING PROGRAMS

2010 ANNUAL REPORT

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

December 2011

TOWN OF OYSTER BAY
OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
SUMMARY OF LANDFILL GAS MONITORING PROGRAMS

2010 ANNUAL REPORT

TABLE OF CONTENTS

Description			Page No.
Preface			1
1.0	BACKGROUND		2
	1.1	General	2
	1.2	Authority and Requirements	2
	1.3	Background on the OBSWDC Landfill Gas Control System	5
	1.4	Background of the Ambient Air, Soil Gas, Pressure Monitoring and Thermal Oxidizer Tests	8
	1.5	Background of Gas Detection and Control Programs	8
	1.6	Background on Energy Production and NCFSA Projects	9
2.0	SAMPLING PROGRAMS		9
	2.1	Monitoring Equipment and Operation	10
	2.2	2010 Gas Monitoring Activities	12
3.0	DISCUSSION OF RESULTS		13
	3.1	General	13
	3.2	Landfill Gas Surveys	13
		3.2.1 2010 Zero Gas Migration Limitation Survey	13
		3.2.2 2010 Perimeter Monitoring Well Survey	18
		3.2.3 2010 Building/Structure Survey	18
	3.3	Supplemental Monitoring Survey	18
4.0	SUMMARY AND CONCLUSIONS		27
	4.1	Landfill Gas Surveys	27
		4.1.1 2010 Zero Gas Migration Limitation Survey	27
		4.1.2 2010 Perimeter Gas Well Monitoring Surveys	28
		4.1.3 2010 Building/Structure Survey	28
	4.2	2010 Supplemental Monitoring Survey	28
	4.3	Monitoring Program Conclusions	29
5.0	RECOMMENDATIONS		29
	5.1	General	29
	5.2	Recommended 2011 Monitoring Programs	30
	5.3	Gas Extraction System Condensate Discharge	32
	5.4	Future Operation of the Landfill Gas Control System	32

TABLE OF CONTENTS – con't.

TABLES AND FIGURES

Description		Page No.
Table 2.1	Summary of 2010 Landfill Gas Monitoring Programs	10
Table 3.1	2010 Gas Well Survey Data	19/20
Table 3.2	2010 Facility Combustible Gas Survey Within Structures	21
Table 3.3	2010 Program Target Compound List and NYSDEC Ambient Air Guideline Concentrations	22/23
Table 3.4	2010 Quarterly Supplemental Monitoring Sample Results from the OBSWDC LFG Perimeter Collection/Control System	25/26
Table 5.1	2011 Monitoring Program Activity Schedule	32
Figure 1.1	2010 Site Location and Adjoining Areas Map	3
Figure 2.1	Perimeter Well Monitoring Points	14
Figure 2.2	Wells Adjoining Nassau County Fire Service Academy	15
Figure 3.1	2010 Annual Zero Gas Migration Limitation Survey	16
References		34

APPENDICES

Appendix A	GEM 2000 PLUS Specification Data Calibration Gas Specification Data
Appendix B	2010 Zero Gas Migration Limitation Survey Data Farmingdale, NY Meteorological Data During Survey
Appendix C	CAS Analytical Data for Vent Samples

TOWN OF OYSTER BAY
OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
SUMMARY OF LANDFILL GAS MONITORING PROGRAMS

2010 ANNUAL REPORT

Preface

The Town of Oyster Bay (Town) has been preparing an annual summary report (Annual Report) of various landfill gas monitoring programs associated with the Old Bethpage Solid Waste Disposal Complex (OBSWDC) for more than 25 years. The OBSWDC landfill gas monitoring program has been modified over the years to accommodate both regulatory requirements as well as changing site conditions. These include the requirements of the 6NYCRR Part 360 Operating Permit Special Conditions (including permit renewals), the presence of landfill gas at one time in adjacent properties and structures, the subsequent phased construction of a landfill gas control system to control off-site gas migration, the completion of the landfill capping and closure system and the requirements of the site Consent Decree 83CV5357 (1988). Specifically, the Consent Decree stipulates that:

> "…the Town will conduct the monitoring program described in the Lockwood, Kessler and Bartlett April 1987 report entitled "1986 Annual Report: Summarizing the Status of Landfill Gas Monitoring Programs and the Establishment of the Zero Percent Gas Migration Limitation at the Old Bethpage Landfill", to be amended as necessary. In addition, the Town will conduct the Supplemental Gas Monitoring Program set forth in Attachment 2." (LKB, 1987)

Section 1, Background, of this report summarizes the varying landfill gas conditions at the site over the years; the facilities constructed to accommodate these conditions and control off-site gas migration; and the modifications to the gas monitoring program to support both site conditions and facilities. Sections 2 through 5 discuss the Sampling Programs, Discussion of Results, Summary and Conclusions and Recommendations for future monitoring and control efforts, respectively.

Most of the historic information in this report was provided by Lockwood, Kessler & Bartlett, Inc. (LKB), the engineer of record for the Town on the OBSWDC and associated activities. RTP Environmental Associates, Inc. (RTP) was contracted to perform certain tasks required by the Consent Decree and the Part 360 permit and to prepare this report.

1.0 BACKGROUND

1.1 General

The OBSWDC is located between Winding and Claremont Roads, south of Bethpage-Sweet Hollow Road in the Town of Oyster Bay, Nassau County, New York. The OBSWDC currently consists of a total of 134 acres which contain a closed and capped landfill, inactive incinerators, an inactive compactor-baler facility, a Municipal Solid Waste (MSW) Transfer Facility, a Groundwater Treatment Facility, a Leachate Treatment Facility, a Landfill Gas Control System, an area periodically utilized for clean fill, a white goods area, scale house, recharge basins, stockpile areas, vehicle maintenance facilities and offices. A map illustrating these facilities and adjoining areas is provided in Figure 1.1. Two (2) unutilized areas of the site are currently leased by others. One of these areas is the northeast portion of the site which includes the inactive incinerators and compactor-baler building. The second is located at the southernmost portion of the site.

1.2 Authority and Requirements

On March 7, 1979, pursuant to inspections performed by the Nassau County Fire Commissioner, a violation was issued to the Nassau County Fire Service Academy (NCFSA) and an order was given to remove all sources of ignition at the NCFSA because an explosive atmosphere was reported to exist in certain enclosed areas. The NCFSA borders the OBSWDC on the southeast. In order to prevent landfill gas (LFG) from contributing to the creation of an explosive atmosphere at the NCFSA, the Town installed a LFG control system. Subsequently, the Town was required to conduct regular combustible gas monitoring at the NCFSA, along the perimeter of the OBSWDC, in onsite buildings and at various offsite locations.

A permit was issued by the New York State Department of Environmental Conservation (NYSDEC) to the Town as per the requirements of 6 NYCRR Part 360. The "SPECIAL CONDITIONS" category, attached to the Permit to Operate No. 0013, Application 30-S-l5, dated August 14, 1979, was created to address the presence of migrating landfill gases in the vicinity of the OBSWDC. The renewal permit conditions, in part, required the Town to develop a monthly monitoring program acceptable to the NYSDEC and the Nassau County Department of Health (NCDH). The monitoring program was to be conducted along various boundaries of the OBSWDC and in various onsite facility structures. Monitoring results were required to be submitted in report form to the NYSDEC and the NCDH.

A variety of orders, agreements and operational permit renewals have been issued since the site's initial permit and these are discussed in previous annual reports. In April 1986, the landfill ceased operations

N

0 375 750 1,500 Feet

ORTHOIMAGERY SOURCE:
NAIP 2009

RTP Environmental Associates, Inc.
Westbury, New York

FIGURE 1.1
SITE LOCATION AND ADJOINING AREAS MAP

TOWN OF OYSTER BAY
SOLID WASTE DISPOSAL COMPLEX
OLD BETHPAGE, NEW YORK

and all MSW received at the complex subsequently has been hauled offsite for disposal or recycling. The site's operating permit was modified to reflect the operation of a solid waste transfer station instead of a landfill.

In 1988, the Town and the New York State Department of Law (NYSDOL) entered into a Final Consent Decree for the remediation of the Old Bethpage Landfill (83 *CV.* 5357). Incorporated into the Consent Decree was a Remedial Action Plan (RAP) which detailed the actions to be undertaken by the Town in compliance with the Final Consent Decree. Appendix A, Section I. (H) of the RAP obligated the Town to continue to operate and maintain the existing gas control systems in compliance with the requirements of 6 NYCRR Part 360. Attachment 2 of the RAP required the Town to supplement the monitoring programs with data obtained from the following:

- quarterly ambient volatile organic compound (VOC) air sampling to be taken at three (3) selected locations during the first year of remediation, and if approved by the NYSDOL, annually thereafter;
- quarterly subsurface VOC gas sampling to be collected at 14 selected sampling locations at a depth of 30" during the first year of remediation and, if approved by the NYSDOL, on an annual basis thereafter; and quarterly subsurface VOC gas sampling at location M-9 at depths of 10', 20', 30' and 40' during the initial year of remediation, and if approved by the NYSDOL, on an annual basis thereafter;
- quarterly thermal oxidizer (TO) emissions sampling for VOC levels during the initial year of remediation (results obtained during the initial year of testing were to be related to the TO temperatures during the initial year of sampling. Thereafter, the oxidizer temperatures will be monitored on a monthly basis to insure that temperatures needed to volatilize the organics are being maintained in the oxidizer. The oxidizer emissions will continue to be sampled on an annual basis for VOC content); and
- quarterly pressure readings at three (3) locations during the initial year of remediation, and if approved by the NYSDOL, on an annual basis thereafter.

The results of the Supplemental Gas Monitoring Program required under the RAP are reported in detail in the Quarterly and Annual RAP Reports submitted in accordance with the Consent Decree. The RAP further stated that, in order to demonstrate compliance with 6 NYCRR Part 360 and maintain a zero percent methane gas migration limitation at the landfill boundary, the Town shall conduct the monitoring program, as described in the LKB Report (LKB, 1987), to be amended, as necessary. The monitoring program is summarized in an annual engineering report addressing the status of all LFG monitoring programs, including the Zero Percent Gas Migration Limitation Survey.

The Town's current 6NYCRR Part 360 Solid Waste Management facility permit (#1-2824-00528/00005) which expires on June 17, 2012, allows for the operation of a municipal solid waste transfer station serving the Town of Oyster Bay, with a solid waste special condition stipulating quarterly monitoring of methane in the transfer station building, the maintenance building and the office building.

1.3 Background on the OBSWDC Landfill Gas Control System

In response to reports of off-site landfill gas migration onto the NCFSA, the original landfill gas system (Phase 1) was installed in 1981 including eight (8) wells generally located along the shared property line with the NCFSA. These wells were connected to a blower station and vented to the atmosphere. In 1983, with further reports of migrating gas crossing Winding Road, the original collection system was expanded along Winding Road (Phase 2) with another six (6) wells. In 1984, the Town installed three (3) deep wells (designated GW-1, 2 and 3) atop the existing landfill to assess the properties of the deposited landfill mass in anticipation of letting a contract for gas to energy production. That contract was awarded in 1985 and the contractor, Energy Tactics, Inc. (ET) took possession of the three (3) wells for their use. Also in 1985, the collection system was further expanded around the northern slope onto the western side of the landfill (Phase 3) with an additional eight (8) wells to protect properties located on Claremont Road. The TO was installed around this time.

In 1991, in order to better control gas around the Briden property located at the southern end of Claremont Road, additional wells were placed along that property boundary. During that work, additional wells to augment the methane gas quality were installed along the bench above the Phase 2 Pit area. Sufficient additional collection pipe was installed to complete the loop around the landfill, thereby allowing the blower station to extract gas from both ends of the collection system. This is now known as the Phase 4 system. The Phase 4 wells installed above the Phase 2 Pit area and some of the Phase 3 wells were subsequently turned over to the gas to energy contractor for this use. The loss of those wells greatly diminished overall landfill gas quality at the TO. Subsequent to this loss, Town personnel became more pro-active in managing gas flow to the TO to maintain combustion without using supplemental (propane or utility natural gas) fuel.

In 1992, the Town entered into a betterment agreement with Nassau County to better control offsite migration onto the NCFSA. That agreement resulted in the installation of three (3) additional wells along the shared NCFSA property line and another blower skid paid for by the County, but required the Town to keep all the wells bordering the NCFSA fully open at all times to prevent the migration of landfill gas onto that site.

Until 2003, the extraction wells within the area atop the landfill were used exclusively by the gas to energy contractor. During the time that the contractor had exclusive rights to mine the landfill gas, they took over the three (3) GW wells, some Phase 3 and Phase 4 gas wells, and installed a number of additional wells (now known as the "ET wells") at the contractor's own expense. That well matrix was connected by an ever changing array of gas collection piping to maximize the heat value of the mined gases. When the gas to energy equipment at the site ceased to operate due to diminishing gas quantities, the plateau area was abandoned by the contractor for further gas extraction. When the gas to energy contractor ceased operation in 2003, the portion of piping still serviceable was claimed by the Town to operate as part of the overall landfill gas collection system. When the contractor formally left the site and removed his generating equipment in 2005, the wells and piping were turned over to the Town by agreement.

The diminishing levels of methane attributed to the age of the landfill have also impacted the operation of the perimeter gas control system's TO. Since 2003, the Town has incorporated selected extraction wells formerly utilized by the gas to energy contractor to supplemental the landfill gas quality at the TO. However, the quality of this gas has continued to decrease. In May 2008, the TO became inoperable primarily due to diminishing methane gas quality. An inspection of the flare at that time indicated that extensive equipment rehabilitation was required before placing it back online. A detailed evaluation of the overall gas control system was performed to identify its current conditions and make recommendations for system repairs and future system operations. The majority of the gas collection wells and piping were generally in satisfactory condition, although most required some maintenance. Based on the results of this evaluation, certain adjustments and repairs to the system were performed by Town maintenance personnel and a repair contract was developed to implement repairs that were beyond the Town's capabilities. The necessary repairs to the TO were specialized and a contractor capable of conducting these repairs was solicited to perform further inspections and evaluation of the mechanical and electrical systems. Based on the results of this evaluation a separate contract was prepared for the repair of the TO. Annual testing of the TO emissions has not been performed since May 2008, but will resume when the unit returns to normal operations.

In order to continue the Town's obligation to prevent offsite gas migration while the system repairs would be accomplished, the perimeter gas control system, which typically has very low LFG concentrations (e.g., around 2% gas), continued operation with the gas being exhausted to the atmosphere. To evaluate whether venting perimeter gas to the atmosphere while repairs were made would result in a significant risk to public health or the environment, the Town directed RTP to assess emissions from direct venting of the perimeter collection system gas. RTP's assessment roughly estimated that, from an air emissions perspective, it appeared that venting the perimeter landfill gas collection system uncontrolled may be a

viable option. Specifically, using a single site-specific total non-methane organic compound data point collected at the blower station in 2007, at a LFG flow rate of 500 cubic feet per minute (cfm), RTP calculated total VOC emissions to be 4.4 tons per year. RTP also calculated hazardous air pollutant (HAP) emissions to be 3.6 tons per year based on the USEPA AP-42 HAP emission factors for MSW-generated LFG. Based on these data and assumptions, VOC and HAP emissions from the uncontrolled release of perimeter system gas as configured at 500 cfm would fall below air-permitting thresholds.

As a follow-up to their initial assessment, RTP collected a one (1) 10-Liter Tedlar bag sample of landfill gas at the blower on October 16, 2008 and had it analyzed for speciated VOCs via EPA Method TO-15. To assess the significance of these results with respect to air quality, LKB compared them to the NYSDEC DAR-1 SGCs and AGC (Short-Term and Annual Guideline Concentrations, respectively). No VOCs were detected in the perimeter system gas at concentrations exceeding their respective SGC or AGC. Based on one (1) actual gas sample, VOC emissions from the gas collection system are not significantly impacting local ambient air quality. The quarterly monitoring of ambient air and soil gas at the site during 2008 and 2009 have not indicated any specific impacts from the perimeter gas control system emissions or offsite soil gas conditions, although several HAP compounds are found to be significantly in excess of AGC values in both upwind and downwind ambient samples.

LKB performed, concurrently, with the system equipment evaluation and the air emissions assessment, an evaluation of the system operations to develop recommendations to improve system performance as the methane generation by the landfill continues to decline. This evaluation was based on a review of the existing gas data, the age of the landfill, its declining gas generation and the Town's obligation to control offsite gas migration.

To improve system performance, LKB recommended that following the system-wide repair contract, the existing wells that are better methane producers (i.e., the internal landfill gas extraction wells, including those wells that were not originally part of the Town's system) be separated from the wells that are not producing significant amounts of methane (i.e., the perimeter landfill gas extractions wells). The existing gas control system would be re-configured to accommodate an 'internal" collection and flare system operating in parallel with an atmosphere-vented perimeter system. By withdrawing gas from the internal portion of the landfill, this will provide the added benefit of reducing gas pressure build-up and hence help control potential gas migration.

1.4 Background of the Ambient Air, Soil Gas, Pressure Monitoring and Thermal Oxidizer Tests

The sampling and analysis of ambient air and soil gases as well as the pressure sampling in the areas at and surrounding the OBSWDC as part of the RAP Attachment 2 began in 1990. The program initially required quarterly testing of ambient air at three (3) locations surrounding the landfill. The program was modified slightly and meteorology was monitored to assure upwind samples were representative of upwind sources and downwind samples captured the impact of landfill activities. Soil gas samples have been collected quarterly from a group of preselected wells, when available. Unavailable access to soil gas wells at times precludes sample collection. Soil gas pressures have been collected quarterly from a separate group of preselected wells. The results of these quarterly sampling efforts are analyzed and summarized in RAP Quarterly Reports. RAP Attachment 2 also initially required quarterly monitoring of the emissions from the TO. The emission measurement program characterized the VOC air emissions from combusting LFG in the TO at the OBSWDC. The Consent Decree also provided for an automatic reduction in the quarterly testing frequency of the TO stack emissions to annual testing after the initial year of monitoring. The change to annual testing of the stack emissions took place on November 10, 1992. In summary, the results of the testing indicated that the TO emissions have been minimal and their impact was well within NYSDEC Annual and Short-Term Concentration Guidelines.

In 2010, four (4) quarterly rounds of ambient air, subsurface soil gas sampling and pressure readings were performed. The 2010 results have been submitted to the Town in separate RTP reports and therefore, will not be addressed in this 2010 Annual Report. The TO was not tested in 2010, as discussed above.

1.5 Background of Gas Detection and Control Programs

As noted above, the Town initiated several landfill gas detection and control programs to monitor and prevent the offsite migration of LFG in the vicinity of the OBSWDC in the late 1970s. Initially, the Town installed permanent sampling probes around the perimeter of the OBSWDC to detect potential offsite LFG migration. Based on the LKB Engineering Report dated June 1980 (LKB, 1980), actions were immediately undertaken by the Town to alleviate offsite LFG migration onto the NCFSA. The Phase 1 Gas Control and Recovery System became operational in June 1982. Eventually, three (3) additional Phases were added to fully encircle the landfill as previously discussed in Section 1.3.

In 2008 an accident caused a breach in the perimeter gas control system near Briden Construction. The system design allowed the majority of the collection system to be placed back in operation shortly after the breach of the collection header along the western slope of the landfill. The broken header was sealed in two (2) locations adjoining the breach allowing negative pressure to be maintained while final repairs

were being arranged. While certain adjustments and repairs to the system are routinely performed by Town maintenance personnel, a system-wide inspection was performed following the accident and a repair contract was developed to implement repairs that were beyond the Town's capabilities. The repairs to the perimeter gas control system were completed in 2010. The system has been collecting perimeter gas during 2010, and a negative pressure barrier is being maintained at the landfill perimeter. The negative pressure is supplied by the blower station near the TO.

1.6 Background on Energy Production and NCFSA Projects

In December 1985, the Town granted and leased all rights to the LFG, which was produced within the existing portions of the OBSWDC, to Energy Tactics, Inc. (ET). This lease was to remain in force for 25 years. However, ET suspended energy production in 2003 due to diminishing gas quality as previously discussed in Section 1.3.

In order to maintain a safe environment for training activities at the NCFSA, the County and the Town agreed to jointly study the occurrence of subsurface combustible gas on the NCFSA and recommend appropriate remedial measures. These studies culminated with both parties entering into a betterment agreement in 1992. The County and Town have since concluded that, with the improvements to the Town's facilities and the construction of the County's remediation facilities, all subsurface LFG along the common border of the NCFSA/OBSWDC are being effectively controlled.

2.0 SAMPLING PROGRAMS

Historically, the sampling by TOB personnel was performed in accordance with the procedures, protocols and schedules recommended in the Annual Reports, as amended (per the Consent Decree), to reflect the modifications to the landfill gas system, revisions to operating permit special conditions and changing gas conditions at the site. The well documented lack of sufficient combustible gas in previous efforts, the lack of offsite property owner reports of odors or combustible gas, the abandonment/removal of structures from service and revisions to operating permit special conditions indicated that the majority of the historical programs completed prior to 2008 were no longer warranted (LKB, 2009). Based on these findings, an amended monitoring program was developed and proposed for future surveys after 2008.

An extensive evaluation of the historic gas monitoring programs was performed by LKB, including the program's initial purpose, to assess their applicability to the current site conditions and regulatory requirements. The evaluation was discussed in detail in the 2008-2009 Report and resulted in modifications to the above site and area-wide monitoring programs. The changes in approach were

intended to make the programs more reflective of the current LFG conditions at the site and current permit conditions, while not affecting whether LFG migration will be detected and whether further remedial actions should be initiated, if necessary (LKB, 2009).

The sampling and surveying programs had historically been organized based on monthly, quarterly and annual monitoring periods. Table 2.1 provides the currently active monitoring survey programs that document landfill gas related conditions at the OBSWDC and in surrounding areas. This list was amended to its current form as a result of the monitoring program evaluation discussed in the 2008-2009 Annual Report. The following sections describe the monitoring activities and equipment associated with required monitoring efforts for the 2010 calendar year.

2.1 Monitoring Equipment and Operation

Most of the monitoring surveys identified in Table 2.1 required the use of handheld portable combustible gas monitors. The exceptions are Survey Nos. 4, 5 and 6 as listed in Table 2.1. For these activities, a detailed description of the monitoring equipment is provided in Appendix F of the Quarterly RAP Reports. RTP began performing Survey Nos. 1, 2 and 7 since the 2008-2009 Annual Report. The Town or other consultants were completing these tasks prior to RTP's involvement.

TABLE 2.1

SUMMARY OF 2010 LANDFILL GAS

MONITORING PROGRAMS

Survey No.	Survey Description	Frequency of Monitoring	Monitoring Performed By
1.	OBSWDC Perimeter Gas Monitoring Well Survey	Quarterly	RTP
2.	Building Structure Survey	Quarterly	RTP
3.	Supplemental Gas Monitoring Program	As Necessary	TOB
4.	Ambient VOC Air Sampling, Subsurface VOC Gas Sampling, Soil Gas Pressure Readings	Quarterly	RTP
5.	Thermal Oxidizer Emissions Sampling for VOCs	Annually	RTP
6.	Thermal Oxidizer Temperature Reporting	Monthly	TOB
7.	Zero Gas Migration Limitation Survey	Annually	RTP

Notes: RTP – RTP Environmental Associates, Inc.
TOB – Town of Oyster Bay staff

Beginning in 2008, RTP was tasked with taking subsurface combustible gas readings for defining the zero gas migration limit (Survey No. 7) including monitoring the subsurface combustible gas conditions at the Nassau County Campground. RTP reviewed the previous sampling procedures as described in the Hazen and Sawyer 2007 Annual Report, which involved using a slam bar to punch 12" holes into the ground every 50' along the perimeter of the landfill boundary and the common boundary between the OBSWDC and the Nassau County Campground (H&S, 2007). To expedite sampling and improve ground penetration, RTP substituted a ¾" diameter, 18" long concrete auger bit, powered by a handheld drill for the slam bar to make the necessary unsupported subsurface sampling points. A ¼" stainless steel tube was then used, along with a rubber stopper, to seal the nominal 18" deep sampling point.

The rationale for extending the soil gas sampling point to an 18" depth is based on assuring the point would likely penetrate an impervious surface, if present. Occasionally, the drilling cannot reach a full 18" depth because of rocks or other obstacles. In those cases, additional attempts to drill a point are made with the minimal depth of any soil gas sample point being at least 12". A Tygon sampling line and a filter are attached to the stainless steel probe; the filter is used to prevent dust and debris from entering the monitor. This assembly is then attached to a multi-gas monitor to determine percent levels of combustible gas in each soil gas point. A LandTEC GEM 2000 Plus Multi-Gas Monitor was substituted for RAE Systems VRAE Multi-Gas Monitor for all 2010 tests. The unit's minimum detection limit is 0.1 percent of combustible gas, measured digitally. It takes approximately 8-seconds for the soil gas in the well to make its way to the sensor. The sensor reaches a stable reading within 15-seconds and the peak value of the combustible gas percentage is recorded. The monitoring of combustible gas at perimeter wells and within structures at the OBSWDC also utilized the GEM 2000 Plus Monitor. A stainless steel probe was attached to the monitor as used in the Zero Gas Migration Survey and the probe was inserted into the respective wells for a period of 15 seconds or greater to determine the gas concentration. For the structures, several readings of 15 seconds or more were typically taken at various locations within the structures. The specifications for the GEM 2000 and associated calibration are provided in Appendix A. The GEM 2000 unit was factory calibrated in January 2010 and span gas is supplied to check accuracy prior to each field use. Annual factory calibrations of the unit are recommended by LandTEC.

Each survey requires the definition of the location of the sampling points at the landfill boundary, Nassau County Campground, Senior Citizens Housing Complex and other features potentially impacted by subsurface LFG migration from the landfill. Based on the lack of in-field reference points, it was determined that the best way of locating sampling points, relative to the above referenced features, would be to use a Trimble GEOXT Global Positioning System (GPS). According to the manufacturer, the system accuracy is approximately 3 ft. of the actual position. The Trimble GPS allows automated storage

of sampling point coordinates and percentage of combustible gas. The GPS approach provides an accurate recording of the location of sampling points and potential problem gas areas, if present.

2.2 2010 Gas Monitoring Activities

RTP was tasked with performing five of the seven surveys listed in Table 2.1 during 2010. The first surveys conducted are listed as Survey Nos. 1 and 2, in Table 2.1. The quarterly surveys for 2010 were performed in March, July, October and November. The data from these surveys are provided in Section 3 of this report.

In October 2010, the NYSDEC, requested that the Town take quarterly samples of landfill gas from the perimeter collection system vent for VOC speciation of the landfill gas collected while the TO is out of service. Data from the Survey No. 3 test during 2010 are provided in Section 3.3.

The ambient air VOC sampling, the subsurface VOC soil gas sampling and the soil gas pressure readings (Survey No. 4) were performed quarterly during 2010. The data for 2010 are provided under separate cover in four (4) quarterly reports and an annual summary.

RTP could not perform Survey No. 5 during 2010 since the TO was still out of service. The TO tests have been historically reported in separate stand alone stack test reports which will continue once the TO is back in service.

Although not part of the gas monitoring effort, the Town is required to supply monthly temperature data for the TO as part of the RAP. This is identified as Survey No. 6 in Table 2.1. Since the TO was out of service in 2010, the Town was unable to perform Survey No. 6. The Town has contracts underway to perform repairs and improvements to the gas control system. Monitoring of TO emissions will recommence once the unit is returned to service (LKB, 2009).

Finally, RTP was tasked with performing the Zero Gas Migration Limitation Survey (Survey No. 7). The 2010 survey was performed on October 7-8, 2010. The data for the limitation survey are discussed in Section 3 of this report.

3.0 DISCUSSION OF RESULTS

3.1 General

Sampling data generated from survey program Nos. 1, 2, 3 and 7, identified in Table 2.1 earlier, are used to detect potential problematic areas and to develop design parameters for modification and expansion of LFG perimeter control system, as necessary. The LFG perimeter control system (included in Phases 1, 2, 3 and 4 of the perimeter collection system) completely encircles the landfill, extending along the northern and western sides of the NCFSA, along Winding Road and along the northwestern portion of the OBSWDC adjacent to Claremont Road, as shown in Figure 2.1 and Figure 2.2. This section provides a discussion of the Zero Gas Migration Survey followed by the other quarterly surveys and the special landfill gas speciated sampling efforts conducted in 2010.

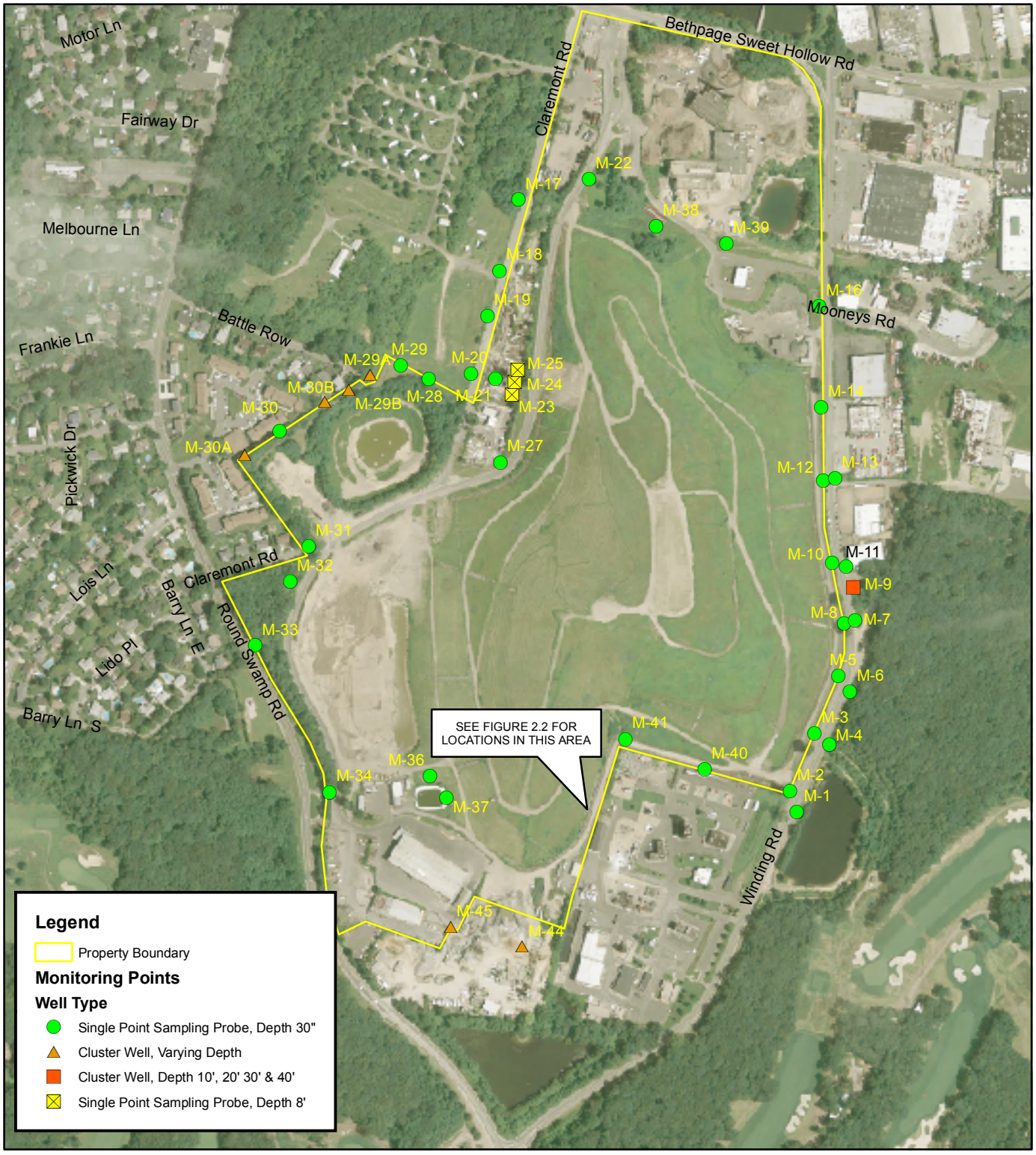
3.2 Landfill Gas Surveys

3.2.1 2010 Zero Gas Migration Limitation Survey

The 2010 Zero Gas Migration Limitation Survey, consisting of sampling points exploring the lateral migration of LFG around the outer boundary of the landfill, was conducted by RTP personnel during October 7-8, 2010. Three-quarter inch (3/4") sample well holes were drilled to a depth of 12 to 18 inches and spaced 50’ apart along the outer boundary of the landfill and other areas around the landfill. When a positive combustible gas reading (measured as % LEL) was obtained at a sampling point, additional sampling points were installed radially outward until a zero combustible gas reading was obtained. This series of points would then provide the boundary of the zero gas migration limit, as required by the Consent Decree. The collected data was then used to identify the extent of combustible gas migration “line of zero percent combustible gas” readings in and around the OBSWDC. Sample points at the toe of the landfill are not installed radially inward toward the landfill to avoid damage to the landfill cap.

The 2010 annual survey data are presented graphically in Figure 3.1. The specific findings of the 2010 annual survey are as follows:

- The results of the 2010 annual survey demonstrate that LFG migration has been contained within the OBSWDC boundary. As shown on Figure 3.1, the combustible gas concentrations for the line of well points are all zero except for one (1) point at the landfill boundary and a second group of points to the west of the landfill. Combustible gas readings are provided on Figure 3.1 and the NY State Plane coordinates and all gas readings are also provided in Appendix B. Hourly



N

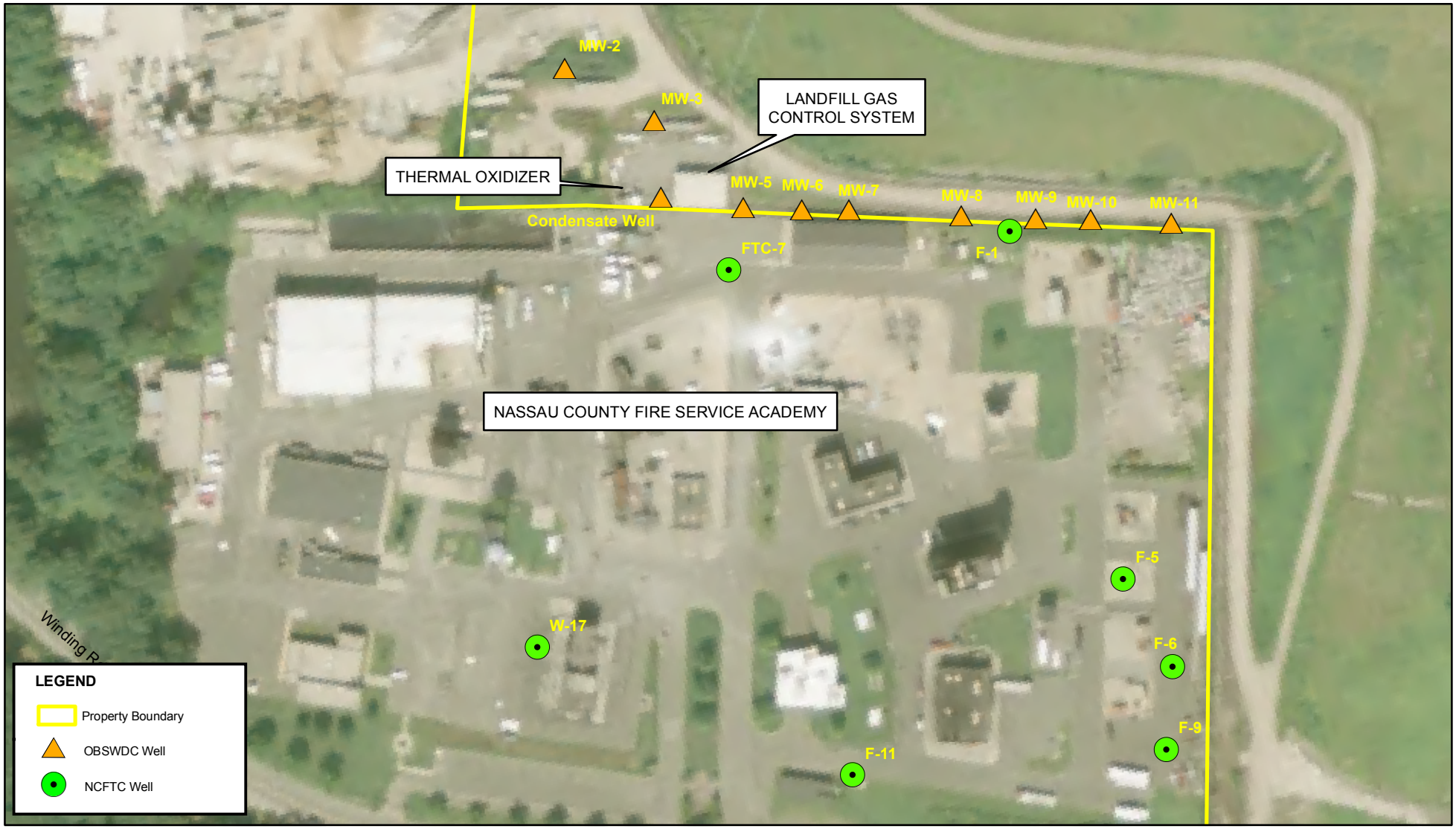
0 250 500 1,000 Feet

FIGURE 2.1
PERIMETER WELL MONITORING POINTS

TOWN OF OYSTER BAY
SOLID WASTE DISPOSAL COMPLEX
OLD BETHPAGE, NEW YORK

ORTHOIMAGERY SOURCE:
NAIP 2009

RTP Environmental Associates, Inc.
Westbury, New York



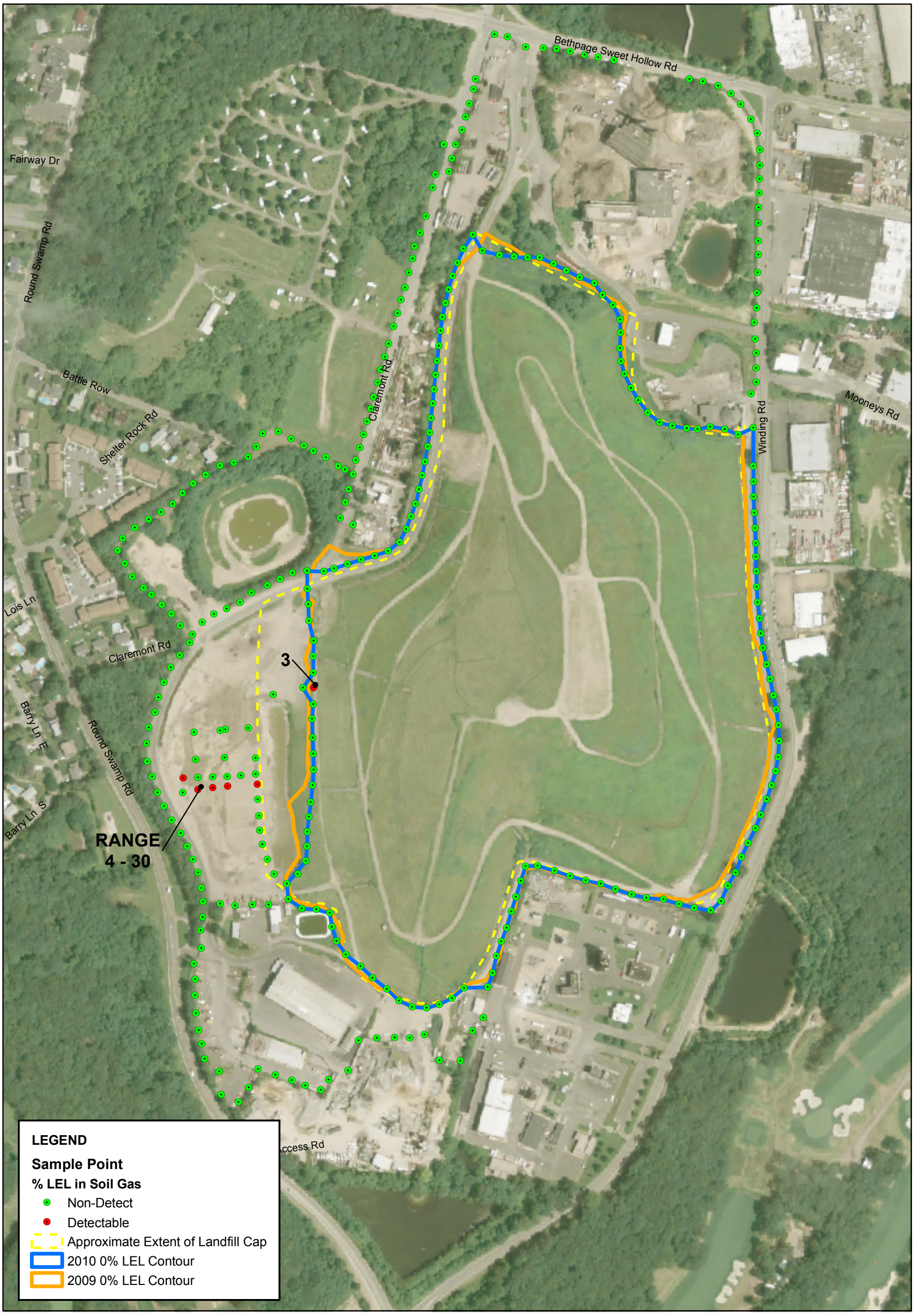
0 62.5 125 250 375 500 Feet

ORTHOIMAGERY SOURCE:
NAIP 2009

RTP Environmental Associates, Inc.
Westbury, New York

FIGURE 2.2
WELLS ADJOINING NASSAU COUNTY FIRE SERVICE ACADEMY

TOWN OF OYSTER BAY
SOLID WASTE DISPOSAL COMPLEX
OLD BETHPAGE, NEW YORK



N

0 125 250 500 750 1,000 Feet

ORTHOIMAGERY SOURCE:
NAIP 2009

RTP Environmental Associates, Inc.
Westbury, New York

FIGURE 3.1
2010 ANNUAL ZERO GAS MIGRATION LIMITATION SURVEY

TOWN OF OYSTER BAY
SOLID WASTE DISPOSAL COMPLEX
OLD BETHPAGE, NEW YORK

meteorological data for Farmingdale, New York for the survey dates are provided in Appendix B. It should be noted that these combustible gas readings are reported in percent of LEL (Lower Explosive Limit, which is 5% combustible gas), not percent gas. Therefore, a result of "2" is 2% of 5%, or 0.1% combustible gas in the soil gas.

- Combustible gas readings above zero along the landfill cap perimeter were limited to one (1) very low reading, as shown in Figure 3.1. This point was on the western portion of the OBSWDC property (adjacent to the retention pond on the west side of the landfill). LFG was also detected west of the retention pond on the west side of the landfill and east of the internal landfill perimeter road. In all cases, the soil gas concentration decreases within a few seconds of inserting the probe into the well, except for the area to the west of the landfill retention pond where elevated readings persisted.

- LKB was contacted and informed of the findings (LKB, 2010). LKB's analysis of the available data regarding the soils deposited in the Phase 2 area indicated that the detections within the southern area of former Phase 2 pit area are attributed to the shallow soil most recently placed there, not to the landfill, which is separated from the fill area by the storm water retention area in the Phase 2 pit. Specifically, the soil in this area contained 1-3 percent naturally occurring organics and was high in fines. Therefore, it contained enough organics to generate detectable levels of methane, and has a high porosity but low permeability to retain the methane. LKB expects that methane levels in the former Phase 2 pit area will continue to decline over time as the organics in the soil are broken down as indicated by the data obtained from 2008 through 2010. Accordingly, no recommendations of any action regarding the methane levels in the former Phase 2 pit area were made at this time, with the exception of performing gas monitoring if excavation is performed in this area (LKB, 2010).

The 2010 Annual Survey data was compared to the combustible gas migration data contour compiled for 2009. The 2009 migration contour is also provided on Figure 3.1. The 2009 contour line has several deviations from the line of perimeter sampling points encircling the toe of the landfill. As seen from the 2010 combustible gas contour line, all of the 2009 positive gas readings have dropped to zero along the landfill toe except for one excursion near the northern terminus of the retention pond. Readings do fall to zero at the retention pond. Overall, the 2010 Survey indicated fewer locations of combustible gas at lower concentrations when compared to the 2009 survey.

As shown, the zero combustible gas migration data for 2010 confirms combustible gas associated with the landfill is well within the OBSWDC boundary.

3.2.2 2010 Perimeter Monitoring Well Survey

In an effort to confirm the gas conditions in the perimeter gas monitoring wells and make recommendations for future monitoring programs, RTP performed four (4) perimeter gas well monitoring events following previously established monitoring survey protocols. The perimeter wells along the OBSWDC property boundary and at the NCFSA were monitored for the presence of combustible gas. The locations of these wells are identified on Figures 2.1 and 2.2. The actual surveys took place in March, July, October and November, 2010. The combustible gas data for all four (4) monitoring events at these locations are presented on Table 3.1. The data show that for the March 17-18, 2010 monitoring event, three (3) wells, MW-5 lower, MW-6 lower and MW-11 upper, had combustible gas levels of 1% of LEL (e.g. 0.05% gas). All other well combustible gas concentrations during the March monitoring event were zero percent of LEL. On July 2, 2010, four (4) wells, F6 and F9 at the 20 ft. level, and MW5 and MW6 at the lower level, had detectable gas concentrations of 1% of LEL. All other July well combustible gas concentrations were zero percent of LEL. For the October 8, 2010 and the November 30, 2010 Surveys, all wells had zero percent of LEL combustible gas, Well F9 at the Fire Service Academy was not available for the 3rd and 4th Quarter monitoring events due to vehicle obstructions. These findings are in general agreement with the 2010 Zero Gas Migration Limitation Survey.

3.2.3 2010 Building/Structure Survey

RTP performed gas monitoring at several of the onsite facility locations that are still in existence. A total of four (4) separate surveys were conducted in conjunction with the above-referenced perimeter gas well monitoring survey discussed in Section 3.2.2. All readings were non-detectable (i.e., less than 1% of the LEL). The available combustible gas data for the building/structure survey are presented in Table 3.2.

3.3 2010 Supplemental Monitoring Survey

Beginning in October 2010, the NYSDEC requested that supplemental monitoring be performed. The supplemental monitoring for 2010 required sampling and analysis of the landfill gas collected by the perimeter collection/control system. This gas is normally directed to the TO and combusted; however, in 2010, the TO was down for repairs. As a result, the perimeter gas was vented to the atmosphere at the blower station's bypass vent. The NYSDEC requested quarterly testing of this exhaust beginning in October 2010 and quarterly monitoring is to continue while the TO is inoperative. There were two (2) quarterly tests of the exhaust from the bypass vent in 2010. These tests occurred on October 18-19, 2010 and November 29-30, 2010. The laboratory results are presented in Appendix C and are discussed below.

TABLE 3.1
2010 GAS WELL SURVEY DATA

			March 2010	July 2010	October 2010	November 2010
Sample ID	X	Y	% LEL	% LEL	% LEL	% LEL
Condensate Well	1136960	213973	0	0	0	0
F-1	1137085	214308	0	0	0	0
F-5 (10')	1137458	214328	0	0	0	0
F-5 (20')	1137458	214328	0	0	0	0
F-5(30')	1137458	214328	0	0	0	0
F-5 (40')	1137458	214328	0	0	0	0
F-6 (10')	1137557	214354	0	0	0	NA
F-6 (20')	1137557	214354	0	1	0	NA
F-9 (10')	1137637	214326	0	0	NA	0
F-9 (20')	1137637	214326	0	1	NA	0
F-11	1137580	214009	0	0	0	0
FTC-7	1137049	214021	0	0	0	0
M-1	1137862	214244	NA	NA	NA	NA
M-2	1137835	214327	0	0	0	0
M-3	1137935	214562	0	0	0	0
M-4	1137993	214518	0	0	0	0
M-5	1138031	214796	0	0	0	0
M-6	1138078	214733	0	0	0	0
M-7	1138099	215021	0	0	0	0
M-8	1138055	215011	0	0	0	0
M-9 (10')	1138092	215156	0	0	0	0
M-9 (20')	1138092	215156	0	0	0	0
M-9 (30')	1138092	215156	0	0	0	0
M-9 (40')	1138092	215156	0	0	0	0
M-10	1138005	215254	0	0	0	0
M-11	1138062	215240	NA	NA	NA	NA
M-12	1137969	215589	0	0	0	0
M-13	1138017	215599	0	0	0	0
M-14	1137961	215887	0	0	0	0
M-16	1137954	216297	0	0	0	0
M-17	1136732	216730	NA	NA	NA	NA
M-18	1136654	216441	0	0	0	0
M-19	1136605	216259	0	0	0	0
M-20	1136540	216023	0	0	0	0
M-21	1136638	216003	NA	NA	NA	NA
M-22	1137018	216814	0	0	0	0
M-23	1136705	215938	NA	NA	NA	NA
M-24	1136716	215991	NA	NA	NA	NA
M-25	1136728	216040	NA	NA	NA	NA
M-27	1136658	215664	NA	NA	NA	NA
M-28	1136366	216001	0	0	0	0
M-29	1136254	216057	NA	NA	NA	NA
M-29A	1136129	216019	NA	NA	NA	NA
M-29B	1136042	215959	NA	NA	NA	NA
M-30	1135762	215789	0	0	0	0

TABLE 3.1
2010 GAS WELL SURVEY DATA

			March 2010	July 2010	October 2010	November 2010
Sample ID	X	Y	% LEL	% LEL	% LEL	% LEL
M-30A	1135620	215694	NA	NA	NA	NA
M-30B	1135945	215911	NA	NA	NA	NA
M-31	1135881	215322	0	0	0	0
M-32	1135804	215179	NA	NA	NA	NA
M-33	1135663	214920	NA	NA	NA	NA
M-34	1135965	214324	0	0	0	0
M-36	1136373	214389	NA	NA	NA	NA
M-37	1136439	214302	0	0	0	0
M-38	1137290	216623	NA	NA	NA	NA
M-39	1137576	216552	0	0	0	0
M-40	1137488	214417	NA	NA	NA	NA
M-41	1137166	214540	NA	NA	NA	NA
M-44	1136746	213695	NA	NA	NA	NA
M-45	1136456	213777	NA	NA	NA	NA
MW-2 Upper	1136807	213912	0	0	0	0
MW-2 Lower	1136807	213912	0	0	0	0
MW-3 Upper	1136882	213987	0	0	0	0
MW-3 Lower	1136882	213987	NA	NA	NA	NA
MW-5 Upper	1136991	214052	0	0	0	0
MW-5 Lower	1136991	214052	1	1	0	0
MW-6 Upper	1137009	214109	0	0	0	0
MW-6 Lower	1137009	214109	1	1	0	0
MW-7 Upper	1137024	214163	0	0	0	0
MW-7 Lower	1137024	214163	0	0	0	0
MW-8 Upper	1137057	214265	0	0	0	0
MW-8 Lower	1137057	214265	0	0	0	0
MW-9 Upper	1137080	214337	0	0	0	0
MW-9 Lower	1137080	214337	0	0	0	0
MW-10 Upper	1137104	214414	0	0	0	0
MW-10 Lower	1137104	214414	0	0	0	0
MW-11 Upper	1137120	214470	1	0	0	0
MW-11 Lower	1137120	214470	NA	NA	NA	NA
W-17	1137370	213733	0	0	0	0

NOTES:

NA - Well unable to be located

XY Coordinates in NY State Plane

TABLE 3.2

2010 FACILITY COMBUSTIBLE GAS SURVEY WITHIN STRUCTURES

	March 17-18, 2010	July 2, 2010	Oct. 8, 2010	Nov. 30, 2010
Sample ID	% LEL	% LEL	% LEL	% LEL
TO Blower Station Drain 1	0	0	0	0
TO Blower Station Drain 2	0	0	0	0
RAP Building N	0	0	0	0
RAP Building NW	0	0	0	0
RAP Building S	0	0	0	0
RAP Building LAB	0	0	0	0
RAP Building Acid Tank	0	0	0	0
RAP Building Acid Tank	0	0	0	0
RAP Building Mezz	0	0	0	0
Guardhouse	0	0	0	0
Town Offices	0	0	0	0
Leachate Treatment Building	0	0	0	0
Transfer Station	0	0	0	0
Maintenance Garage	0	0	0	0
Recycling Building Area	0	0	0	0
Scalehouse	0	0	0	0

NOTE:

*** Combustible gas readings were taken at various locations throughout each structure.**

Two (2) 40-minute samples were collected, one at the beginning and one at the end of the 24-hour ambient air quality tests conducted quarterly at the OBSWDC. The non-methane volatile organics, methane and carbon dioxide concentrations were measured in addition to speciated VOCs. The NYSDEC has established Air Guide No. 1 that provides the current guidelines for ambient air concentration of various air toxics. These guidelines are updated periodically by the NYSDEC. The NYSDEC guidelines applicable to the samples results reported herein are presented in Table 3.3. Please note that the concentrations of specific compounds in the LFG were compared directly to short- and long-term ambient toxic guidelines. The LFG samples are not ambient air samples; therefore, perimeter vent concentrations exceeding the level of a guideline do not necessarily constitute an exceedance of that ambient guideline.

The samples collected at the OBSWDC during the quarterly tests were analyzed by Columbia Analytical Services (CAS). CAS is certified by the New York State Department of Health, NELAP NY Lab ID No.

TABLE 3.3

2010 PROGRAM TARGET COMPOUND LIST
AND NYSDEC AMBIENT AIR GUIDELINE CONCENTRATIONS

CHEMICAL NAME	CAS NUMBER	AIRS CODE	SGC µg/m³	W (SGC)	AGC µg/m³	W (AGC)	T	CODES													
								1		3	4	5	6	7	8	9	10	11	12	13	14	15
Acetone	00067-64-1	4	180,000	Z	30,000	H	L				I											
Benzene	00071-43-2	4	1,300	D	0.13	E	H	U		H	A											
Bromodichloromethane	00075-27-4	4	---		70.0	D	M															
Bromoform	00075-25-2	4	---		0.91	E	M			H	I											
Bromomethane	00074-83-9	4	3,900	D	5.0	E	M			H	I											
2-Butanone	00078-93-3	4	13,000	D	5,000	E	M															
Carbon Disulfide	00075-15-0	6	6,200	D	700	E	M			H	I											
Carbon Tetrachloride	00056-23-5	4	1,900	D	0.17	E	H	U		H	B											
Chlorobenzene	00108-90-7	4	---		110	T	M			H	I											
Chloroform	00067-66-3	4	150	D	0.043	E	M	U		H	I											
Chloromethane	00074-87-3	4	22,000	D	90	E	M			H	I											
Dibromochloromethane	00124-48-1	4	---		0.10	d	M															
1,2-Dichlorobenzene (o)	00095-50-1	4	30,000	Z	200	H	M				I											
1,3-Dichlorobenzene (m)	00541-73-1	4	---		10	H	M															
1,4-Dichlorobenzene (p)	00106-46-7	4	---		0.09	D	M	U		H	I											
1,1-Dichloroethane	00075-34-3	4	---		0.63	D	L	U		H	I											
1,2-Dichloroethane	00107-06-2	4	---		0.038	E	M	U		H	I											
1,1-Dichloroethene	00075-35-4	4	---		70	D	M			H	I											
cis-1,2-Dichloroethene	00156-59-2	4	---		63	D	M															
trans-1,2-Dichloroethene	00156-60-5	4	----		63	D	M															
1,2-Dichloropropane	00078-87-5	4	----		4.0	E	M			H												
cis-1,3-Dichloropropene	10061-01-5	4	---		0.25	E		U		H	I											
trans-1,3-Dichloropropene	10061-02-6	4	---		0.25	E		U		H	I											
Ethylbenzene	00100-41-4	4	54,000	Z	1,000	E	M			H	I											
2-Ethyltoluene	611-14-3		----		0.10	d																
4-Ethyltoluene	622-96-8		----		0.10	d																
2-Hexanone	00591-78-6	4	4,000	Z	30	E																
Methylene Chloride	00075-09-2	6	14,000	D	2.1	E	M	U		H	I											
4-Methyl-2-Pentanone	00108-10-1	4	31,000	Z	3,000	E	M			H												
Styrene	00100-42-5	4	17,000	Z	1,000	E	M			H	I											
1,1,2,2-Tetrachloroethane	00079-34-5	4	---		16	T	M			H	I											
Tetrachloroethene	00127-18-4	4	1,000	H	1.0	H	M	U		H	I											
Toluene	00108-88-3	4	37,000	D	5,000	E	L			H	I											
1,1,1-Trichloroethane	00071-55-6	6	9,000	E	5,000	E	L			H	I											
1,1,2-Trichloroethane	00079-00-5	4	---		1.40	D	M			H	I											
Trichloroethene	00079-01-6	4	14,000	Z	0.50	D	M	U		H	B											
Trichlorofluoromethane	00075-69-4	6	9,000	A	5,000	A	L								R	R						
Vinyl Chloride	00075-01-4	4	180,000	D	0.11	E	H	U		H	A											
m,p-Xylene	179601-23-1	4	4,300	D	100	E	M			H	I											
o-Xylene	95-47-6	4	4,300	D	100	E	M			H	I											
Decane	00124-18-5	4	---		700	A	M										R					

TABLE 3.3
(Continued)

2010 PROGRAM TARGET COMPOUND LIST
AND NYSDEC AMBIENT AIR GUIDELINE CONCENTRATIONS

NOTES:

TOXICITY (T):

(H) HIGH Toxicity Contaminant.
(M) MODERATE Toxicity Contaminant.
(L) LOW Toxicity Contaminant.

WHO (W), Source of AGC/SGC Assignment:

(A) AGC/SGC based upon NYSDEC "Analogy".
(D) NYSDEC derived AGC/SGC.
(E) AGC based upon EPA IRIS data (RFC or Unit Risk).
(H) NYSDOH derived AGC/SGC.
(S) AGC/SGC listed is FEDERAL or NYS Standard.
(T) AGC based upon ACGIH TLV.
(Y) SGC is based on ACGIH TLV Ceiling limit.
(Z) SGC is based on ACGIH STEL.
(d) AGC assigned Moderate Toxicity "de minimis" limit.
(*) AGC assigned High Toxicity "de minimis" limit.
(----) There is no SGC for this compound.

WHO (W), Source of special AGC/SGC Interim Assignment:

(s) AGC/SGC based upon Equivalent FEDERAL or NYS Standard.
(X) There is no AGC/SGC value for this contaminant.

-----codes-----

' 111111
123456789012345:

codes, (Position 1):

(U) AGC equivalent to "one in a million risk".

codes, (Position 3):

(H) FEDERAL HAP identified by 1990 CAAA.

codes, (Positions 4 & 5):

(A) ACGIH Human Carcinogen.
(B) ACGIH Suspected Human Carcinogen.
(C) ACGIH Ceiling Limit.
(G) ACGIH Simple Asphyxiant.
(I) Refer to ACGIH Handbook.
(K) Multiple TLVs assigned in ACGIH Handbook.

codes, (Position 8):

(Q) REFERENCED AGC adjusted for elemental assignment.

codes, (Position 9):

(Q) REFERENCED SGC adjusted for elemental assignment.

codes, (Position 10):

(R) AGC ASSIGNED TO REFERENCED COMPOUND.

codes, (Position 11):

(R) SGC ASSIGNED TO REFERENCED COMPOUND.

codes, (Position 12):

(Q) AGC ASSIGNED AS DIFFERENT ELEMENT(s) & ADJUSTED.

codes, (Position 13):

(Q) SGC ASSIGNED AS DIFFERENT ELEMENT(s) & ADJUSTED.

codes, (Position 14):

(M) REFERENCED AGC adjusted for MOLECULAR WEIGHTS.

codes, (Position 15):

(M) REFERENCED SGC adjusted for MOLECULAR WEIGHTS.

- AGC/SGC recently revised October 2010 and are still current as of December 2011.

11221 and CAS follows a NELAP-approved quality assurance program. Samples were analyzed for total non-methane organic compounds (NMOC) per modified EPA Method TO-3 using a gas chromatograph equipped with a flame ionization detector (FID). The samples were also analyzed for methane and carbon dioxide according to EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TED). Finally, the samples were also analyzed for selected VOCs and tentatively identified compounds (TIC) in accordance with EPA Method TO-15 (EPA/625/R-96/010b). The analytical system, was comprised of a gas chromatograph/mass spectrometer (GC/MS) interfaced to a whole air preconcentrator. Tedlar bags were used to collect the samples for transport to the laboratory. The Tedlar bags were preconditioned three (3) times prior to the collection of the respective samples.

The LFG perimeter collection system gas samples were collected according to above referenced protocols from the bypass vent at the TO blower station, packaged and then shipped to CAS for analysis. The analytical results presented in Table 3.4 are based on the laboratory reports contained in Appendix C. As shown in Table 3.4, several compounds were detected in the perimeter system exhaust vent gas. In general, the two (2) samples species and concentrations collected per quarter were in reasonable agreement considering the samples were collected nearly 24 hours apart. The samples results are also in reasonable agreement between quarters. The shaded values indicate compound concentrations that exceed the respective state ambient air guidelines. However, please note that Table 3.4 provides direct comparison of LFG concentrations to ambient air guidelines.

As such, an exceedance does not constitute a violation of any guidelines. The lowest state guidelines for observed constituents are for vinyl chloride and benzene which, on average, the LFG concentrations exceed the guidelines by 170 times and 290 times, respectively. The only other compound exceeding the state guidelines is tetrachlorethene. Although the perimeter gas exits the bypass vent at concentrations in excess of the guideline, these concentrations are rapidly reduced because of atmospheric dilution effects that reduces the levels to within ambient annual guideline values. This is in agreement with the quarterly ambient air quality tests that were performed concurrently and reported under a separate report.

No TICs, as identified in the second section of Table 3.4, exceed their respective state AGC. No target or TIC compounds exceed their respective SGCs.

TABLE 3.4

2010 QUARTERLY SUPPLEMENTAL MONITORING SAMPLE RESULTS
FROM THE
OBSWDC LFG PERIMETER COLLECTION/CONTROL SYSTEM

Quarterly I.D.	1st Quarter*		2nd Quarter*		3rd Quarter		4th Quarter		ANNUAL AVERAGE	CURRENT	CURRENT
Sample ID					OBL-1	OBL-2	OBL-1	OBL-2	---	SGC	AGC
Methane (% v/v)**					2.12	2.28	3.11	4.90	3.1	---	---
Carbon Dioxide (% v/v)**					3.19	3.08	5.94	6.95	4.8	---	---
NMOC (ppmV)**					26.0	28.0	29.0	32.0	28.8	---	---
Target Constituents ($\mu g/m^3$)											
Acetone										180,000	30,000
Benzene					**30.0**	**33.0**	**33.0**	**53.0**	**37.3**	----	0.13
Bromodichloromethane										1,300	70.0
Bromoform										---	0.91
Bromomethane										---	5.0
2-Butanone										3,900	5,000
Carbon Disulfide										13,000	700
Carbon Tetrachloride										6,200	0.17
Chlorobenzene					18.0	22.0	16.0	29.0	21.3	1,900	110
Chloroform										---	0.043
Chloromethane										---	90
Dibromochloromethane										----	0.10
1,2-Dichlorobenzene (o)										150	200
1,3-Dichlorobenzene (m)										22,000	10
1,4-Dichlorobenzene (p)										---	0.09
1,1-Dichloroethane										---	0.63
1,2-Dichloroethane										30,000	0.038
1,1-Dichloroethene										---	70
cis-1,2-Dichloroethene										---	63
trans-1,2-Dichloroethene										---	63
1,2-Dichloropropane										---	4.0
1,3-Dichloropropene, cis isomers										---	0.25
1,3-Dichloropropene, trans isomers										---	0.25
Ethylbenzene					18.0	21.0	10.0	25.0	18.5	----	1,000
2-Ethyltoluene										----	0.10
4-Ethyltoluene										---	0.10
2-Hexanone										54,000	30
Methylene Chloride										----	2.1
4-Methyl-2-Pentanone										9,000	3,000
Styrene										4,000	1,000
1,1,2,2-Tetrachloroethane										14,000	16
Tetrachloroethene					**7.9**	**8.3**	5.0	**12.0**	**8.3**	31,000	1.0
Toluene					12.0	13.0	12.0	13.0	12.5	17,000	5,000
1,1,1-Trichloroethane										---	5,000
1,1,2-Trichloroethane										1,000	1.40
Trichloroethene										37,000	0.50
Trichlorofluoromethane										9,000	5,000
Vinyl Chloride					**14.0**	**17.0**	**14.0**	**29.0**	**18.5**	---	0.11
m,p-Xylenes					15.0	17.0	10.0	10.0	13.0	14,000	100
o-Xylenes					5.5	6.3	5.0	5.0	5.5	9,000	100
n-Decane					35.0	38.0	5.0	5.0	20.8	180,000	700

TABLE 3.4
(Continued)

2010 QUARTERLY SUPPLEMENTAL MONITORING SAMPLE RESULTS
FROM THE
OBSWDC LFG PERIMETER COLLECTION/CONTROL SYSTEM
ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

Quarterly	1st Quarter*		2nd Quarter*		3rd Quarter		4th Quarter		ANNUAL AVERAGE	CURRENT	CURRENT
Sample ID	OBL-1	OBL-2	OBL-1	OBL-2	OBL-1	OBL-2	OBL-1	OBL-2	---	SGC	AGC
TIC Constituents (µg/m3)											
Propane					230	250	220	340	260	---	43,000
Isobutene					150	140	210	290	198	---	57,000
n-Butane					160	170	190	240	190	---	57,000
2-Methylpentane					160	150	140	170	155	350,000	4,200
3-Methylpentane					140	140	130	170	145	350,000	4,200
4-Methyloctane					170	140			155	---	---
2,4-Dimethylheptane					150				150	---	---
$C_{10}H_{22}$ Branched Alkane (RT: 23.70)					170	140			155	---	---
$C_{11}H_{24}$ Branched Alkane (RT:24.34)					250	250			250	---	---
Unknown (RT: 24.42)						130			130	---	---
$C_{11}H_{24}$ Branched Alkane (RT:25.33)					130	150			140	---	---
$C_{11}H_{24}$ Branched Alkane (RT:25.41)					130	150			140	---	---
$C_{11}H_{24}$ Branched Alkane (RT:25.70)					200				200	---	---
$C_{11}H_{24}$ Branched Alkane (RT:25.71)						220			220	---	---
$C_{12}H_{26}$ Branched Alkane (RT: 25.92)					320	240			280	---	---
$C_{12}H_{26}$ Branched Alkane (RT: 26.01)					230	220			225	---	---
$C_{12}H_{26}$ Branched Alkane (RT: 26.51)					180	140			160	---	---
Chlorodifluoromethane							69		69	---	50000
Isopentane							110	140	125	---	42000
n-Pentane							110	160	135	---	4200
Methylcyclopentane							120	140	130	---	700
2-Methylhexane								66	66	---	---
3-Methylhexane							68	90	79	---	---
Methylcyclohexane							70	93	82	---	3800
Dimethylcyclohexane Isomers					5	5	75	110	49	---	---
Chlorotrifluoromethane										9000	5000
2-Chloroethylvinyl ether										---	---
Benzaldehyde										---	---

NOTES:

* RTP began data collection, as per NYSDEC request, commencing in the third quarter 2010. As such, first and second quarter analysis was not completed by RTP for 2010.

** Methane and Carbon Dioxide Method Reporting Limits (MRLs) are 0.1%; Non-Methane Organic Carbon (NMOC) MRL is 1.0 ppmV; and Target Constituent MRLs are 5.0 µg/m3 except for m,p-Xylene at 10 µg/m^3 and Acetone, Carbon Disulfide, and 2-Butanone at 50 µg/m^3.

- All values are reported in micrograms per standard cubic meter (µg/std-m^3), except where noted.
- Blank values:
  Targeted Compounds and Targeted TICs- All blank values are below the MRL.
  Additional Tentatively Identified Compounds- All blank values are either below the respective TIC MRL.
- Values in shaded areas are at or exceed the level of the current (recently revised October 2010 and still current as of December 2011) and/or previous ambient air Annual Guideline Concentration (AGC) values. However, it is important to note that LFG concentrations are not ambient concentrations, and therfore, should not be compared to ambient guidelines. As such, these exceedances of guidelines, do not constitute an exceedance of an ambient guideline.

4.0 SUMMARY AND CONCLUSIONS

4.1 Landfill Gas Surveys

4.1.1 2010 Zero Gas Migration Limitation Survey

The 2010 Annual Zero Gas Migration Limitation Survey data, collected by RTP personnel during October 7-8, 2010, are provided in Appendix B. This data was used to identify all points with zero combustible gas, and therefore, defines the zero percent combustible gas migration contour. As shown in Figure 3.1, the gas migration limit remained confined to the OBSWDC complex.

The following conclusions are based on the site survey data obtained in the 2010 annual site survey:

- Both the southern (contiguous to the NCFSA) and eastern portions of the OBSWDC, which had reportedly experienced offsite migration of LFG in the past, did not show that combustible gas is currently in those areas. An area, where combustible gas was detected, was between the southwestern boundary of the landfill and the perimeter road. This area was located just north of the Town's site offices, just southwest of the storm water retention area on the west side of the landfill. This is in the area where gas was detected in 2008 and 2009. LKB's analysis of the available information regarding the soils deposited in this area indicated that the detections within the southern area of former Phase 2 pit area are attributed to the shallow soil most recently placed there, and not to the landfill which is separated from the fill area by the storm water retention area in the Phase 2 pit. Specifically, the soil in this area contained 1-3 percent organics and was high in fines. Therefore, it contained enough organics to generate detectable levels of methane, and has the high porosity but low permeability to retain methane. LKB expects that methane levels in the former Phase 2 pit area will continue to decline over time as the organics in the soil are broken down as indicated by the data collected from 2008 through 2010. Accordingly, no recommended actions regarding the methane levels in the former Phase 2 pit area are suggested at this time. The area where gas was detected is contained onsite since readings on the west side of the perimeter road all show zero combustible gas. One (1) combustible gas reading was also located onsite near the retention pond.

- The Zero Gas Migration Limitation Survey for 2010 indicates that LFG generated by the landfill is currently being contained by the landfill gas control system (See Figure 3.1).

- All other sampling locations monitored in the 2010 Annual Site Survey continue to show that the zero percent combustible gas migration limit remained stable and within the OBSWDC property

boundaries. This includes the areas east of Winding Road, the Nassau County Campground, the Senior Citizen Housing, Briden Construction, the NCFSA and other adjoining areas.

4.1.2 2010 Perimeter Gas Well Monitoring Surveys

Combustible gas concentration data collected from the perimeter gas monitoring wells over four (4) individual monitoring events, one (1) per quarter, indicate that only trace amounts of gas were detected at only a few of the wells sampled. The observed concentrations were well below the LEL which is the NYCRR Part 360 limit for combustible gas at the property boundary. Therefore, the 2010 perimeter gas well monitoring data indicates that the regulatory requirements are being met and the LFG generated by the landfill is currently being contained by the landfill gas collection and control system.

4.1.3 2010 Building/Structure Survey

Combustible gas concentration data was collected within the selected structures onsite over four (4) individual monitoring events, one per quarter. The observed data indicate that no structure had even trace amounts of combustible gas as all readings were recorded as zero percent of the LEL. The 6 NYCRR Part 360 limit for combustible gas in structures is greater than 25% of the LEL. Therefore, the 2010 building/structure survey data indicates that the regulatory requirements are being met.

4.2 2010 Supplemental Monitoring Survey

Supplemental monitoring of landfill gas the bypass vent at the blower station was requested by the NYSDEC. The data is intended to monitor the LFG concentrations of speciated VOCs and other gases being released to the atmosphere at the vent while the TO is not operational. Monitoring of the vent is to be performed quarterly. Quarterly monitoring samples were collected on October 18-19, 2010, just after the request was made by the NYSDEC. At that time, two (2) samples were collected concurrently with the 3rd Quarter 2010 ambient air monitoring event. The second vent exhaust sampling event was performed on November 29-30, 2010 when two (2) samples were also collected concurrently with the 4th quarter ambient air monitoring event. The vent concentration data indicates that, based on four (4) grab samples (2 per quarter), between five (5) to nine (9) target air toxic compounds were detected at fairly low concentrations along with 12 to 15 or more TICs. Three (3) compounds, vinyl chloride, benzene and tetrachloroethene exceeded their respective NYSDEC AGC guideline values for ambient air. These levels are expected to be diluted significantly prior to reaching ground level on surrounding properties, and therefore, are unlikely to exceed AGC guidelines offsite. This conclusion is in agreement with the results of the 2010 Quarterly Ambient Air Monitoring Program. Non-methane organics averaged 29 ppm

over the 4 samples. Methane increased from 2.2 percent to 4.0 percent from the 3rd Quarter to the 4th Quarter Monitoring Event.

4.3 2010 Monitoring Program Conclusions

The following conclusions can be drawn based on the 2010 monitoring programs at the OBSWDC.

- The zero gas migration limit data indicates the combustible levels of landfill gas are not extending beyond the capped landfill area. In the Phase 2 pit area, just west of the onsite retention pond gas is present at non-combustible levels but the source of that gas appears to be organic soil that was used as fill in the area. It should be noted that in 2010 there were fewer locations that showed percentages of LEL above zero as compared to the 2009 monitoring event.
- The speciated compounds detected in the LFG perimeter collection control system bypass vent exhaust are at levels that should not be a cause for concern. The levels of methane measured continue to be well below the levels necessary to operate the Thermal Oxidizer (LKB, 2010).
- The LFG perimeter collection/control system is preventing off-site gas migration and controlling combustible gas to levels that meet the requirements of the site Consent Decree and 6 NYCRR Part 360.

5.0 RECOMMENDATIONS

5.1 General

The programs discussed in this report represent a continuation of certain relevant programs developed in previous reports, specifically the Comprehensive Land Use and Operations Plan (LKB, 1979), the 1986 Annual Report Summarizing the Status of Landfill Gas Monitoring Programs and the Establishment of the Zero Percent Gas Migration Limitation at the Old Bethpage Landfill (LKB, 1987), and are an integral part of the Final Consent Decree and the regulations currently governing the operation of the OBSWDC. As part of the Consent Decree, the Town is obligated, under Appendix AI.(H), to demonstrate compliance with the requirements of 6 NYCRR Part 360, and maintain a zero methane gas limitation at the landfill boundary. The Town is to conduct the monitoring program described in the LKB 1986 Annual Report, "to be amended as necessary." (LKB, 1987)

The OBSWDC landfill gas monitoring surveys have been modified over the years to accommodate both regulatory and permit requirements as well as changing site conditions. The most recent modifications

were based on the findings contained in the 2008-2009 Annual Report (RTP, 2010); the diminishing levels of landfill gas being generated by the Old Bethpage Landfill as it ages and the modifications to site operational permits since the initial program was undertaken. In addition to regulatory compliance, these programs provide the Town with essential data for adjusting operational activities at the site. The following discussion provides the recommended monitoring programs for the 2011 calendar year.

5.2 Recommended 2011 Monitoring Programs

The following recommendations were developed by LKB and the Town in conjunction with discussions with the NYSDEC, and are presented here as part of the summary of landfill gas monitoring programs being conducted. As the Old Bethpage Landfill continues to age, LFG production continues to decrease. Production rate decreases have been confirmed by several findings including: the shutdown of the ET facility in 2003; the decrease in high quality (high percent methane) gas mined from the landfill; the reductions in combustible gas concentrations in perimeter collection system wells; and the decrease in areas where LFG is migrating beyond the footprint of the landfill.

The monitoring conducted during the 2010 calendar year, as discussed above, indicate that there have been no significant expansions of the areas containing combustible gas. In fact, in comparing the zero gas migration limit survey for 2010 with the 2009 survey, the concentrations and extent of the areas with combustible gas have decreased. Other monitoring data from of perimeter monitoring wells on the NCFSA and onsite structures indicate no or little change between the 2010 versus 2009 observations. Based on the above, it is recommended that the monitoring program conducted in 2010 be continued for 2011. Therefore, the surveys identified in Table 5.1 and discussed in more detail in the paragraphs that follow are recommended for the 2011 calendar year.

1. OBSWDC Perimeter Gas Monitoring Well Survey. These combustible gas surveys will be performed at the available OBSWDC perimeter gas monitoring wells identified on Figures 2.1 and 2.2 and will occur during the quarterly ambient air, soil gas and pressure testing performed by RTP.

2. Building Structure Survey. A combustible gas survey will be conducted at the following on-site structures: scale house, guard house, RAP building, Town offices, leachate treatment building., transfer station, maintenance garage, the recycling area buildings and the blower station for the TO. This monitoring will be performed quarterly during the quarterly ambient air tests, soil gas and pressure testing performed by RTP and the Annual Zero Gas Migration Limitation Survey.

3. Supplemental Gas Monitoring Program- LFG System Bypass Vent Monitoring. A supplemental gas monitoring program was instituted in 2010 to monitor releases to the atmosphere of the gas from the perimeter collection system, as requested by the NYSDEC. The two (2) sampling events that were conducted in 2010 show fairly low concentrations of landfill gas exiting the LFG perimeter collection/control system bypass vent, as indicated by an average methane concentration of approximately 2 to 4%. Based on these data, continuing the quarterly sampling of the bypass vent is recommended for 2011, as long as the TO remains inoperable. Should the TO be repaired in 2011, a stack test of the TO will be performed. In addition, should the TO become operational, monthly temperature recordings will resume for the TO as per the Consent Decree.

4. Ambient VOC Air Sampling, Subsurface VOC Gas Sampling and Soil Gas Pressure Readings. These surveys will be performed concurrently and their data are all included in quarterly reports and summarized in a separate annual report.

5. Thermal Oxidizer Emissions Sampling for VOCs. This sampling will be reinitialized within 180 days of the TO coming back online. If in the future gas concentrations diminish to a point where the TO cannot operate effectively, the Town should research other means of disposing of the landfill gases being generated.

6. Thermal Oxidizer Monthly Temperature Reporting. Monthly temperature reporting for the TO will be reinitialized as soon as the unit is back online.

7. Zero Gas Migration Limitation Survey. The annual monitoring of the zero gas migration limit will continue. The primary focus of this effort should be along the edge of the landfill liner to assure subsurface gas migration is contained within the limits of the landfill boundary. This will assure, along with the quarterly monitoring survey, onsite and offsite structures are not being impacted by landfill generated combustible gas. This annual survey should be extended to cover areas between onsite and offsite structures and the landfill, including the buildings identified in the Building Structure Survey (No. 2 above) such as: the guardhouse, scale house, RAP building. recycling buildings, Town offices and maintenance building, site transfer building and the blower station. The annual survey of the border of the Nassau County Campground should be performed as part of this survey.

TABLE 5.1

2011 MONITORING PROGRAM

ACTIVITY SCHEDULE

Survey No.	Survey Description	Frequency of Monitoring	Monitoring Performed By
1.	OBSWDC Perimeter Gas Monitoring Well Survey	Quarterly	RTP
2.	Building Structure Survey	Quarterly	RTP
3.	Supplemental Gas Monitoring Program a. LFG System Bypass Vent Monitoring	Quarterly	RTP
4.	Ambient VOC Air Sampling, Subsurface VOC Gas Sampling, Soil Gas Pressure Readings	Quarterly	RTP
5.	Thermal Oxidizer Emissions Sampling for VOCs	Annually	RTP
6.	Thermal Oxidizer Temperature Reporting	Monthly	TOB
7.	Zero Gas Migration Limitation Survey	Annually	RTP

Notes: RTP – RTP Environmental Associates, Inc.
TOB – Town of Oyster Bay staff

5.3 Gas Extraction System Condensate Discharge

The Town has been permitted by the Nassau County Department of Public Works to discharge condensate from the gas extraction system into the Nassau County Sewer System. Condensate from the Phase 1 and 2 Gas Control Systems and some carryover of condensate mist from the Phase 3 Gas Control System is directed through a bed of lime chips prior to discharge. Most condensate generated by the Phase 3 and 4 Gas Control Systems are discharged by gravity to leachate collection well 'A' and ultimately pumped to and treated at the Town's Leachate Treatment Plant prior to discharge to the Nassau County Sewer System. No modifications to the condensate management program were recommended by LKB for the 2010 calendar year (LKB, 2010). The activities should be continued for the 2011 calendar year.

5.4 Future Operation of the Landfill Gas Control System

After 30 years of operation, the quantity and quality (methane content) of gas generated by the landfill have diminished significantly, and the landfill gas (LFG) system facilities and equipment are at the end of their useful service life. In November 2010, the Town solicited public bids to repair the TO and return it

to service, however no bids were received. Simultaneously, in support of the effort to return the TO to service and increase LFG quality at the TO to combustible levels, the Town commissioned LKB in 2010 to redesign the piping system in the blower building to separate the LFG collected from the interior wells from the LFG collected from the perimeter system, with a common spare blower set. The purpose of this redesign was to obtain additional higher quality LFG from the unused former gas-to-energy wells in the interior portions of the landfill to provide a higher quality of LFG to the repaired TO. The low quality LFG (up to 5% methane during 2010) from the perimeter collection system would continue to be vented to the atmosphere.

[Postscript: In early 2011, the Town solicited bids again for repairing the thermal oxidizer, however only two bids were received and both were substantially higher than anticipated. The bids received for repairing the thermal oxidizer when combined with the estimate for separating the flow from the internal and perimeter LFG control systems, totaled approximately $1,000,000. However, the methane production capacity of the landfill will continue to decline, making efficient operation of the system unattainable over the long term. Therefore, in 2011, the Town requested that it be allowed to discontinue the operation of the thermal oxidizer permanently. The Town proposed to continue the operation of the perimeter LFG collection system in its current operational mode to control potential off-site LFG migration. (LKB, 2011)]

The recommendations to modify the operation of the LFG control system, including discontinuing the future operation of the TO, will be discussed in more detail in the 2011 Annual Report.

REFERENCES

LKB, 1979. Comprehensive Land Use and Operations Plan.
Lockwood, Kessler & Bartlett, Inc., One Aerial Way, Syosset, New York, 1979.
Submitted to: Town of Oyster Bay, Syosset, New York.

LKB, 1980. Preliminary Engineering Design Report: Phase 1 Gas Control and Recovery Program.
Lockwood, Kessler & Bartlett, Inc., One Aerial Way, Syosset, New York, June, 1980.
Submitted to: Town of Oyster Bay, Syosset, New York.

LKB, 1985. 1984 Annual Report Summarizing the Status of the Landfill Gas Monitoring Programs and the Establishment of the Zero Percent Gas Migration Limitation at the Old Bethpage Landfill.
Lockwood, Kessler & Bartlett, Inc., One Aerial Way, Syosset, New York, April 1985.
Submitted to: Town of Oyster Bay, Syosset, New York.

LKB, 1987. 1986 Annual Report Summarizing the Status of Landfill Gas Monitoring Programs and the Establishment of the Zero Percent Gas Migration Limitation at the Old Bethpage Landfill.
Lockwood, Kessler & Bartlett, Inc., One Aerial Way, Syosset, New York, April 1987.
Submitted to: Town of Oyster Bay, Syosset, New York.

H&S, 2007. 2007 Annual Report, Summarizing the Results of Landfill Gas Monitoring Programs at the Old Bethpage Solid Waste Disposal Complex and Adjacent Areas.
Hazen and Sawyer, P.C., 498 Seventh Avenue, New York, New York, December 2007.

LKB, 2009 Communications with LKB Staff.

LKB, 2010 Communications with LKB Staff.

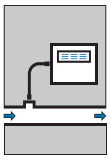
RTP, 2010 2008-2009 Annual Report, Summary of Landfill Gas Monitoring Programs. Prepared by RTP Environmental Associates, Inc., 400 Post Avenue, Westbury, New York. November, 2010.

APPENDIX A
GEM 2000 PLUS SPECIFICATION DATA
CALIBRATION GAS SPECIFICATION DATA

LANDTEC

GEM™2000PLUS

PORTABLE GAS ANALYZER INSTRUMENTATION



Enhanced Model Enables Field Technicians

The GEM™2000 PLUS is designed & field proven to monitor landfill gas extraction systems accurately & efficiently. The GEM™2000 PLUS offers all the advantages and capabilities of the GEM™2000. Utilizing new technology the GEM™2000 PLUS adds the enhanced ability to read Carbon Monoxide and Hydrogen Sulfide.

Features

- Measures CO & H_2S gases
- Measures % CH_4, CO_2 and O_2 Volume, static pressure and differential pressure
- Calculates balance gas, flow (SCFM) and calorific value (KW or BTU)
- Displays % LEL of CH_4 and user-defined comments
- Records site and well conditions
- Extended operation (10 - 14 hrs use from one charge)
- Certified instrinsically safe for landfill use
- Two instruments in one (GA and GEM mode)

Benefits

- Minimize erroneous CO readings
- No need to take more than one instrument to site
- Can be used for routine sub-surface migration monitoring of landfill site perimeter probes and for measuring gas composition, pressure and flow in gas extraction systems
- The user is able to set up comments and questions to record information at site and at each sample point
- Ensures consistent collection of data for accurate analysis
- Allows balancing of gas extraction systems

Applications

- Subsurface Migration Probes
- Gas Extraction Wells
- Flare Monitoring
- Landfills

 850 South Via Lata, Suite 112 Colton, CA 92324 Phone (800) LANDTEC, (909) 783-3636
Visit our web site at http://www.LANDTECNA.com

Technical Specification

Gases Measured	CO_2, CH_4, by dual wavelength infrared cell with reference channel. O_2, H_2S, CO (Hydrogen compensated) by internal electrochemical cell

Range			
CH_4	0-100% Reading	O_2	0-25%
CO_2	0-100% Reading	CO	0-2000ppm
		H_2S	0-500ppm

Gas Accuracy	CH_4	CO_2	O_2
0-5%	±0.3%	±0.3%	±1.0%
5-15%	±1.0%	±1.0%	±1.0%
15% - Full Scale	±3.0%	±3.0%	±1.0%

Other Parameters	Unit	Resolution	Comments
Energy	BTU/hr	1000 BTU/hr	Calculated from specific parameters.
Static Pressure	in.H_2O	0.1 in.H_2O	Direct Measurement
Differential Pressure	in.H_2O	0.001 in.H_2O	Direct Measurement

CO Measurement	Compensated for interference from Hydrogen up to 1% Hydrogen. Cross sensitivity approx 1%.
Flow	Typically 300 cc/min
Flow with 5.9 in.Hg vacuum	Approximately 250 cc/min
Operating Temperature Range	32°F - 104°F
Relative Humidity	0-95% non condensing
Barometric Pressure	±5.9 in.Hg from calibration pressure
Barometric Pressure Accuracy	±1% typically
Battery Life	Typical use 10 hours from fully charged
Charge Time	Approximately 2 hours from complete discharge.

LANDTEC North America
Western Sales Office
(800) 821-0496 • Fax (909) 825-0591
Eastern Sales Office
(800) 390-7745 • Fax (301) 391-6546

LANDTEC South America
+55(11) 5181-6591 • Fax +55(11) 5181-6585
www.LANDTEC.com.br

FIELD ENVIRONMENTAL INSTRUMENTS, INC.
www.fieldenvironmental.com

301 Brushton Avenue
Suite A
Pittsburgh PA 15221
800-393-4009 Toll Free
(412) 436-2600 Local
(412) 436-2616 Fax

Landtec Landfill Meter Calibration Certificate

	Reading %	Acceptable Range
Fresh Air Oxygen	20.8	(20.65% - 21.15%)

	Lot #	Expiration
Cal Standard	9-3685	3/24/2011

	Reading %	Acceptable Range
Methane 15%	15.0	(14.7% - 15.3%)
Carbon Dioxide 15%	15.0	(14.5% - 15.5%)
Carbon Monoxide 50%	50.0	(51% - 49%)
Hydrogen Sulfide 25%	25.0	(24% - 26%)

Model	GEM-2000+
S/N	gm12023109
Barcode	U59954X
Order #	138684

Calibrated By: Gene Donofrio

Date of Calibration: 01/13/10

All calibrations performed by Field Environmental Instruments conform to manufacturer's specifications.
All calibration gas used is traceable to NIST. Additional documentation is available upon request.

APPENDIX B

2010 ZERO GAS MIGRATION LIMITATION SURVEY DATA
FARMINGDALE, NY METEOROLOGICAL DATA DURING SURVEY

Zero Gas Migration Limitation Survey Data
October 2010

Town of Oyster Bay
Old Bethpage Solid Waste Disposal Complex

Date	Time	Sample ID	% LEL	X	Y
10/7/2010	09:09:26am	1	0	1137462	216529
10/7/2010	09:10:59am	2	0	1137418	216555
10/7/2010	09:12:26am	3	0	1137368	216586
10/7/2010	09:13:36am	4	0	1137323	216608
10/7/2010	09:15:04am	5	0	1137274	216637
10/7/2010	09:16:52am	6	0	1137279	216647
10/7/2010	09:18:12am	7	0	1137220	216661
10/7/2010	09:19:17am	8	0	1137166	216686
10/7/2010	09:20:14am	9	0	1137122	216704
10/7/2010	09:21:15am	10	0	1137079	216732
10/7/2010	09:23:18am	11	0	1137030	216753
10/7/2010	09:26:48am	12	0	1136987	216781
10/7/2010	09:30:36am	13	0	1136962	216728
10/7/2010	09:31:22am	14	0	1136885	216657
10/7/2010	09:32:41am	15	0	1136865	216610
10/7/2010	09:33:45am	16	0	1136851	216559
10/7/2010	09:34:46am	17	0	1136840	216511
10/7/2010	09:35:42am	18	0	1136830	216458
10/7/2010	09:36:37am	19	0	1136826	216406
10/7/2010	09:37:29am	20	0	1136819	216355
10/7/2010	09:38:27am	21	0	1136815	216306
10/7/2010	09:39:20am	22	0	1136809	216256
10/7/2010	09:40:24am	23	0	1136804	216205
10/7/2010	09:41:15am	24	0	1136798	216152
10/7/2010	09:42:11am	25	0	1136792	216099
10/7/2010	09:43:23am	26	0	1136788	216053
10/7/2010	09:44:17am	27	0	1136782	216004
10/7/2010	09:45:08am	28	0	1136767	215952
10/7/2010	09:45:59am	29	0	1136757	215904
10/7/2010	09:46:46am	30	0	1136748	215859
10/7/2010	09:47:37am	31	0	1136735	215805
10/7/2010	09:48:45am	32	0	1136719	215759
10/7/2010	09:49:32am	33	0	1136700	215715
10/7/2010	09:50:23am	34	0	1136676	215669
10/7/2010	09:51:18am	35	0	1136637	215643
10/7/2010	09:52:08am	36	0	1136590	215622
10/7/2010	09:52:59am	37	0	1136590	215640
10/7/2010	09:53:51am	38	0	1136602	215585
10/7/2010	09:55:25am	39	0	1136547	215616
10/7/2010	09:56:35am	40	0	1136545	215629
10/7/2010	09:57:21am	41	0	1136500	215609
10/7/2010	09:58:19am	42	0	1136496	215622

Zero Gas Migration Limitation Survey Data
October 2010

Town of Oyster Bay
Old Bethpage Solid Waste Disposal Complex

Date	Time	Sample ID	% LEL	X	Y
10/7/2010	09:59:05am	43	0	1136486	215632
10/7/2010	10:00:10am	44	0	1136450	215590
10/7/2010	10:01:25am	45	0	1136440	215600
10/7/2010	10:02:24am	46	0	1136430	215639
10/7/2010	10:03:20am	47	0	1136427	215662
10/7/2010	10:05:28am	48	0	1136376	215601
10/7/2010	10:06:05am	49	0	1136309	215558
10/7/2010	10:07:26am	50	0	1136250	215533
10/7/2010	10:08:42am	51	0	1136207	215510
10/7/2010	10:10:08am	52	0	1136162	215405
10/7/2010	10:18:08am	53	0	1136142	215348
10/7/2010	10:20:13am	54	0	1136362	215415
10/7/2010	10:21:39am	55	0	1136332	215483
10/7/2010	10:22:45am	56	0	1136369	215464
10/7/2010	10:23:48am	57	0	1136365	215359
10/7/2010	10:24:41am	58	0	1136357	215309
10/7/2010	10:25:46am	59	0	1136358	215258
10/7/2010	10:26:58am	60	0	1136342	215257
10/7/2010	10:27:55am	61	0	1136357	215199
10/7/2010	10:29:05am	62	0	1136354	215150
10/7/2010	10:30:02am	63	0	1136353	215097
10/7/2010	10:31:19am	64	0	1136354	215048
10/7/2010	10:32:42am	65	0	1136353	215001
10/7/2010	10:33:41am	66	0	1136352	214951
10/7/2010	10:34:59am	67	0	1136351	214900
10/7/2010	10:36:12am	68	0	1136353	214848
10/7/2010	10:37:06am	69	0	1136351	214797
10/7/2010	10:38:03am	70	0	1136338	214799
10/7/2010	10:39:17am	71	0	1136356	214750
10/7/2010	10:40:13am	72	0	1136343	214749
10/7/2010	10:41:19am	73	0	1136331	214749
10/7/2010	10:42:41am	74	0	1136315	214745
10/7/2010	10:44:27am	75	0	1136301	214744
10/7/2010	10:45:16am	76	0	1136282	214741
10/7/2010	10:46:14am	77	0	1136362	214703
10/7/2010	10:49:39am	78	0	1136347	214695
10/7/2010	10:58:39am	79	0	1136330	214699
10/7/2010	10:59:29am	80	0	1136316	214689
10/7/2010	11:00:41am	81	0	1136298	214688
10/7/2010	11:02:41am	82	0	1136300	214644
10/7/2010	11:03:41am	83	0	1136315	214593
10/7/2010	11:04:51am	84	0	1136319	214550

Zero Gas Migration Limitation Survey Data
October 2010

Town of Oyster Bay
Old Bethpage Solid Waste Disposal Complex

Date	Time	Sample ID	% LEL	X	Y
10/7/2010	11:06:03am	85	0	1136290	214508
10/7/2010	11:07:14am	86	0	1136271	214476
10/7/2010	11:08:44am	87	0	1136320	214419
10/7/2010	11:10:43am	88	0	1136295	214399
10/7/2010	11:11:58am	89	0	1136348	214378
10/7/2010	11:12:55am	90	0	1136399	214372
10/7/2010	11:14:06am	91	0	1136435	214347
10/7/2010	11:15:09am	92	0	1136459	214305
10/7/2010	11:15:57am	93	0	1136478	214262
10/7/2010	11:17:28am	94	0	1136491	214215
10/7/2010	11:18:32am	95	0	1136466	214214
10/7/2010	11:20:24am	96	0	1136499	214167
10/7/2010	11:21:16am	97	0	1136532	214138
10/7/2010	11:22:35am	98	0	1136566	214109
10/7/2010	11:23:35am	99	0	1136601	214079
10/7/2010	11:24:56am	100	0	1136649	214069
10/7/2010	11:25:35am	101	0	1136679	214034
10/7/2010	11:26:49am	102	0	1136722	214015
10/7/2010	11:29:21am	103	0	1136780	214010
10/7/2010	11:30:15am	104	0	1136819	214019
10/7/2010	11:31:27am	105	0	1136857	214039
10/7/2010	11:32:10am	106	0	1136895	214071
10/7/2010	11:33:09am	107	0	1136934	214096
10/7/2010	11:35:28am	108	0	1136995	214109
10/7/2010	11:36:18am	109	0	1137009	214145
10/7/2010	11:37:15am	110	0	1137037	214188
10/7/2010	11:38:10am	111	0	1137047	214236
10/7/2010	11:39:31am	112	0	1137059	214281
10/7/2010	11:40:39am	113	0	1137071	214326
10/7/2010	11:42:32am	114	0	1137084	214375
10/7/2010	11:43:22am	115	0	1137093	214368
10/7/2010	11:44:50am	116	0	1137100	214416
10/7/2010	11:45:43am	117	0	1137115	214459
10/7/2010	11:47:14am	118	0	1137131	214507
10/7/2010	11:48:05am	119	0	1137181	214512
10/7/2010	11:49:00am	120	0	1137224	214497
10/7/2010	11:49:54am	121	0	1137262	214486
10/7/2010	11:51:12am	122	0	1137306	214474
10/7/2010	11:54:41am	123	0	1137352	214460
10/7/2010	11:55:43am	124	0	1137391	214447
10/7/2010	11:56:45am	125	0	1137432	214440
10/7/2010	11:57:52am	126	0	1137484	214426

Zero Gas Migration Limitation Survey Data
October 2010

Town of Oyster Bay
Old Bethpage Solid Waste Disposal Complex

Date	Time	Sample ID	% LEL	X	Y
10/7/2010	11:58:41am	127	0	1137529	214413
10/7/2010	11:59:49am	128	0	1137574	214397
10/7/2010	12:01:47pm	129	0	1137612	214413
10/7/2010	12:02:21pm	130	0	1137659	214399
10/7/2010	12:03:38pm	131	0	1137716	214392
10/7/2010	12:05:26pm	132	0	1137767	214419
10/7/2010	12:06:21pm	133	0	1137812	214441
10/7/2010	12:07:03pm	134	0	1137838	214481
10/7/2010	12:08:12pm	135	0	1137860	214523
10/7/2010	12:09:02pm	136	0	1137883	214569
10/7/2010	12:10:16pm	137	0	1137900	214613
10/7/2010	12:11:18pm	138	0	1137920	214654
10/7/2010	12:12:29pm	139	0	1137939	214698
10/7/2010	12:13:26pm	140	0	1137493	216493
10/7/2010	12:14:15pm	141	0	1137482	216446
10/7/2010	01:54:51pm	142	0	1137480	216394
10/7/2010	01:55:37pm	143	0	1137484	216341
10/7/2010	01:56:31pm	144	0	1137489	216285
10/7/2010	01:57:16pm	145	0	1137510	216230
10/7/2010	01:58:11pm	146	0	1137531	216182
10/7/2010	01:59:06pm	147	0	1137563	216142
10/7/2010	02:00:05pm	148	0	1137604	216107
10/7/2010	02:00:58pm	149	0	1137649	216093
10/7/2010	02:01:52pm	150	0	1137697	216087
10/7/2010	02:02:41pm	151	0	1137738	216085
10/7/2010	02:03:48pm	152	0	1137786	216082
10/7/2010	02:04:48pm	153	0	1137827	216072
10/7/2010	02:05:41pm	154	0	1137881	216069
10/7/2010	02:07:02pm	155	0	1137921	216106
10/7/2010	02:07:58pm	156	0	1137913	216045
10/7/2010	02:09:16pm	157	0	1137907	215988
10/7/2010	02:11:58pm	158	0	1137910	215938
10/7/2010	02:12:40pm	159	0	1137914	215886
10/7/2010	02:13:48pm	160	0	1137917	215835
10/7/2010	02:15:56pm	161	0	1137918	215782
10/7/2010	02:17:07pm	162	0	1137920	215731
10/7/2010	02:26:44pm	163	0	1137925	215679
10/7/2010	02:27:46pm	164	0	1137928	215628
10/7/2010	02:28:39pm	165	0	1137929	215577
10/7/2010	02:29:21pm	166	0	1137931	215528
10/7/2010	02:30:14pm	167	0	1137931	215478
10/7/2010	02:31:57pm	168	0	1137935	215429

Zero Gas Migration Limitation Survey Data
October 2010

Town of Oyster Bay
Old Bethpage Solid Waste Disposal Complex

Date	Time	Sample ID	% LEL	X	Y
10/7/2010	02:32:46pm	169	0	1137943	215378
10/7/2010	02:33:47pm	170	0	1137949	215325
10/7/2010	02:34:28pm	171	0	1137958	215277
10/7/2010	02:35:11pm	172	0	1137981	215278
10/7/2010	02:36:34pm	173	0	1137968	215227
10/7/2010	02:37:21pm	174	0	1137977	215175
10/7/2010	02:38:07pm	175	0	1137988	215126
10/7/2010	02:39:15pm	176	0	1137996	215076
10/7/2010	02:40:09pm	177	0	1138003	215027
10/7/2010	02:41:09pm	178	0	1138029	215031
10/7/2010	02:41:59pm	179	0	1138007	214976
10/7/2010	02:42:47pm	180	0	1138004	214923
10/7/2010	02:43:51pm	181	0	1137996	214868
10/7/2010	02:45:23pm	182	0	1137982	214817
10/7/2010	02:46:20pm	183	0	1137961	214757
10/7/2010	02:47:10pm	184	0	1136992	214044
10/7/2010	02:48:08pm	185	0	1136982	214000
10/7/2010	02:48:57pm	186	0	1136962	213954
10/7/2010	02:49:40pm	187	0	1136950	213900
10/7/2010	02:50:25pm	188	0	1136937	213859
10/7/2010	02:51:22pm	189	0	1136905	213815
10/7/2010	02:52:10pm	190	0	1136893	213781
10/7/2010	02:53:07pm	191	0	1136857	213823
10/7/2010	02:54:04pm	192	0	1136806	213835
10/7/2010	02:55:15pm	193	0	1136817	213914
10/7/2010	02:55:46pm	194	0	1136767	213909
10/7/2010	02:56:29pm	195	0	1136720	213921
10/7/2010	02:57:14pm	196	0	1136674	213926
10/7/2010	02:58:05pm	197	0	1136622	213929
10/7/2010	02:58:56pm	198	0	1136568	213918
10/7/2010	02:59:41pm	199	0	1136527	213879
10/7/2010	03:00:26pm	200	0	1136506	213831
10/7/2010	03:01:17pm	201	0	1136484	213785
10/7/2010	03:02:14pm	202	0	1136428	213784
10/7/2010	03:03:02pm	203	0	1136398	213707
10/7/2010	03:03:57pm	204	0	1136317	213739
10/7/2010	03:05:10pm	205	0	1136272	213752
10/7/2010	03:05:50pm	206	0	1136226	213771
10/7/2010	03:06:48pm	207	0	1136180	213785
10/7/2010	03:07:40pm	208	0	1136154	213738
10/7/2010	03:08:23pm	209	0	1136122	213712
10/7/2010	03:09:06pm	210	0	1136089	213674

Zero Gas Migration Limitation Survey Data
October 2010

Town of Oyster Bay
Old Bethpage Solid Waste Disposal Complex

Date	Time	Sample ID	% LEL	X	Y
10/7/2010	03:09:57pm	211	0	1136044	213696
10/7/2010	03:10:53pm	212	0	1136012	213726
10/7/2010	03:11:55pm	213	0	1135999	213802
10/7/2010	03:14:13pm	214	0	1135973	213848
10/7/2010	03:16:35pm	215	0	1135943	213897
10/7/2010	03:18:32pm	216	0	1135953	213936
10/7/2010	03:20:36pm	217	0	1135948	214003
10/7/2010	03:22:26pm	218	0	1135945	214050
10/7/2010	03:23:43pm	219	0	1135944	214097
10/7/2010	03:24:45pm	220	0	1135941	214158
10/7/2010	03:25:37pm	221	0	1135960	214242
10/7/2010	03:27:37pm	222	0	1135961	214279
10/7/2010	03:29:25pm	223	0	1135967	214341
10/7/2010	03:32:49pm	224	0	1135975	214375
10/7/2010	03:33:57pm	225	0	1135973	214422
10/7/2010	03:34:41pm	226	0	1135960	214478
10/7/2010	03:35:53pm	227	0	1135943	214523
10/7/2010	03:36:58pm	228	0	1135925	214576
10/7/2010	03:38:11pm	229	0	1135901	214622
10/7/2010	03:39:11pm	230	0	1135872	214672
10/8/2010	09:03:56am	231	0	1135844	214707
10/8/2010	09:04:59am	232	0	1135821	214759
10/8/2010	09:05:59am	233	0	1135804	214804
10/8/2010	09:07:01am	234	0	1135786	214857
10/8/2010	09:07:52am	235	0	1135776	214910
10/8/2010	09:08:37am	236	0	1135775	214966
10/8/2010	09:09:30am	237	0	1135780	215025
10/8/2010	09:10:25am	238	0	1135798	215080
10/8/2010	09:11:18am	239	0	1135816	215121
10/8/2010	09:12:35am	240	0	1135828	215227
10/8/2010	09:13:33am	241	0	1135858	215223
10/8/2010	09:14:32am	242	0	1135883	215266
10/8/2010	09:15:38am	243	0	1135895	215336
10/8/2010	09:16:33am	244	0	1135881	215393
10/8/2010	09:17:19am	245	0	1135847	215431
10/8/2010	09:18:19am	246	0	1135811	215467
10/8/2010	09:19:21am	247	0	1135767	215506
10/8/2010	09:20:15am	248	0	1135729	215547
10/8/2010	09:21:35am	249	0	1135699	215592
10/8/2010	09:22:22am	250	0	1135673	215604
10/8/2010	09:23:16am	251	0	1135669	215649
10/8/2010	09:24:31am	252	0	1135681	215701

Zero Gas Migration Limitation Survey Data
October 2010

Town of Oyster Bay
Old Bethpage Solid Waste Disposal Complex

Date	Time	Sample ID	% LEL	X	Y
10/8/2010	09:25:07am	253	3	1135725	215730
10/8/2010	09:26:45am	254	0	1135767	215766
10/8/2010	09:28:48am	255	0	1135808	215790
10/8/2010	09:29:51am	256	0	1135854	215820
10/8/2010	09:30:44am	257	0	1135895	215854
10/8/2010	09:32:11am	258	0	1135938	215888
10/8/2010	09:32:48am	259	0	1135980	215922
10/8/2010	09:33:47am	260	0	1136026	215946
10/8/2010	09:36:36am	261	0	1136073	215964
10/8/2010	09:37:19am	262	0	1136122	215987
10/8/2010	09:38:09am	263	0	1136158	216010
10/8/2010	09:39:24am	264	0	1136181	216054
10/8/2010	09:41:00am	265	0	1136221	216082
10/8/2010	09:41:34am	266	0	1136266	216058
10/8/2010	09:42:07am	267	0	1136312	216036
10/8/2010	09:43:00am	268	0	1136358	216012
10/8/2010	09:44:07am	269	0	1136398	215992
10/8/2010	09:45:22am	270	0	1136440	215968
10/8/2010	09:46:26am	271	0	1136200	214552
10/8/2010	09:47:21am	272	0	1136210	214536
10/8/2010	09:48:23am	273	0	1136145	214550
10/8/2010	09:49:22am	274	0	1136060	214508
10/8/2010	09:50:10am	275	0	1136193	214604
10/8/2010	09:51:23am	276	0	1136137	214601
10/8/2010	09:52:10am	277	0	1136080	214604
10/8/2010	09:53:30am	278	0	1136028	214594
10/8/2010	09:54:30am	279	0	1135978	214587
10/8/2010	09:55:22am	280	0	1135931	214681
10/8/2010	09:56:20am	281	0	1135984	214694
10/8/2010	09:57:18am	282	0	1136030	214698
10/8/2010	09:58:27am	283	0	1136093	214708
10/8/2010	10:00:21am	284	0	1136171	214710
10/8/2010	10:01:15am	285	0	1136153	214802
10/8/2010	10:02:33am	286	0	1136055	214799
10/8/2010	10:03:21am	287	0	1135956	214793
10/8/2010	10:04:36am	288	0	1135881	214779
10/8/2010	10:05:32am	289	0	1135907	214882
10/8/2010	10:06:32am	290	0	1136006	214891
10/8/2010	10:08:08am	291	0	1136099	214902
10/8/2010	10:09:32am	292	0	1136180	214905
10/8/2010	10:10:27am	293	0	1136167	215007
10/8/2010	10:11:31am	294	0	1136069	214991

Zero Gas Migration Limitation Survey Data
October 2010

Town of Oyster Bay
Old Bethpage Solid Waste Disposal Complex

Date	Time	Sample ID	% LEL	X	Y
10/8/2010	10:12:22am	295	0	1135976	214976
10/8/2010	10:13:20am	296	0	1135891	215004
10/8/2010	10:14:26am	297	0	1135904	215103
10/8/2010	10:15:29am	298	0	1136000	215110
10/8/2010	10:16:41am	299	0	1136111	215100
10/8/2010	10:21:36am	300	0	1136173	215224
10/8/2010	10:22:54am	301	0	1136276	215284
10/8/2010	10:23:50am	302	0	1136496	215742
10/8/2010	10:24:40am	303	0	1136464	215766
10/8/2010	10:25:57am	304	0	1136482	215814
10/8/2010	10:26:43am	305	0	1136498	215871
10/8/2010	10:27:36am	306	0	1136516	215927
10/8/2010	10:28:36am	307	0	1136527	215979
10/8/2010	10:31:43am	308	0	1136540	216026
10/8/2010	10:33:09am	309	0	1136554	216078
10/8/2010	10:34:47am	310	4	1136569	216133
10/8/2010	10:39:05am	311	20	1136581	216180
10/8/2010	10:39:37am	312	4	1136597	216232
10/8/2010	10:40:54am	313	13	1136612	216292
10/8/2010	10:42:13am	314	0	1136624	216340
10/8/2010	10:44:01am	315	30	1136642	216389
10/8/2010	10:46:44am	316	0	1136654	216438
10/8/2010	10:48:03am	317	0	1136667	216485
10/8/2010	10:49:04am	318	0	1136680	216537
10/8/2010	10:50:27am	319	0	1136695	216592
10/8/2010	10:51:52am	320	0	1136708	216644
10/8/2010	10:53:02am	321	0	1136724	216689
10/8/2010	10:56:47am	322	0	1136733	216740
10/8/2010	10:58:35am	323	0	1136746	216783
10/8/2010	11:08:29am	324	0	1136763	216830
10/8/2010	11:09:07am	325	0	1136776	216874
10/8/2010	11:09:45am	326	0	1136788	216921
10/8/2010	11:10:26am	327	0	1136847	216962
10/8/2010	11:11:27am	328	0	1136861	217015

Note:

XY Coordinates in NY State Plane Long Island (Feet) NAD83.

APPENDIX C
CAS ANALYTICAL DATA FOR VENT SAMPLES

LABORATORY REPORT

November 2, 2010

Brian Aerne
RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590

RE: TOB-OBL 3Q LFG Sampling / TOB-OBL

Dear Brian:

Enclosed are the results of the samples submitted to our laboratory on October 20, 2010. For your reference, these analyses have been assigned our service request number P1003897.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Kate Aguilera
Project Manager

Client:	RTP Environmental Associates, Inc.	CAS Project No:	P1003897
Project:	TOB-OBL 3Q LFG Sampling / TOB-OBL	New York Lab ID:	11221

CASE NARRATIVE

The samples were received intact under chain of custody on October 20, 2010 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Total Gaseous Non-Methane Organics as Methane Analysis

The samples were analyzed for total gaseous non-methane organics as methane per modified EPA Method TO-3 using a gas chromatograph equipped with a flame ionization detector (FID).

Fixed Gases Analysis

The samples were also analyzed for fixed gases (methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD).

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds and tentatively identified compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. The analytical system was comprised of a gas chromatograph/ mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. According to the method, the use of Tedlar bags is considered a method modification.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: RTP Environmental Associates, Inc. Service Request: P1003897
Project ID: TOB-OBL 3Q LFG Sampling / TOB-OBL

Date Received: 10/20/10
Time Received: 10:10

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	TO-3 Modified - C1C6+ Bag	3C Modified - Fxd Gases Bag	TO-15 Modified - VOC Bags
TOB-OBL-1	P1003897-001	Air	10/18/10	10:27	X	X	X
TOB-OBL-2	P1003897-002	Air	10/19/10	09:32	X	X	X

CHAIN OF CUSTODY RECORD

RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590
Ph: (516) 333-4526
Fax: (516) 333-4571

Project name:	TOB-OBL 3Q LFG Sampling
Project ID:	TOB-OBL
Project Location:	Oyster Bay Landfill
Laboratory:	Columbia Analytical
Samplers: (Signature)	BA

P1003597 Page 1 of 1

Test ID	Sample ID	Matrix (A, L, S)	Date	Time	Sample Method	Sample Duration	Number of Containers	Analysis Requested: TNMOC	SOC (custom)	CH4	CO2
101810	TOB-OBL-1	A	10/18/10	10:27	Grab	40 min	1	✓	✓	✓	✓
101910	TOB-OBL-2	A	10/19/10	9:32	Grab	40 min	1	✓	✓	✓	✓

Relinquished by: (Signature)	Date/Time: 10/19/10 / 10:45	Received By: (Signature)	Date/Time: 10/20/10 1010
Relinquished by: (Signature)	Date/Time:	Received By: (Signature)	Date/Time:

Remarks: ATTN: Kate Aguilera

Custom VOC list discussed w/ Kate Aguilera.
Please call Brian Aerne @ 516-333-4526 w/ questions.
Thank you!

Delivery Method:	UPS Priority Overnight
Custody Seals Intact:	Yes No

\\Rtpdc01\public\RTPNY\Forms\Chain of Custodies\BRKN LFG COC

Columbia Analytical Services™ 2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

Sample Acceptance Check Form

Client: RTP Environmental Associates, Inc. Work order: P1003897

Project: TOB-OBL 3Q LFG Sampling / TOB-OBL

Sample(s) received on: 10/20/10 Date opened: 10/20/10 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☐	☒	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature _____ °C Blank Temperature _____ °C			
10	Was a **trip blank** received?	☐	☒	☐
	Trip blank supplied by CAS: _____			
11	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
12	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1003897-001.01	1.0 L Tedlar Bag					
P1003897-002.01	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

Client: **RTP Environmental Associates, Inc.**
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Project ID: P1003897

Total Gaseous Nonmethane Organics (TGNMO) as Methane

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton
Sampling Media: 1.0 L Tedlar Bag(s)
Test Notes:

Date(s) Collected: 10/18 - 10/19/10
Date Received: 10/20/10
Date Analyzed: 10/20/10

Client Sample ID	CAS Sample ID	Injection Volume ml(s)	**Result ppmV**	MRL ppmV	Data Qualifier
TOB-OBL-1	P1003897-001	1.0	**26**	1.0	
TOB-OBL-2	P1003897-002	1.0	**28**	1.0	
Method Blank	P101020-MB	1.0	ND	1.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-1** CAS Project ID: P1003897
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P1003897-001

Test Code: EPA Method 3C Modified Date Collected: 10/18/10
Instrument ID: HP5890 II/GC1/TCD Date Received: 10/20/10
Analyst: Wade Henton Date Analyzed: 10/20/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
74-82-8	**Methane**	**2.12**	0.10	
124-38-9	**Carbon Dioxide**	**3.19**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-2** CAS Project ID: P1003897
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P1003897-002

Test Code: EPA Method 3C Modified Date Collected: 10/19/10
Instrument ID: HP5890 II/GC1/TCD Date Received: 10/20/10
Analyst: Wade Henton Date Analyzed: 10/20/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
74-82-8	**Methane**	**2.28**	0.10	
124-38-9	**Carbon Dioxide**	**3.08**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1003897
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P101020-MB

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 10/20/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-1**
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL**

CAS Project ID: P1003897
CAS Sample ID: P1003897-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13
Analyst: Chris Cornett
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 10/18/10
Date Received: 10/20/10
Date Analyzed: 10/20/10
Volume(s) Analyzed: 0.10 Liter(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	**14**	5.0	**5.3**	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	ND	50	ND	21	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene Chloride	ND	5.0	ND	1.4	
75-15-0	Carbon Disulfide	ND	50	ND	16	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
78-93-3	2-Butanone (MEK)	ND	50	ND	17	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**30**	5.0	**9.4**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-1** CAS Project ID: P1003897
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P1003897-001

Test Code: EPA TO-15 Modified Date Collected: 10/18/10
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/20/10
Analyst: Chris Cornett Date Analyzed: 10/20/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 Liter(s)
Test Notes:

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**12**	5.0	**3.3**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
127-18-4	Tetrachloroethene	**7.9**	5.0	**1.2**	0.74	
108-90-7	Chlorobenzene	**18**	5.0	**3.8**	1.1	
100-41-4	Ethylbenzene	**18**	5.0	**4.1**	1.2	
179601-23-1	m,p-Xylenes	**15**	10	**3.5**	2.3	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**5.5**	5.0	**1.3**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
622-96-8	4-Ethyltoluene	ND	5.0	ND	1.0	
611-14-3	2-Ethyltoluene	ND	5.0	ND	1.0	
124-18-5	n-Decane	**35**	5.0	**6.1**	0.86	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**

Client Sample ID: **TOB-OBL-1** CAS Project ID: P1003897

Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P1003897-001

Tentatively Identified Compounds

Test Code: EPA TO-15 Modified Date Collected: 10/18/10

Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/20/10

Analyst: Chris Cornett Date Analyzed: 10/20/10

Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 Liter(s)

Test Notes: **T**

GC/MS Retention Time	**Compound Identification**	**Concentration µg/m³**	**Data Qualifier**
4.70	Propane	**230**	
5.76	Isobutene	**150**	
5.94	n-Butane	**160**	
11.22	2-Methylpentane	**160**	
11.82	3-Methylpentane	**140**	
20.95	2,4-Dimethylheptane	**150**	
22.03	4-Methyloctane	**170**	
23.70	$C_{10}H_{22}$ Branched Alkane	**170**	
24.34	$C_{11}H_{24}$ Branched Alkane	**250**	
25.33	$C_{11}H_{24}$ Branched Alkane	**130**	
25.41	$C_{11}H_{24}$ Branched Alkane	**130**	
25.70	$C_{11}H_{24}$ Branched Alkane	**200**	
25.92	$C_{12}H_{26}$ Branched Alkane	**320**	
26.01	$C_{12}H_{26}$ Branched Alkane	**230**	
26.51	$C_{12}H_{26}$ Branched Alkane	**180**	

T = Analyte is a tentatively identified compound, result is estimated.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-2**
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL**

CAS Project ID: P1003897
CAS Sample ID: P1003897-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13
Analyst: Chris Cornett
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 10/19/10
Date Received: 10/20/10
Date Analyzed: 10/20/10
Volume(s) Analyzed: 0.10 Liter(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	**17**	5.0	**6.6**	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	ND	50	ND	21	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene Chloride	ND	5.0	ND	1.4	
75-15-0	Carbon Disulfide	ND	50	ND	16	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
78-93-3	2-Butanone (MEK)	ND	50	ND	17	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**33**	5.0	**10**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-2** CAS Project ID: P1003897
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P1003897-002

Test Code: EPA TO-15 Modified Date Collected: 10/19/10
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/20/10
Analyst: Chris Cornett Date Analyzed: 10/20/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 Liter(s)
Test Notes:

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**13**	5.0	**3.4**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
127-18-4	Tetrachloroethene	**8.3**	5.0	**1.2**	0.74	
108-90-7	Chlorobenzene	**22**	5.0	**4.8**	1.1	
100-41-4	Ethylbenzene	**21**	5.0	**4.9**	1.2	
179601-23-1	m,p-Xylenes	**17**	10	**3.9**	2.3	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**6.3**	5.0	**1.4**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
622-96-8	4-Ethyltoluene	ND	5.0	ND	1.0	
611-14-3	2-Ethyltoluene	ND	5.0	ND	1.0	
124-18-5	n-Decane	**38**	5.0	**6.6**	0.86	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**

Client Sample ID: **TOB-OBL-2** CAS Project ID: P1003897

Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P1003897-002

Tentatively Identified Compounds

Test Code: EPA TO-15 Modified Date Collected: 10/19/10

Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/20/10

Analyst: Chris Cornett Date Analyzed: 10/20/10

Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 Liter(s)

Test Notes: **T**

GC/MS Retention Time	**Compound Identification**	**Concentration µg/m³**	**Data Qualifier**
4.70	Propane	**250**	
5.76	Isobutene	**140**	
5.94	n-Butane	**170**	
11.22	2-Methylpentane	**150**	
11.82	3-Methylpentane	**140**	
22.03	4-Methyloctane	**140**	
23.70	$C_{10}H_{22}$ Branched Alkane	**140**	
24.34	$C_{11}H_{24}$ Branched Alkane	**250**	
24.42	Unidentified Compound	**130**	
25.33	$C_{11}H_{24}$ Branched Alkane	**150**	
25.41	$C_{11}H_{24}$ Branched Alkane	**150**	
25.71	$C_{11}H_{24}$ Branched Alkane	**220**	
25.92	$C_{12}H_{26}$ Branched Alkane	**240**	
26.01	$C_{12}H_{26}$ Branched Alkane	**220**	
26.51	$C_{12}H_{26}$ Branched Alkane	**140**	

T = Analyte is a tentatively identified compound, result is estimated.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1003897
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P101020-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Chris Cornett Date Analyzed: 10/20/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	0.50	ND	0.24	
75-01-4	Vinyl Chloride	ND	0.50	ND	0.20	
74-83-9	Bromomethane	ND	0.50	ND	0.13	
75-00-3	Chloroethane	ND	0.50	ND	0.19	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	0.50	ND	0.089	
75-35-4	1,1-Dichloroethene	ND	0.50	ND	0.13	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
75-15-0	Carbon Disulfide	ND	5.0	ND	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	ND	0.13	
75-34-3	1,1-Dichloroethane	ND	0.50	ND	0.12	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	0.50	ND	0.13	
67-66-3	Chloroform	ND	0.50	ND	0.10	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ND	0.092	
71-43-2	Benzene	ND	0.50	ND	0.16	
56-23-5	Carbon Tetrachloride	ND	0.50	ND	0.080	
78-87-5	1,2-Dichloropropane	ND	0.50	ND	0.11	
75-27-4	Bromodichloromethane	ND	0.50	ND	0.075	
79-01-6	Trichloroethene	ND	0.50	ND	0.093	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1003897
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P101020-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Chris Cornett Date Analyzed: 10/20/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.50	ND	0.12	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ND	0.092	
108-88-3	Toluene	ND	0.50	ND	0.13	
591-78-6	2-Hexanone	ND	0.50	ND	0.12	
124-48-1	Dibromochloromethane	ND	0.50	ND	0.059	
127-18-4	Tetrachloroethene	ND	0.50	ND	0.074	
108-90-7	Chlorobenzene	ND	0.50	ND	0.11	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	0.50	ND	0.048	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ND	0.073	
622-96-8	4-Ethyltoluene	ND	0.50	ND	0.10	
611-14-3	2-Ethyltoluene	ND	0.50	ND	0.10	
124-18-5	n-Decane	ND	0.50	ND	0.086	
541-73-1	1,3-Dichlorobenzene	ND	0.50	ND	0.083	
106-46-7	1,4-Dichlorobenzene	ND	0.50	ND	0.083	
95-50-1	1,2-Dichlorobenzene	ND	0.50	ND	0.083	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**

Client Sample ID: **Method Blank** CAS Project ID: P1003897

Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Sample ID: P101020-MB

Tentatively Identified Compounds

Test Code: EPA TO-15 Modified Date Collected: NA

Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA

Analyst: Chris Cornett Date Analyzed: 10/20/10

Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)

Test Notes:

GC/MS Retention Time	**Compound Identification**	**Concentration µg/m³**	**Data Qualifier**
	No Compounds Detected		

SURROGATE SPIKE RECOVERY RESULTS

Client: **RTP Environmental Associates, Inc.**
Client Project ID: **TOB-OBL 3Q LFG Sampling / TOB-OBL** CAS Project ID: P1003897

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date(s) Collected: 10/18 - 10/19/10
Analyst: Chris Cornett Date(s) Received: 10/20/10
Sampling Media: 1.0 L Tedlar Bag(s) Date(s) Analyzed: 10/20/10
Test Notes:

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P101020-MB	**104**	**100**	**93**	70-130	
TOB-OBL-1	P1003897-001	**100**	**111**	**110**	70-130	
TOB-OBL-2	P1003897-002	**93**	**108**	**108**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

LABORATORY REPORT

December 15, 2010

Brian Aerne
RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590

RE: TOB-OBL 4Q LFG Sampling / TOB-OBL

Dear Brian:

Enclosed are the results of the samples submitted to our laboratory on December 1, 2010. For your reference, these analyses have been assigned our service request number P1004498.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Kate Aguilera
Project Manager

Client:	RTP Environmental Associates, Inc.	CAS Project No:	P1004498
Project:	TOB-OBL 4Q LFG Sampling / TOB-OBL	New York Lab ID:	11221

CASE NARRATIVE

The samples were received intact under chain of custody on December 1, 2010 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD).

Total Gaseous Non-Methane Organics as Methane Analysis

The samples were also analyzed for total gaseous non-methane organics as methane per modified EPA Method TO-3 using a gas chromatograph equipped with a flame ionization detector (FID).

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds and tentatively identified compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. The analytical system was comprised of a gas chromatograph/mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. According to the method, the use of Tedlar bags is considered a method modification.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: RTP Environmental Associates, Inc. Service Request: P1004498
Project ID: TOB-OBL 4Q LFG Sampling / TOB-OBL

Date Received: 12/1/2010
Time Received: 10:20

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	TO-3 Modified - C1C6+ Bag	3C Modified - Fxd Gases Bag	TO-15 Modified - VOC Bags
TOB-OBL-1	P1004498-001	Air	11/29/2010	14:21	X	X	X
TOB-OBL-2	P1004498-002	Air	11/30/2010	12:55	X	X	X

CHAIN OF CUSTODY RECORD

RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590
Ph: (516) 333-4526
Fax: (516) 333-4571

Project name:	TOB-OBL 4Q LFG Sampling
Project ID:	TOB-OBL
Project Location:	Oyster Bay Landfill
Laboratory:	Columbia Analytical
Samplers: (Signature)	BA

P1004498

Test ID	Sample ID	Matrix (A, L, S)	Date	Time	Sample Method	Sample Duration	Number of Containers	Analysis Requested: TNMOC	Analysis Requested: VOC (custom)	Analysis Requested: CH4	Analysis Requested: CO2
(1)	112910	TOB-OBL-1	A	11/29/10	14:21	Grab	45 min	1	✓	✓	✓	✓
(2)	113010	TOB-OBL-2	A	11/30/10	12:55	Grab	45 min	1	✓	✓	✓	✓

Relinquished by: (Signature)	Date/Time: 11/30/10 / 15:00	Received By: (Signature)	Date/Time: 12/1/10 1020
Relinquished by: (Signature)	Date/Time:	Received By: (Signature)	Date/Time:

Remarks: ATTN: Kate Aguilera
Custom VOC list discussed w/ Kate Aguillera.
Please call Brian Aerne @ 516 333-4526 w/ questions!
Thanks!

Delivery Method:	UPS Priority Overnight
Custody Seals Intact:	Yes No

P:\RTP NY\Forms\Chain of Custodies\TOB LFG COC.xls

Columbia Analytical Services™ 2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

Sample Acceptance Check Form

Client: RTP Environmental Associates, Inc. Work order: P1004498

Project: TOB-OBL 4Q LFG Sampling / TOB-OBL

Sample(s) received on: 12/1/10 Date opened: 12/1/10 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☐	☒	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature _____ °C Blank Temperature _____ °C			
10	Was a **trip blank** received?	☐	☒	☐
	Trip blank supplied by CAS: _____			
11	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
12	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1004498-001.01	1.0 L Tedlar Bag					
P1004498-002.01	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-1** CAS Project ID: P1004498
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P1004498-001

Test Code: EPA Method 3C Modified Date Collected: 11/29/10
Instrument ID: HP5890 II/GC1/TCD Date Received: 12/1/10
Analyst: Wade Henton Date Analyzed: 12/1/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
74-82-8	**Methane**	**3.11**	0.10	
124-38-9	**Carbon Dioxide**	**5.94**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-2** CAS Project ID: P1004498
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P1004498-002

Test Code: EPA Method 3C Modified Date Collected: 11/30/10
Instrument ID: HP5890 II/GC1/TCD Date Received: 12/1/10
Analyst: Wade Henton Date Analyzed: 12/1/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
74-82-8	**Methane**	**4.90**	0.10	
124-38-9	**Carbon Dioxide**	**6.95**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1004498
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P101201-MB

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 12/01/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Project ID: P1004498

Total Gaseous Nonmethane Organics (TGNMO) as Methane

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton
Sampling Media: 1.0 L Tedlar Bag(s)
Test Notes:

Date(s) Collected: 11/29 - 11/30/10
Date Received: 12/1/10
Date Analyzed: 12/1/10

Client Sample ID	CAS Sample ID	Injection Volume ml(s)	**Result ppmV**	MRL ppmV	Data Qualifier
TOB-OBL-1	P1004498-001	1.0	**29**	1.0	
TOB-OBL-2	P1004498-002	1.0	**32**	1.0	
Method Blank	P101201-MB	1.0	ND	1.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-1**
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL**

CAS Project ID: P1004498
CAS Sample ID: P1004498-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 11/29/10
Date Received: 12/1/10
Date Analyzed: 12/2/10
Volume(s) Analyzed: 0.050 Liter(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	10	ND	4.8	
75-01-4	Vinyl Chloride	**14**	10	**5.7**	3.9	
74-83-9	Bromomethane	ND	10	ND	2.6	
75-00-3	Chloroethane	ND	10	ND	3.8	
67-64-1	Acetone	ND	100	ND	42	
75-69-4	Trichlorofluoromethane	ND	10	ND	1.8	
75-35-4	1,1-Dichloroethene	ND	10	ND	2.5	
75-09-2	Methylene Chloride	ND	10	ND	2.9	
75-15-0	Carbon Disulfide	ND	100	ND	32	
156-60-5	trans-1,2-Dichloroethene	ND	10	ND	2.5	
75-34-3	1,1-Dichloroethane	ND	10	ND	2.5	
78-93-3	2-Butanone (MEK)	ND	100	ND	34	
156-59-2	cis-1,2-Dichloroethene	ND	10	ND	2.5	
67-66-3	Chloroform	ND	10	ND	2.0	
107-06-2	1,2-Dichloroethane	ND	10	ND	2.5	
71-55-6	1,1,1-Trichloroethane	ND	10	ND	1.8	
71-43-2	Benzene	**33**	10	**10**	3.1	
56-23-5	Carbon Tetrachloride	ND	10	ND	1.6	
78-87-5	1,2-Dichloropropane	ND	10	ND	2.2	
75-27-4	Bromodichloromethane	ND	10	ND	1.5	
79-01-6	Trichloroethene	ND	10	ND	1.9	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-1** CAS Project ID: P1004498
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P1004498-001

Test Code: EPA TO-15 Modified Date Collected: 11/29/10
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 12/1/10
Analyst: Wida Ang Date Analyzed: 12/2/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.050 Liter(s)
Test Notes:

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	10	ND	2.2	
108-10-1	4-Methyl-2-pentanone	ND	10	ND	2.4	
10061-02-6	trans-1,3-Dichloropropene	ND	10	ND	2.2	
79-00-5	1,1,2-Trichloroethane	ND	10	ND	1.8	
108-88-3	Toluene	**12**	10	**3.2**	2.7	
591-78-6	2-Hexanone	ND	10	ND	2.4	
124-48-1	Dibromochloromethane	ND	10	ND	1.2	
127-18-4	Tetrachloroethene	ND	10	ND	1.5	
108-90-7	Chlorobenzene	**16**	10	**3.6**	2.2	
100-41-4	Ethylbenzene	**10**	10	**2.4**	2.3	
179601-23-1	m,p-Xylenes	ND	20	ND	4.6	
75-25-2	Bromoform	ND	10	ND	0.97	
100-42-5	Styrene	ND	10	ND	2.3	
95-47-6	o-Xylene	ND	10	ND	2.3	
79-34-5	1,1,2,2-Tetrachloroethane	ND	10	ND	1.5	
622-96-8	4-Ethyltoluene	ND	10	ND	2.0	
611-14-3	2-Ethyltoluene	ND	10	ND	2.0	
124-18-5	n-Decane	ND	10	ND	1.7	
541-73-1	1,3-Dichlorobenzene	ND	10	ND	1.7	
106-46-7	1,4-Dichlorobenzene	ND	10	ND	1.7	
95-50-1	1,2-Dichlorobenzene	ND	10	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-1** CAS Project ID: P1004498
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P1004498-001

Tentatively Identified Compounds

Test Code: EPA TO-15 Modified Date Collected: 11/29/10
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 12/1/10
Analyst: Wida Ang Date Analyzed: 12/2/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.050 Liter(s)
Test Notes: **T**

GC/MS Retention Time	Compound Identification	Concentration µg/m³	Data Qualifier
4.83	Chlorodifluoromethane	**69**	
4.91	Propane	**220**	
6.04	Isobutene	**210**	
6.23	n-Butane	**190**	
8.11	Isopentane	**110**	
8.96	n-Pentane	**110**	
11.67	2-Methylpentane	**140**	
12.28	3-Methylpentane	**130**	
14.25	Methylcyclopentane	**120**	
16.35	3-Methylhexane	**68**	
18.21	Methylcyclohexane	**70**	
20.11	Dimethylcyclohexane Isomers	**75**	
	Chlorotrifluoromethane	NF	
	2-Chloroethylvinyl ether	NF	
	Benzaldehyde	NF	

T = Analyte is a tentatively identified compound, result is estimated.
NF = Compound was searched for, but not found.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-2** CAS Project ID: P1004498
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P1004498-002

Test Code: EPA TO-15 Modified Date Collected: 11/30/10
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 12/1/10
Analyst: Wida Ang Date Analyzed: 12/2/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.050 Liter(s)
Test Notes:

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	10	ND	4.8	
75-01-4	Vinyl Chloride	**29**	10	**11**	3.9	
74-83-9	Bromomethane	ND	10	ND	2.6	
75-00-3	Chloroethane	ND	10	ND	3.8	
67-64-1	Acetone	ND	100	ND	42	
75-69-4	Trichlorofluoromethane	ND	10	ND	1.8	
75-35-4	1,1-Dichloroethene	ND	10	ND	2.5	
75-09-2	Methylene Chloride	ND	10	ND	2.9	
75-15-0	Carbon Disulfide	ND	100	ND	32	
156-60-5	trans-1,2-Dichloroethene	ND	10	ND	2.5	
75-34-3	1,1-Dichloroethane	ND	10	ND	2.5	
78-93-3	2-Butanone (MEK)	ND	100	ND	34	
156-59-2	cis-1,2-Dichloroethene	ND	10	ND	2.5	
67-66-3	Chloroform	ND	10	ND	2.0	
107-06-2	1,2-Dichloroethane	ND	10	ND	2.5	
71-55-6	1,1,1-Trichloroethane	ND	10	ND	1.8	
71-43-2	Benzene	**53**	10	**17**	3.1	
56-23-5	Carbon Tetrachloride	ND	10	ND	1.6	
78-87-5	1,2-Dichloropropane	ND	10	ND	2.2	
75-27-4	Bromodichloromethane	ND	10	ND	1.5	
79-01-6	Trichloroethene	ND	10	ND	1.9	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **TOB-OBL-2** CAS Project ID: P1004498
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P1004498-002

Test Code: EPA TO-15 Modified Date Collected: 11/30/10
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 12/1/10
Analyst: Wida Ang Date Analyzed: 12/2/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.050 Liter(s)
Test Notes:

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	10	ND	2.2	
108-10-1	4-Methyl-2-pentanone	ND	10	ND	2.4	
10061-02-6	trans-1,3-Dichloropropene	ND	10	ND	2.2	
79-00-5	1,1,2-Trichloroethane	ND	10	ND	1.8	
108-88-3	Toluene	**13**	10	**3.3**	2.7	
591-78-6	2-Hexanone	ND	10	ND	2.4	
124-48-1	Dibromochloromethane	ND	10	ND	1.2	
127-18-4	Tetrachloroethene	**12**	10	**1.7**	1.5	
108-90-7	Chlorobenzene	**29**	10	**6.4**	2.2	
100-41-4	Ethylbenzene	**25**	10	**5.9**	2.3	
179601-23-1	m,p-Xylenes	ND	20	ND	4.6	
75-25-2	Bromoform	ND	10	ND	0.97	
100-42-5	Styrene	ND	10	ND	2.3	
95-47-6	o-Xylene	ND	10	ND	2.3	
79-34-5	1,1,2,2-Tetrachloroethane	ND	10	ND	1.5	
622-96-8	4-Ethyltoluene	ND	10	ND	2.0	
611-14-3	2-Ethyltoluene	ND	10	ND	2.0	
124-18-5	n-Decane	ND	10	ND	1.7	
541-73-1	1,3-Dichlorobenzene	ND	10	ND	1.7	
106-46-7	1,4-Dichlorobenzene	ND	10	ND	1.7	
95-50-1	1,2-Dichlorobenzene	ND	10	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**

Client Sample ID: **TOB-OBL-2** CAS Project ID: P1004498

Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P1004498-002

Tentatively Identified Compounds

Test Code: EPA TO-15 Modified Date Collected: 11/30/10

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 12/1/10

Analyst: Wida Ang Date Analyzed: 12/2/10

Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.050 Liter(s)

Test Notes: **T**

GC/MS Retention Time	Compound Identification	Concentration µg/m³	Data Qualifier
4.91	Propane	**340**	
6.04	Isobutene	**290**	
6.23	n-Butane	**240**	
8.11	Isopentane	**140**	
8.96	n-Pentane	**160**	
11.67	2-Methylpentane	**170**	
12.28	3-Methylpentane	**170**	
14.25	Methylcyclopentane	**140**	
15.98	2-Methylhexane	**66**	
16.35	3-Methylhexane	**90**	
18.21	Methylcyclohexane	**93**	
20.10	Dimethylcyclohexane Isomers	**110**	
	Chlorotrifluoromethane	NF	
	2-Chloroethylvinyl ether	NF	
	Benzaldehyde	NF	

T = Analyte is a tentatively identified compound, result is estimated.

NF = Compound was searched for, but not found.

RESULTS OF ANALYSIS

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1004498
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P101202-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 12/2/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	0.50	ND	0.24	
75-01-4	Vinyl Chloride	ND	0.50	ND	0.20	
74-83-9	Bromomethane	ND	0.50	ND	0.13	
75-00-3	Chloroethane	ND	0.50	ND	0.19	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	0.50	ND	0.089	
75-35-4	1,1-Dichloroethene	ND	0.50	ND	0.13	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
75-15-0	Carbon Disulfide	ND	5.0	ND	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	ND	0.13	
75-34-3	1,1-Dichloroethane	ND	0.50	ND	0.12	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	0.50	ND	0.13	
67-66-3	Chloroform	ND	0.50	ND	0.10	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ND	0.092	
71-43-2	Benzene	ND	0.50	ND	0.16	
56-23-5	Carbon Tetrachloride	ND	0.50	ND	0.080	
78-87-5	1,2-Dichloropropane	ND	0.50	ND	0.11	
75-27-4	Bromodichloromethane	ND	0.50	ND	0.075	
79-01-6	Trichloroethene	ND	0.50	ND	0.093	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1004498
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P101202-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 12/2/10
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.50	ND	0.12	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ND	0.092	
108-88-3	Toluene	ND	0.50	ND	0.13	
591-78-6	2-Hexanone	ND	0.50	ND	0.12	
124-48-1	Dibromochloromethane	ND	0.50	ND	0.059	
127-18-4	Tetrachloroethene	ND	0.50	ND	0.074	
108-90-7	Chlorobenzene	ND	0.50	ND	0.11	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	0.50	ND	0.048	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ND	0.073	
622-96-8	4-Ethyltoluene	ND	0.50	ND	0.10	
611-14-3	2-Ethyltoluene	ND	0.50	ND	0.10	
124-18-5	n-Decane	ND	0.50	ND	0.086	
541-73-1	1,3-Dichlorobenzene	ND	0.50	ND	0.083	
106-46-7	1,4-Dichlorobenzene	ND	0.50	ND	0.083	
95-50-1	1,2-Dichlorobenzene	ND	0.50	ND	0.083	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **RTP Environmental Associates, Inc.**

Client Sample ID: **Method Blank** CAS Project ID: P1004498

Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Sample ID: P101202-MB

Tentatively Identified Compounds

Test Code:	EPA TO-15 Modified	Date Collected:	NA
Instrument ID:	Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9	Date Received:	NA
Analyst:	Wida Ang	Date Analyzed:	12/2/10
Sampling Media:	1.0 L Tedlar Bag	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			

GC/MS Retention Time	**Compound Identification**	**Concentration µg/m³**	**Data Qualifier**
	No Compounds Detected		

SURROGATE SPIKE RECOVERY RESULTS

Client: **RTP Environmental Associates, Inc.**
Client Project ID: **TOB-OBL 4Q LFG Sampling / TOB-OBL** CAS Project ID: P1004498

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 11/29 - 11/30/10
Analyst: Wida Ang Date(s) Received: 12/1/10
Sampling Media: 1.0 L Tedlar Bag(s) Date(s) Analyzed: 12/2/10
Test Notes:

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P101202-MB	**110**	**97**	**102**	70-130	
TOB-OBL-1	P1004498-001	**98**	**96**	**110**	70-130	
TOB-OBL-2	P1004498-002	**98**	**104**	**114**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.