UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

DATE: APR 13 2006

SUBJECT: Explanation of Significant Differences for the Combe Fill South Landfill Superfund Site

FROM: Carole Petersen, Chief
New Jersey Remediation Branch

TO: George Pavlou, Director
Emergency and Remedial Response Division

Attached for your approval is an Explanation of Significant Differences (ESD) for the Combe Fill South Landfill Superfund Site (Site), located in Chester Township, Morris County, New Jersey. The modification identified in the ESD pertains to a change from an active landfill gas and condensate collection and treatment system to a passive landfill gas venting system during the remedial action phase of the project.

The remedy selected in the September 29, 1986 ROD consisted of installing an alternate water supply for affected residences; capping of the 65-acre landfill in accordance with Resource Conservation and Recovery Act requirements; installing an active collection and treatment system for landfill gases; pumping and on-Site treatment of shallow groundwater and leachate, with discharge to Trout Brook; implementing surface water controls to accommodate seasonal precipitation and storm runoff; installing security fencing to restrict Site access; implementing appropriate environmental monitoring to ensure the effectiveness of the remedial action; and conducting a supplemental feasibility study to evaluate the need for remediation of the deep aquifer.

In accordance with Section 117 (d) of the Comprehensive Environmental Response, Compensation, and Liability Act, a notice of the ESD will be published in the local newspaper.

I recommend that you approve this ESD. My staff and I are available to discuss this recommendation at your convenience.

Attachment

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Attachment

CONCURRENCES

Name: Combe Fill South | Init: | Date: | Filename: ESD memo for LFG Del.doc

Symbol	NNJRS	NNJRS	NJRB	ERRD	ERRD			
Surname	Baxter	McKnight	Petersen	Pavlou	EPicCahn			
Date	3/30/06	3/30/06	4/1/06	4/7/06	4/7/06			

REGION II FORM 1320-1 (9/85)

EXPLANATION OF SIGNIFICANT DIFFERENCES
COMBE FILL SOUTH LANDFILL SUPERFUND SITE

Site Name and Location
Combe Fill South Landfill Superfund Site
Chester Township
Morris County, New Jersey

Introduction

The United States Environmental Protection Agency (EPA) and the New Jersey Department of Environmental Protection (NJDEP) are jointly issuing this Explanation of Significant Differences (ESD) to explain a modification of EPA's selected remedy issued on September 29, 1986 as the Record of Decision (ROD) for the Combe Fill South Landfill Superfund Site (Site). This ESD pertains to a change from an active landfill gas and condensate collection and treatment system to a passive landfill gas venting system during the remedial action phase of the project. The change to a passive gas venting system was made as a result of test results obtained from studies subsequent to the 1986 ROD and contemporaneous with the change. Subsequent to the change, further testing has confirmed the appropriateness and protectiveness of that change.

This ESD is issued in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. 9617(c), and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR 300.435 (c)(2)(i), which contain provisions for addressing and documenting "significant" changes that occur to a remedy after a ROD is signed. While the change described herein may not be "significant" within the meaning of 40 CFR 300.435(c)(2)(i), nevertheless NJDEP and EPA are issuing this ESD in the exercise of their discretion to provide the public with notice of the change in accordance with the public notice provisions of the NCP. This ESD and documents contemporaneous to, and which form the basis for the 1994 decision to implement the passive gas venting system, as well as subsequent test results confirming its protectiveness, will be incorporated into the Administrative Record for the Site in accordance with Section 300.825(a)(2) of the NCP. The Administrative Record is available for review during normal business hours

at EPA Region II, 290 Broadway, New York, New York 10007, and at the Chester Township Municipal Building, 1 Parker Road, Chester, New Jersey 07930.

Site History, Contamination Problems, and Selected Remedy

The Combe Fill South Landfill Superfund Site is located at 98 Parker Road in Chester Township, Morris County, New Jersey. The landfill property is about 115 acres and extends into portions of both Washington and Chester Townships.[1] As remediated, the final cap area is over 62 acres with about another 20 acres occupied primarily by the treatment facility, drainage ditches, site roads, and detention basins.

Historically, the Site may have been operated from as early as the 1940s through 1981. Approximately five million cubic yards of refuse were estimated in the ROD to be contained within the landfill. The majority of waste disposed of at the Site was household waste and non-hazardous industrial waste. The Site was listed on the National Priorities List (NPL) in 1983. A Remedial Investigation and Feasibility Study (RI/FS) for the Site was performed during 1984 and 1985. During the RI/FS, a wide range of hazardous substances and/or chemical contaminants were found. These hazardous substances and contaminants were consistent with known past usage of the Site and the variety of wastes accepted, and they persisted in groundwater, surface water and the atmosphere. Volatile organic compounds were identified within both the unconsolidated and consolidated aquifers in and around the Site. Groundwater contamination was, and likely continues to be, migrating northeast and southwest and was predicted to possibly increase in concentration with distance from the landfill. The FS specifically identified residents living on Schoolhouse Lane, less than one-half mile from the landfill, and pupils of the day-care facility located on Parker Road as being at risk because groundwater is the primary source of potable water in the immediate area surrounding the Site.

A design contract was awarded in December 1987 and the construction documents were completed in February 1992.

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[1] In Chester Township, the Combe Fill South Landfill property is listed on the tax map as Block 17, Lot 7. In Washington Township the CFSL property is listed as Block 37, Lots 15, 16, and 16.01.

The remedy selected in the September 29, 1986 ROD consisted of:

- An alternate water supply for affected residences;[2]
- Capping of the 65-acre landfill in accordance with Resource Conservation and Recovery Act requirements;
- An active collection and treatment[3] system for landfill gases;
- Pumping and on-Site treatment of shallow groundwater and leachate, with discharge to Trout Brook;
- Surface water controls to accommodate seasonal precipitation and storm runoff;
- Security fencing to restrict Site access;
- Appropriate environmental monitoring to ensure the effectiveness of the remedial action; and
- A supplemental feasibility study to evaluate the need for remediation of the deep aquifer.[4]

Description of Difference and Basis for the Change

The difference between the remedy selected in the 1986 ROD and the action described in this ESD is the elimination of the active landfill gas and condensate collection and treatment system and its replacement with a passive landfill gas venting system.

After the installation of the gas wells in 1994, the New Jersey Department of Environmental Protection directed the design contractor to test those gas wells to ensure that the designed flare was suitable for the landfill gas. By letter dated July 11, 1994, attached hereto as Exhibit 1, the contractor recommended "that the gas flare system should be deleted from the contract and that the gas well vents at Combe Fill South should be passively vented."

Testing at that time had shown that the total worst-case landfill emissions of 0.44 pounds per hour for non-methane hydrocarbons and 0.054 pounds per hour of toxic volatile organic substances were both below state-of-the-art control guidelines. Additionally, the average incremental risk

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[2] In February 1995, the alternate water supply component of the ROD was suspended by NJDEP and USEPA pending results of further sampling.

[3] As is explained more fully herein, the active gas collection and treatment component of the ROD was suspended because testing of the landfill gas in 1994 revealed that passive venting was appropriate.

[4] This work commenced in 2003.

posed by landfill emissions was predicted to be 8.72×10^{-7}, which was lower than the policy limit of 1.0×10^{-6}. Based on this data, NJDEP and EPA decided to accept the design contractor's recommendation that passive gas venting was appropriate.

Accordingly, on July 28, 1994, NJDEP's Division of Publicly Funded Site Remediation Remedial Planning & Design Element applied to NJDEP's Air Quality Regulation Program for a modification to its existing air permit, attached hereto as Exhibit 2, for the landfill to eliminate the direct-flow, enclosed flare and to allow passive venting of the 65 wells installed. The NJDEP Air Quality Regulation Program issued an air permit equivalency, attached hereto as Exhibit 3, for passive gas venting on August 2, 1994.

Installation of the clay and liner portions of the cap proceeded from 1994 into early 1995. Installation of the topsoil layer was completed in November 1995. Since there were major punch list and warranty items to be completed, substantial completion was not declared until September 1997. In November 1997, the contractor performed a confirmatory round of sampling on-site at the direction of NJDEP. The results of this testing, reported by letter dated March 16, 1998, attached hereto as Exhibit 4, confirmed that the worst-case emissions of non-methane hydrocarbons and toxic volatile organic substances were below NJDEP emission rate limitations. The contractor concluded that no further action regarding landfill gas venting was required. In its letter dated March 16, 1998, the remedial designer noted that there was an estimated cost savings associated with the deletion of over $1,000,000.

By letter dated July 27, 1994, attached hereto as Exhibit 5, the design contractor advised the remedial action contractor of the deletion of the active landfill gas collection and treatment system. This deletion took the form of a modification, Modification 32. Modification 32, the text of which is attached hereto as Exhibit 6, was issued to the remedial action contractor on August 19, 1994. The design contractor estimated that the deletion would result in a credit of about $1,500,000. A final credit calculation of $1,578,317.30 was provided by the design contractor to the remedial action contractor by transmittal dated April 12, 1995, attached hereto as Exhibit 7.

Supporting Agency Comments

EPA supports and concurs in NJDEP's revision to the Combe Fill South Landfill remedy through the elimination of the active landfill and condensate collection and treatment system and its replacement with a passive landfill gas venting system. NJDEP supports EPA's decision to issue this ESD.

Affirmation of Statutory Determinations

Considering all of the information and data referred to herein, and the modification made to the selected remedy described herein, EPA and NJDEP concur that the remedy remains protective of human health and the environment, complies with federal and state requirements that were identified in the ROD and this ESD as applicable or relevant and appropriate to this remedial action, and remains cost effective. In addition, the remedy, modified as described herein, utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

Public Participation Activities

NJDEP and EPA routinely meet with local officials, residents and interested parties to update them on the status of Site activities. In accordance with the public notice provisions of the NCP and CERCLA, EPA will publish a notice of this ESD in the local newspaper, The Daily Record. The ESD and supporting documentation will be placed in the Administrative Record for the Site, which is available at the information repositories for public review.

William McCabe

George Pavlou, Director
Emergency and Remedial
Response Division

4-17-06
Date

Exhibits

1. July 11, 1994 - O'Brien & Gere letter
2. July 28, 1994 - NJDEP memo
3. August 2, 1994 - NJDEP memo
4. March 16, 1998 - O'Brien & Gere letter
5. July 27, 1994 - O'Brien & Gere letter
6. August 19, 1994 - O'Brien & Gere letter

O'BRIEN & GERE
ENGINEERS, INC.

July 11, 1994

NJDEPE/DPFSR
Bureau of Construction
Combe Fill South Landfill
Chester, New Jersey 07930

Attn: Site Construction Managers

Re: Combe Fill South Landfill

Subject: Gas Well Air Sampling Results

File: 3013.015

Dear Sir/Madam:

This letter report summarizes the results of the gas well air sampling event performed by O'Brien & Gere Engineers (O'Brien & Gere) on June 13 and June 14, 1994 at the Combe Fill South Landfill (Combe Fill South) located in Chester, New Jersey.

The on-site gas testing program conducted at Combe Fill South by O'Brien & Gere from April 14 to May 6, 1994 indicated that the landfill gas methane concentration was significantly lower than anticipated during design. The gas generation rate is dependent on several factors, including refuse age. More dilute gas concentrations may be a result of refuse which has passed or is nearing the end of its steady state generation period. Therefore, stationary source testing was conducted at eight landfill gas wells to evaluate the concentrations of non-methane hydrocarbons, toxic volatile organic substances, total volatile chlorinated organics, and hydrogen sulfide in order to determine if changes in the landfill gas characterization have occurred such that the need for a flare could be downsized or eliminated.

The results of the gas well air testing are summarized as follows:

- Table 1 - Non-methane Hydrocarbons
- Table 2 - Toxic Volatile Organic Substances
- Table 3 - Total Volatile Chlorinated Organics
- Table 4 - Hydrogen Sulfide

The laboratory results, including nitrogen concentrations and the chain of custody, and an instrument calibration certificate are presented in Appendix A.

O'Brien & Gere Engineers, Inc., an O'Brien & Gere Company
5000 Brittonfield Parkway / P.O. Box 4873 / Syracuse, NY 13221 / (315) 437-6100 FAX (315) 463-7554
...and offices in major U.S. cities

GAS WELL SAMPLING LOCATIONS

Testing was performed on gas wells 11, 25, 26, 27, 28, 45, 57, and 66. As mentioned above, O'Brien & Gere performed methane testing on these same gas wells from April 14 to May 6, 1994. It is O'Brien & Gere's opinion that evaluation of these gas wells provides a representative account of the activity that is occurring at Combe Fill South. All samples were collected between the hours of 11:00 A.M. and 5:00 P.M., since the landfill is believed to be most active during this time period.

SAMPLING AND ANALYTICAL PROCEDURES

Non-Methane Hydrocarbons

Gas well testing for non-methane hydrocarbons (NMHC) was conducted in accordance with procedures outlined in South Coast Air Quality Management District (SCAQMD) 25.2 - Determination of Carbon Monoxide, Methane and Total Non-methane Organic Compounds at Low Concentrations by Total Combustion Analysis (TCA/FID).

Samples from the gas wells were collected in SUMMA® canisters supplied by ENSECO Air Toxics Laboratory (ENSECO). Canister identification tags were completed with information that included sample location, sampling time, date, pre- and post-pressure readings, and the initials of the sampling personnel. The canisters were shipped to ENSECO with a completed chain of custody for analysis. Non-methane hydrocarbons were quantified by gas chromatography/flame ionization detection (GC/FID).

Toxic Volatile Organic Substances & Total Volatile Chlorinated Organics

Gas well testing for toxic volatile organic substances (TXS) and total volatile chlorinated organics (TVCO) was conducted in accordance with procedures outlined in Toxic Organics Method 14 (TO-14) - Determination of Volatile Organic Compounds in Ambient Air Using SUMMA® Passivated Canister Sampling and Gas Chromatographic Analysis. This method is located in the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air.

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Hydrogen Sulfide

Gas well testing for hydrogen sulfide was conducted using a Bacharach Sentinel 4 portable gas monitor. This unit is accurate to within 2% of the full range of 0 to 200 ppm hydrogen sulfide. An air sample was continuously collected over a five minute period which identified a peak concentration as well as a time weighted average (TWA) concentration of hydrogen sulfide.

Sample Ports and Gas Velocity

To prevent any alterations to existing gas wells, a 4"x4"x2" PVC tee and a 5' PVC extension were placed on the top of each sampled gas well head to provide a sample port and means to determine gas velocity. While this does not follow USEPA Reference Method 1 - Sample and Velocity Traverses for Stationary Sources, since it is considered a flow disturbance, approval was received by New Jersey Department of Environmental Protection & Energy (NJDEPE). Gas velocity measurements were determined using a Solomat® environmental measurement instrument.

RESULTS AND DISCUSSION

The laboratory results are reported in parts per million (ppm) and parts per billion (ppb). The following conversion formulas were used to express the compound concentrations in lb/hr:

ppm to lb/hr:

$(C/10^6) \times V \times A \times 1/359 \times (492°R/537°R) \times (60 \text{ minutes}/1 \text{ hour}) \times MW$

where:

C = contaminant concentration, ppm
V = gas velocity, ft/min
A = duct cross-sectional area, ft^2
1/359 = ideal gas constant, lb-mole/ft^3
MW = molecular weight of contaminant, lb/lb-mole

ppb to lb/hr:

$(C/10^9) \times V \times A \times 1/359 \times (492°R/537°R) \times (60 \text{ minutes}/1 \text{ hour}) \times MW$

lb/hr of TVCO to lb/hr as Cl:

lb/hr TVCO x 35.45 x (N/MW)

where:

35.45 = molecular weight of chlorine, lb/lb-mole
N = number of chlorine atoms in TVCO
MW = molecular weight of TVCO, lb/lb-mole

Non-Methane Hydrocarbon Results

Gas well air sampling results for NMHC are presented in Table 1. The New Jersey regulation which governs whether "state-of-the-art" air pollution control equipment is required for NMHC (as methane) applies when emissions of NMHC are greater than 0.5 lb/hr from the entire landfill. Of the eight gas wells that were tested, Well 28 released the greatest amount of NMHC at approximately 0.00681 lb/hr. As a conservative assumption (i.e., worst case), this emission rate was assumed to occur from each of the landfill's 65 wells. This results in a total projected landfill emission rate of NMHC of 0.44 lb/hr which is below the New Jersey regulation of greater than 0.5 lb/hr.

Toxic Volatile Organic Substances Results

Gas well air sampling results for TXS are presented in Table 2. A review of Table 2 indicates that of thirteen TXS sampled and analyzed for, only benzene and tetrachloroethene were present at detectable levels. The New Jersey regulation which governs whether "state-of-the-art" air pollution control equipment is required for TXS applies when emissions of TXS are greater than 0.1 lb/hr from the entire landfill. Of the eight gas wells that were tested, Well 45 released the greatest amount of TXS at approximately 0.000836 lb/hr. As a conservative assumption (i.e., worst case), this emission rate was assumed to occur from each of the 65 wells. This results in a total projected emission rate of TXS of 0.054 lb/hr which is below the New Jersey regulation of greater than 0.1 lb/hr.

Total Volatile Chlorinated Organic Results

Gas well air sampling results for TVCO are presented in Table 3. Of the eight gas wells that were tested, Well 45 released the greatest amount of TVCO at approximately 0.006706 lb/hr. As a conservative assumption (i.e., worst case) this emission rate was assumed to occur from each of the 65 wells. This results in a total projected emission rate of TVOC of 0.44 lb/hr.

Hydrogen Sulfide Results

Gas well air sampling results for hydrogen sulfide are presented in Table 4. Of the eight gas wells that were tested, Well 28 released the greatest amount of hydrogen sulfide at approximately 0.001700 lb/hr. As a conservative assumption (i.e., worst case) this emission rate was assumed to occur from each of the 65 wells. This results in a total projected emission rate of hydrogen sulfide of 0.11 lb/hr.

CONCLUSIONS AND RECOMMENDATIONS

O'Brien & Gere has presented the Combe Fill South gas well testing results as conservative assumptions (i.e. worst case), when considering total emissions rates from the entire landfill. The eight gas wells tested are believed to accurately represent activity of the landfill. While the calculated lb/hr emission rates of NMHC and TXS are below New Jersey emission rate limitations, it should be noted that total emissions are probably a fraction of those reported herein, since worst case concentrations have been applied to each of the 65 wells at the landfill. Therefore, it is O'Brien & Gere's recommendation that the gas flare system should be deleted from the contract and that the gas well vents at Combe Fill South should be passively vented.

We will begin working on a modification to the contract upon NJDEPE concurrence with this recommendation and reauthorization to proceed. If you have any questions or comments please call Robert Bowers or the undersigned.

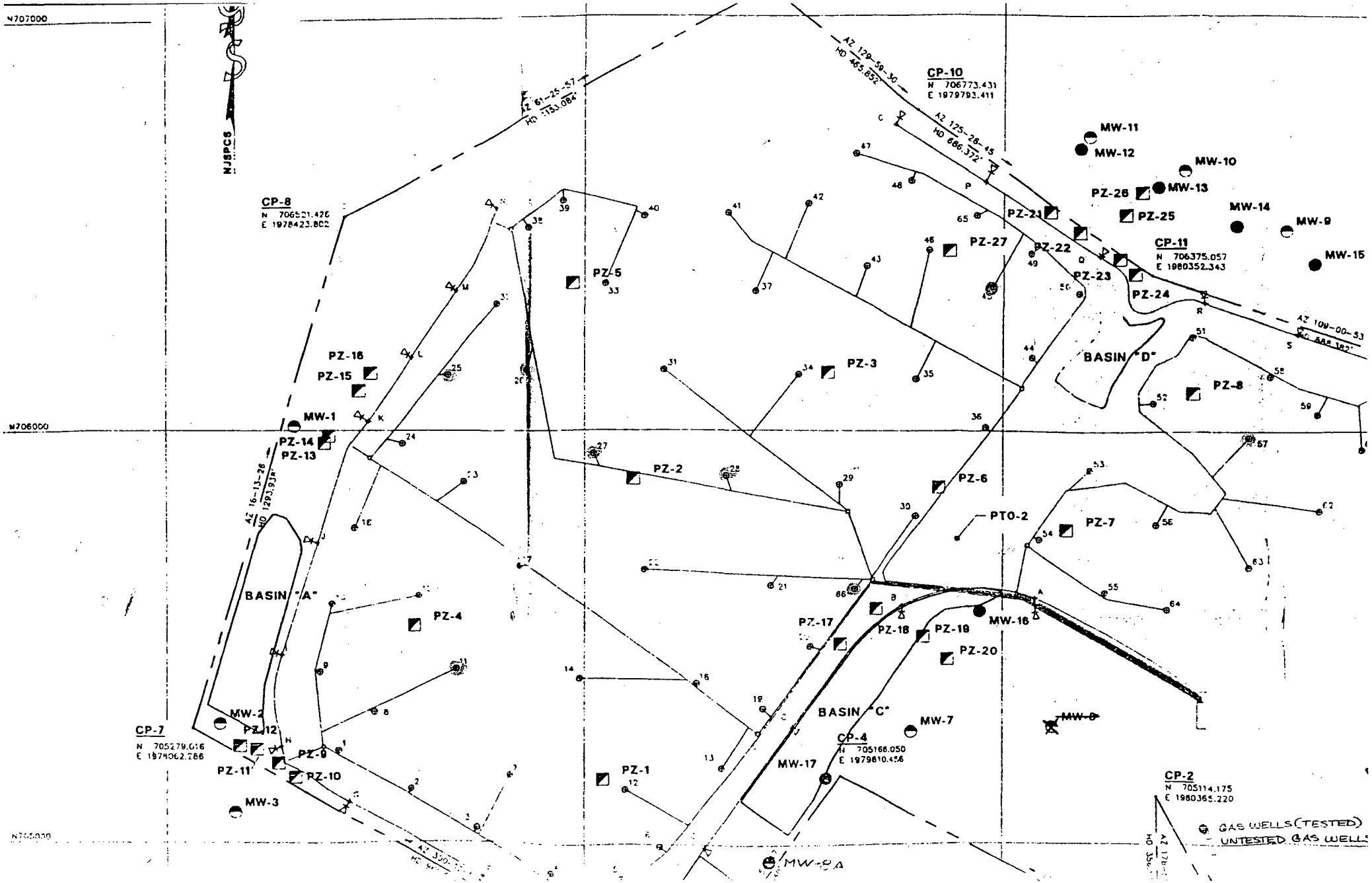
Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Peter W. McMaster, P.E.
Vice President

RMN:tl/01:17

cc: Judy A. Allen, P.E. - O'Brien & Gere Engineers, Inc.
Robert R. Bowers, P.E. - O'Brien & Gere Engineers, Inc.
Robert M. Neimeier - O'Brien & Gere Engineers, Inc.
Marcy A. Newman, P.E. - O'Brien & Gere Engineers,Inc.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PZ-21
PZ-22
PZ-23
PZ-24
PZ-25
PZ-26
PZ-27
PTO-2
BASIN "A"
BASIN "B"
BASIN "C"
BASIN "D"
GAS WELLS (TESTED)
UNTESTED GAS WELLS

Table 1
COMBE FILL SOUTH LANDFILL
Non-Methane Hydrocarbons

COMPOUND NAME	MOLECULAR WEIGHT	CONCENTRATION (ppm)	FLOW RATE (ft/min)	RELEASES (lb/hr)
WELL 11				
NMHC as Methane	16.05	30	570	0.00367
WELL 25				
NMHC as Methane	16.05	15	199	0.00064
WELL 26				
NMHC as Methane	16.05	24	549	0.00283
WELL 27				
NMHC as Methane	16.05	32	410	0.00281
WELL 28				
NMHC as Methane	16.05	68	467	0.00681
WELL 45				
NMHC as Methane	16.05	50	534	0.00573
WELL 57				
NMHC as Methane	16.05	21	364	0.00164
WELL 66				
NMHC as Methane	16.05	21	252	0.00113
Worst Case Assumption: WELL 28 0.00681 x 65 wells =				0.44265

Table 2
COMBE FILL SOUTH LANDFILL
Toxic Volatile Organic Substances

COMPOUND NAME	MOLECULAR WEIGHT	CONCENTRATION (ppb)	FLOW RATE (ft/min)	RELEASES (lb/hr)
WELL 11				
Benzene	78.12	120	570	0.000071
WELL 25				
Benzene	78.12	26	199	0.000005
WELL 26				
Benzene	78.12	200	549	0.000115
WELL 27				
Benzene	78.12	710	410	0.000304
WELL 28				
Benzene	78.12	830	467	0.000405
Tetrachloroethene	131.5	53		0.000043
WELL 45				
Benzene	78.12	1500	534	0.000836
WELL 57				
Benzene	78.12	21	364	0.000008
WELL 66				
Benzene	78.12	92	252	0.000024
Worst Case Assumption: WELL 45 0.000836 x 65 wells =				0.054340

Table 3
COMBE FILL SOUTH LANDFILL
Toxic Volatile Chlorinated Organic Concentrations

COMPOUND NAME	MOLECULAR WEIGHT	CONCEN-TRATION (ppb)	FLOW RATE (ft/min)	RELEASES (lb/hr)	TOTAL VOLATILE CHLORINATED ORGANICS as Cl (lb/hr)
WELL 11			570		
1,2-Cl 1,1,2,2-F ethane	170.92	280		0.000365	0.000151
Vinyl Chloride	62.50	73		0.000035	0.000020
Chloroethane	64.52	94		0.000046	0.000025
Trichlorofluoromethane	137.36	34		0.000036	0.000028
Chlorobenzene	112.56	210		0.000180	0.000057
1,4-Dichlorobenzene	147.00	290		0.000325	0.000156
				Total	0.000437
WELL 25			199		
1,2-Cl 1,1,2,2-F ethane	170.92	16		0.000007	0.000003
Vinyl Chloride	62.50	4.4		0.000001	0.000000
Chloroethane	64.52	26		0.000004	0.000002
Trichlorofluoromethane	137.36	48		0.000018	0.000014
Chlorobenzene	112.56	47		0.000014	0.000004
1,4-Dichlorobenzene	147.00	18		0.000007	0.000003
				Total	0.000027
WELL 26			549		
1,2-Cl 1,1,2,2-F ethane	170.92	150		0.000188	0.000078
Vinyl Chloride	62.50	140		0.000064	0.000036
Chloroethane	64.52	200		0.000095	0.000052
Trichlorofluoromethane	137.36	24		0.000024	0.000019
Methylene Chloride	84.93	17		0.000011	0.000009
c-1,2-Dichloroethene	96.94	22		0.000016	0.000011
Chlorobenzene	112.56	210		0.000173	0.000055
1,4-Dichlorobenzene	147.00	160		0.000173	0.000083
				Total	0.000343

Table 3
COMBE FILL SOUTH LANDFILL
Toxic Volatile Chlorinated Organic Concentrations

COMPOUND NAME	MOLECULAR WEIGHT	CONCEN-TRATION (ppb)	FLOW RATE (ft/min)	RELEASES (lb/hr)	TOTAL VOLATILE CHLORINATED ORGANICS as Cl (lb/hr)
WELL 27			410		
1,2-Cl 1,1,2,2-F ethane	170.92	1200		0.001124	0.000465
Vinyl Chloride	62.50	120		0.000041	0.000023
Chloroethane	64.52	150		0.000053	0.000029
Trichlorofluoromethane	137.36	30		0.000023	0.000017
Chlorobenzene	112.56	290		0.000179	0.000056
1,4-Dichlorobenzene	147.00	88		0.000071	0.000034
				Total	0.000626
WELL 28			467		
1,2-Cl 1,1,2,2-F ethane	170.92	560		0.000597	0.000247
Vinyl Chloride	62.50	340		0.000133	0.000075
Chloroethane	64.52	170		0.000068	0.000038
Trichlorofluoromethane	137.36	2900		0.002486	0.001922
c-1,2-Dichloroethene	96.94	70		0.000042	0.000031
Tetrachloroethene	165.82	53		0.000055	0.000047
Chlorobenzene	112.56	590		0.000414	0.000130
1,4-Dichlorobenzene	147.00	190		0.000174	0.000084
1,2-Dichlorobenzene	147.00	64		0.000059	0.000028
				Total	0.002602
WELL 45			534		
Dichlorodifluoromethane	120.91	7900		0.006816	0.003991
1,2-Cl 1,1,2,2-F ethane	170.92	2700		0.003293	0.001364
Vinyl Chloride	62.50	42		0.000019	0.000011
Chloroethane	64.52	72		0.000033	0.000018
Trichlorofluoromethane	137.36	1700		0.001666	0.001288
Chlorobenzene	112.56	60		0.000048	0.000015
1,4-Dichlorobenzene	147.00	37		0.000039	0.000019
				Total	0.006706

Table 3
COMBE FILL SOUTH LANDFILL
Toxic Volatile Chlorinated Organic Concentrations

COMPOUND NAME	MOLECULAR WEIGHT	CONCEN-TRATION (ppb)	FLOW RATE (ft/min)	RELEASES (lb/hr)	TOTAL VOLATILE CHLORINATED ORGANICS as Cl (lb/hr)
WELL 57			364		
Dichlorodifluoromethane	120.91	4000		0.002352	0.001377
1,2-Cl 1,1,2,2-F ethane	170.92	84		0.000070	0.000029
Vinyl Chloride	62.50	9.8		0.000003	0.000002
Chloroethane	64.52	14		0.000004	0.000002
Trichlorofluoromethane	137.36	810		0.000541	0.000418
Chlorobenzene	112.56	22		0.000012	0.000004
1,4-Dichlorobenzene	147.00	14		0.000010	0.000005
				Total	0.001838
WELL 66			252		
Dichlorodifluoromethane	120.91	770		0.000314	0.000184
1,2-Cl 1,1,2,2-F ethane	170.92	760		0.000437	0.000181
Vinyl Chloride	62.50	40		0.000008	0.000005
Chloroethane	64.52	36		0.000008	0.000004
Chlorobenzene	112.56	65		0.000025	0.000008
1,4-Dichlorobenzene	147.00	38		0.000019	0.000009
				Total	0.000391
Worst Case Assumption: Well 45 0.006706 x 65 =					0.435890

Table 4
COMBE FILL SOUTH LANDFILL
Hydrogen Sulfide Concentrations

COMPOUND NAME	MOLECULAR WEIGHT	CONCENTRATION PEAK (ppm)	FLOW RATE (ft/min)	RELEASES (lb/hr)
WELL 11				
Hydrogen Sulfide	34.06	5	570	0.001297
WELL 25				
Hydrogen Sulfide	34.06	1	199	0.000091
WELL 26				
Hydrogen Sulfide	34.06	2	549	0.000500
WELL 27				
Hydrogen Sulfide	34.06	5	410	0.000933
WELL 28				
Hydrogen Sulfide	34.06	8	467	0.001700
WELL 45				
Hydrogen Sulfide	34.06	3	534	0.000729
WELL 57				
Hydrogen Sulfide	34.06	1	364	0.000166
WELL 66				
Hydrogen Sulfide	34.06	1	252	0.000115
Worst Case Assumption: WELL 28 0.001700 x 65 wells =				0.110500

Time Weight Average (TWA)

WELL 11 = 3 ppm
WELL 25 = 0 ppm
WELL 26 = 1 ppm
WELL 27 = 1 ppm
WELL 28 = 4 ppm
WELL 45 = 0 ppm
WELL 57 = 0 ppm
WELL 66 = 0 ppm

VEM-004
8/89

DRAFT

Side 1

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF NEW SOURCE REVIEW

APPLICATION FOR
PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

Source Emissions and Source Data Form

(Complete this form for each source and submit with application Form VEM-003)

SECTION E

SOURCE INFORMATION

1. Source Description: Passive venting of gas from the Combe Fill South Landfill Superfund site located in Washington & Chester Townships, Morris County

2. Operating Schedule

24	8,760	1994
Hours/Day	Hours/Year	Operation Starting Date

3. % Annual Production Throughput By Quarter

25	25	25	25
Jan.-Mar.	Apr.-June	July-Sept.	Oct.-Dec.

4. Volume Of Gas Discharged From This Source (ACFM): 1,890 Source Discharge Temperature (°F): 70

SECTION F

CONTROL APPARATUS ON SOURCE

		Capital Cost (Dollars)	Annual Operating Cost (Dollars)	No. of Sources Connected
Primary	None			
Secondary	None			
Tertiary	None			

SECTION G

AIR CONTAMINANTS FROM SOURCE

CONTAMINANT NAME	Maximum Emissions w/o Control (lbs./hr.)	Maximum Emissions with Control (lbs./hr.)	How Determined
Hydrogen Sulfide	0.11	--	--
Total TXS *	0.054	--	--
Total Chlorides	0.44	--	--
NMHC as Methane	0.44		
* No individual toxic volatile organic substance present at 0.01 lb/hr			

* Use VEM-004 Supplement if additional space if required.

TO INSURE PROPER COORDINATION BETWEEN VEM-003 and VEM-004 FORMS, INSERT IDENTICAL COMPANY NAME AND DESIGNATION OF STACK FROM VEM-003, SIDE 1.

Full Business Name _____

Company Designation of Stack(s)

Appendix A

Enseco - Air Toxics Laboratory
18501 East Gale Avenue, Suite 130
City of Industry, CA 91748-1321
(818) 965-1006 • FAX (818) 965-1003

June 24, 1994

O'BRIEN & GERE ENGINEERS, INC.
5000 Brittonfield Parkway
Syracuse, NY 13221
ATTN: MR. ROB NEIMEIER

ANALYSIS NO.: 105994-0001/0008-SA
ANALYSES: Volatile Organics by GCMS - EPA TO14, Fixed Gases (ASTM D1946), SCAQMD 25.2 (Methane, Total Non-methane Hydrocarbons as Methane)
DATE SAMPLED: 06/13/94, 06/14/94
DATE SAMPLE REC'D: 06/16/94

PROJECT: COMBE FILL SOUTH LANDFILL - GAS WELL TESTING

Enclosed with this letter is the report on the chemical and physical analyses for the samples from ANALYSIS NO.: 105994-0001/0008-SA as shown above.

The samples waere received by Enseco-Air Toxics Laboratory, intact and with the chain-of-custody record attached.

Please note that ND means not detected at the reporting limits expressed.

The preliminary results were faxed to Mr. Rob Neimeier on June 20, 1994.

APPROVED

6-29-94
DATE

SAMPLE DESCRIPTION INFORMATION
for
O'Brien & Gere Engineers, Inc.

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
105994-0001-SA	A-172-WELL 28	AIR	13 JUN 94	12:25	16 JUN 94
105994-0002-SA	A-274-WELL 27	AIR	13 JUN 94	16:15	16 JUN 94
105994-0003-SA	A-289-WELL 66	AIR	14 JUN 94	11:25	16 JUN 94
105994-0004-SA	A-134-WELL 26	AIR	14 JUN 94	12:01	16 JUN 94
105994-0005-SA	A-306-WELL 25	AIR	14 JUN 94	13:05	16 JUN 94
105994-0006-SA	A-291-WELL 11	AIR	14 JUN 94	13:45	16 JUN 94
105994-0007-SA	A-310-WELL 45	AIR	14 JUN 94	14:30	16 JUN 94
105994-0008-SA	9361B-WELL 57	AIR	14 JUN 94	15:15	16 JUN 94

Enseco
Corning Environmental Services

Fixed Gases
ASTM-D1946

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-172-WELL 28
Lab ID: 105994-0001-SA
Matrix: AIR Sampled: 13 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Nitrogen	21	% (v/v)	0.18

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
Corning Environmental Services

Fixed Gases
ASTM-D1946

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-274-WELL 27
Lab ID: 105994-0002-SA
Matrix: AIR Sampled: 13 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Nitrogen	32	% (v/v)	0.18

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
Corning Environmental Services

Fixed Gases
ASTM-D1946

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-289-WELL 66
Lab ID: 105994-0003-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Nitrogen	61	% (v/v)	0.18

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
Corning Environmental Services

Fixed Gases
ASTM-D1946

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-134-WELL 26
Lab ID: 105994-0004-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Nitrogen	39	% (v/v)	0.18

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
Corning Environmental Services

Fixed Gases
ASTM-D1946

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-306-WELL 25
Lab ID: 105994-0005-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Nitrogen	63	% (v/v)	0.19

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
Corning Environmental Services

Fixed Gases
ASTM-D1946

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-291-WELL 11
Lab ID: 105994-0006-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Nitrogen	38	% (v/v)	0.17

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
Corning Environmental Services

Fixed Gases
ASTM-D1946

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-310-WELL 45
Lab ID: 105994-0007-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 17 JUN 94

Parameter	Result	Units	Reporting Limit
Nitrogen	58	% (v/v)	0.18

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
Corning Environmental Services

Fixed Gases
ASTM-D1946

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: 9361B-WELL 57
Lab ID: 105994-0008-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 17 JUN 94

Parameter	Result	Units	Reporting Limit
Nitrogen	60	% (v/v)	0.18

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
A Corning Company

SCAQMD

Method 25.2

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-172-WELL 28
Lab ID: 105994-0001-SA
Matrix: AIR Sampled: 13 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Methane	350000	ppm (v/v)	1800
Total Non-Methane Hydrocarbons as Methane	68	ppm (v/v)	5.0

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
A Corning Company

SCAQMD

Method 25.2

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-274-WELL 27
Lab ID: 105994-0002-SA
Matrix: AIR Sampled: 13 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Methane	260000	ppm (v/v)	1800
Total Non-Methane Hydrocarbons as Methane	32	ppm (v/v)	5.0

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
A Corning Company

SCAQMD

Method 25.2

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-289-WELL 66
Lab ID: 105994-0003-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Methane	56000	ppm (v/v)	1800
Total Non-Methane Hydrocarbons as Methane	21	ppm (v/v)	5.0

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
A Corning Company

SCAQMD

Method 25.2

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-134-WELL 26
Lab ID: 105994-0004-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Methane	200000	ppm (v/v)	1800
Total Non-Methane Hydrocarbons as Methane	24	ppm (v/v)	5.0

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
A Corning Company

SCAQMD

Method 25.2

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-306-WELL 25
Lab ID: 105994-0005-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Methane	31000	ppm (v/v)	1900
Total Non-Methane Hydrocarbons as Methane	15	ppm (v/v)	5.0

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
A Corning Company

SCAQMD

Method 25.2

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-291-WELL 11
Lab ID: 105994-0006-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 16 JUN 94

Parameter	Result	Units	Reporting Limit
Methane	170000	ppm (v/v)	1700
Total Non-Methane Hydrocarbons as Methane	30	ppm (v/v)	5.0

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
A Corning Company

SCAQMD

Method 25.2

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-310-WELL 45
Lab ID: 105994-0007-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 17 JUN 94

Parameter	Result	Units	Reporting Limit
Methane	81000	ppm (v/v)	1800
Total Non-Methane Hydrocarbons as Methane	50	ppm (v/v)	5.0

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
A Corning Company

SCAQMD

Method 25.2

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: 9361B-WELL 57
Lab ID: 105994-0008-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 17 JUN 94

Parameter	Result	Units	Reporting Limit
Methane	54000	ppm (v/v)	1800
Total Non-Methane Hydrocarbons as Methane	21	ppm (v/v)	5.0

ND = Not detected
NA = Not applicable

Reported By: Maria Jones Approved By: Val Mallari

Enseco
Corning Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-172-WELL 28
Lab ID: 105994-0001-SA
Matrix: AIR Sampled: 13 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
Dichlorodifluoromethane	NA	ppb (v/v)	--	1
Chloromethane	ND	ppb (v/v)	72	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	560	ppb (v/v)	36	
Vinyl chloride	340	ppb (v/v)	36	
Bromomethane	ND	ppb (v/v)	36	
Chloroethane	170	ppb (v/v)	72	
Trichlorofluoromethane	2900	ppb (v/v)	36	
1,1-Dichloroethene	ND	ppb (v/v)	36	
Carbon disulfide	ND	ppb (v/v)	180	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	36	
Acetone	ND	ppb (v/v)	180	
Methylene chloride	ND	ppb (v/v)	36	
trans-1,2-Dichloroethene	ND	ppb (v/v)	36	
1,1-Dichloroethane	ND	ppb (v/v)	36	
Vinyl acetate	ND	ppb (v/v)	180	
cis-1,2-Dichloroethene	70	ppb (v/v)	36	
2-Butanone	ND	ppb (v/v)	180	
Chloroform	ND	ppb (v/v)	36	
1,1,1-Trichloroethane	ND	ppb (v/v)	36	
Carbon tetrachloride	ND	ppb (v/v)	36	
Benzene	830	ppb (v/v)	36	
1,2-Dichloroethane	ND	ppb (v/v)	36	
Trichloroethene	ND	ppb (v/v)	36	
1,2-Dichloropropane	ND	ppb (v/v)	36	
Bromodichloromethane	ND	ppb (v/v)	36	
cis-1,3-Dichloropropene	ND	ppb (v/v)	36	
4-Methyl-2-pentanone	ND	ppb (v/v)	72	
Toluene	940	ppb (v/v)	36	
trans-1,3-Dichloropropene	ND	ppb (v/v)	36	
1,1,2-Trichloroethane	ND	ppb (v/v)	36	
Tetrachloroethene	53	ppb (v/v)	36	
2-Hexanone	ND	ppb (v/v)	72	
Dibromochloromethane	ND	ppb (v/v)	36	
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	36	
Chlorobenzene	590	ppb (v/v)	36	
Ethylbenzene	2100	ppb (v/v)	36	
Xylenes (total)	5800	ppb (v/v)	36	
Styrene	ND	ppb (v/v)	36	
Bromoform	ND	ppb (v/v)	36	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Volatile Organics by GCMS - EPA TO14 (CONT.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-172-WELL 28
Lab ID: 105994-0001-SA
Matrix: AIR Sampled: 13 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	36
Benzyl chloride	ND	ppb (v/v)	36
4-Ethyl toluene	560	ppb (v/v)	36
1,3,5-Trimethylbenzene	320	ppb (v/v)	36
1,2,4-Trimethylbenzene	870	ppb (v/v)	36
1,3-Dichlorobenzene	ND	ppb (v/v)	36
1,4-Dichlorobenzene	190	ppb (v/v)	36
1,2-Dichlorobenzene	64	ppb (v/v)	36
1,2,4-Trichlorobenzene	ND	ppb (v/v)	72
Hexachlorobutadiene	ND	ppb (v/v)	72
1,4-Dioxane	ND	ppb (v/v)	180
1,3-Butadiene	ND	ppb (v/v)	180

Note 1 : Compound not analyzed due to high level of carbon dioxide.

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Enseco
Corning Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-274-WELL 27
Lab ID: 105994-0002-SA
Matrix: AIR Sampled: 13 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
Dichlorodifluoromethane	NA	ppb (v/v)	--	1
Chloromethane	ND	ppb (v/v)	18	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1200	ppb (v/v)	9.0	
Vinyl chloride	120	ppb (v/v)	9.0	
Bromomethane	ND	ppb (v/v)	9.0	
Chloroethane	150	ppb (v/v)	18	
Trichlorofluoromethane	30	ppb (v/v)	9.0	
1,1-Dichloroethene	ND	ppb (v/v)	9.0	
Carbon disulfide	ND	ppb (v/v)	45	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	9.0	
Acetone	ND	ppb (v/v)	45	
Methylene chloride	ND	ppb (v/v)	9.0	
trans-1,2-Dichloroethene	ND	ppb (v/v)	9.0	
1,1-Dichloroethane	ND	ppb (v/v)	9.0	
Vinyl acetate	ND	ppb (v/v)	45	
cis-1,2-Dichloroethene	ND	ppb (v/v)	9.0	
2-Butanone	ND	ppb (v/v)	45	
Chloroform	ND	ppb (v/v)	9.0	
1,1,1-Trichloroethane	ND	ppb (v/v)	9.0	
Carbon tetrachloride	ND	ppb (v/v)	9.0	
Benzene	710	ppb (v/v)	9.0	
1,2-Dichloroethane	ND	ppb (v/v)	9.0	
Trichloroethene	ND	ppb (v/v)	9.0	
1,2-Dichloropropane	ND	ppb (v/v)	9.0	
Bromodichloromethane	ND	ppb (v/v)	9.0	
cis-1,3-Dichloropropene	ND	ppb (v/v)	9.0	
4-Methyl-2-pentanone	ND	ppb (v/v)	18	
Toluene	110	ppb (v/v)	9.0	
trans-1,3-Dichloropropene	ND	ppb (v/v)	9.0	
1,1,2-Trichloroethane	ND	ppb (v/v)	9.0	
Tetrachloroethene	ND	ppb (v/v)	9.0	
2-Hexanone	ND	ppb (v/v)	31	G
Dibromochloromethane	ND	ppb (v/v)	9.0	
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	9.0	
Chlorobenzene	290	ppb (v/v)	9.0	
Ethylbenzene	360	ppb (v/v)	9.0	
Xylenes (total)	560	ppb (v/v)	9.0	
Styrene	ND	ppb (v/v)	9.0	
Bromoform	ND	ppb (v/v)	9.0	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Volatile Organics by GCMS - EPA TO14 (CONT.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-274-WELL 27
Lab ID: 105994-0002-SA
Matrix: AIR Sampled: 13 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	9.0
Benzyl chloride	ND	ppb (v/v)	9.0
4-Ethyl toluene	76	ppb (v/v)	9.0
1,3,5-Trimethylbenzene	53	ppb (v/v)	9.0
1,2,4-Trimethylbenzene	180	ppb (v/v)	9.0
1,3-Dichlorobenzene	ND	ppb (v/v)	9.0
1,4-Dichlorobenzene	88	ppb (v/v)	9.0
1,2-Dichlorobenzene	ND	ppb (v/v)	9.0
1,2,4-Trichlorobenzene	ND	ppb (v/v)	18
Hexachlorobutadiene	ND	ppb (v/v)	18
1,4-Dioxane	ND	ppb (v/v)	32
1,3-Butadiene	ND	ppb (v/v)	45

Note 1 : Compound not analyzed due to high level of carbon dioxide.

Note G : Reporting Limit elevated due to sample matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Enseco
Corning Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-289-WELL 66
Lab ID: 105994-0003-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
Dichlorodifluoromethane	770	ppb (v/v)	9.0	D
Chloromethane	ND	ppb (v/v)	5.5	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	760	ppb (v/v)	9.0	D
Vinyl chloride	40	ppb (v/v)	2.7	
Bromomethane	ND	ppb (v/v)	2.7	
Chloroethane	36	ppb (v/v)	5.5	
Trichlorofluoromethane	ND	ppb (v/v)	2.7	
1,1-Dichloroethene	ND	ppb (v/v)	2.7	
Carbon disulfide	ND	ppb (v/v)	14	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	2.7	
Acetone	ND	ppb (v/v)	14	
Methylene chloride	ND	ppb (v/v)	2.7	
trans-1,2-Dichloroethene	ND	ppb (v/v)	2.7	
1,1-Dichloroethane	ND	ppb (v/v)	2.7	
Vinyl acetate	ND	ppb (v/v)	14	
cis-1,2-Dichloroethene	ND	ppb (v/v)	2.7	
2-Butanone	ND	ppb (v/v)	14	
Chloroform	ND	ppb (v/v)	2.7	
1,1,1-Trichloroethane	ND	ppb (v/v)	2.7	
Carbon tetrachloride	ND	ppb (v/v)	2.7	
Benzene	92	ppb (v/v)	2.7	
1,2-Dichloroethane	ND	ppb (v/v)	2.7	
Trichloroethene	ND	ppb (v/v)	2.7	
1,2-Dichloropropane	ND	ppb (v/v)	2.7	
Bromodichloromethane	ND	ppb (v/v)	2.7	
cis-1,3-Dichloropropene	ND	ppb (v/v)	2.7	
4-Methyl-2-pentanone	ND	ppb (v/v)	5.5	
Toluene	22	ppb (v/v)	2.7	
trans-1,3-Dichloropropene	ND	ppb (v/v)	2.7	
1,1,2-Trichloroethane	ND	ppb (v/v)	2.7	
Tetrachloroethene	ND	ppb (v/v)	2.7	
2-Hexanone	ND	ppb (v/v)	5.5	
Dibromochloromethane	ND	ppb (v/v)	2.7	
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	2.7	
Chlorobenzene	65	ppb (v/v)	2.7	
Ethylbenzene	130	ppb (v/v)	2.7	
Xylenes (total)	310	ppb (v/v)	2.7	
Styrene	ND	ppb (v/v)	2.7	
Bromoform	ND	ppb (v/v)	2.7	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Volatile Organics by GCMS - EPA TO14 (CONT.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-289-WELL 66
Lab ID: 105994-0003-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	2.7
Benzyl chloride	ND	ppb (v/v)	2.7
4-Ethyl toluene	39	ppb (v/v)	2.7
1,3,5-Trimethylbenzene	36	ppb (v/v)	2.7
1,2,4-Trimethylbenzene	67	ppb (v/v)	2.7
1,3-Dichlorobenzene	ND	ppb (v/v)	2.7
1,4-Dichlorobenzene	38	ppb (v/v)	2.7
1,2-Dichlorobenzene	ND	ppb (v/v)	2.7
1,2,4-Trichlorobenzene	ND	ppb (v/v)	5.5
Hexachlorobutadiene	ND	ppb (v/v)	5.5
1,4-Dioxane	ND	ppb (v/v)	9.6
1,3-Butadiene	ND	ppb (v/v)	14

Note D : Compound quantitated at a secondary dilution.

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

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Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-134-WELL 26
Lab ID: 105994-0004-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
Dichlorodifluoromethane	NA	ppb (v/v)	--	1
Chloromethane	ND	ppb (v/v)	29	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	150	ppb (v/v)	14	
Vinyl chloride	140	ppb (v/v)	14	
Bromomethane	ND	ppb (v/v)	14	
Chloroethane	200	ppb (v/v)	29	
Trichlorofluoromethane	24	ppb (v/v)	14	
1,1-Dichloroethene	ND	ppb (v/v)	14	
Carbon disulfide	ND	ppb (v/v)	72	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	14	
Acetone	ND	ppb (v/v)	72	
Methylene chloride	17	ppb (v/v)	14	
trans-1,2-Dichloroethene	ND	ppb (v/v)	14	
1,1-Dichloroethane	ND	ppb (v/v)	14	
Vinyl acetate	ND	ppb (v/v)	72	
cis-1,2-Dichloroethene	22	ppb (v/v)	14	
2-Butanone	ND	ppb (v/v)	72	
Chloroform	ND	ppb (v/v)	14	
1,1,1-Trichloroethane	ND	ppb (v/v)	14	
Carbon tetrachloride	ND	ppb (v/v)	14	
Benzene	200	ppb (v/v)	14	
1,2-Dichloroethane	ND	ppb (v/v)	14	
Trichloroethene	ND	ppb (v/v)	14	
1,2-Dichloropropane	ND	ppb (v/v)	14	
Bromodichloromethane	ND	ppb (v/v)	14	
cis-1,3-Dichloropropene	ND	ppb (v/v)	14	
4-Methyl-2-pentanone	ND	ppb (v/v)	54	G
Toluene	330	ppb (v/v)	14	
trans-1,3-Dichloropropene	ND	ppb (v/v)	14	
1,1,2-Trichloroethane	ND	ppb (v/v)	14	
Tetrachloroethene	ND	ppb (v/v)	14	
2-Hexanone	ND	ppb (v/v)	29	
Dibromochloromethane	ND	ppb (v/v)	14	
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	14	
Chlorobenzene	210	ppb (v/v)	14	
Ethylbenzene	1300	ppb (v/v)	14	
Xylenes (total)	2900	ppb (v/v)	14	
Styrene	ND	ppb (v/v)	14	
Bromoform	ND	ppb (v/v)	14	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Volatile Organics by GCMS - EPA TO14 (CONT.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-134-WELL 26
Lab ID: 105994-0004-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	14	
Benzyl chloride	ND	ppb (v/v)	14	G
4-Ethyl toluene	500	ppb (v/v)	14	
1,3,5-Trimethylbenzene	280	ppb (v/v)	14	
1,2,4-Trimethylbenzene	680	ppb (v/v)	14	
1,3-Dichlorobenzene	ND	ppb (v/v)	14	
1,4-Dichlorobenzene	160	ppb (v/v)	14	
1,2-Dichlorobenzene	ND	ppb (v/v)	14	
1,2,4-Trichlorobenzene	ND	ppb (v/v)	29	
Hexachlorobutadiene	ND	ppb (v/v)	29	
1,4-Dioxane	ND	ppb (v/v)	50	
1,3-Butadiene	ND	ppb (v/v)	72	

Note 1 : Compound not analyzed due to high level of carbon dioxide.

Note G : Reporting Limit elevated due to sample matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

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Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-306-WELL 25
Lab ID: 105994-0005-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
Dichlorodifluoromethane	NA	ppb (v/v)	--	1
Chloromethane	ND	ppb (v/v)	5.2	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	16	ppb (v/v)	2.6	
Vinyl chloride	4.4	ppb (v/v)	2.6	
Bromomethane	ND	ppb (v/v)	2.6	
Chloroethane	26	ppb (v/v)	5.2	
Trichlorofluoromethane	48	ppb (v/v)	2.6	
1,1-Dichloroethene	ND	ppb (v/v)	2.6	
Carbon disulfide	ND	ppb (v/v)	13	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	2.6	
Acetone	ND	ppb (v/v)	13	
Methylene chloride	ND	ppb (v/v)	2.6	
trans-1,2-Dichloroethene	ND	ppb (v/v)	2.6	
1,1-Dichloroethane	ND	ppb (v/v)	2.6	
Vinyl acetate	ND	ppb (v/v)	13	
cis-1,2-Dichloroethene	ND	ppb (v/v)	2.6	
2-Butanone	ND	ppb (v/v)	13	
Chloroform	ND	ppb (v/v)	2.6	
1,1,1-Trichloroethane	ND	ppb (v/v)	2.6	
Carbon tetrachloride	ND	ppb (v/v)	2.6	
Benzene	26	ppb (v/v)	2.6	
1,2-Dichloroethane	ND	ppb (v/v)	2.6	
Trichloroethene	ND	ppb (v/v)	2.6	
1,2-Dichloropropane	ND	ppb (v/v)	2.6	
Bromodichloromethane	ND	ppb (v/v)	2.6	
cis-1,3-Dichloropropene	ND	ppb (v/v)	2.6	
4-Methyl-2-pentanone	ND	ppb (v/v)	5.2	
Toluene	9.7	ppb (v/v)	2.6	
trans-1,3-Dichloropropene	ND	ppb (v/v)	2.6	
1,1,2-Trichloroethane	ND	ppb (v/v)	2.6	
Tetrachloroethene	ND	ppb (v/v)	2.6	
2-Hexanone	ND	ppb (v/v)	5.2	
Dibromochloromethane	ND	ppb (v/v)	2.6	
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	2.6	
Chlorobenzene	47	ppb (v/v)	2.6	
Ethylbenzene	39	ppb (v/v)	2.6	
Xylenes (total)	140	ppb (v/v)	2.6	
Styrene	ND	ppb (v/v)	2.6	
Bromoform	ND	ppb (v/v)	2.6	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Volatile Organics by GCMS - EPA TO14 (CONT.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-306-WELL 25
Lab ID: 105994-0005-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	2.6	
Benzyl chloride	ND	ppb (v/v)	25	G
4-Ethyl toluene	22	ppb (v/v)	2.6	
1,3,5-Trimethylbenzene	13	ppb (v/v)	2.6	
1,2,4-Trimethylbenzene	23	ppb (v/v)	2.6	
1,3-Dichlorobenzene	ND	ppb (v/v)	2.6	
1,4-Dichlorobenzene	18	ppb (v/v)	2.6	
1,2-Dichlorobenzene	ND	ppb (v/v)	2.6	
1,2,4-Trichlorobenzene	ND	ppb (v/v)	5.2	
Hexachlorobutadiene	ND	ppb (v/v)	5.2	
1,4-Dioxane	ND	ppb (v/v)	9.1	
1,3-Butadiene	ND	ppb (v/v)	13	

Note 1 : Compound not analyzed due to high level of carbon dioxide.

Note G : Reporting Limit elevated due to sample matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

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Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-291-WELL 11
Lab ID: 105994-0006-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
Dichlorodifluoromethane	NA	ppb (v/v)	--	1
Chloromethane	ND	ppb (v/v)	34	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	280	ppb (v/v)	17	
Vinyl chloride	73	ppb (v/v)	17	
Bromomethane	ND	ppb (v/v)	17	
Chloroethane	94	ppb (v/v)	34	
Trichlorofluoromethane	34	ppb (v/v)	17	
1,1-Dichloroethene	ND	ppb (v/v)	17	
Carbon disulfide	ND	ppb (v/v)	84	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	17	
Acetone	ND	ppb (v/v)	84	
Methylene chloride	ND	ppb (v/v)	17	
trans-1,2-Dichloroethene	ND	ppb (v/v)	17	
1,1-Dichloroethane	ND	ppb (v/v)	17	
Vinyl acetate	ND	ppb (v/v)	84	
cis-1,2-Dichloroethene	ND	ppb (v/v)	17	
2-Butanone	ND	ppb (v/v)	84	
Chloroform	ND	ppb (v/v)	17	
1,1,1-Trichloroethane	ND	ppb (v/v)	17	
Carbon tetrachloride	ND	ppb (v/v)	17	
Benzene	120	ppb (v/v)	17	
1,2-Dichloroethane	ND	ppb (v/v)	17	
Trichloroethene	ND	ppb (v/v)	17	
1,2-Dichloropropane	ND	ppb (v/v)	17	
Bromodichloromethane	ND	ppb (v/v)	17	
cis-1,3-Dichloropropene	ND	ppb (v/v)	17	
4-Methyl-2-pentanone	39	ppb (v/v)	34	
Toluene	410	ppb (v/v)	17	
trans-1,3-Dichloropropene	ND	ppb (v/v)	17	
1,1,2-Trichloroethane	ND	ppb (v/v)	17	
Tetrachloroethene	ND	ppb (v/v)	17	
2-Hexanone	ND	ppb (v/v)	34	
Dibromochloromethane	ND	ppb (v/v)	17	
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	17	
Chlorobenzene	210	ppb (v/v)	17	
Ethylbenzene	2300	ppb (v/v)	17	
Xylenes (total)	4400	ppb (v/v)	17	
Styrene	ND	ppb (v/v)	17	
Bromoform	ND	ppb (v/v)	17	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Volatile Organics by GCMS - EPA TO14 (CONT.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-291-WELL 11
Lab ID: 105994-0006-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	17	
Benzyl chloride	ND	ppb (v/v)	410	G
4-Ethyl toluene	630	ppb (v/v)	17	
1,3,5-Trimethylbenzene	360	ppb (v/v)	17	
1,2,4-Trimethylbenzene	820	ppb (v/v)	17	
1,3-Dichlorobenzene	ND	ppb (v/v)	17	
1,4-Dichlorobenzene	290	ppb (v/v)	17	
1,2-Dichlorobenzene	ND	ppb (v/v)	17	
1,2,4-Trichlorobenzene	ND	ppb (v/v)	34	
Hexachlorobutadiene	ND	ppb (v/v)	34	
1,4-Dioxane	ND	ppb (v/v)	59	
1,3-Butadiene	ND	ppb (v/v)	84	

Note 1 : Compound not analyzed due to high level of carbon dioxide.

Note G : Reporting Limit elevated due to sample matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Volatile Organics by GCMS - EPA TO14 (CONT.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-310-WELL 45
Lab ID: 105994-0007-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	18	
Benzyl chloride	ND	ppb (v/v)	110	G
4-Ethyl toluene	140	ppb (v/v)	18	
1,3,5-Trimethylbenzene	77	ppb (v/v)	18	
1,2,4-Trimethylbenzene	130	ppb (v/v)	18	
1,3-Dichlorobenzene	ND	ppb (v/v)	18	
1,4-Dichlorobenzene	37	ppb (v/v)	18	
1,2-Dichlorobenzene	ND	ppb (v/v)	18	
1,2,4-Trichlorobenzene	ND	ppb (v/v)	36	
Hexachlorobutadiene	ND	ppb (v/v)	36	
1,4-Dioxane	ND	ppb (v/v)	63	
1,3-Butadiene	ND	ppb (v/v)	90	

Note D : Compound quantitated at a secondary dilution.

Note G : Reporting Limit elevated due to sample matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

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Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: A-310-WELL 45
Lab ID: 105994-0007-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
Dichlorodifluoromethane	7900	ppb (v/v)	90	D
Chloromethane	ND	ppb (v/v)	36	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	2700	ppb (v/v)	90	D
Vinyl chloride	42	ppb (v/v)	18	
Bromomethane	ND	ppb (v/v)	18	
Chloroethane	72	ppb (v/v)	36	
Trichlorofluoromethane	1700	ppb (v/v)	18	
1,1-Dichloroethene	ND	ppb (v/v)	18	
Carbon disulfide	ND	ppb (v/v)	90	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	18	
Acetone	ND	ppb (v/v)	90	
Methylene chloride	ND	ppb (v/v)	18	
trans-1,2-Dichloroethene	ND	ppb (v/v)	18	
1,1-Dichloroethane	ND	ppb (v/v)	18	
Vinyl acetate	ND	ppb (v/v)	90	
cis-1,2-Dichloroethene	ND	ppb (v/v)	18	
2-Butanone	ND	ppb (v/v)	90	
Chloroform	ND	ppb (v/v)	18	
1,1,1-Trichloroethane	ND	ppb (v/v)	18	
Carbon tetrachloride	ND	ppb (v/v)	18	
Benzene	1500	ppb (v/v)	18	
1,2-Dichloroethane	ND	ppb (v/v)	18	
Trichloroethene	ND	ppb (v/v)	18	
1,2-Dichloropropane	ND	ppb (v/v)	18	
Bromodichloromethane	ND	ppb (v/v)	18	
cis-1,3-Dichloropropene	ND	ppb (v/v)	18	
4-Methyl-2-pentanone	ND	ppb (v/v)	36	
Toluene	990	ppb (v/v)	18	
trans-1,3-Dichloropropene	ND	ppb (v/v)	18	
1,1,2-Trichloroethane	ND	ppb (v/v)	18	
Tetrachloroethene	ND	ppb (v/v)	18	
2-Hexanone	ND	ppb (v/v)	36	
Dibromochloromethane	ND	ppb (v/v)	18	
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	18	
Chlorobenzene	60	ppb (v/v)	18	
Ethylbenzene	1100	ppb (v/v)	18	
Xylenes (total)	2300	ppb (v/v)	18	
Styrene	ND	ppb (v/v)	18	
Bromoform	ND	ppb (v/v)	18	

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ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

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Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: 9361B-WELL 57
Lab ID: 105994-0008-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit	
Dichlorodifluoromethane	4000	ppb (v/v)	18	D
Chloromethane	ND	ppb (v/v)	4.0	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	84	ppb (v/v)	2.0	
Vinyl chloride	9.8	ppb (v/v)	2.0	
Bromomethane	ND	ppb (v/v)	2.0	
Chloroethane	14	ppb (v/v)	4.0	
Trichlorofluoromethane	810	ppb (v/v)	18	D
1,1-Dichloroethene	ND	ppb (v/v)	2.0	
Carbon disulfide	ND	ppb (v/v)	10	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	2.0	
Acetone	ND	ppb (v/v)	10	
Methylene chloride	ND	ppb (v/v)	2.0	
trans-1,2-Dichloroethene	ND	ppb (v/v)	2.0	
1,1-Dichloroethane	ND	ppb (v/v)	2.0	
Vinyl acetate	ND	ppb (v/v)	10	
cis-1,2-Dichloroethene	ND	ppb (v/v)	2.0	
2-Butanone	ND	ppb (v/v)	10	
Chloroform	ND	ppb (v/v)	2.0	
1,1,1-Trichloroethane	ND	ppb (v/v)	2.0	
Carbon tetrachloride	ND	ppb (v/v)	2.0	
Benzene	21	ppb (v/v)	2.0	
1,2-Dichloroethane	ND	ppb (v/v)	2.0	
Trichloroethene	ND	ppb (v/v)	2.0	
1,2-Dichloropropane	ND	ppb (v/v)	2.0	
Bromodichloromethane	ND	ppb (v/v)	2.0	
cis-1,3-Dichloropropene	ND	ppb (v/v)	2.0	
4-Methyl-2-pentanone	ND	ppb (v/v)	4.0	
Toluene	44	ppb (v/v)	2.0	
trans-1,3-Dichloropropene	ND	ppb (v/v)	2.0	
1,1,2-Trichloroethane	ND	ppb (v/v)	2.0	
Tetrachloroethene	ND	ppb (v/v)	2.0	
2-Hexanone	ND	ppb (v/v)	4.0	
Dibromochloromethane	ND	ppb (v/v)	2.0	
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	2.0	
Chlorobenzene	22	ppb (v/v)	2.0	
Ethylbenzene	32	ppb (v/v)	2.0	
Xylenes (total)	68	ppb (v/v)	2.0	
Styrene	ND	ppb (v/v)	2.0	
Bromoform	ND	ppb (v/v)	2.0	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

Volatile Organics by GCMS - EPA TO14 (CONT.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: 9361B-WELL 57
Lab ID: 105994-0008-SA
Matrix: AIR Sampled: 14 JUN 94 Received: 16 JUN 94
Authorized: 16 JUN 94 Prepared: NA Analyzed: 20 JUN 94

Parameter	Result	Units	Reporting Limit
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	2.0
Benzyl chloride	ND	ppb (v/v)	2.0
4-Ethyl toluene	7.8	ppb (v/v)	2.0
1,3,5-Trimethylbenzene	7.1	ppb (v/v)	2.0
1,2,4-Trimethylbenzene	6.8	ppb (v/v)	2.0
1,3-Dichlorobenzene	ND	ppb (v/v)	2.0
1,4-Dichlorobenzene	14	ppb (v/v)	2.0
1,2-Dichlorobenzene	ND	ppb (v/v)	2.0
1,2,4-Trichlorobenzene	ND	ppb (v/v)	4.0
Hexachlorobutadiene	ND	ppb (v/v)	4.0
1,4-Dioxane	ND	ppb (v/v)	7.0
1,3-Butadiene	ND	ppb (v/v)	10

Note D : Compound quantitated at a secondary dilution.

ND = Not detected
NA = Not applicable

Reported By: Dave Olson Approved By: Val Mallari

QC LOT ASSIGNMENT REPORT - MS QC
Air Toxics

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
105994-0001-SA	AIR	SCAQMD-252	16 JUN 94-B1	16 JUN 94-C1	
105994-0001-SA	AIR	TO-14	20 JUN 94-B1	20 JUN 94-B1	
105994-0001-SA	AIR	ASTM-D1946	16 JUN 94-B1	16 JUN 94-C1	
105994-0002-SA	AIR	SCAQMD-252	16 JUN 94-B1	16 JUN 94-C1	
105994-0002-SA	AIR	TO-14	20 JUN 94-B1	20 JUN 94-B1	
105994-0002-SA	AIR	ASTM-D1946	16 JUN 94-B1	16 JUN 94-C1	
105994-0003-SA	AIR	SCAQMD-252	16 JUN 94-B1	16 JUN 94-C1	
105994-0003-SA	AIR	TO-14	20 JUN 94-B1	20 JUN 94-B1	
105994-0003-SA	AIR	ASTM-D1946	16 JUN 94-B1	16 JUN 94-C1	
105994-0004-SA	AIR	SCAQMD-252	16 JUN 94-B1	16 JUN 94-C1	
105994-0004-SA	AIR	TO-14	20 JUN 94-B1	20 JUN 94-B1	
105994-0004-SA	AIR	ASTM-D1946	16 JUN 94-B1	16 JUN 94-C1	
105994-0005-SA	AIR	SCAQMD-252	16 JUN 94-B1	16 JUN 94-C1	
105994-0005-SA	AIR	TO-14	20 JUN 94-B1	20 JUN 94-B1	
105994-0005-SA	AIR	ASTM-D1946	16 JUN 94-B1	16 JUN 94-C1	
105994-0006-SA	AIR	SCAQMD-252	16 JUN 94-B1	16 JUN 94-C1	
105994-0006-SA	AIR	TO-14	20 JUN 94-B1	20 JUN 94-B1	
105994-0006-SA	AIR	ASTM-D1946	16 JUN 94-B1	16 JUN 94-C1	
105994-0007-SA	AIR	SCAQMD-252	17 JUN 94-A1	17 JUN 94-A1	
105994-0007-SA	AIR	TO-14	20 JUN 94-B1	20 JUN 94-B1	
105994-0007-SA	AIR	ASTM-D1946	17 JUN 94-A1	17 JUN 94-A1	
105994-0008-SA	AIR	SCAQMD-252	17 JUN 94-A1	17 JUN 94-A1	
105994-0008-SA	AIR	TO-14	20 JUN 94-B1	20 JUN 94-B1	
105994-0008-SA	AIR	ASTM-D1946	17 JUN 94-A1	17 JUN 94-A1	

DUPLICATE CONTROL SAMPLE REPORT
Air Toxics
Project: 105994

Category: SCAQMD-252 South Coast AQMD Method 25.2
Matrix: AIR
QC Lot: 16 JUN 94-B1 Date Analyzed: 16 JUN 94
Concentration Units: ppm (v/v)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Methane	100	98.1	99.2	98.6	99	80-120	1.1	20
TNMHCs as Methane	1130	1160	1160	1160	103	80-120	0.0	20

Category: SCAQMD-252 South Coast AQMD Method 25.2
Matrix: AIR
QC Lot: 17 JUN 94-A1 Date Analyzed: 17 JUN 94
Concentration Units: ppm (v/v)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Methane	100	99.1	99.2	99.2	99	80-120	0.10	20
TNMHCs as Methane	1130	1110	1160	1140	101	80-120	4.7	20

Category: TO-14 Method TO-14 - Volatile Organics
Matrix: AIR
QC Lot: 20 JUN 94-B1 Date Analyzed: 20 JUN 94
Concentration Units: ppb (v/v)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Methylene chloride	48.4	50.2	49.9	50.0	103	86-116	0.60	10
1,1-Dichloroethene	48.4	48.5	48.1	48.3	100	90-115	0.83	10
Trichloroethene	36.7	37.8	36.2	37.0	101	85-114	4.3	10
Toluene	48.4	48.7	48.6	48.6	101	92-114	0.21	10
1,1,2,2-Tetrachloroethane	55.5	62.9	64.7	63.8	115	76-124	2.8	10

Category: ASTM-D1946 Fixed Gases (ASTM-D1946)
Matrix: AIR
QC Lot: 16 JUN 94-B1 Date Analyzed: 17 JUN 94
Concentration Units: % (v/v)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Methane	0.0100	0.00981	0.00992	0.00986	99	80-120	1.1	20
Carbon dioxide	10.0	10.0	10.0	10.0	100	80-120	0.0	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

DUPLICATE CONTROL SAMPLE REPORT
Air Toxics
Project: 105994

Category: ASTM-D1946 Fixed Gases (ASTM-D1946)
Matrix: AIR
QC Lot: 17 JUN 94-A1 Date Analyzed: 17 JUN 94
Concentration Units: % (v/v)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Methane	0.0100	0.00991	0.00992	0.00992	99	80-120	0.10	20
Carbon dioxide	10.0	10.0	10.0	10.0	100	80-120	0.0	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT
Air Toxics (cont.)
Project: 105994

Test: TO-14-G Volatile Organics by GCMS - EPA TO-14
Matrix: AIR
QC Run: 20 JUN 94-B1 Date Analyzed: 20 JUN 94

Analyte	Result	Units	Reporting Limit
Dichlorodifluoromethane	ND	ppb (v/v)	2.0
Chloromethane	ND	ppb (v/v)	4.0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ppb (v/v)	2.0
Vinyl chloride	ND	ppb (v/v)	2.0
Bromomethane	ND	ppb (v/v)	2.0
Chloroethane	ND	ppb (v/v)	4.0
Trichlorofluoromethane	ND	ppb (v/v)	2.0
1,1-Dichloroethene	ND	ppb (v/v)	2.0
Carbon disulfide	ND	ppb (v/v)	10
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	2.0
Acetone	ND	ppb (v/v)	10
Methylene chloride	ND	ppb (v/v)	2.0
trans-1,2-Dichloroethene	ND	ppb (v/v)	2.0
1,1-Dichloroethane	ND	ppb (v/v)	2.0
Vinyl acetate	ND	ppb (v/v)	10
cis-1,2-Dichloroethene	ND	ppb (v/v)	2.0
2-Butanone	ND	ppb (v/v)	10
Chloroform	ND	ppb (v/v)	2.0
1,1,1-Trichloroethane	ND	ppb (v/v)	2.0
Carbon tetrachloride	ND	ppb (v/v)	2.0
Benzene	ND	ppb (v/v)	2.0
1,2-Dichloroethane	ND	ppb (v/v)	2.0
Trichloroethene	ND	ppb (v/v)	2.0
1,2-Dichloropropane	ND	ppb (v/v)	2.0
Bromodichloromethane	ND	ppb (v/v)	2.0
cis-1,3-Dichloropropene	ND	ppb (v/v)	2.0
4-Methyl-2-pentanone	ND	ppb (v/v)	4.0
Toluene	ND	ppb (v/v)	2.0
trans-1,3-Dichloropropene	ND	ppb (v/v)	2.0
1,1,2-Trichloroethane	ND	ppb (v/v)	2.0
Tetrachloroethene	ND	ppb (v/v)	2.0
2-Hexanone	ND	ppb (v/v)	4.0
Dibromochloromethane	ND	ppb (v/v)	2.0
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	2.0
Chlorobenzene	ND	ppb (v/v)	2.0
Ethylbenzene	ND	ppb (v/v)	2.0
Xylenes (total)	ND	ppb (v/v)	2.0
Styrene	ND	ppb (v/v)	2.0
Bromoform	ND	ppb (v/v)	2.0
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	2.0
Benzyl chloride	ND	ppb (v/v)	2.0
4-Ethyl toluene	ND	ppb (v/v)	2.0
1,3,5-Trimethylbenzene	ND	ppb (v/v)	2.0
1,2,4-Trimethylbenzene	ND	ppb (v/v)	2.0

ND = Not Detected

METHOD BLANK REPORT
Air Toxics (cont.)
Project: 105994

Test: TO-14-G Volatile Organics by GCMS - EPA TO-14
Matrix: AIR
QC Run: 20 JUN 94-B1 Date Analyzed: 20 JUN 94

Analyte	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ppb (v/v)	2.0
1,4-Dichlorobenzene	ND	ppb (v/v)	2.0
1,2-Dichlorobenzene	ND	ppb (v/v)	2.0
1,2,4-Trichlorobenzene	ND	ppb (v/v)	4.0
Hexachlorobutadiene	ND	ppb (v/v)	4.0
1,4-Dioxane	ND	ppb (v/v)	10
1,3-Butadiene	ND	ppb (v/v)	10

Test: ASTM-D1946 ASTM-D1946
Matrix: AIR
QC Run: 16 JUN 94-C1 Date Analyzed: 16 JUN 94

Analyte	Result	Units	Reporting Limit
Nitrogen	ND	% (v/v)	0.10

QC Run: 17 JUN 94-A1 Date Analyzed: 17 JUN 94

Analyte	Result	Units	Reporting Limit
Nitrogen	ND	% (v/v)	0.10

ND = Not Detected

Enseco
A Corning Company

METHOD BLANK REPORT
Air Toxics
Project: 105994

Test: SCAQMD-25-2-G SCAQMD 25.2
Matrix: AIR
QC Run: 16 JUN 94-C1 Date Analyzed: 16 JUN 94

Analyte	Result	Units	Reporting Limit
Methane	ND	ppm (v/v)	2.0
Total Non-Methane Hydrocarbons as Methane	ND	ppm (v/v)	5.0

QC Run: 17 JUN 94-A1 Date Analyzed: 17 JUN 94

Analyte	Result	Units	Reporting Limit
Methane	ND	ppm (v/v)	2.0
Total Non-Methane Hydrocarbons as Methane	ND	ppm (v/v)	5.0

ND = Not Detected

CANISTER FIELD DATA RECORD

CLIENT: O'Brien & Gere

CANISTER SERIAL #: A-134

DATE CLEANED: 6/9/94

	VAC. (inches Hg) or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK	30	6/9/94	dc
INITIAL FIELD VACUUM	30-	6/14/94	RMN
FINAL FIELD READING	2	6/14/94	RMN
LABORATORY READING	2	6-16	JW

COMMENTS:

CANISTER FIELD DATA RECORD

CLIENT: O'Brien & Gere

CANISTER SERIAL #: A-172

DATE CLEANED: 6/8/94

	VAC. (inches Hg) or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK	30	6/9/94	dc
INITIAL FIELD VACUUM	30+	6/13/94	RMN
FINAL FIELD READING	2	6/13/94	RMN
LABORATORY READING	2	6-16	JW

COMMENTS:

CANISTER FIELD DATA RECORD

CLIENT: O'Brien & Gere

CANISTER SERIAL #: A-7-74

DATE CLEANED: 6/8/94

	VAC. (inches Hg) or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK	30	6/9/94	dc
INITIAL FIELD VACUUM	30+	6/13/94	RMN
FINAL FIELD READING	0	6/13/94	RMN
LABORATORY READING	2	6-16	JW

COMMENTS:

CANISTER FIELD DATA RECORD

CLIENT: O'Brien & Gere

CANISTER SERIAL #: A-2897

DATE CLEANED: 4/8/94

	VAC. (inches Hg) or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK	30	6/9/94	do
INITIAL FIELD VACUUM	30+	6/14/94	RMN
FINAL FIELD READING	0	6/14/94	RMN
LABORATORY READING	2	6-16	JW

COMMENTS:

CANISTER FIELD DATA RECORD

CLIENT: O'Brien & Gere

CANISTER SERIAL #: A-291

DATE CLEANED: 6/8/94

	VAC. (inches Hg) or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK	30	6/9/94	~~dd~~
INITIAL FIELD VACUUM	30+	6/14/94	RMN
FINAL FIELD READING	2	6/14/94	RMN
LABORATORY READING	0	6-16	JW

COMMENTS:

CANISTER FIELD DATA RECORD

CLIENT: O'Brien & Gere

CANISTER SERIAL #: A-306

DATE CLEANED: 6/8/94

	VAC. (inches Hg) or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK	30	6/9/94	dp
INITIAL FIELD VACUUM	30" +	6/14/94	RMN
FINAL FIELD READING	3 +	6/14/94	RMN
LABORATORY READING	4	6-16	JW

COMMENTS:

CANISTER FIELD DATA RECORD

CLIENT: O'Brien & Gere

CANISTER SERIAL #: A-310

DATE CLEANED: 6/8/94

	VAC. (inches Hg) or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK	30	6/9/94	dd
INITIAL FIELD VACUUM	30+	6/14/94	RMN
FINAL FIELD READING	2	6/14/94	RMN
LABORATORY READING	2	6-16	JW

COMMENTS:

CANISTER FIELD DATA RECORD

CLIENT: O'Brien & Gere

CANISTER SERIAL #: 9361B

DATE CLEANED: 6/8/94

	VAC. (inches Hg) or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK	30	6/9/94	do
INITIAL FIELD VACUUM	30	6/14/94	RMN
FINAL FIELD READING	3	6/14/94	RMN
LABORATORY READING	2	6-16	JW

COMMENTS:

CHAIN OF CUSTODY RECORD ENS-1145-A

Enseco
A Corning Company

☐ 2544 Industrial Ave., West Sacramento, CA. 95691-3435 (916) 372-1393
☐ 7440 Lincoln Way, Garden Grove, CA. 92641-1432 (714) 898-6370.
☒ 18501 East Gale Ave., City of Industry, CA. 91748-1321 (818) 965-1006
☐ Mobile Labs, 1 (800) ENSECO-8

DATE: 6-14-94 | CHAIN OF CUSTODY NUMBER: 18455
LAB NUMBER: 105994 | Page 1 of 1

CLIENT: O'Brien and Gere Engineers
PROJECT MANAGER: Rob Neimeier
ADDRESS: 5000 Brittonfield Parkway
TELEPHONE NUMBER (AREA CODE): (315) 437-6100 x 2321
CITY: Syracuse | STATE: NY | ZIP CODE: 13221
SITE CONTACT: NA
PROJECT NAME: Combe Fill South Landfill - Gas Well Testing
TELEPHONE NUMBER (AREA CODE): NA
CONTRACT/PURCHASE ORDER/QUOTE NO.: 3013-015-975 1994

SAMPLE NO./IDENTIFICATION	DATE	TIME	LAB/SAMPLE NUMBER	SAMPLE TYPE: LIQ.	AIR	SOLID	NO. OF CONTAINERS	ANALYSES: SCAQMD 25.2 - Total non-methane HC	TO-14 - Full Scan	Nitrogen (N2)					Sample Condition/ REMARKS
A-172 - Well 28	6-13	1225			X		1	X	X	X					
A-274 - Well 27	6-13	1615			X		1	X	X	X					
A-289 - Well 66	6-14	1125			X		1	X	X	X					
A-134 - Well 26	6-14	1201			X		1	X	X	X					
A-306 - Well 25	6-14	1305			X		1	X	X	X					
A-291 - Well 11	6-14	1345			X		1	X	X	X					
A-310 - Well 45	6-14	1430			X		1	X	X	X					
93613 - Well 57	6-14	1515			X		1	X	X	X					

DO THE SAMPLE(S) POSE ANY POTENTIAL HAZARD(S)? IF YES, PLEASE EXPLAIN
Landfill gas vent samples

SAMPLERS (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME
Robert M Neimeier	Robert M Neimeier		6-15-94	1530

RECEIVED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	DATE	TIME

RECEIVED FOR LABORATORY BY	RECEIVED	DATE	TIME	ACCEPTED	DATE	TIME
JHARRISON		6/15/94	930			

METHOD OF SHIPMENT: FED EX

SPECIAL INSTRUCTIONS:
72 hour turnaround unless otherwise informed;
TIC analysis may be performed if desired by client

The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the **Enseco** Terms and Conditions, unless a contract or purchase order has been executed and is sited above.

SAMPLE DESPOSITION:
1. Storage time requested: _____ days (Samples will be stored for thirty (30) days without additional charge; thereafter storage charges will be billed at the published rates.)
2. Sample to be returned to client: ☐ Yes ☐ No (**Enseco** will dispose of unreturned samples for a charge of $15.00. Disposal will be by incineration wherever possible; otherwise, as appropriate, according to legal requirements.)

DISTRIBUTION: WHITE - With Report; CANARY - To **ENSECO**; PINK - To Courier; GOLDENROD - To Sample Control

CHAIN OF CUSTODY RECORD

ENS-1145-A

Enseco
A Corning Company

☐ 2544 Industrial Ave., West Sacramento, CA. 95691-3435 (916) 372-1393
☐ 7440 Lincoln Way, Garden Grove, CA. 92641-1432 (714) 898-6370
☒ 18501 East Gale Ave., City of Industry, CA. 91748-1321 (818) 965-1006
☐ Mobile Labs, 1 (800) ENSECO-8

DATE: 6-14-94
CHAIN OF CUSTODY NUMBER: 18455
LAB NUMBER: 105994
Page 1 of 1

CLIENT: O'Brien and Gere Engineers
PROJECT MANAGER: Rob Neimeier
ADDRESS: 5000 Brittenfield Parkway
TELEPHONE NUMBER (AREA CODE): (315) 437-6100 x 2321
CITY: Syracuse
STATE: NY
ZIP CODE: 13221
SITE CONTACT: NA
PROJECT NAME: Cambe Fill South Landfill - Gas Well Testing
TELEPHONE NUMBER (AREA CODE): NA
CONTRACT/PURCHASE ORDER/QUOTE NO.: 3013-015-975 1994

ANALYSES

SAMPLE NO./IDENTIFICATION	DATE	TIME	LAB/SAMPLE NUMBER	SAMPLE TYPE: LIQ.	AIR	SOLID	NO. OF CONTAINERS	SCAQMD 25.2 - Total Non-Methane HC	TO-14 - Full Scan	Nitrogen (N2)	Sample Condition/ REMARKS
A-172 - Well 28	6-13	1235			X		1	X	X	X	
A-274 - Well 27	6-13	1615			X		1	X	X	X	
A-289 - Well 66	6-14	1125			X		1	X	X	X	
A-134 - Well 26	6-14	1201			X		1	X	X	X	
A-306 - Well 25	6-14	1305			X		1	X	X	X	
A-291 - Well 11	6-14	1345			X		1	X	X	X	
A-310 - Well 45	6-14	1430			X		1	X	X	X	
93613 - Well 57	6-14	1515			X		1	X	X	X	

DO THE SAMPLE(S) POSE ANY POTENTIAL HAZARD(S)? IF YES, PLEASE EXPLAIN
Landfill gas vent samples

SAMPLERS (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME
Robert M Neimeier	Robert M Neimeier		6-15-94	1530

RECEIVED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	DATE	TIME

RECEIVED FOR LABORATORY BY	RECEIVED	DATE	TIME	ACCEPTED	DATE	TIME
JAPILSON		6/16/94	930			

METHOD OF SHIPMENT: FED EX

SPECIAL INSTRUCTIONS
72 hour turnaround unless otherwise informed;
TIC analysis may be performed if desired by client

The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the **Enseco** Terms and Conditions, unless a contract or purchase order has been executed and is sited above.

SAMPLE DESPOSITION:
1. Storage time requested: _____ days (Samples will be stored for thirty (30) days without additional charge; thereafter storage charges will be billed at the published rates.)
2. Sample to be returned to client: ☐ Yes ☐ No (**Enseco** will dispose of unreturned samples for a charge of $15.00. Disposal will be by incineration wherever possible; otherwise, as appropriate, according to legal requirements.)

DISTRIBUTION: WHITE - With Report; CANARY - To **ENSECO**; PINK - To Courier; GOLDENROD - To Sample Control

Response Rentals

Reply To:

Response Rentals

Calibration Certificate

Instrument: BACHARACH

Model: SENT. 4

Serial Number: WG0575

Calibration Standard:

Concentration	Response
30% LEL CH_4	30% LEL CH_4
35ppm CO	35ppm CO
23ppm H_2S	23ppm H_2S

Technician: RN **Date:** 6-3-94

This instrument has been calibrated according to the calibration procedure as described in the operation manual.

1057 East Henrietta Rd. • Rochester, NY 14623 • 716-424-2140 • Fax: 716-424-2166

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHRISTINE TODD WHITMAN
Governor

ROBERT C. SHINN, JR.
Commissioner

JUL 28 1994

MEMORANDUM

TO: DR. ICLAL ATAY, CHIEF, BUREAU OF AIR QUALITY ENGINEERING
AIR QUALITY REGULATION PROGRAM

FROM: EDWARD PUTNAM, ASSISTANT DIRECTOR
REMEDIAL PLANNING & DESIGN

SUBJECT: REQUEST FOR MODIFICATION OF AIR PERMIT EQUIVALENT (LOG NO. 01-90-4341) FOR COMBE FILL SOUTH LANDFILL

Enclosed is a revised air permit equivalent application for the Combe Fill South Landfill Superfund site located in Washington and Chester Townships, Morris County. The original air permit equivalent for the site, Log No. 01-90-4341, is based on a direct flow enclosed flare. The Division of Publicly Funded Site Remediation is petitioning for a modification of the original permit because recent landfill gas testing has proven that state-of-the-art air pollution control is no longer required for the site. Specifically, recent testing has demonstrated that the total worst case landfill emissions are 0.44 pounds per hour for non-methane hydrocarbons and 0.054 pounds per hour for toxic volatile organic substances, both of which are below state-of-the-art control guidelines. In addition, the average incremental risk posed by the landfill emissions is predicted to be 8.72E-07, which is lower than the policy limit of 1.0E-06. On the basis of this data, it is requested that the Combe Fill South Landfill air permit equivalent be modified to allow passive venting of the sixty-five wells that have been installed on the property.

In order to avoid delays to construction at the Combe Fill South Landfill, it is requested that the enclosed permit equivalent application be processed by August 5, 1994. If you have any questions regarding the application, please contact Paula Walshe of the Bureau of Construction at (908)879-8740. Your assistance is greatly appreciated.

PMW:LTMAP.CFS
Enclosures
c: A. Farro, DPFSR
D. Prince, BC
P. Walshe, BC
C. Wallace, BSM

AUG 01 1994
CFS 2392

VEM-003
2/91

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF NEW SOURCE REVIEW

APPLICATION FOR PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT AND CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

TO: New Jersey Department of Environmental Protection
Bureau of New Source Review
CN 027, Trenton, NJ. 08625-0027

Read Instructions Before Completing Application

SECTION A

1. Full Business Name NJDEP/Division of Publicly Funded Site Remediation
2. Mailing Address 401 East State Street (No.) Trenton (City) Mercer (County (if NJ)) NJ (State) 08625-0413 (Zip Code)
3. Division and/or Plant Name Combe Fill South Landfill Superfund Site
4. Plant Location Parker Road (No. Street) Chester & Washington Townships (City) Morris (County)
5. Location of Equipment on Premises (bldg., dept., area, etc.) on landfill

SECTION B

REASON FOR APPLICATION (Check One)

- ☐ New Equipment without Control Apparatus
- ☐ New Equipment with Control Apparatus
- ☐ New Control Apparatus on Existing Equipment
- ☐ Modification to Existing Equipment
- ☐ Modification to Existing Control Apparatus
- ☐ Five Year Renewal of Certificate No. _____
- ☒ Other (Explain) Request for Modification of Log No. 01-90-4341

1. Nature of Business Former Municipal Landfill - Superfund Site
2. Estimated Starting Date of Construction March 1994
3. Date Equipment to be put in use March 1994
4. Plant Contact Paula M. Walshe (Name (print or type)) NJDEP Construction Manager (Title) (908) 879-8740 (Telephone No.)
5. APC Plant ID _____

SECTION C

STACK INFORMATION (EQUIVALENT STACK INFORMATION)

1. Company Designation of Stack(s) GV #1 - #59, #61 - #66
2. Previous Certificate Numbers (if any for this stack) 01-90-4341
3. a. Number of Sources Venting to this Stack 1 (Complete a separate VEM-004 for each source)
   b. Number of Stacks Venting Source Operation(s) 65 (Complete a separate VEM-003 for each stack)
4. Distance to the nearest Property Line (ft.) 125 - 800
5. Stack Diameter (inches) 4
6. Discharge Height Above Ground (ft.) 4
7. Exit Temperature of Stack Gases avg. 70F
8. Vol. of Gas Discharged at Stack Conditions (ACFM) 2,132
9. Discharge Directions: ☐ Horizontal ☐ Up ☒ Down

I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including fines or imprisonment or both, for submitting false, inaccurate or incomplete information.

Edward Putnam	Assistant Director	[signature]	7/27/94
Name (print or type)	Title	Signature	Date

This application will not be processed unless proper fee is submitted.

FOR ASSISTANCE CALL 1-800-441-0065

FOR DEPARTMENT USE ONLY Log No. ☐☐-☐☐-☐☐☐☐ Fee _____ Eval. _____

VEM-004
8/89

Side 1

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF NEW SOURCE REVIEW

APPLICATION FOR
PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

Source Emissions and Source Data Form

(Complete this form for each source and submit with application Form VEM-003)

SECTION E

SOURCE INFORMATION

1. Source Description: Passive venting of gas from the Combe Fill South Landfill Superfund site located in Washington & Chester Townships, Morris County

2. Operating Schedule

24	8,760	1994
Hours/Day	Hours/Year	Operation Starting Date

3. % Annual Production Throughput By Quarter

25	25	25	25
Jan.-Mar.	Apr.-June	July-Sept.	Oct.-Dec.

4. Volume Of Gas Discharged From This Source (ACFM): 2,132 Source Discharge Temperature (°F): 70

SECTION F

CONTROL APPARATUS ON SOURCE

	Capital Cost (Dollars)	Annual Operating Cost (Dollars)	No. of Sources Connected
Primary: None			
Secondary: None			
Tertiary: None			

SECTION G

AIR CONTAMINANTS FROM SOURCE

CONTAMINANT NAME	Maximum Emissions w/o Control (lbs./hr.)	Maximum Emissions with Control (lbs./hr.)	How Determined
Hydrogen Sulfide	0.11	--	--
Total TXS *	0.054	--	--
Total Chlorides	0.44	--	--
NMHC as Methane	0.44	--	--
* No individual toxic volatile organic substance present at 0.01 lb/hr			

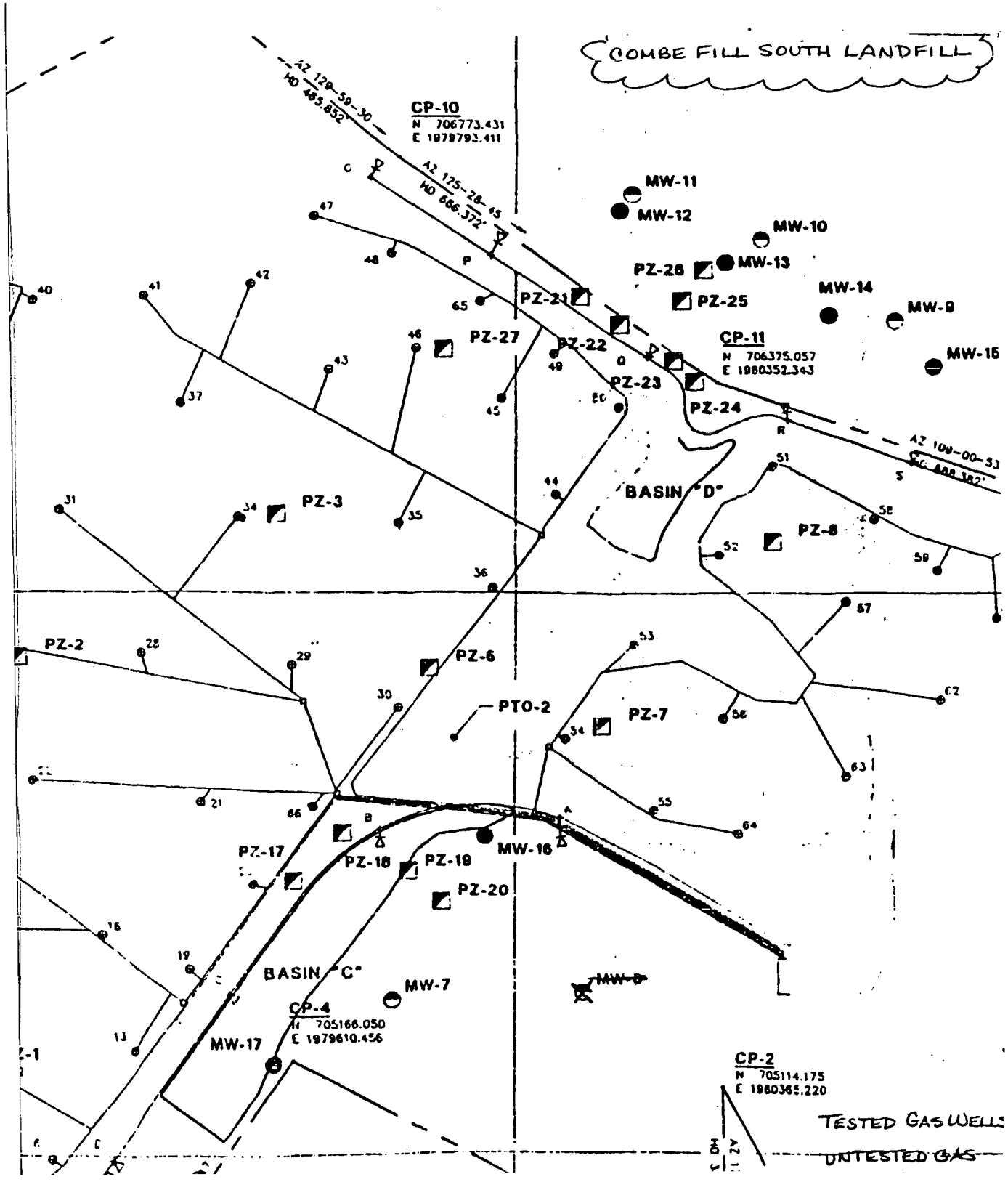
* Use VEM-004 Supplement if additional space if required.

TO INSURE PROPER COORDINATION BETWEEN VEM-003 and VEM-004 FORMS, INSERT IDENTICAL COMPANY NAME AND DESIGNATION OF STACK FROM VEM-003, SIDE 1.

Full Business Name: NJDEP/Division of Publicly Funded Site Remediation

Company Designation of Stack(s): GV #1 - #59, #61 - #66

(over)


COMBE FILL SOUTH LANDFILL
CP-10
N 706773.431
E 1979793.411
AZ 129-59-30
HD 465.852
AZ 175-28-45
HD 686.372'
CP-11
N 706375.057
E 1980352.343
AZ 109-00-33
HD 888.182'
MW-11
MW-12
MW-10
MW-13
MW-14
MW-9
MW-15
PZ-26
PZ-25
PZ-21
PZ-27
PZ-22
PZ-23
PZ-24
BASIN "D"
PZ-3
PZ-8
PZ-2
PZ-6
PTO-2
PZ-7
PZ-17
PZ-18
PZ-19
PZ-20
MW-16
MW-8
BASIN "C"
MW-7
CP-4
N 705166.050
E 1979610.456
MW-17
CP-2
N 705114.175
E 1980365.220
TESTED GAS WELL
UNTESTED GAS

SCREENING RISK ASSESSMENT WORKSHEET FOR CARCINOGENIC EFFECTS

Date: 7/27/94

Evaluator: P. Walshe

PART A: Source Information ****WORST CASE EMISSIONS****

1. NSR Log No.: 01-90-4341
2. Stack Height (ft.): 4
3. Discharge Direction: down
4. Stack Diameter (in.): 4
5. Temperature (Deg. F): 70
6. ACFM: 2132
7. Distance to Nearest Property Line (ft.): 125
8. Oper. Hrs Per Day: 24 Per Yr: 8760
9. Nature of Business: closed sanitary landfill
10. Source Category:
11. Dilution Factor, D: 3.37E-04 sec/m**3 (from chart)
12. Type of Control Apparatus on Source: N/A
13. % of Control Efficiency: N/A

PART B: Contaminant Information - Carcinogens

Substance	CAS No.	Emissions Q (lb/hr)	Emissions Q' = 126000 x Q (ug/sec)	Concentration C = D x Q' (ug/m**3)	Unit Risk Factor URF (ug/**3)E-01	Incremental Risk IR =C x URF
Acetaldehyde	75-07-0	0.00E+00	0.00E+00	0.00E+00	2.2E-06	0.00E+00
Acrylamide *	79-06-1	0.00E+00	0.00E+00	0.00E+00	1.3E-03	0.00E+00
Acrylonitrile	107-13-1	0.00E+00	0.00E+00	0.00E+00	6.8E-05	0.00E+00
Allyl Chloride	107-05-1	0.00E+00	0.00E+00	0.00E+00	5.5E-08	0.00E+00
Arsenic	–	0.00E+00	0.00E+00	0.00E+00	4.3E-03	0.00E+00
Asbestos	1332-21-4	0.00E+00	0.00E+00	0.00E+00	6.9E+00	0.00E+00
Benzene	71-43-2	5.43E-02	6.85E+03	2.31E+00	8.3E-06	1.92E-05
Benzidine	92-87-5	0.00E+00	0.00E+00	0.00E+00	6.7E-02	0.00E+00
Benzo(a)Pyrene	50-32-8	0.00E+00	0.00E+00	0.00E+00	1.7E-03	0.00E+00
Benzyl Chloride	100-44-7	0.00E+00	0.00E+00	0.00E+00	1.2E-05	0.00E+00
Beryllium	–	0.00E+00	0.00E+00	0.00E+00	2.4E-03	0.00E+00
Bis(2-Chloroethyl)Ether	111-44-4	0.00E+00	0.00E+00	0.00E+00	3.3E-04	0.00E+00
Bis(2-Chloromethyl)Ether	542-88-1	0.00E+00	0.00E+00	0.00E+00	6.2E-02	0.00E+00
1,3-Butadiene	106-99-0	0.00E+00	0.00E+00	0.00E+00	2.8E-04	0.00E+00
Cadmium	–	0.00E+00	0.00E+00	0.00E+00	3.5E-03	0.00E+00
Carbon Tetrachloride	56-23-5	0.00E+00	0.00E+00	0.00E+00	1.5E-05	0.00E+00
Chlordane	57-74-9	0.00E+00	0.00E+00	0.00E+00	3.7E-04	0.00E+00
Chloroform	67-66-3	0.00E+00	0.00E+00	0.00E+00	2.3E-05	0.00E+00
Chromium (VI)	–	0.00E+00	0.00E+00	0.00E+00	1.2E-02	0.00E+00
1,2-Dichloropropane	78-87-5	0.00E+00	0.00E+00	0.00E+00	7.2E-07	0.00E+00
1,4-Dioxane	123-91-1	0.00E+00	0.00E+00	0.00E+00	3.1E-06	0.00E+00

TOTAL INCREMENTAL RISK PAGE 1 = 1.92E-05

Part B (continued):

Worst Case Emissions

Substance	CAS No.	Emissions Q (lb/hr)	Emissions Q' = 128000 x Q (ug/sec)	Concentration C = D x Q' (ug/m**3)	Unit Risk Factor URF (ug/**3)E-01	Incremental Risk IR =C x URF
1,2-Diphenylhydrazine	122-66-7	0.00E+00	0.00E+00	0.00E+00	2.2E-04	0.00E+00
Epichlorohydrin	106-89-8	0.00E+00	0.00E+00	0.00E+00	1.2E-06	0.00E+00
Ethyl Acrylate	140-88-5	0.00E+00	0.00E+00	0.00E+00	5.0E-07	0.00E+00
Ethylene Dibromide	106-93-4	0.00E+00	0.00E+00	0.00E+00	2.2E-04	0.00E+00
Ethylene Dichloride	106-06-2	0.00E+00	0.00E+00	0.00E+00	2.6E-05	0.00E+00
Ethylene Oxide	75-21-8	0.00E+00	0.00E+00	0.00E+00	1.0E-04	0.00E+00
Formaldehyde	50-00-0	0.00E+00	0.00E+00	0.00E+00	1.3E-05	0.00E+00
Heptachlor	76-44-8	0.00E+00	0.00E+00	0.00E+00	1.3E-03	0.00E+00
Hexachlorobenzene	118-74-1	0.00E+00	0.00E+00	0.00E+00	4.6E-04	0.00E+00
Hexachloroethane	67-72-1	0.00E+00	0.00E+00	0.00E+00	4.0E-06	0.00E+00
Hydrazine	302-01-2	0.00E+00	0.00E+00	0.00E+00	4.9E-03	0.00E+00
Lindane	58-89-9	0.00E+00	0.00E+00	0.00E+00	3.8E-04	0.00E+00
Methyl Chloride	74-87-3	0.00E+00	0.00E+00	0.00E+00	1.8E-06	0.00E+00
Methylene Chloride	75-09-2	**6.89E-04**	**8.68E+01**	**2.93E-02**	4.7E-07	**1.38E-08**
4,4-Methylenedianiline	101-77-9	0.00E+00	0.00E+00	0.00E+00	2.1E-05	0.00E+00
Nickel	–	0.00E+00	0.00E+00	0.00E+00	2.4E-04	0.00E+00
Nickel Subsulfide	–	0.00E+00	0.00E+00	0.00E+00	4.8E-04	0.00E+00
Nitrobenzene	98-95-3	0.00E+00	0.00E+00	0.00E+00	1.2E-07	0.00E+00
2-Nitropropane	79-46-9	0.00E+00	0.00E+00	0.00E+00	2.7E-03	0.00E+00
N-Nitrosodimethylamine	62-75-9	0.00E+00	0.00E+00	0.00E+00	1.4E-02	0.00E+00
N-Nitroso-n-methylurea	684-93-5	0.00E+00	0.00E+00	0.00E+00	8.6E-02	0.00E+00
N-Nitrosomorpholine	59-89-2	0.00E+00	0.00E+00	0.00E+00	2.5E-05	0.00E+00
Pentachlorophenol	87-86-5	0.00E+00	0.00E+00	0.00E+00	3.9E-07	0.00E+00
Polychlorinated Biphenyls	1336-36-3	0.00E+00	0.00E+00	0.00E+00	1.2E-03	0.00E+00
Propylene Oxide	75-56-9	0.00E+00	0.00E+00	0.00E+00	3.7E-06	0.00E+00
Styrene	100-42-5	0.00E+00	0.00E+00	0.00E+00	5.7E-07	0.00E+00
2,3,7,8-TCDD (Dioxin)	1746-01-6	0.00E+00	0.00E+00	0.00E+00	3.3E+01	0.00E+00
1,1,2,2-Tetrachloroethane	79-34-5	0.00E+00	0.00E+00	0.00E+00	5.8E-05	0.00E+00
Tetrachloroethylene	127-18-4	**3.57E-03**	**4.50E+02**	**1.52E-01**	1.4E-05	**2.12E-06**
Toxaphene	8001-35-2	0.00E+00	0.00E+00	0.00E+00	3.2E-03	0.00E+00
1,1,2-Trichloroethane	79-00-5	0.00E+00	0.00E+00	0.00E+00	1.6E-05	0.00E+00
Trichloroethylene	79-01-6	0.00E+00	0.00E+00	0.00E+00	1.0E-05	0.00E+00
2,4,6-Trichlorophenol	88-06-02	0.00E+00	0.00E+00	0.00E+00	3.1E-06	0.00E+00
Vinyl Chloride	75-01-4	**7.35E-03**	**9.25E+02**	**3.12E-01**	8.4E-05	**2.62E-05**
Vinylidene Chloride	75-35-4	0.00E+00	0.00E+00	0.00E+00	5.0E-05	0.00E+00

TOTAL INCREMENTAL RISK PAGE 2 = 2.83E-05

TOTAL INCREMENTAL RISK BOTH PAGES = 4.75E-05

SCREENING RISK ASSESSMENT WORKSHEET FOR CARCINOGENIC EFFECTS

Date: 7/27/94

Evaluator: P. Walshe

PART A: Source Information ****AVERAGE EMISSIONS****

1. NSR Log No.: 01-90-4341
2. Stack Height (ft.): 4
3. Discharge Direction: down
4. Stack Diameter (in.): 4
5. Temperature (Deg. F): 70
6. ACFM: 2132
7. Distance to Nearest Property Line (ft.): 400
8. Oper. Hrs Per Day: 24 Per Yr: 8760
9. Nature of Business: closed sanitary landfill
10. Source Category:
11. Dilution Factor, D: 3.47E-05 sec/m**3 (from chart)
12. Type of Control Apparatus on Source: N/A
13. % of Control Efficiency: N/A

PART B: Contaminant Information - Carcinogens

Substance	CAS No.	Emissions Q (lb/hr)	Emissions Q' = 126000 x Q (ug/sec)	Concentration C = D x Q' (ug/m**3)	Unit Risk Factor URF (ug/**3)E-01	Incremental Risk IR =C x URF
Acetaldehyde	75-07-0	0.00E+00	0.00E+00	0.00E+00	2.2E-06	0.00E+00
Acrylamide	79-06-1	0.00E+00	0.00E+00	0.00E+00	1.3E-03	0.00E+00
Acrylonitrile	107-13-1	0.00E+00	0.00E+00	0.00E+00	6.8E-05	0.00E+00
Allyl Chloride	107-05-1	0.00E+00	0.00E+00	0.00E+00	5.5E-08	0.00E+00
Arsenic	--	0.00E+00	0.00E+00	0.00E+00	4.3E-03	0.00E+00
Asbestos	1332-21-4	0.00E+00	0.00E+00	0.00E+00	6.9E+00	0.00E+00
Benzene	71-43-2	8.39E-03	1.06E+03	3.67E-02	8.3E-06	3.05E-07
Benzidine	92-87-5	0.00E+00	0.00E+00	0.00E+00	6.7E-02	0.00E+00
Benzo(a)Pyrene	50-32-8	0.00E+00	0.00E+00	0.00E+00	1.7E-03	0.00E+00
Benzyl Chloride	100-44-7	0.00E+00	0.00E+00	0.00E+00	1.2E-05	0.00E+00
Beryllium	--	0.00E+00	0.00E+00	0.00E+00	2.4E-03	0.00E+00
Bis(2-Chloroethyl)Ether	111-44-4	0.00E+00	0.00E+00	0.00E+00	3.3E-04	0.00E+00
Bis(2-Chloromethyl)Ether	542-88-1	0.00E+00	0.00E+00	0.00E+00	6.2E-02	0.00E+00
1,3-Butadiene	106-99-0	0.00E+00	0.00E+00	0.00E+00	2.8E-04	0.00E+00
Cadmium	--	0.00E+00	0.00E+00	0.00E+00	3.5E-03	0.00E+00
Carbon Tetrachloride	56-23-5	0.00E+00	0.00E+00	0.00E+00	1.5E-05	0.00E+00
Chlordane	57-74-9	0.00E+00	0.00E+00	0.00E+00	3.7E-04	0.00E+00
Chloroform	67-66-3	0.00E+00	0.00E+00	0.00E+00	2.3E-05	0.00E+00
Chromium (VI)	--	0.00E+00	0.00E+00	0.00E+00	1.2E-02	0.00E+00
1,2-Dichloropropane	78-87-5	0.00E+00	0.00E+00	0.00E+00	7.2E-07	0.00E+00
1,4-Dioxane	123-91-1	0.00E+00	0.00E+00	0.00E+00	3.1E-06	0.00E+00

TOTAL INCREMENTAL RISK PAGE 1 = **3.05E-07**

Average Emissions

Substance	CAS No.	Emissions Q (lb/hr)	Emissions Q' = 126000 x Q (ug/sec)	Concentration C = D x Q' (ug/m**3)	Unit Risk Factor URF (ug/**3)E-01	Incremental Risk IR =C x URF
1,2-Diphenylhydrazine	122-66-7	0.00E+00	0.00E+00	0.00E+00	2.2E-04	0.00E+00
Epichlorohydrin	106-89-8	0.00E+00	0.00E+00	0.00E+00	1.2E-06	0.00E+00
Ethyl Acrylate	140-88-5	0.00E+00	0.00E+00	0.00E+00	5.0E-07	0.00E+00
Ethylene Dibromide	106-93-4	0.00E+00	0.00E+00	0.00E+00	2.2E-04	0.00E+00
Ethylene Dichloride	106-06-2	0.00E+00	0.00E+00	0.00E+00	2.6E-05	0.00E+00
Ethylene Oxide	75-21-8	0.00E+00	0.00E+00	0.00E+00	1.0E-04	0.00E+00
Formaldehyde	50-00-0	0.00E+00	0.00E+00	0.00E+00	1.3E-05	0.00E+00
Heptachlor	76-44-8	0.00E+00	0.00E+00	0.00E+00	1.3E-03	0.00E+00
Hexachlorobenzene	118-74-1	0.00E+00	0.00E+00	0.00E+00	4.6E-04	0.00E+00
Hexachloroethane	67-72-1	0.00E+00	0.00E+00	0.00E+00	4.0E-06	0.00E+00
Hydrazine	302-01-2	0.00E+00	0.00E+00	0.00E+00	4.9E-03	0.00E+00
Lindane	58-89-9	0.00E+00	0.00E+00	0.00E+00	3.8E-04	0.00E+00
Methyl Chloride	74-87-3	0.00E+00	0.00E+00	0.00E+00	1.8E-06	0.00E+00
Methylene Chloride	75-09-2	**3.18E-05**	**4.01E+00**	**1.39E-04**	4.7E-07	**6.53E-11**
4,4-Methylenedianiline	101-77-9	0.00E+00	0.00E+00	0.00E+00	2.1E-05	0.00E+00
Nickel	–	0.00E+00	0.00E+00	0.00E+00	2.4E-04	0.00E+00
Nickel Subsulfide	–	0.00E+00	0.00E+00	0.00E+00	4.8E-04	0.00E+00
Nitrobenzene	98-95-3	0.00E+00	0.00E+00	0.00E+00	1.2E-07	0.00E+00
2-Nitropropane	79-46-9	0.00E+00	0.00E+00	0.00E+00	2.7E-03	0.00E+00
N-Nitrosodimethylamine	62-75-9	0.00E+00	0.00E+00	0.00E+00	1.4E-02	0.00E+00
N-Nitroso-n-methylurea	684-93-5	0.00E+00	0.00E+00	0.00E+00	8.6E-02	0.00E+00
N-Nitrosomorpholine	59-89-2	0.00E+00	0.00E+00	0.00E+00	2.5E-05	0.00E+00
Pentachlorophenol	87-86-5	0.00E+00	0.00E+00	0.00E+00	3.9E-07	0.00E+00
Polychlorinated Biphenyls	1336-36-3	0.00E+00	0.00E+00	0.00E+00	1.2E-03	0.00E+00
Propylene Oxide	75-56-9	0.00E+00	0.00E+00	0.00E+00	3.7E-06	0.00E+00
Styrene	100-42-5	0.00E+00	0.00E+00	0.00E+00	5.7E-07	0.00E+00
2,3,7,8-TCDD (Dioxin)	1746-01-6	0.00E+00	0.00E+00	0.00E+00	3.3E+01	0.00E+00
1,1,2,2-Tetrachloroethane	79-34-5	0.00E+00	0.00E+00	0.00E+00	5.8E-05	0.00E+00
Tetrachloroethylene	127-18-4	**2.75E-04**	**3.46E+01**	**1.20E-03**	1.4E-05	**1.68E-08**
Toxaphene	8001-35-2	0.00E+00	0.00E+00	0.00E+00	3.2E-03	0.00E+00
1,1,2-Trichloroethane	79-00-5	0.00E+00	0.00E+00	0.00E+00	1.6E-05	0.00E+00
Trichloroethylene	79-01-6	0.00E+00	0.00E+00	0.00E+00	1.0E-05	0.00E+00
2,4,6-Trichlorophenol	88-06-02	0.00E+00	0.00E+00	0.00E+00	3.1E-06	0.00E+00
Vinyl Chloride	75-01-4	**1.50E-03**	**1.89E+02**	**6.56E-03**	8.4E-05	**5.51E-07**
Vinylidene Chloride	75-35-4	0.00E+00	0.00E+00	0.00E+00	5.0E-05	0.00E+00

TOTAL INCREMENTAL RISK PAGE 2 = 5.68E-07

TOTAL INCREMENTAL RISK BOTH PAGES = 8.72E-07

Purpose of Application:

On February 10, 1993 an air permit equivalent was issued for the construction and operation of a direct flow flare at the Combe Fill South Landfill Superfund site located in Washington and Chester Townships in Morris County. Since that time, the Division of Publicly Funded Site Remediation (DPFSR) has determined through landfill gas testing that state-of-the-art air pollution control is no longer required for the site. As a result, the DPFSR is requesting to modify the existing air permit equivalent to allow passive venting of the landfill through the sixty-five wells that have been installed on the property.

Source Description (Existing Venting System):

The Combe Fill South Landfill is a sixty-five acre sanitary landfill. The DPFSR is presently implementing a remedial action at the site pursuant to CERCLA. The remedial action includes the installation of a six foot cap, as well as sixty-five single methane vents throughout the capped surface of the landfill. A nine foot high fence surrounds the entire property.

Emissions Tests:

Eight vents were selected for testing on the basis of their proportionate distribution throughout the landfill. The following parameters and methods were included in the testing program that occurred in June 1994:

Parameter	Method
Non-methane Hydrocarbons	SCAQMD Method 25.2
TXS	EPA Method TO-14
Total Volatile Chlorinated Organics	EPA Method TO-14
Hydrogen Sulfide	direct reading

The emission rates that are identified in the air permit equivalent application are proposed based on these tests.

Existing Operational Problems: None.

Control Technologies: None.

Applicable Regulations:

1. NJAC 7:27-8 (Permits and Certificates)

   Note that NJAC 7:27-17 (Toxic Volatile Organic Substances or TXS) is not applicable because the worst case TXS emission from the entire landfill is estimated to be 0.054 pounds per hour. This value is less that the exemption criteria of 0.1 pounds per hour that is specified in NJAC 7:27-17.9.

   State-of-the-art (SOTA) control is not required because the worst case emissions for non-methane hydrocarbons and TXS are estimated to be 0.44 and 0.054 pounds per hour, respectively. The SOTA guideline requires SOTA control if the non-methane hydrocarbons and TXS emissions exceed 0.5 and 0.1 pounds per hour, respectively.

Emission Basis:

In June 1994 O'Brien & Gere Engineers, Inc. collected gas samples from eight vents, six of which are located on the interior portion of the landfill and two of which are located on the perimeter. The average flow rate for the interior landfill vents was measured to be 42.1 cubic feet per minute (CFM), whereas the average perimeter vent flow rate was 19.7 CFM. The estimated emission rates of air contaminants were determined as follows:

1. Non-methane hydrocarbons: The maximum concentration of non-methane hydrocarbons was detected at Well 28, which had a measured gas flow rate of 40.8 CFM. To simulate the worst case emission of non-methane hydrocarbons from the entire landfill, the concentration that was detected at Well 28 was multiplied by 65, the total number of vents.

2. TXS: The maximum concentration of TXS was detected at Well 45, which had a measured gas flow rate of 46.6 CFM. To simulate the worst case emission of TXS from the entire landfill, the concentration that was detected at Well 45 was multiplied by 65, the total number of vents.

3. Total Chlorides: The maximum concentration of chlorides was detected at Well 45, which had a measured gas flow rate of 46.6 CFM. To simulate the worst case emission of chlorides from the entire landfill, the concentration that was detected at Well 45 was multiplied by 65, the total number of vents.

4. Hydrogen Sulfide: The maximum concentration of hydrogen sulfide was detected at Well 28, which had a measured gas flow rate of 40.8 CFM. To simulate the worst case emission of hydrogen sulfide from the entire landfill, the concentration that was detected at Well 28 was multiplied by 65, the total number of vents.

Emission Calculations:

Calculations are included in Attachment A. A sample calculation for TXS emissions is presented below, based on the maximum concentration from the eight wells that were sampled.

The maximum TXS concentration was measured at Well 45, where benzene was detected at 1,500 ppb. To convert parts per billion to pounds per hour, the following equation was used:

$(C/10^9) \times V \times A \times 1/359 \times (492°R/537°R) \times (60 \text{ min}/1 \text{ hr}) \times MW$

where:

C	=	contaminant concentration in ppb
V	=	gas velocity, ft/min
A	=	duct cross sectional area of 0.0837 ft^2
1/359	=	ideal gas constant, lb-mole/ft^3
MW	=	molecular wt. of contaminant, lb/lb-mole

Calculation of benzene emission from Well 45:

$(1500E\text{-}09)(534 \text{ CFM})(0.0837 \text{ ft}^2)(1 \text{ lb-mole}/359 \text{ ft}^3)(492°R/537°R)(60 \text{ min/hr})(78 \text{ lb/lb-mole})$

$= 8.36 \times 10^{-4} \text{ lb/hr}$

The worst case TXS emission rate from the landfill was modeled by multiplying the above rate by 65, the total number of wells. The resulting value was 0.054 pounds per hour.

The above calculations were repeated for non-methane hydrocarbons, total chlorides, and hydrogen sulfide, as discussed in the section entitled "Emission Basis". The emission rates that were estimated in this manner accurately represent the worst case emissions from the landfill for the following reasons: (1) The contaminant concentrations that were used were the highest measured concentrations from any one well during the sampling event; and (2) The gas flow rates from the wells that were employed in the model are among the higher limit flow rates that were measured during the sampling event.

Emission Rates:

For the entire landfill, the respective maximum concentrations for non-methane hydrocarbons (NMHC), TXS, total chlorides, and hydrogen sulfide are predicted to be 0.44 pounds per hour, 0.054 pounds per hour, 0.44 pounds per hour, and 0.11 pounds per hour. These rates were estimated as follows:

	Max. Emission One Vent (lb/hr)	x	Total No. of Vents	=	Max. Landfill Emission
NMHC	0.00681		65		0.44 lb/hr
TXS	0.000836		65		0.054 lb/hr
Tot. Chlorides	0.00671		65		0.44 lb/hr
H^2S	0.00170		65		0.11 lb/hr

Attachment A
Emission Calculations

Calculation of Volumetric Flow Rate of Landfill Gas:

The cross section area, A, of the well was determined as follows:

$$A = 0.25 \times Pi \times D^2$$

where:

Pi = 3.14
D = diameter, ft

For a four inch diameter well riser, the area is 0.0837 ft^2.

The volumetric flow rate, R, from each well is calculated as follows:

$$R = V \times A$$

where:

V = velocity, ft/min
A = area, ft^2

The flow rates are listed below.

Vent	Velocity (ft/min)	Area (ft^2)	Flow Rate (ft^3/min)	Location on Landfill
11	570	0.0837	49.8	interior
25	199	0.0837	17.4	perimeter
26	549	0.0837	47.9	interior
27	410	0.0837	35.8	interior
28	467	0.0837	40.8	interior
45	534	0.0837	46.6	interior
57	364	0.0837	31.8	interior
66	252	0.0837	22.0	perimeter

Thirty-eight vents have been installed in the interior portion of the landfill, and twenty-seven vents have been installed along the perimeter.

The amount of gas that is discharged from the landfill is estimated as follows:

Average Interior Vent Flow Rate:

(49.8 + 47.9 + 35.8 + 40.8 + 46.6 + 31.8)/6 = 42.1 CFM

Average Perimeter Vent Flow Rate:
(17.4 + 22.0)/2 = 19.7 CFM

Estimated Landfill Gas Flow Rate:

(42.1 CFM x 38) + (19.7 CFM x 27) = 2,131.7 CFM or 2,132 CFM

Identification of the Distances of Vents from the Property Line:

Vent	Distance (ft)
11	450
25	400
26	475
27	800
28	800
45	250
57	300
66	450

The minimum distance to the property line from any vent is 125 feet, whereas the maximum distance is 800 ft. On average, the vents producing the greatest volume of gas and the greatest concentration of contaminants are 400 feet or more from the nearest property line.

Calculation of Emission Rates for Contaminants:

The following formula was used to convert contaminant concentrations in parts per million or billion to emission rates in pounds per hour:

$$(C/10^e) \times R \times 1/359 \times (492°R/537°R) \times (60 \text{ min/hr}) \times MW$$

where:

C	=	contaminant concentration in ppm or ppb
e	=	6 if C is in ppm or 9 if C is in ppb
R	=	volumetric flow rate, CFM
1/359	=	ideal gas constant, lb-mole/ft^3
MW	=	molecular weight of contaminant, lb/lb-mole

Emission Rates for Non-methane Hydrocarbons:

Vent 11

C = 30 ppm
e = 6
R = 49.8
MW = 16.05

$(30 \times 10^{-6}) \times 49.8 \times 1/359 \times 492/537 \times 60 \times 16.05 = 3.67 \times 10^{-3}$ lbs/hr

Vent 25

C = 15 ppm
e = 6
R = 17.4
MW = 16.05

$(15 \times 10^{-6}) \times 17.4 \times 1/359 \times 492/537 \times 60 \times 16.05 = 6.41 \times 10^{-4}$ lbs/hr

Vent 26

C = 24 ppm
e = 6
R = 47.9
MW = 16.05

$(24 \times 10^{-6}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 16.05 = 2.83 \times 10^{-3}$ lbs/hr

Vent 27

C = 32 ppm
e = 6
R = 35.8
MW = 16.05

$(32 \times 10^{-6}) \times 35.8 \times 1/359 \times 492/537 \times 60 \times 16.05 = 2.81 \times 10^{-3}$ lbs/hr

Vent 28

C = 68 ppm
e = 6
R = 40.8
MW = 16.05

$(68 \times 10^{-6}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 16.05 = 6.81 \times 10^{-3}$ lbs/hr

Vent 45

C = 50 ppm
e = 6
R = 46.6
MW = 16.05

$(50 \times 10^{-6}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 16.05 = 5.73 \times 10^{-3}$ lbs/hr

Vent 57

C = 21 ppm
e = 6
R = 31.8
MW = 16.05

$(21 \times 10^{-6}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 16.05 = 1.64 \times 10^{-3}$ lbs/hr

Vent 66

C = 21 ppm
e = 6
R = 22.0
MW = 16.05

$(21 \times 10^{-6}) \times 22.0 \times 1/359 \times 492/537 \times 60 \times 16.05 = 1.13 \times 10^{-3}$ lbs/hr

The highest non-methane hydrocarbon concentration was measured at Vent 28 (6.81×10^{-3} lbs/hr). The worst case emission from the landfill is estimated by multiplying 6.81×10^{-3} by 65, the total number of vents. The resulting emission rate is 0.44 lbs/hr.

Emission Rates for TXS:

Vent 11

C = 120 ppb of benzene
e = 9
R = 49.8
MW = 78.12

$(120 \times 10^{-9}) \times 49.8 \times 1/359 \times 492/537 \times 60 \times 78.12 = 7.15 \times 10^{-5}$ lbs/hr

Vent 25

C = 26 ppb of benzene
e = 9
R = 17.4
MW = 78.12

$(26 \times 10^{-9}) \times 17.4 \times 1/359 \times 492/537 \times 60 \times 78.12 = 5.41 \times 10^{-6}$ lbs/hr

Vent 26

C = 200 ppb of benzene
e = 9
R = 47.9
MW = 78.12

$(200 \times 10^{-9}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 78.12 = 1.15 \times 10^{-4}$ lbs/hr

Vent 27

C = 710 ppb of benzene
e = 9
R = 35.8

MW = 78.12

$(710 \times 10^{-9}) \times 35.8 \times 1/359 \times 492/537 \times 60 \times 78.12 = 3.04 \times 10^{-4}$ lbs/hr

Vent 28

C = 830 ppb of benzene and 53 ppb of tetrachloroethene
e = 9
R = 40.8
MW = 78.12 (benzene) and 131.5 (tetrachloroethene)

Benzene:
$(830 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 78.12 = 4.05 \times 10^{-4}$ lbs/hr

Tetrachloroethene:
$(53 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 131.5 = 4.35 \times 10^{-5}$ lbs/hr

TOTAL = 4.49×10^{-4} lbs/hr

Vent 45

C = 1500 ppb of benzene
e = 9
R = 46.6
MW = 78.12

$(1500 \times 10^{-9}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 78.12 = 8.36 \times 10^{-4}$ lbs/hr

Vent 57

C = 21 ppb of benzene
e = 9
R = 31.8
MW = 78.12

$(21 \times 10^{-9}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 78.12 = 7.99 \times 10^{-6}$ lbs/hr

Vent 66

C = 92 ppb of benzene
e = 9
R = 22.0
MW = 78.12

$(92 \times 10^{-9}) \times 22.0 \times 1/359 \times 492/537 \times 60 \times 78.12 = 2.42 \times 10^{-5}$ lbs/hr

The highest TXS concentration was measured at Vent 45 (8.36×10^{-4} lbs/hr). The worst case emission from the landfill is estimated by multiplying 8.36×10^{-4} by 65, the total number of vents. The resulting emission rate is 0.054 lbs/hr.

Emission Rates for Total Chlorides:

Note that the emission rates for each of the identified contaminants is presented in pounds per hour of contaminant and pounds per hour of contaminant as chlorine. The emission rate of the contaminant is derived by using the formula that is identified above. The emission rate of the contaminant as chlorine is calculated according to the following formula:

Emission Rate x MW_{Cl}/MW x No. of Cl Molecules in Contaminant

where:
MW_{Cl} = molecular weight of chlorine, 35.45 lb/lb-mole
MW = molecular weight of contaminant, lb/lb-mole

Vent 11

Contaminant	C (ppb)	MW	No. of Cl Molecules
1,2-dichloro-1,1,2,2-tetrafluoroethane	280	170.92	2
vinyl chloride	73	62.5	1
chloroethane	94	64.52	1
trichlorofluoromethane	34	137.36	3
chlorobenzene	210	112.56	1
1,4-dichlorobenzene	290	147.0	2

e = 9
R = 49.8

1,2-Dichloro-1,1,2,2-Tetrafluoroethane:
$(280 \times 10^{-9}) \times 49.8 \times 1/359 \times 492/537 \times 60 \times 170.92 = 3.65 \times 10^{-4}$ lbs/hr
As Chlorine: $3.65 \times 10^{-4} \times 35.45/170.92 \times 2 =$ **1.51×10^{-4} lbs/hr**

Vinyl Chloride:
$(73 \times 10^{-9}) \times 49.8 \times 1/359 \times 492/537 \times 60 \times 62.5 = 3.48 \times 10^{-5}$ lbs/hr
As Chlorine: $3.48 \times 10^{-5} \times 35.45/62.5 \times 1 =$ **1.97×10^{-5} lbs/hr**

Chloroethane:
$(94 \times 10^{-9}) \times 49.8 \times 1/359 \times 492/537 \times 60 \times 64.52 = 4.62 \times 10^{-5}$ lbs/hr
As Chlorine: $4.62 \times 10^{-5} \times 35.45/64.52 \times 1 =$ **2.54×10^{-5} lbs/hr**

Trichlorofluoromethane:
$(34 \times 10^{-9}) \times 49.8 \times 1/359 \times 492/537 \times 60 \times 137.36 = 3.56 \times 10^{-5}$ lbs/hr
As Chlorine: $3.56 \times 10^{-5} \times 35.45/137.36 \times 3 =$ **2.78×10^{-5} lbs/hr**

Chlorobenzene:
$(210 \times 10^{-9}) \times 49.8 \times 1/359 \times 492/537 \times 60 \times 112.56 = 1.80 \times 10^{-4}$ lbs/hr
As Chlorine: $1.80 \times 10^{-4} \times 35.45/112.56 \times 1 =$ **5.67×10^{-5} lbs/hr**

1,4-Dichlorobenzene
$(290 \times 10^{-9}) \times 49.8 \times 1/359 \times 492/537 \times 60 \times 147.00 = 3.25 \times 10^{-4}$ lbs/hr
As Chlorine: $3.25 \times 10^{-4} \times 35.45/147.00 \times 2 =$ **1.56×10^{-4} lbs/hr**

TOTAL CHLORIDES (lbs/hr):
$(1.51 + 1.56) \times 10^{-4} + (1.97 + 2.54 + 2.78 + 5.67) \times 10^{-5} =$ **4.37×10^{-4}**

Vent 25

Contaminant	C (ppb)	MW	No. of Cl Molecules
1,2-dichloro-1,1,2,2-tetrafluoroethane	16	170.92	2
vinyl chloride	4.4	62.5	1
chloroethane	26	64.52	1
trichlorofluoromethane	48	137.36	3
chlorobenzene	47	112.56	1
1,4-dichlorobenzene	18	147.0	2

e = 9
R = 17.4

1,2-Dichloro-1,1,2,2-Tetrafluoroethane:
$(16 \times 10^{-9}) \times 17.4 \times 1/359 \times 492/537 \times 60 \times 170.92 = 7.29 \times 10^{-6}$ lbs/hr
As Chlorine: $7.29 \times 10^{-6} \times 35.45/170.92 \times 2 = \mathbf{3.02 \times 10^{-6}}$ **lbs/hr**

Vinyl Chloride:
$(4.4 \times 10^{-9}) \times 17.4 \times 1/359 \times 492/537 \times 60 \times 62.5 = 7.32 \times 10^{-7}$ lbs/hr
As Chlorine: $7.32 \times 10^{-7} \times 35.45/62.5 \times 1 = \mathbf{4.15 \times 10^{-7}}$ **lbs/hr**

Chloroethane:
$(26 \times 10^{-9}) \times 17.4 \times 1/359 \times 492/537 \times 60 \times 64.52 = 4.47 \times 10^{-6}$ lbs/hr
As Chlorine: $4.47 \times 10^{-6} \times 35.45/64.52 \times 1 = \mathbf{2.46 \times 10^{-6}}$ **lbs/hr**

Trichlorofluoromethane:
$(48 \times 10^{-9}) \times 17.4 \times 1/359 \times 492/537 \times 60 \times 137.36 = 1.76 \times 10^{-5}$ lbs/hr
As Chlorine: $1.76 \times 10^{-5} \times 35.45/137.36 \times 3 = \mathbf{1.36 \times 10^{-5}}$ **lbs/hr**

Chlorobenzene:
$(47 \times 10^{-9}) \times 17.4 \times 1/359 \times 492/537 \times 60 \times 112.56 = 1.41 \times 10^{-5}$ lbs/hr
As Chlorine: $1.41 \times 10^{-5} \times 35.45/112.56 \times 1 = \mathbf{4.44 \times 10^{-6}}$ **lbs/hr**

1,4-Dichlorobenzene
$(18 \times 10^{-9}) \times 17.4 \times 1/359 \times 492/537 \times 60 \times 147.00 = 7.05 \times 10^{-6}$ lbs/hr
As Chlorine: $7.05 \times 10^{-6} \times 35.45/147.00 \times 2 = \mathbf{3.40 \times 10^{-6}}$ **lbs/hr**

TOTAL CHLORIDES (lbs/hr):
$1.36 \times 10^{-5} + (3.02 + 2.46 + 4.44 + 3.40) \times 10^{-6} + 4.15 \times 10^{-7} = \mathbf{2.73 \times 10^{-5}}$

Vent 26

Contaminant	C (ppb)	MW	No. of Cl Molecules
1,2-dichloro-1,1,2,2-tetrafluoroethane	150	170.92	2
vinyl chloride	140	62.5	1
chloroethane	200	64.52	1
trichlorofluoromethane	24	137.36	3
methylene chloride	17	84.93	2
c-1,2-Dichloroethene	22	96.94	2
chlorobenzene	210	112.56	1
1,4-dichlorobenzene	160	147.0	2

e = 9
R = 47.9

1,2-Dichloro-1,1,2,2-Tetrafluoroethane:
$(150 \times 10^{-9}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 170.92 = 1.88 \times 10^{-4}$ lbs/hr
As Chlorine: $1.88 \times 10^{-4} \times 35.45/170.92 \times 2 =$ **7.80×10^{-5} lbs/hr**

Vinyl Chloride:
$(140 \times 10^{-9}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 62.5 = 6.42 \times 10^{-5}$ lbs/hr
As Chlorine: $6.42 \times 10^{-5} \times 35.45/62.5 \times 1 =$ **3.64×10^{-5} lbs/hr**

Chloroethane:
$(200 \times 10^{-9}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 64.52 = 9.46 \times 10^{-5}$ lbs/hr
As Chlorine: $9.46 \times 10^{-5} \times 35.45/64.52 \times 1 =$ **5.20×10^{-5} lbs/hr**

Trichlorofluoromethane:
$(24 \times 10^{-9}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 137.36 = 2.42 \times 10^{-5}$ lbs/hr
As Chlorine: $2.42 \times 10^{-5} \times 35.45/137.36 \times 3 =$ **1.87×10^{-5} lbs/hr**

Methylene Chloride:
$(17 \times 10^{-9}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 84.93 = 1.06 \times 10^{-5}$ lbs/hr
As Chlorine: $1.06 \times 10^{-5} \times 35.45/84.93 \times 2 =$ **8.84×10^{-6} lbs/hr**

c-1,2-Dichloroethene:
$(22 \times 10^{-9}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 96.94 = 1.56 \times 10^{-5}$ lbs/hr
As Chlorine: $1.56 \times 10^{-5} \times 35.45/96.94 \times 2 =$ **1.14×10^{-5} lbs/hr**

Chlorobenzene:
$(210 \times 10^{-9}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 112.56 = 1.73 \times 10^{-4}$ lbs/hr
As Chlorine: $1.73 \times 10^{-4} \times 35.45/112.56 \times 1 =$ **5.45×10^{-5} lbs/hr**

1,4-Dichlorobenzene
$(160 \times 10^{-9}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 147.00 = 1.73 \times 10^{-4}$ lbs/hr
As Chlorine: $1.73 \times 10^{-4} \times 35.45/147.00 \times 2 =$ **8.34×10^{-5} lbs/hr**

TOTAL CHLORIDES (lbs/hr):
$(7.80+3.64+5.20+1.87+1.14+5.45+8.34) \times 10^{-5} + 8.84 \times 10^{-6} =$ **3.43×10^{-4}**

Vent 27

Contaminant	C (ppb)	MW	No. of Cl Molecules
1,2-dichloro-1,1,2,2-tetrafluoroethane	1200	170.92	2
vinyl chloride	120	62.5	1
chloroethane	150	64.52	1
trichlorofluoromethane	30	137.36	3
chlorobenzene	290	112.56	1
1,4-dichlorobenzene	88	147.0	2

e = 9
R = 35.8

1,2-Dichloro-1,1,2,2-Tetrafluoroethane:
$(1200 \times 10^{-9}) \times 35.8 \times 1/359 \times 492/537 \times 60 \times 170.92 = 1.12 \times 10^{-3}$ lbs/hr
As Chlorine: $1.12 \times 10^{-3} \times 35.45/170.92 \times 2 =$ **4.65×10^{-4} lbs/hr**

Vinyl Chloride:
$(120 \times 10^{-9}) \times 35.8 \times 1/359 \times 492/537 \times 60 \times 62.5 = 4.11 \times 10^{-5}$ lbs/hr
As Chlorine: $4.11 \times 10^{-5} \times 35.45/62.5 \times 1 =$ **2.33×10^{-5} lbs/hr**

Chloroethane:
$(150 \times 10^{-9}) \times 35.8 \times 1/359 \times 492/537 \times 60 \times 64.52 = 5.31 \times 10^{-5}$ lbs/hr
As Chlorine: $5.31 \times 10^{-5} \times 35.45/64.52 \times 1 =$ **2.91×10^{-5} lbs/hr**

Trichlorofluoromethane:
$(30 \times 10^{-9}) \times 35.8 \times 1/359 \times 492/537 \times 60 \times 137.36 = 2.26 \times 10^{-5}$ lbs/hr
As Chlorine: $2.26 \times 10^{-5} \times 35.45/137.36 \times 3 =$ **1.75×10^{-5} lbs/hr**

Chlorobenzene:
$(290 \times 10^{-9}) \times 35.8 \times 1/359 \times 492/537 \times 60 \times 112.56 = 1.79 \times 10^{-4}$ lbs/hr
As Chlorine: $1.79 \times 10^{-4} \times 35.45/112.56 \times 1 =$ **5.64×10^{-5} lbs/hr**

1,4-Dichlorobenzene
$(88 \times 10^{-9}) \times 35.8 \times 1/359 \times 492/537 \times 60 \times 147.00 = 7.09 \times 10^{-5}$ lbs/hr
As Chlorine: $7.09 \times 10^{-5} \times 35.45/147.00 \times 2 =$ **3.42×10^{-5} lbs/hr**

TOTAL CHLORIDES (lbs/hr):
$4.65 \times 10^{-4} + (2.33 + 2.91 + 1.75 + 5.64 + 3.42) \times 10^{-5} =$ **6.26×10^{-4}**

Vent 28

Contaminant	C (ppb)	MW	No. of Cl Molecules
1,2-dichloro-1,1,2,2-tetrafluoroethane	560	170.92	2
vinyl chloride	340	62.5	1
chloroethane	170	64.52	1
trichlorofluoromethane	2900	137.36	3
c-1,2-dichloroethene	70	96.94	2
tetrachloroethene	53	165.82	4
chlorobenzene	590	112.56	1
1,4-dichlorobenzene	190	147.0	2
1,2-dichlorobenzene	64	147.0	2

e = 9
R = 40.8

1,2-Dichloro-1,1,2,2-Tetrafluoroethane:
$(560 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 170.92 = 5.97 \times 10^{-4}$ lbs/hr
As Chlorine: $5.97 \times 10^{-4} \times 35.45/170.92 \times 2 = \mathbf{2.47 \times 10^{-4}}$ **lbs/hr**

Vinyl Chloride:
$(340 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 62.5 = 1.33 \times 10^{-4}$ lbs/hr
As Chlorine: $1.33 \times 10^{-4} \times 35.45/62.5 \times 1 = \mathbf{7.54 \times 10^{-5}}$ **lbs/hr**

Chloroethane:
$(170 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 64.52 = 6.85 \times 10^{-5}$ lbs/hr
As Chlorine: $6.85 \times 10^{-5} \times 35.45/64.52 \times 1 = \mathbf{3.77 \times 10^{-5}}$ **lbs/hr**

Trichlorofluoromethane:
$(2900 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 137.36 = 2.49 \times 10^{-3}$ lbs/hr
As Chlorine: $2.49 \times 10^{-3} \times 35.45/137.36 \times 3 = \mathbf{1.92 \times 10^{-3}}$ **lbs/hr**

c-1,2-Dichloroethene:
$(70 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 96.94 = 4.24 \times 10^{-5}$ lbs/hr
As Chlorine: $4.24 \times 10^{-5} \times 35.45/96.94 \times 2 = \mathbf{3.10 \times 10^{-5}}$ **lbs/hr**

Tetrachloroethene:
$(53 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 165.82 = 5.49 \times 10^{-5}$ lbs/hr
As Chlorine: $5.49 \times 10^{-5} \times 35.45/165.82 \times 4 = \mathbf{4.70 \times 10^{-5}}$ **lbs/hr**

Chlorobenzene:
$(590 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 112.56 = 4.14 \times 10^{-4}$ lbs/hr
As Chlorine: $4.14 \times 10^{-4} \times 35.45/112.56 \times 1 = \mathbf{1.30 \times 10^{-4}}$ **lbs/hr**

1,4-Dichlorobenzene
$(190 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 147.00 = 1.74 \times 10^{-4}$ lbs/hr
As Chlorine: $1.74 \times 10^{-4} \times 35.45/147.00 \times 2 = \mathbf{8.39 \times 10^{-5}}$ **lbs/hr**

1,2-Dichlorobenzene
$(64 \times 10^{-9}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 147.00 = 5.88 \times 10^{-5}$ lbs/hr
As Chlorine: $5.88 \times 10^{-5} \times 35.45/147.00 \times 2 = \mathbf{2.83 \times 10^{-5}}$ **lbs/hr**

TOTAL CHLORIDES (lbs/hr):
$1.92 \times 10^{-3} + (2.47 + 1.30) \times 10^{-4} + (7.54 + 3.77 + 3.10 + 4.70 + 8.39 + 2.83) \times 10^{-5} = \mathbf{2.60 \times 10^{-3}}$

Vent 45

Contaminant	C (ppb)	MW	No. of Cl Molecules
dichlorodifluoromethane	7900	120.91	2
1,2-dichloro-1,1,2,2-tetrafluoroethane	2700	170.92	2
vinyl chloride	42	62.5	1
chloroethane	72	64.52	1
trichlorofluoromethane	1700	137.36	3
chlorobenzene	60	112.56	1
1,4-dichlorobenzene	37	147.0	2

e = 9
R = 46.6

Dichlorodifluoromethane:
$(7900 \times 10^{-9}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 120.91 = 6.82 \times 10^{-3}$ lbs/hr
As Chlorine: $6.82 \times 10^{-3} \times 35.45/120.91 \times 2 = \mathbf{4.00 \times 10^{-3}}$ **lbs/hr**

1,2-Dichloro-1,1,2,2-Tetrafluoroethane:
$(2700 \times 10^{-9}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 170.92 = 3.29 \times 10^{-3}$ lbs/hr
As Chlorine: $3.29 \times 10^{-3} \times 35.45/170.92 \times 2 = \mathbf{1.36 \times 10^{-3}}$ **lbs/hr**

Vinyl Chloride:
$(42 \times 10^{-9}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 62.5 = 1.87 \times 10^{-5}$ lbs/hr
As Chlorine: $1.87 \times 10^{-5} \times 35.45/62.5 \times 1 = \mathbf{1.06 \times 10^{-5}}$ **lbs/hr**

Chloroethane:
$(72 \times 10^{-9}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 64.52 = 3.31 \times 10^{-5}$ lbs/hr
As Chlorine: $3.31 \times 10^{-5} \times 35.45/64.52 \times 1 = \mathbf{1.82 \times 10^{-5}}$ **lbs/hr**

Trichlorofluoromethane:
$(1700 \times 10^{-9}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 137.36 = 1.67 \times 10^{-3}$ lbs/hr
As Chlorine: $1.67 \times 10^{-3} \times 35.45/137.36 \times 3 = \mathbf{1.29 \times 10^{-3}}$ **lbs/hr**

Chlorobenzene:
$(60 \times 10^{-9}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 112.56 = 4.82 \times 10^{-5}$ lbs/hr
As Chlorine: $4.82 \times 10^{-5} \times 35.45/112.56 \times 1 = \mathbf{1.52 \times 10^{-5}}$ **lbs/hr**

1,4-Dichlorobenzene
$(37 \times 10^{-9}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 147.00 = 3.88 \times 10^{-5}$ lbs/hr
As Chlorine: $3.88 \times 10^{-5} \times 35.45/147.00 \times 2 = \mathbf{1.87 \times 10^{-5}}$ **lbs/hr**

TOTAL CHLORIDES (lbs/hr):
$(4.00+1.36+1.29) \times 10^{-3} + (1.06+1.82+1.52+1.87) \times 10^{-5} = \mathbf{6.71 \times 10^{-3}}$

Vent 57

Contaminant	C (ppb)	MW	No. of Cl Molecules
dichlorodifluoromethane	4000	120.91	2
1,2-dichloro-1,1,2,2-tetrafluoroethane	84	170.92	2
vinyl chloride	9.8	62.5	1
chloroethane	14	64.52	1
trichlorofluoromethane	810	137.36	3
chlorobenzene	22	112.56	1
1,4-dichlorobenzene	14	147.0	2

e = 9
R = 31.8

Dichlorodifluoromethane:
$(4000 \times 10^{-9}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 120.91 = 2.35 \times 10^{-3}$ lbs/hr
As Chlorine: $2.35 \times 10^{-3} \times 35.45/120.91 \times 2 = \mathbf{1.38 \times 10^{-3}}$ **lbs/hr**

1,2-Dichloro-1,1,2,2-Tetrafluoroethane:
$(84 \times 10^{-9}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 170.92 = 6.99 \times 10^{-5}$ lbs/hr
As Chlorine: $6.99 \times 10^{-5} \times 35.45/170.92 \times 2 = \mathbf{2.90 \times 10^{-5}}$ **lbs/hr**

Vinyl Chloride:
$(9.8 \times 10^{-9}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 62.5 = 2.98 \times 10^{-6}$ lbs/hr
As Chlorine: $2.98 \times 10^{-6} \times 35.45/62.5 \times 1 = \mathbf{1.69 \times 10^{-6}}$ **lbs/hr**

Chloroethane:
$(14 \times 10^{-9}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 64.52 = 4.40 \times 10^{-6}$ lbs/hr
As Chlorine: $4.40 \times 10^{-6} \times 35.45/64.52 \times 1 = \mathbf{2.42 \times 10^{-6}}$ **lbs/hr**

Trichlorofluoromethane:
$(810 \times 10^{-9}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 137.36 = 5.41 \times 10^{-4}$ lbs/hr
As Chlorine: $5.41 \times 10^{-4} \times 35.45/137.36 \times 3 = \mathbf{4.18 \times 10^{-4}}$ **lbs/hr**

Chlorobenzene:
$(22 \times 10^{-9}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 112.56 = 1.21 \times 10^{-5}$ lbs/hr
As Chlorine: $1.21 \times 10^{-5} \times 35.45/112.56 \times 1 = \mathbf{3.80 \times 10^{-6}}$ **lbs/hr**

1,4-Dichlorobenzene
$(14 \times 10^{-9}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 147.00 = 1.00 \times 10^{-5}$ lbs/hr
As Chlorine: $1.00 \times 10^{-5} \times 35.45/147.00 \times 2 = \mathbf{4.83 \times 10^{-6}}$ **lbs/hr**

TOTAL CHLORIDES (lbs/hr):
$1.38 \times 10^{-3} + 4.18 \times 10^{-4} + 2.90 \times 10^{-5} + (1.69+2.42+3.80+4.83) \times 10^{-6} = \mathbf{1.84 \times 10^{-3}}$

Vent 66

Contaminant	C (ppb)	MW	No. of Cl Molecules
dichlorodifluoromethane	770	120.91	2
1,2-dichloro-1,1,2,2-tetrafluoroethane	760	170.92	2
vinyl chloride	40	62.5	1
chloroethane	36	64.52	1
chlorobenzene	65	112.56	1
1,4-dichlorobenzene	38	147.0	2

e = 9
R = 22.0

Dichlorodifluoromethane:
$(770 \times 10^{-9}) \times 22.0 \times 1/359 \times 492/537 \times 60 \times 120.91 = 3.14 \times 10^{-4}$ lbs/hr
As Chlorine: $3.14 \times 10^{-4} \times 35.45/120.91 \times 2 =$ **1.84×10^{-4} lbs/hr**

1,2-Dichloro-1,1,2,2-Tetrafluoroethane:
$(760 \times 10^{-9}) \times 22.0 \times 1/359 \times 492/537 \times 60 \times 170.92 = 4.37 \times 10^{-4}$ lbs/hr
As Chlorine: $4.37 \times 10^{-4} \times 35.45/170.92 \times 2 =$ **1.81×10^{-4} lbs/hr**

Vinyl Chloride:
$(40 \times 10^{-9}) \times 22.0 \times 1/359 \times 492/537 \times 60 \times 62.5 = 8.42 \times 10^{-6}$ lbs/hr
As Chlorine: $8.42 \times 10^{-6} \times 35.45/62.5 \times 1 =$ **4.78×10^{-6} lbs/hr**

Chloroethane:
$(36 \times 10^{-9}) \times 22.0 \times 1/359 \times 492/537 \times 60 \times 64.52 = 7.82 \times 10^{-6}$ lbs/hr
As Chlorine: $7.82 \times 10^{-6} \times 35.45/64.52 \times 1 =$ **4.30×10^{-6} lbs/hr**

Chlorobenzene:
$(65 \times 10^{-9}) \times 22.0 \times 1/359 \times 492/537 \times 60 \times 112.56 = 2.46 \times 10^{-5}$ lbs/hr
As Chlorine: $2.46 \times 10^{-5} \times 35.45/112.56 \times 1 =$ **7.76×10^{-6} lbs/hr**

1,4-Dichlorobenzene
$(38 \times 10^{-9}) \times 22.0 \times 1/359 \times 492/537 \times 60 \times 147.00 = 1.88 \times 10^{-5}$ lbs/hr
As Chlorine: $1.88 \times 10^{-5} \times 35.45/147.00 \times 2 =$ **9.08×10^{-6} lbs/hr**

TOTAL CHLORIDES (lbs/hr):
$(1.84 + 1.81) \times 10^{-4} + (4.78 + 4.30 + 7.76 + 9.08) \times 10^{-6} =$ **3.91×10^{-4}**

The highest concentration of chlorides was measured at Vent 45 (6.71×10^{-3} lbs/hr). The worst case emission from the landfill is estimated by multiplying 6.71×10^{-3} by 65, the total number of vents. The resulting emission rate is 0.44 lbs/hr.

Emission Rates for Hydrogen Sulfide:

Vent 11

C = 5
e = 6
R = 49.8
MW = 34.06

$(5 \times 10^{-6}) \times 49.8 \times 1/359 \times 492/537 \times 60 \times 34.06 = 1.30 \times 10^{-3}$ lbs/hr

Vent 25

C = 1
e = 6
R = 17.4
MW = 34.06

$(1 \times 10^{-6}) \times 17.4 \times 1/359 \times 492/537 \times 60 \times 34.06 = 9.07 \times 10^{-5}$ lbs/hr

Vent 26

C = 2
e = 6
R = 47.9
MW = 34.06

$(2 \times 10^{-6}) \times 47.9 \times 1/359 \times 492/537 \times 60 \times 34.06 = 5.00 \times 10^{-4}$ lbs/hr

Vent 27

C = 5
e = 6
R = 35.8
MW = 34.06

$(5 \times 10^{-6}) \times 35.8 \times 1/359 \times 492/537 \times 60 \times 34.06 = 9.33 \times 10^{-4}$ lbs/hr

Vent 28

C = 8
e = 6
R = 40.8
MW = 34.06

$(8 \times 10^{-6}) \times 40.8 \times 1/359 \times 492/537 \times 60 \times 34.06 = 1.70 \times 10^{-3}$ lbs/hr

Vent 45

C = 3
e = 6
R = 46.6
MW = 34.06

$(3 \times 10^{-6}) \times 46.6 \times 1/359 \times 492/537 \times 60 \times 34.06 = 7.29 \times 10^{-4}$ lbs/hr

Vent 57

C = 1
e = 6
R = 31.8
MW = 34.06

$(1 \times 10^{-6}) \times 31.8 \times 1/359 \times 492/537 \times 60 \times 34.06 = 1.66 \times 10^{-4}$ lbs/hr

Vent 66

C = 1
e = 6
R = 22.0
MW = 34.06

$(1 \times 10^{-6}) \times 22.0 \times 1/359 \times 492/537 \times 60 \times 34.06 = 1.15 \times 10^{-4}$ lbs/hr

The highest hydrogen sulfide concentration was measured at Vent 28 (1.70×10^{-3} lbs/hr). The worst case emission from the landfill is estimated by multiplying 1.70×10^{-3} by 65, the total number of vents. The resulting emission rate is 0.11 lbs/hr.

Calculation of Risk Assessment for Carcinogenic Effects:

Of the fifty-six contaminants listed on the "Screening Risk Assessment Worksheet for Carcinogenic Effects", only four were detected in the landfill gas: benzene, methylene chloride, tetrachloroethylene, and vinyl chloride. To determine the risk posed to the population, two scenarios were modeled, a worst case emissions scenario and an average case emissions scenario. The results show that the maximum risk associated with the landfill gas emissions is 4.75×10^{-5}, whereas the average risk is 8.72×10^{-7}. Since the average risk is less than the NJDEP guideline of 1×10^{-6}, SOTA pollution control does not appear to be required. Although the worst case emissions exceed this guideline, it is unlikely that there will be adverse affect for two reasons: (1) The site is enclosed by a nine foot high fence; and (2) The wells producing the greatest volume of gas and greatest concentration of contaminants are located in the interior portion of the landfill. In general, these wells are located a minimum distance of 400 feet from the nearest property line, thereby greatly reducing the risk.

Calculations for worst case and average emissions are presented below.

Benzene:

Worst Case: Vent 45 (8.36×10^{-4} lbs/hr)
Total No. of Vents: 65
Rate: 8.36×10^{-4} lbs/hr x 65 = **5.43×10^{-2} lbs/hr**

Average Case:

Interior Vent	Benzene Emission (lbs/hr)
11	7.15×10^{-5}
26	1.15×10^{-4}
27	3.04×10^{-4}
28	4.05×10^{-4}
45	8.36×10^{-4}
57	7.99×10^{-6}
	1.74×10^{-3}

Average Interior Vent Emission:
$1.74 \times 10^{-3}/6 = 2.90 \times 10^{-4}$ lbs/hr

Perimeter Vent	Benzene Emission (lbs/hr)
25	5.41×10^{-6}
66	2.42×10^{-5}
	2.96×10^{-5}

Average Perimeter Vent Emission:
$2.96 \times 10^{-5}/2 = 1.48 \times 10^{-5}$ lbs/hr

Average Landfill Emission:
$2.90 \times 10^{-4} \times 27 = 7.83 \times 10^{-3}$ lbs/hr
$1.48 \times 10^{-5} \times 38 = 5.63 \times 10^{-4}$ lbs hr
TOTAL: **8.39×10^{-3} lbs hr**

where:
27 = number of interior vents
38 = number of perimeter vents

Methylene Chloride:

Worst Case: Vent 26 (1.06×10^{-5} lbs/hr)
Total No. of Vents: 65
Rate: 1.06×10^{-5} lbs/hr x 65 = **6.89×10^{-4} lbs/hr**

Note that this case is highly unlikely because methylene chloride was only detected in one of the eight vents that were tested.

Average Case:

Interior Vent	Methylene Chloride Emission (lbs/hr)
11	0.0
26	1.06×10^{-5}
27	0.0
28	0.0
45	0.0
57	0.0
	1.06×10^{-5}

Average Interior Vent Emission:
1.06×10^{-5} lbs/hr

Perimeter Vent	Methylene Chloride Emission (lbs/hr)
25	0.0
66	0.0
	0.0

Average Perimeter Vent Emission:
0.0 lbs/hr

Average Landfill Emission:

Methylene chloride was detected in only one of the eight vents that were tested, Vent 26. As a result, it is assumed for the average case model that methylene chloride will be emitted only from Vents 23, 26, and 33 at a rate of 1.06×10^{-5} lbs/hr.

$1.06 \times 10^{-5} \times 3$ vents = **3.18×10^{-5} lbs/hr**

Tetrachloroethylene:

Worst Case: Vent 28 (5.49×10^{-5} lbs/hr)
Total No. of Vents: 65
Rate: 5.49×10^{-5} lbs/hr $\times$ 65 = **3.57×10^{-3} lbs/hr**

Note that this case is highly unlikely because tetrachloroethylene was only detected in one of the eight vents that were tested.

Average Case:

Interior Vent	Tetrachloroethylene Emission (lbs/hr)
11	0.0
26	0.0
27	0.0
28	5.49×10^{-5}
45	0.0
57	0.0
	5.49×10^{-5}

Average Interior Vent Emission:
5.49×10^{-5} lbs/hr

Perimeter Vent	Benzene Emission (lbs/hr)
25	0.0
66	0.0
	0.0

Average Perimeter Vent Emission:
0.0 lbs/hr

Average Landfill Emission:

Tetrachloroethylene was detected in only one of the eight vents that were tested, Vent 28. As a result, it is assumed for the average case model that tetrachloroethylene will be emitted only from Vents 21, 22, 28, 29, and 34 at a rate of 5.49×10^{-5} lbs/hr.

$5.49 \times 10^{-5} \times 5$ vents = **2.74×10^{-4} lbs/hr**

Vinyl Chloride:

Worst Case: Vent 28 (1.13×10^{-4} lbs/hr)
Total No. of Vents: 65
Rate: 1.13×10^{-4} lbs/hr $\times$ 65 = **7.35×10^{-3} lbs/hr**

Average Case:

Interior Vent	Vinyl Chloride Emission (lbs/hr)
11	3.48×10^{-5}
26	6.42×10^{-5}
27	4.11×10^{-5}
28	1.33×10^{-4}
45	1.87×10^{-5}
57	2.98×10^{-6}
	2.95×10^{-4}

Average Interior Vent Emission:
$2.95 \times 10^{-4}/6 = 4.91 \times 10^{-5}$ lbs/hr

Perimeter Vent	Vinyl Chloride Emission (lbs/hr)
25	7.32×10^{-7}
66	8.42×10^{-6}
	9.15×10^{-6}

Average Perimeter Vent Emission:

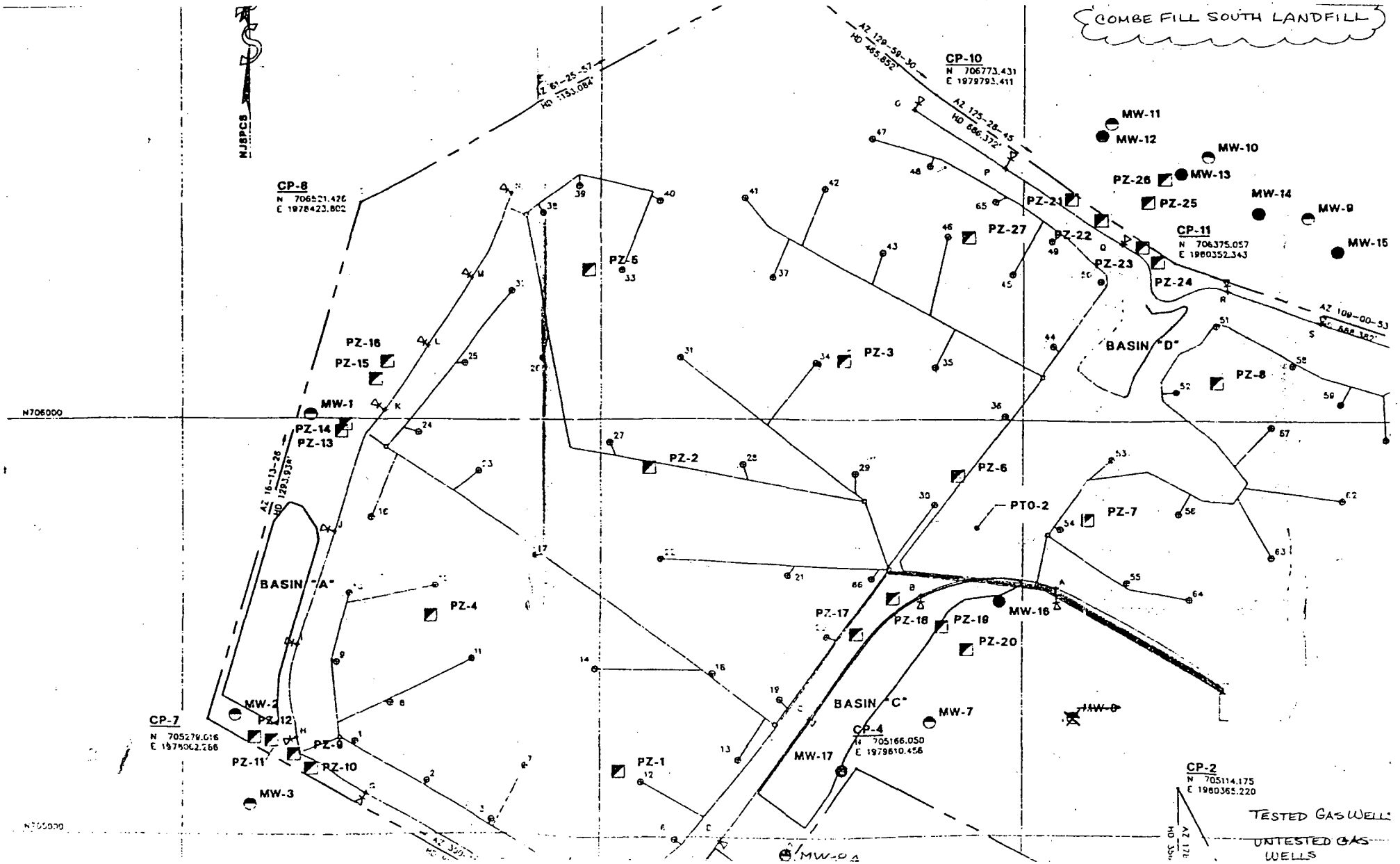
$9.15 \times 10^{-6}/2 = 4.58 \times 10^{-6}$ lbs/hr

Average Landfill Emission:

$4.91 \times 10^{-5} \times 27 =$	1.33×10^{-3} lbs/hr
$4.58 \times 10^{-6} \times 38 =$	1.74×10^{-4} lbs hr
TOTAL:	**1.50×10^{-3} lbs hr**

where:

27 = number of interior vents
38 = number of perimeter vents


COMBE FILL SOUTH LANDFILL
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CP-8
N 706521.426
E 1978423.802
CP-11
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UNTESTED GAS WELLS

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL
PROTECTION AND ENERGY

CHRISTINE TODD WHITMAN
Governor

ROBERT C. SHINN, JR.
Commissioner

August 2, 1994

M E M O R A N D U M

TO: Edward Putnam, Assistant Director
Remedial Planning and Design
Division of Publicly Funded Site Remediation

FROM: Dr. Iclal Atay, Chief
Bureau of Air Quality Engineering
Air Quality Regulation Program
Environmental Regulation

SUBJECT: Combe Fill South Landfill Superfund Site
Air permit equivalent application to allow passive venting of the 65 wells which were installed on the property.

Application Log # 01-94-3086

A permit equivalent for the Combe Fill South Landfill passive Gas Venting System is enclosed. Please be informed that an air permit equivalent issued on February 10, 1993 (Plant ID #: 25681, Permit/Certificate No.: 114162, Application Log NO.: 01-90-4341) for Direct Flow Flare is now cancelled.

If you have any questions, please call me at 4-0491.

Enclosure

C: J. Walsh, Chief, Bureau of Enforcement Services (w/1)
M. Papp, REO, Northern Office (w/1)
D. Prince, Section Chief, Bureau of Construction (w/1)
P. Walshe, Construction Manager, Bureau of Construction (w/1)
R. Patel (w/1)

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State of New Jersey

DEPARTMENT OF ENVIRONMENTAL
PROTECTION AND ENERGY

CHRISTINE TODD WHITMAN
Governor

ROBERT C. SHINN, JR.
Commissioner

PERMIT TO CONSTRUCT AND CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

Name:	Combe Fill South Landfill Superfund Site
Plant Location:	Parker Road Chester & Washington Townships Morris County New Jersey
Plant ID No.:	25681
Permit/Certificate NO.:	To be assigned
Applicant's Designation of Stack:	GC #1 to #59, #61 to #66
Effective date of Permit Equivalent:	August 2, 1994
Application Log #:	01-94-3086

On the basis of all the information available regarding Combe Fill South Landfill passive vents, the Department of Environmental Protection concludes that the vents meet all applicable requirements of the New Jersey Air Pollution Control Regulations codified at N.J.A.C. 7:27-1 et seq. Accordingly, the Department issues this Permit equivalent to Construct and Certificate to Operate the gas vents at Combe Fill South Landfill Superfund Site.

This permit equivalent incorporates by reference all conditions in the application submitted on July 27, 1994.

Sincerely,

Iclal Atay, Ph.D., Chief
Bureau of Air Quality Engineering

O'BRIEN & GERE
ENGINEERS, INC.

March 16, 1998

George H. King, P.E., Chief
NJDEP/DPFSR
Bureau of Construction
401 East State Street, 6th Floor
Trenton, New Jersey 08625-0413

Re: Combe Fill South Landfill
Gas Well Emissions Sampling
Confirmation Round - 1997

File: 3013.015.

Dear Mr. King:

O'Brien & Gere Engineers, Inc. (O'Brien & Gere) is pleased to present the results of gas well emissions sampling performed by O'Brien & Gere on November 5, 1997 at the Combe Fill South landfill located in Chester, New Jersey. Gas well emissions sampling was performed at the request of the New Jersey Department of Environmental Protection (NJDEP) under the Construction Supervision Agreement (CSA). Field and engineering activities associated with this sampling program were presented in our work plan submitted to the NJDEP, dated October 23, 1997 and approved November 5, 1997.

The results of the gas well emissions sampling are summarized in the attached tables, as follows:

- Table 1 - Non-methane Hydrocarbons Emissions
- Table 2 - Toxic Volatile Organic Substance Emissions
- Table 3 - Total Volatile Chlorinated Organic Emissions
- Table 4 - Hydrogen Sulfide Emissions
- Table 5 - Nitrogen Concentrations.

The laboratory data are presented in Attachment A. Gas well field data sheets are presented in Attachment B.

Background

At the request of NJDEP, O'Brien & Gere performed a gas well emissions sampling program on June 13 and 14, 1994 in order to evaluate whether changes in the landfill gas characterization had occurred such that the need for a flare to control landfill emissions could be downsized or eliminated. The sampling program parameters were non-methane hydrocarbons (NMHC), toxic volatile organic substances (TXS), total volatile chlorinated organics (TVCO), hydrogen sulfide (H_2S), and nitrogen (N_2). Eight gas wells (out of a total of sixty-five) were sampled; specifically, well numbers 11, 25, 26, 27, 28, 45, 57, and 66. These wells were selected by O'Brien & Gere as being representative of worst case landfill emissions. The results of the 1994 sampling program indicated that even under worst case assumptions (attributing the highest result from the eight wells sampled to each of the 65 wells), total landfill emission estimates were below NJDEP emission rate limitations. After significant review with NJDEP and with its concurrence, O'Brien & Gere recommended that the gas flare system be deleted from the construction contract, resulting in an estimated cost savings of over $1,000,000.

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. . . and offices in major U.S. cities

At the request of NJDEP, O'Brien & Gere performed a second gas well emissions sampling program on November 5, 1997, for the same parameters evaluated in the 1994 sampling program. The purpose of this sampling event was to confirm that landfill emissions continue to be within the NJDEP emission rate limitations.

Sampling and Analytical Procedures

The following summarizes the sampling and analytical procedures employed during the sampling program.

Sampling locations

Sampling was performed on gas wells 11, 25, 26, 27, 28, 45, 57, and 66. The above-ground piping of the wells was modified so that representative samples could be collected. The existing 4-inch PVC pipe was cut approximately 6 inches above the landfill cover and a new piece of 4-inch PVC (approximately 60 inches in length) was coupled to the existing stub. Two sample ports were located in accordance with USEPA Reference Method 1A. One tube compression fitting sample port and one velocity traverse sample port were located 90° apart in the same plane. The sample ports were located ten duct diameters downstream of a flow disturbance and four duct diameters upstream of a flow disturbance.

Gas velocity measurements

A total of eight traverse points were monitored on one cross-sectional traverse of the 4-inch gas wells. O'Brien & Gere proposed to measure gas velocity using an Alnor air velocity kit. In some cases, however, the gas velocity was less than the detectable range of this instrument. As a result, gas velocity measurements were obtained using a NJDEP-supplied "hot wire" anemometer, manufactured by Solomat. Gas velocity was measured prior to, and immediately following, collection of the samples and portable analyzer monitoring. Gas well air temperatures were obtained using an O'Brien & Gere-supplied Type-K thermocouple, manufactured by Solomat.

NMHC, TXS, TVCO, and N_2 sampling and analysis

Gas well samples for NMHC, TXS, TVCO, and N_2 were collected in pre-evacuated SUMMA canisters using laboratory-supplied flow regulators calibrated to approximately 500 millimeters (ml) per minute. The canisters arrived from the laboratory under vacuum at approximately 30 inches of mercury. Prior to sampling, a Teflon sample line was positioned in the center of the gas well, secured by a compression fitting, and purged with a sample pump for approximately 5 minutes. Following purging of the Teflon line, gas well samples were collected in the canisters over a 5-minute period. Canister identification tags were completed with the following information: gas well number, sampling date and time, pre- and post-vacuum readings, and the initials of the field sampler.

At the completion of the sampling program, a chain-of-custody form was completed and the canisters were shipped to Quanterra Environmental Services, Inc. (Quanterra), Industry, California for laboratory analysis. Gas well samples were analyzed in accordance with the following methods:

Analyte	Method	Analytical technique
NMHC	USEPA Method 25C	Gas Chromatography/ Flame Ionization Detection (GC/FID)
TXS/TVCO	USEPA Method TO-14	GC/Mass Spectrometry (MS)
N_2	USEPA Method 3C	GC/Thermal Conductivity Detection (TCD)

H_2S monitoring

Gas well monitoring for H_2S was conducted using an Industrial Scientific Model HMX 271 portable gas monitor. The monitor was calibrated prior to field use with a National Institute of Standards & Technology (NIST) traceable calibration gas standard of 25.1 parts per million (ppm) H_2S in nitrogen. H_2S was monitored from the same sample line used for collecting canister samples. Once the H_2S monitor readings stabilized, the concentration was recorded on a field data sheet.

Sampling Results and Discussion

The laboratory results presented in Attachment A are reported in ppm and parts per billion (ppb). The following conversion formulas were used to express the compound concentrations in pounds per hour (lb/hr), as presented in Tables 1 through 4.

Converting ppm to lb/hr:

$$\textit{Mass emission rate (lb/hr)} = \frac{C \times V \times P \times MW \times 60}{R \times T_G}$$

where:
C = compound concentration, ppm (or $ft^3/10^6$ ft^3)
V = actual volumetric flowrate, ft^3/min
P = atmospheric pressure, 1 atm
MW = molecular weight of compound, lb/lb-mol
R = ideal gas constant, 0.7302 ft^3 atm/lb-mol°R
T_G = gas well temperature, °R

Converting ppb to lb/hr:

$$\textit{Mass emission rate (lb/hr)} = \frac{C \times V \times P \times MW \times 60}{R \times T_G}$$

where:
C = compound concentration, ppb (or $ft^3/10^9$ ft^3)

Converting lb/hr of a chlorinated organic (CLO) to lb/hr as chlorine (Cl):

$$\frac{lb}{hr}\ CLO\ x\ 35.45\ x\ \frac{N}{MW} = \frac{lb}{hr}\ as\ Cl$$

where: 35.45 = molecular weight of chlorine, lb/lb-mole
N = number of chlorine atoms in the CLO
MW = molecular weight of the CLO, lb/lb-mole

NMHC results

Gas well emission results for NMHC are presented in Table 1. As identified in the NJDEP Sanitary Landfill Policy (Policy no. DEQ/BERD/001), NMHC emissions in excess of 3.5 lb/hr from the entire landfill require "state-of-the-art" air pollution control equipment. The worst case NMHC emission rate was 0.0126 lb/hr and occurred from gas well 26. Using this worst case value for each of the 65 gas wells at the landfill results in a total projected landfill NMHC emission rate of 0.819 lb/hr, which is well below the NJDEP emission rate limitation of 3.5 lb/hr.

It is noted that the NMHC emission rate limitation of 0.5 lb/hr, which was provided by NJDEP and used by O'Brien & Gere in the 1994 sampling program, was incorrect. The correct value for comparison to the NMHC emission rate limit is 3.5 lb/hr.

The 1994 NMHC emission rate from the entire landfill was 0.443 lb/hr. The worst case 1997 NMHC emission rate of 0.819 lb/hr indicates an increase of approximately 85% from the entire landfill.

TXS Results

The individual TXS emission results for the eight gas wells sampled are presented in Table 2. TXS analytes included benzene, benzyl chloride, 1,3-butadiene, carbon tetrachloride, chloroform, 1,2-dichloropropane, 1,4-dioxane, ethylene dibromide, ethylene dichloride, methyl chloride, methylene chloride, styrene, 1,1,2,2-tetrachloroethane, tetrachloroethylene, 1,1,2-trichloroethane, trichloroethylene, and vinyl chloride.

A review of Table 2 indicates that the laboratory detected five of the eighteen TXS listed above. As identified in the New Jersey Final Regulations, NJAC 7:27-17.9, TXS emissions in excess of 0.1 lb/hr from the entire landfill require "state-of-the-art" air pollution control equipment. The worst case TXS (benzene) emission rate was 0.000201 lb/hr and occurred from gas well 26. Using this worst case value for each of the 65 gas wells at the landfill results in a total projected landfill TXS emission rate of 0.0130 lb/hr, which is below the NJDEP emission rate limitation of 0.1 lb/hr.

The 1994 TXS emission rate from the entire landfill was 0.0543 lb/hr. The worst case 1997 TXS emission rate of 0.0131 lb/hr indicates a decrease of approximately 76% from the entire landfill.

TVCO Results

The individual TVCO emission results for the eight gas wells sampled are presented in Table 3. The worst case TVCO emission rate was 0.00112 lb/hr and occurred from gas well 27. Using this worst case value for each of the 65 gas wells at the landfill results in a total projected landfill TVCO emission rate of 0.0728 lb/hr. NJDEP has not established a TVCO emission rate limitation for landfills.

The 1994 TVCO emission rate from the entire landfill was 0.436 lb/hr. The worst case 1997 TVCO emission rate of 0.0728 lb/hr indicates a decrease of approximately 83% from the entire landfill.

H_2S Results

The individual H_2S emission results for the eight gas wells sampled are presented in Table 4. The worst case H_2S emission rate was 0.000239 lb/hr and occurred from gas well 11. Using this worst case value for each of the 65 gas wells at the landfill results in a total projected landfill H_2S emission rate of 0.0155 lb/hr. NJDEP has not established an H_2S emission rate limitation for landfills.

The 1994 H_2S emission rate from the entire landfill was 0.111 lb/hr. The worst case 1997 H_2S emission rate of 0.0155 lb/hr indicates a decrease of approximately 86% from the entire landfill.

N_2 Results

Gas well concentrations of N_2 are presented in Table 5. As identified in the current version of USEPA Method 25C, the gas sample is considered acceptable if the N_2 concentration is less than 20%. The USEPA is presently updating sampling methodologies in 40 CFR Parts 60, 61, and 63, (Method 25C is located in Part 60). The draft version of Method 25C has the same provisions for N_2 concentrations, but alternatively allows the sample to be considered acceptable if the oxygen concentration is less than 5%.

A review of Table 5 indicates that gas wells 25, 45, 57, and 66 had N_2 concentrations in excess of 20%. Of these gas wells, 25 and 45 had oxygen concentrations of 9% and 5.8%, respectively (oxygen concentrations are noted on the field data sheets). It is noted, however, that gas wells 25 and 45 also had lower explosive limit (LEL) concentrations of 49% and 20%, respectively, whereas the remaining gas wells sampled had LEL concentrations of 100% and oxygen concentrations not greater than 0.5%. The lower levels of LEL and higher levels of oxygen indicate less activity in gas wells 25 and 45.

In addition, the volumetric flowrates associated with gas wells 25 and 45 are notably very low, and indicate that ambient air may be influencing these gas wells, thus causing elevated N_2 and oxygen concentrations. Factors that may affect the volumetric flowrate are ambient temperature, gas well temperature, atmospheric pressure, precipitation, hydrogeology, topography, freeze/thaw cycles, and refuse placement. O'Brien & Gere believes that the nitrogen concentrations observed during this test program are accurate and representative of the current landfill activity, and therefore, we consider the samples from gas wells 25 and 45 to be acceptable.

Conclusions and Recommendations

Based on the 1994 and 1997 sampling programs, there has been an increase in emission rates of NMHC, and a decrease in emission rates of TXS, TVCO, and H_2S. O'Brien & Gere presumes that the impervious nature of the landfill cap installed after the 1994 sampling program may be creating a concentrating effect, where landfill gas that would have otherwise been penetrating the landfill cover, is now directed to the gas wells. Nevertheless, the worst case emission rates of NMHC and TXS from the landfill are below the NJDEP emission rate limitations, which confirms the results of the 1994 sampling program, and therefore, there is no change in the status of the landfill and no further action relating to landfill gas venting is required.

If you have any questions or comments regarding this report, please call Robert Bowers or me.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Peter W. McMaster, P.E.
Senior Vice President

RMN:djb

Enclosures: Tables 1 - 5
Attachment A - Laboratory data
Attachment B - Gas Well Field Data Sheets

cc: Denis Prince, NJDEP/DPFSR
Jesse Robbins, NJDEP/DPFSR
Robert R. Bowers, P.E. - O'Brien & Gere Engineers, Inc.
Wayne Hoagland, P.E. - O'Brien & Gere Engineers, Inc.

Table 1

Combe Fill South Landfill
Chester, NJ

Gas Well Emissions Sampling - 11/05/97
Non-Methane Hydrocarbon Emissions

Gas Well No.	NMHC Concentration as carbon (ppmv)	Velocity (ft/min)	Flowrate (acfm)	Gas Well Temperature (°F)	Molecular Weight as Carbon (lb/lb-mol)	Emissions (lb/hr)
11	370	51	4.45	62	12.0	0.00311
25	290	10	0.873	68	12.0	0.000473
26	290	266	23.2	67	12.0	0.0126
27	310	130	11.3	69	12.0	0.00656
28	340	164	14.3	66	12.0	0.00912
45	120	22	1.92	59	12.0	0.000438
57	290	89	7.77	63	12.0	0.00425
66	310	93	8.12	57	12.0	0.00480
				Worst Case Assumption: gas well no. 26 x 65 gas wells:		**0.819**
				NJDEP emission limit:		**3.5**

Note: The emission limit is identified in the NJDEP Sanitary Landfill Policy (Policy No. DEQ/BERD/001).

Table 2

Combe Fill South Landfill
Chester, NJ

Gas Well Emissions Sampling - 11/05/97
Toxic Volatile Organic Substance Emissions

Gas Well No.	Compounds	Concentration (ppbv)	Velocity (ft/min)	Flowrate (acfm)	Gas Well Temperature (°F)	Molecular Weight (lb/lb-mol)	Emissions (lb/hr)
11	benzene	330	51	4.45	62	78.12	0.0000181
25	benzene	360	10	0.873	62	78.12	0.00000386
26	benzene	710	266	23.2	67	78.12	0.000201
	trichloroethene	24	266	23.2	67	131.38	0.0000114
27	benzene	580	130	11.3	69	78.12	0.0000798
	trichloroethene	12	130	11.3	69	131.38	0.00000278
28	benzene	910	164	14.3	66	78.12	0.000159
	tetrachloroethene	75	164	14.3	66	131.5	0.0000220
	vinyl chloride	92	164	14.3	66	62.50	0.0000129
45	methylene chloride	170	22	1.92	59	84.93	0.00000439
57	vinyl chloride	130	89	7.77	63	62.50	0.00000991
66	benzene	100	93	8.12	57	78.12	0.0000101
					Worst Case Assumption: gas well no. 26 x 65 gas wells:		**0.0130**
					NJDEP emission limit:		**0.1**

Note: The emission limit is identified in the New Jersey Final Regulations, NJAC 7:27-17.9.

Table 3

Combe Fill South Landfill
Chester, NJ

Gas Well Emissions Sampling - 11/05/97
Total Volatile Chlorinated Organic Emissions

Gas Well No.	Compounds	Concentration (ppbv)	Velocity (ft/min)	Flowrate (acfm)	Gas Well Temperature (°F)	Molecular Weight (lb/lb-mol)	Emissions (lb/hr)	Emissions as Chlorine (lb/hr)
11	chlorobenzene	900	51	4.45	62	112.56	0.0000710	0.0000224
	chloroethane	380	51	4.45	62	64.52	0.0000172	0.00000944
	1,4-dichlorobenzene	420	51	4.45	62	147.00	0.0000433	0.0000209
	dichlorodifluoromethane	440	51	4.45	62	120.91	0.0000373	0.0000219
	1,2-dichloro-1,1,2,2-tetrafluoroethane	190	51	4.45	62	170.92	0.0000228	0.00000944
							Total:	**0.0000839**
25	chlorobenzene	630	10	0.873	68	112.56	0.00000963	0.00000303
	chloroethane	300	10	0.873	68	64.52	0.00000263	0.00000144
	1,4-dichlorobenzene	130	10	0.873	68	147.00	0.00000260	0.00000125
	1,2-dichloro-1,1,2,2-tetrafluoroethane	1300	10	0.873	68	170.92	0.0000302	0.0000125
							Total:	**0.0000182**
26	chlorobenzene	480	266	23.2	67	112.56	0.000196	0.0000616
	chloroethane	370	266	23.2	67	64.52	0.0000864	0.0000475
	1,2-dichlorobenzene	17	266	23.2	67	147.00	0.00000904	0.00000436
	1,4-dichlorobenzene	370	266	23.2	67	147.00	0.000197	0.0000949
	dichlorodifluoromethane	710	266	23.2	67	120.91	0.000311	0.000182
	cis-1,2-dichloroethene	15	266	23.2	67	96.94	0.00000526	0.00000385
	1,2-dichloro-1,1,2,2-tetrafluoroethane	520	266	23.2	67	170.92	0.000322	0.000133
	trichloroethene	24	266	23.2	67	131.38	0.0000114	0.00000924
	trichlorofluoromethane	48	266	23.2	67	137.36	0.0000239	0.0000185
							Total:	**0.000556**

Table 3

Combe Fill South Landfill
Chester, NJ

Gas Well Emissions Sampling - 11/05/97
Total Volatile Chlorinated Organic Emissions

Gas Well No.	Compounds	Concentration (ppbv)	Velocity (ft/min)	Flowrate (acfm)	Gas Well Temperature (°F)	Molecular Weight (lb/lb-mol)	Emissions (lb/hr)	Emissions as Chlorine (lb/hr)
27	chlorobenzene	600	130	11.3	69	112.56	0.000119	0.0000375
	chloroethane	250	130	11.3	69	64.52	0.0000284	0.0000156
	1,2-dichlorobenzene	9.1	130	11.3	69	147.00	0.00000236	0.00000114
	1,4-dichlorobenzene	240	130	11.3	69	147.00	0.0000622	0.0000300
	dichlorodifluoromethane	5000	130	11.3	69	120.91	0.00107	0.000625
	1,1-dichloroethane	10	130	11.3	69	98.96	0.00000174	0.00000125
	cis-1,2-dichloroethene	14	130	11.3	69	96.94	0.00000239	0.00000175
	1,2-dichloro-1,1,2,2-tetrafluoroethane	3200	130	11.3	69	170.92	0.000964	0.000400
	trichloroethene	12	130	11.3	69	131.38	0.00000278	0.00000225
	vinyl chloride	92	130	11.3	69	62.50	0.0000101	0.00000575
							Total:	**0.00112**
28	chlorobenzene	520	164	14.3	66	112.56	0.000131	0.0000412
	chloroethane	160	164	14.3	66	64.52	0.0000231	0.0000127
	1,2-dichlorobenzene	30	164	14.3	66	147.00	0.00000986	0.00000476
	1,4-dichlorobenzene	330	164	14.3	66	147.00	0.000108	0.0000523
	dichlorodifluoromethane	76	164	14.3	66	120.91	0.0000205	0.0000120
	cis-1,2-dichloroethene	41	164	14.3	66	96.94	0.00000889	0.00000650
	1,2-dichloro-1,1,2,2-tetrafluoroethane	890	164	14.3	66	170.92	0.000340	0.000141
	methylene chloride	30	164	14.3	66	84.93	0.00000570	0.00000238
	tetrachloroethene	75	164	14.3	66	165.82	0.0000278	0.0000238
	trichlorofluoromethane	980	164	14.3	66	131.50	0.000288	0.000233
							Total:	**0.000530**

Table 3

Combe Fill South Landfill
Chester, NJ

Gas Well Emissions Sampling - 11/05/97
Total Volatile Chlorinated Organic Emissions

Gas Well No.	Compounds	Concentration (ppbv)	Velocity (ft/min)	Flowrate (acfm)	Gas Well Temperature (°F)	Molecular Weight (lb/lb-mol)	Emissions (lb/hr)	Emissions as Chlorine (lb/hr)
45	dichlorodifluoromethane	25000	22	1.92	59	120.91	0.000919	0.000539
	1,2-dichloro-1,1,2,2-tetrafluoroethane	6900	22	1.92	59	170.92	0.000358	0.000149
	methylene chloride	170	22	1.92	59	84.93	0.00000439	0.00000183
	trichlorofluoromethane	10000	22	1.92	59	131.50	0.000400	0.000323
							Total:	**0.00101**
57	chlorobenzene	69	89	7.77	63	112.56	0.00000948	0.00000298
	chloroethane	210	89	7.77	63	64.52	0.0000165	0.00000908
	1,4-dichlorobenzene	170	89	7.77	63	147.00	0.0000305	0.0000147
	dichlorodifluoromethane	1300	89	7.77	63	120.91	0.000192	0.000112
	1,2-dichloro-1,1,2,2-tetrafluoroethane	1200	89	7.77	63	170.92	0.000250	0.000104
	trichlorofluoromethane	6200	89	7.77	63	131.50	0.000995	0.000805
	vinyl chloride	130	89	7.77	63	62.50	0.00000991	0.00000562
							Total:	**0.00105**
66	chlorobenzene	100	93	8.12	57	112.56	0.0000145	0.00000457
	1,4-dichlorobenzene	120	93	8.12	57	147.00	0.0000228	0.0000110
	dichlorodifluoromethane	2500	93	8.12	57	120.91	0.000390	0.000229
	1,2-dichloro-1,1,2,2-tetrafluoroethane	7200	93	8.12	57	170.92	0.00159	0.000658
							Total:	**0.000903**
						Worst Case Assumption: gas well no. 27 x 65 gas wells:		**0.0728**

Table 4

Combe Fill South Landfill
Chester, NJ

Gas Well Emissions Sampling - 11/05/97
Hydrogen Sulfide Emissions

Gas Well No.	H2S Concentration (ppmv)	Velocity (ft/min)	Flowrate (acfm)	Gas Well Temperature (°F)	Molecular Weight (lb/lb-mol)	Emissions (lb/hr)
11	10	51	4.45	62	34.06	0.000239
25	10	10	0.873	68	34.06	0.0000463
26	1	266	23.2	67	34.06	0.000123
27	0	130	11.3	69	34.06	0
28	0	164	14.3	66	34.06	0
45	0	22	1.92	59	34.06	0
57	1	89	7.77	63	34.06	0.0000416
66	1	93	8.12	57	34.06	0.0000439
				Worst Case Assumption: gas well no. 11 x 65 gas wells:		**0.0155**

Table 5

Combe Fill South Landfill
Chester, NJ

Gas Well Emissions Sampling - 11/05/97
Nitrogen Concentrations

Gas Well No.	Nitrogen Concentration (%v)
11	ND
25	27
26	7.1
27	11
28	9.4
45	38
57	36
66	49

ATTACHMENT A

Laboratory data

Quanterra Environmental Services

Quanterra Incorporated
18501 East Gale Avenue #130
City of Industry, California 91748

818 965-1006 Telephone
818 965-1003 Fax

December 15, 1997

O'Brien & Gere Engineers, Inc.
5000 Brittonfield Parkway
East Syracuse, NY 13057
Mr. Robert Neimeier

ANALYSIS NO.: 129361-0001/0008-SA
ANALYSES: Volatile Organics by GCMS - EPA TO14, EPA Method 25C, EPA Method 3C - Nitrogen
DATE SAMPLED: 11/05/97
DATE SAMPLES REC'D: 11/14/97

PROJECT: COMBE FILL SOUTH

Enclosed with this letter is the report on the chemical and physical analyses for the samples from ANALYSIS NO.: 129361-0001/0008-SA as shown above.

The samples were received by Quanterra Incorporated, City of Industry, intact and with the chain-of-custody record attached.

Please note that ND means not detected at the reporting limits expressed.

The preliminary results were faxed to Mr. Robert Neimeier on November 26, 1997.

Maria O. Jones
Project Manager

12/15/97
Date
Approved

Quanterra
Environmental
Services

SAMPLE DESCRIPTION INFORMATION
for
O'Brien & Gere Engineers, Inc.

Lab ID	Client ID		Matrix	Sampled Date	Sampled Time	Received Date
129361-0001-SA	GW-45	12841	AIR	05 NOV 97	10:58	14 NOV 97
129361-0002-SA	GW-26	9323BB	AIR	05 NOV 97	11:40	14 NOV 97
129361-0003-SA	GW-25	9530BB	AIR	05 NOV 97	12:17	14 NOV 97
129361-0004-SA	GW-11	93298	AIR	05 NOV 97	12:59	14 NOV 97
129361-0005-SA	GW-28	93085	AIR	05 NOV 97	13:32	14 NOV 97
129361-0006-SA	GW-27	9695B	AIR	05 NOV 97	14:04	14 NOV 97
129361-0007-SA	GW-57	A-286	AIR	05 NOV 97	14:46	14 NOV 97
129361-0008-SA	GW-66	136	AIR	05 NOV 97	15:21	14 NOV 97

Quanterra
Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-45 12841		
LAB ID:	129361-0001-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 15 NOV 97
Instrument:	GC/MS-A	Dilution: 42	

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	25000	D	210	ppb (v/v)
Chloromethane	ND		170	ppb (v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	6900		84	ppb (v/v)
Vinyl chloride	ND		84	ppb (v/v)
Bromomethane	ND		84	ppb (v/v)
Chloroethane	ND		170	ppb (v/v)
Trichlorofluoromethane	10000		84	ppb (v/v)
1,1-Dichloroethene	ND		84	ppb (v/v)
Carbon disulfide	ND		420	ppb (v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		84	ppb (v/v)
Acetone	ND		420	ppb (v/v)
Methylene chloride	170		84	ppb (v/v)
trans-1,2-Dichloroethene	ND		84	ppb (v/v)
1,1-Dichloroethane	ND		84	ppb (v/v)
Vinyl acetate	ND		420	ppb (v/v)
cis-1,2-Dichloroethene	ND		84	ppb (v/v)
2-Butanone	ND		420	ppb (v/v)
Chloroform	ND		84	ppb (v/v)
1,1,1-Trichloroethane	ND		84	ppb (v/v)
Carbon tetrachloride	ND		84	ppb (v/v)
Benzene	ND		84	ppb (v/v)
1,2-Dichloroethane	ND		84	ppb (v/v)
Trichloroethene	ND		84	ppb (v/v)
1,2-Dichloropropane	ND		84	ppb (v/v)
Bromodichloromethane	ND		84	ppb (v/v)
cis-1,3-Dichloropropene	ND		84	ppb (v/v)
4-Methyl-2-pentanone	ND		420	ppb (v/v)
Toluene	ND		84	ppb (v/v)
trans-1,3-Dichloropropene	ND		84	ppb (v/v)
1,1,2-Trichloroethane	ND		84	ppb (v/v)
Tetrachloroethene	ND		84	ppb (v/v)
2-Hexanone	ND		1300	ppb (v/v)
Dibromochloromethane	ND		84	ppb (v/v)
1,2-Dibromoethane (EDB)	ND		84	ppb (v/v)
Chlorobenzene	ND		84	ppb (v/v)
Ethylbenzene	ND		84	ppb (v/v)
Xylenes (total)	ND		84	ppb (v/v)
Styrene	ND		84	ppb (v/v)
Bromoform	ND		84	ppb (v/v)
1,1,2,2-Tetrachloroethane	ND		84	ppb (v/v)
Benzyl chloride	ND		420	ppb (v/v)
4-Ethyltoluene	ND		84	ppb (v/v)
1,3,5-Trimethylbenzene	ND		84	ppb (v/v)

D = Compound quantitated using a secondary dilution.
ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-45 12841
LAB ID: 129361-0001-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 42

Parameter	Result	Qualifier	RL	Units
1,2,4-Trimethylbenzene	ND		84	ppb (v/v)
1,3-Dichlorobenzene	ND		84	ppb (v/v)
1,4-Dichlorobenzene	ND		84	ppb (v/v)
1,2-Dichlorobenzene	ND		84	ppb (v/v)
1,2,4-Trichlorobenzene	ND		840	ppb (v/v)
Hexachlorobutadiene	ND		170	ppb (v/v)
1,3-Butadiene	ND		420	ppb (v/v)
1,4-Dioxane	ND		420	ppb (v/v)

ND = Not Detected

Quanterra
Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-26 9323BB
LAB ID: 129361-0002-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 6.7

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	710	D	140	ppb (v/v)
Chloromethane	ND		27	ppb (v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	520		13	ppb (v/v)
Vinyl chloride	ND	G	110	ppb (v/v)
Bromomethane	ND		13	ppb (v/v)
Chloroethane	370		27	ppb (v/v)
Trichlorofluoromethane	48		13	ppb (v/v)
1,1-Dichloroethene	ND		13	ppb (v/v)
Carbon disulfide	ND		67	ppb (v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		13	ppb (v/v)
Acetone	74		67	ppb (v/v)
Methylene chloride	ND		13	ppb (v/v)
trans-1,2-Dichloroethene	ND		13	ppb (v/v)
1,1-Dichloroethane	ND		13	ppb (v/v)
Vinyl acetate	ND		67	ppb (v/v)
cis-1,2-Dichloroethene	15		13	ppb (v/v)
2-Butanone	ND		67	ppb (v/v)
Chloroform	ND		13	ppb (v/v)
1,1,1-Trichloroethane	ND		13	ppb (v/v)
Carbon tetrachloride	ND		13	ppb (v/v)
Benzene	710		13	ppb (v/v)
1,2-Dichloroethane	ND		13	ppb (v/v)
Trichloroethene	24		13	ppb (v/v)
1,2-Dichloropropane	ND		13	ppb (v/v)
Bromodichloromethane	ND		13	ppb (v/v)
cis-1,3-Dichloropropene	ND		13	ppb (v/v)
4-Methyl-2-pentanone	ND	G	99	ppb (v/v)
Toluene	170		13	ppb (v/v)
trans-1,3-Dichloropropene	ND		13	ppb (v/v)
1,1,2-Trichloroethane	ND		13	ppb (v/v)
Tetrachloroethene	ND		13	ppb (v/v)
2-Hexanone	ND		200	ppb (v/v)
Dibromochloromethane	ND		13	ppb (v/v)
1,2-Dibromoethane (EDB)	ND		13	ppb (v/v)
Chlorobenzene	480		13	ppb (v/v)
Ethylbenzene	700		13	ppb (v/v)
Xylenes (total)	2000		13	ppb (v/v)
Styrene	ND		13	ppb (v/v)
Bromoform	ND		13	ppb (v/v)
1,1,2,2-Tetrachloroethane	ND		13	ppb (v/v)
Benzyl chloride	ND		67	ppb (v/v)
4-Ethyltoluene	370		13	ppb (v/v)

D = Compound quantitated using a secondary dilution.
G = Reporting limit(s) raised due to matrix interference.
ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-26 9323BB
LAB ID: 129361-0002-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 6.7

Parameter	Result	Qualifier	RL	Units
1,3,5-Trimethylbenzene	340		13	ppb (v/v)
1,2,4-Trimethylbenzene	600		13	ppb (v/v)
1,3-Dichlorobenzene	ND		13	ppb (v/v)
1,4-Dichlorobenzene	370		13	ppb (v/v)
1,2-Dichlorobenzene	17		13	ppb (v/v)
1,2,4-Trichlorobenzene	ND		130	ppb (v/v)
Hexachlorobutadiene	ND		27	ppb (v/v)
1,3-Butadiene	ND		67	ppb (v/v)
1,4-Dioxane	ND		67	ppb (v/v)

ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-25 9530BB
LAB ID: 129361-0003-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 8.4

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	--	1	--	ppb (v/v)
Chloromethane	ND		34	ppb (v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1300		17	ppb (v/v)
Vinyl chloride	ND	G	52	ppb (v/v)
Bromomethane	ND		17	ppb (v/v)
Chloroethane	300		34	ppb (v/v)
Trichlorofluoromethane	ND		17	ppb (v/v)
1,1-Dichloroethene	ND		17	ppb (v/v)
Carbon disulfide	ND		84	ppb (v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		17	ppb (v/v)
Acetone	440		84	ppb (v/v)
Methylene chloride	ND		17	ppb (v/v)
trans-1,2-Dichloroethene	ND		17	ppb (v/v)
1,1-Dichloroethane	ND		17	ppb (v/v)
Vinyl acetate	ND		84	ppb (v/v)
cis-1,2-Dichloroethene	ND		17	ppb (v/v)
2-Butanone	570		84	ppb (v/v)
Chloroform	ND		17	ppb (v/v)
1,1,1-Trichloroethane	ND		17	ppb (v/v)
Carbon tetrachloride	ND		17	ppb (v/v)
Benzene	360		17	ppb (v/v)
1,2-Dichloroethane	ND		17	ppb (v/v)
Trichloroethene	ND		17	ppb (v/v)
1,2-Dichloropropane	ND		17	ppb (v/v)
Bromodichloromethane	ND		17	ppb (v/v)
cis-1,3-Dichloropropene	ND		17	ppb (v/v)
4-Methyl-2-pentanone	ND	G	130	ppb (v/v)
Toluene	37		17	ppb (v/v)
trans-1,3-Dichloropropene	ND		17	ppb (v/v)
1,1,2-Trichloroethane	ND		17	ppb (v/v)
Tetrachloroethene	ND		17	ppb (v/v)
2-Hexanone	ND		250	ppb (v/v)
Dibromochloromethane	ND		17	ppb (v/v)
1,2-Dibromoethane (EDB)	ND		17	ppb (v/v)
Chlorobenzene	630		17	ppb (v/v)
Ethylbenzene	60		17	ppb (v/v)
Xylenes (total)	960		17	ppb (v/v)
Styrene	ND		17	ppb (v/v)
Bromoform	ND		17	ppb (v/v)
1,1,2,2-Tetrachloroethane	ND		17	ppb (v/v)
Benzyl chloride	ND		84	ppb (v/v)
4-Ethyltoluene	130		17	ppb (v/v)

1 = Compound not analyzed due to high level of carbon dioxide.
G = Reporting limit(s) raised due to matrix interference.
ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-25 9530BB
LAB ID: 129361-0003-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 8.4

Parameter	Result	Qualifier	RL	Units
1,3,5-Trimethylbenzene	140		17	ppb (v/v)
1,2,4-Trimethylbenzene	660		17	ppb (v/v)
1,3-Dichlorobenzene	ND		17	ppb (v/v)
1,4-Dichlorobenzene	130		17	ppb (v/v)
1,2-Dichlorobenzene	ND		17	ppb (v/v)
1,2,4-Trichlorobenzene	ND		170	ppb (v/v)
Hexachlorobutadiene	ND		34	ppb (v/v)
1,3-Butadiene	ND		84	ppb (v/v)
1,4-Dioxane	ND		84	ppb (v/v)

ND = Not Detected

Quanterra
Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-11 93298
LAB ID: 129361-0004-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 22

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	440		45	ppb (v/v)
Chloromethane	ND		90	ppb (v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	190		45	ppb (v/v)
Vinyl chloride	ND		45	ppb (v/v)
Bromomethane	ND		45	ppb (v/v)
Chloroethane	380		90	ppb (v/v)
Trichlorofluoromethane	ND		45	ppb (v/v)
1,1-Dichloroethene	ND		45	ppb (v/v)
Carbon disulfide	ND		220	ppb (v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		45	ppb (v/v)
Acetone	ND		220	ppb (v/v)
Methylene chloride	ND		45	ppb (v/v)
trans-1,2-Dichloroethene	ND		45	ppb (v/v)
1,1-Dichloroethane	ND		45	ppb (v/v)
Vinyl acetate	ND		220	ppb (v/v)
cis-1,2-Dichloroethene	ND		45	ppb (v/v)
2-Butanone	ND		220	ppb (v/v)
Chloroform	ND		45	ppb (v/v)
1,1,1-Trichloroethane	ND		45	ppb (v/v)
Carbon tetrachloride	ND		45	ppb (v/v)
Benzene	330		45	ppb (v/v)
1,2-Dichloroethane	ND		45	ppb (v/v)
Trichloroethene	ND		45	ppb (v/v)
1,2-Dichloropropane	ND		45	ppb (v/v)
Bromodichloromethane	ND		45	ppb (v/v)
cis-1,3-Dichloropropene	ND		45	ppb (v/v)
4-Methyl-2-pentanone	ND		220	ppb (v/v)
Toluene	66		45	ppb (v/v)
trans-1,3-Dichloropropene	ND		45	ppb (v/v)
1,1,2-Trichloroethane	ND		45	ppb (v/v)
Tetrachloroethene	ND		45	ppb (v/v)
2-Hexanone	ND		670	ppb (v/v)
Dibromochloromethane	ND		45	ppb (v/v)
1,2-Dibromoethane (EDB)	ND		45	ppb (v/v)
Chlorobenzene	900		45	ppb (v/v)
Ethylbenzene	530		45	ppb (v/v)
Xylenes (total)	4300		45	ppb (v/v)
Styrene	ND		45	ppb (v/v)
Bromoform	ND		45	ppb (v/v)
1,1,2,2-Tetrachloroethane	ND		45	ppb (v/v)
Benzyl chloride	ND		220	ppb (v/v)
4-Ethyltoluene	680		45	ppb (v/v)
1,3,5-Trimethylbenzene	670		45	ppb (v/v)
1,2,4-Trimethylbenzene	1600		45	ppb (v/v)

ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-11 93298
LAB ID: 129361-0004-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 22

Parameter	Result	Qualifier	RL	Units
1,3-Dichlorobenzene	ND		45	ppb (v/v)
1,4-Dichlorobenzene	420		45	ppb (v/v)
1,2-Dichlorobenzene	ND		45	ppb (v/v)
1,2,4-Trichlorobenzene	ND		450	ppb (v/v)
Hexachlorobutadiene	ND		90	ppb (v/v)
1,3-Butadiene	ND		220	ppb (v/v)
1,4-Dioxane	ND		220	ppb (v/v)

ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-28 93085
LAB ID: 129361-0005-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 14

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	76		29	ppb (v/v)
Chloromethane	ND		58	ppb (v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	890		29	ppb (v/v)
Vinyl chloride	ND	G	200	ppb (v/v)
Bromomethane	ND		29	ppb (v/v)
Chloroethane	160		58	ppb (v/v)
Trichlorofluoromethane	980		29	ppb (v/v)
1,1-Dichloroethene	ND		29	ppb (v/v)
Carbon disulfide	ND		140	ppb (v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		29	ppb (v/v)
Acetone	ND		140	ppb (v/v)
Methylene chloride	30		29	ppb (v/v)
trans-1,2-Dichloroethene	ND		29	ppb (v/v)
1,1-Dichloroethane	ND		29	ppb (v/v)
Vinyl acetate	ND		140	ppb (v/v)
cis-1,2-Dichloroethene	41		29	ppb (v/v)
2-Butanone	ND		140	ppb (v/v)
Chloroform	ND		29	ppb (v/v)
1,1,1-Trichloroethane	ND		29	ppb (v/v)
Carbon tetrachloride	ND		29	ppb (v/v)
Benzene	910		29	ppb (v/v)
1,2-Dichloroethane	ND		29	ppb (v/v)
Trichloroethene	ND		29	ppb (v/v)
1,2-Dichloropropane	ND		29	ppb (v/v)
Bromodichloromethane	ND		29	ppb (v/v)
cis-1,3-Dichloropropene	ND		29	ppb (v/v)
4-Methyl-2-pentanone	ND	G	210	ppb (v/v)
Toluene	340		29	ppb (v/v)
trans-1,3-Dichloropropene	ND		29	ppb (v/v)
1,1,2-Trichloroethane	ND		29	ppb (v/v)
Tetrachloroethene	75		29	ppb (v/v)
2-Hexanone	ND		430	ppb (v/v)
Dibromochloromethane	ND		29	ppb (v/v)
1,2-Dibromoethane (EDB)	ND		29	ppb (v/v)
Chlorobenzene	520		29	ppb (v/v)
Ethylbenzene	840		29	ppb (v/v)
Xylenes (total)	2500		29	ppb (v/v)
Styrene	ND		29	ppb (v/v)
Bromoform	ND		29	ppb (v/v)
1,1,2,2-Tetrachloroethane	ND		29	ppb (v/v)
Benzyl chloride	ND		140	ppb (v/v)
4-Ethyltoluene	260		29	ppb (v/v)
1,3,5-Trimethylbenzene	250		29	ppb (v/v)

G = Reporting limit(s) raised due to matrix interference.
ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-28 93085
LAB ID: 129361-0005-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 14

Parameter	Result	Qualifier	RL	Units
1,2,4-Trimethylbenzene	350		29	ppb (v/v)
1,3-Dichlorobenzene	ND		29	ppb (v/v)
1,4-Dichlorobenzene	330		29	ppb (v/v)
1,2-Dichlorobenzene	30		29	ppb (v/v)
1,2,4-Trichlorobenzene	ND		290	ppb (v/v)
Hexachlorobutadiene	ND		58	ppb (v/v)
1,3-Butadiene	ND		140	ppb (v/v)
1,4-Dioxane	ND		140	ppb (v/v)

ND = Not Detected

Quanterra
Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-27 9695B
LAB ID: 129361-0006-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 4.2

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	5000	D1	140	ppb (v/v)
Chloromethane	ND	D1	270	ppb (v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	3200	D	140	ppb (v/v)
Vinyl chloride	92		8.4	ppb (v/v)
Bromomethane	ND		8.4	ppb (v/v)
Chloroethane	250		17	ppb (v/v)
Trichlorofluoromethane	11		8.4	ppb (v/v)
1,1-Dichloroethene	ND		8.4	ppb (v/v)
Carbon disulfide	ND		42	ppb (v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		8.4	ppb (v/v)
Acetone	ND		42	ppb (v/v)
Methylene chloride	ND		8.4	ppb (v/v)
trans-1,2-Dichloroethene	ND		8.4	ppb (v/v)
1,1-Dichloroethane	10		8.4	ppb (v/v)
Vinyl acetate	ND		42	ppb (v/v)
cis-1,2-Dichloroethene	14		8.4	ppb (v/v)
2-Butanone	ND		42	ppb (v/v)
Chloroform	ND		8.4	ppb (v/v)
1,1,1-Trichloroethane	ND		8.4	ppb (v/v)
Carbon tetrachloride	ND		8.4	ppb (v/v)
Benzene	580		8.4	ppb (v/v)
1,2-Dichloroethane	ND		8.4	ppb (v/v)
Trichloroethene	12		8.4	ppb (v/v)
1,2-Dichloropropane	ND		8.4	ppb (v/v)
Bromodichloromethane	ND		8.4	ppb (v/v)
cis-1,3-Dichloropropene	ND		8.4	ppb (v/v)
4-Methyl-2-pentanone	ND	G	84	ppb (v/v)
Toluene	31		8.4	ppb (v/v)
trans-1,3-Dichloropropene	ND		8.4	ppb (v/v)
1,1,2-Trichloroethane	ND		8.4	ppb (v/v)
Tetrachloroethene	ND		8.4	ppb (v/v)
2-Hexanone	ND		130	ppb (v/v)
Dibromochloromethane	ND		8.4	ppb (v/v)
1,2-Dibromoethane (EDB)	ND		8.4	ppb (v/v)
Chlorobenzene	600		8.4	ppb (v/v)
Ethylbenzene	91		8.4	ppb (v/v)
Xylenes (total)	230		8.4	ppb (v/v)
Styrene	ND		8.4	ppb (v/v)
Bromoform	ND		8.4	ppb (v/v)
1,1,2,2-Tetrachloroethane	ND		8.4	ppb (v/v)
Benzyl chloride	ND		42	ppb (v/v)

1 = Reporting limit elevated due to high level of moisture/carbon dioxide.
D = Compound quantitated using a secondary dilution.
G = Reporting limit(s) raised due to matrix interference.
ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-27 9695B
LAB ID: 129361-0006-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 4.2

Parameter	Result	Qualifier	RL	Units
4-Ethyltoluene	44		8.4	ppb (v/v)
1,3,5-Trimethylbenzene	47		8.4	ppb (v/v)
1,2,4-Trimethylbenzene	110		8.4	ppb (v/v)
1,3-Dichlorobenzene	ND		8.4	ppb (v/v)
1,4-Dichlorobenzene	240		8.4	ppb (v/v)
1,2-Dichlorobenzene	9.1		8.4	ppb (v/v)
1,2,4-Trichlorobenzene	ND		84	ppb (v/v)
Hexachlorobutadiene	ND		17	ppb (v/v)
1,3-Butadiene	ND		42	ppb (v/v)
1,4-Dioxane	ND		42	ppb (v/v)

ND = Not Detected

Quanterra
Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-57 A-286
LAB ID: 129361-0007-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 28

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	1300		56	ppb (v/v)
Chloromethane	ND		110	ppb (v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1200		56	ppb (v/v)
Vinyl chloride	130		56	ppb (v/v)
Bromomethane	ND		56	ppb (v/v)
Chloroethane	210		110	ppb (v/v)
Trichlorofluoromethane	6200		56	ppb (v/v)
1,1-Dichloroethene	ND		56	ppb (v/v)
Carbon disulfide	ND		280	ppb (v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		56	ppb (v/v)
Acetone	ND		280	ppb (v/v)
Methylene chloride	ND		56	ppb (v/v)
trans-1,2-Dichloroethene	ND		56	ppb (v/v)
1,1-Dichloroethane	ND		56	ppb (v/v)
Vinyl acetate	ND		280	ppb (v/v)
cis-1,2-Dichloroethene	ND		56	ppb (v/v)
2-Butanone	290		280	ppb (v/v)
Chloroform	ND		56	ppb (v/v)
1,1,1-Trichloroethane	ND		56	ppb (v/v)
Carbon tetrachloride	ND		56	ppb (v/v)
Benzene	ND		56	ppb (v/v)
1,2-Dichloroethane	ND		56	ppb (v/v)
Trichloroethene	ND		56	ppb (v/v)
1,2-Dichloropropane	ND		56	ppb (v/v)
Bromodichloromethane	ND		56	ppb (v/v)
cis-1,3-Dichloropropene	ND		56	ppb (v/v)
4-Methyl-2-pentanone	ND		280	ppb (v/v)
Toluene	ND		56	ppb (v/v)
trans-1,3-Dichloropropene	ND		56	ppb (v/v)
1,1,2-Trichloroethane	ND		56	ppb (v/v)
Tetrachloroethene	ND		56	ppb (v/v)
2-Hexanone	ND		840	ppb (v/v)
Dibromochloromethane	ND		56	ppb (v/v)
1,2-Dibromoethane (EDB)	ND		56	ppb (v/v)
Chlorobenzene	69		56	ppb (v/v)
Ethylbenzene	ND		56	ppb (v/v)
Xylenes (total)	ND		56	ppb (v/v)
Styrene	ND		56	ppb (v/v)
Bromoform	ND		56	ppb (v/v)
1,1,2,2-Tetrachloroethane	ND		56	ppb (v/v)
Benzyl chloride	ND		280	ppb (v/v)
4-Ethyltoluene	ND		56	ppb (v/v)
1,3,5-Trimethylbenzene	ND		56	ppb (v/v)
1,2,4-Trimethylbenzene	ND		56	ppb (v/v)

ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-57 A-286
LAB ID: 129361-0007-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-A Dilution: 28

Parameter	Result	Qualifier	RL	Units
1,3-Dichlorobenzene	ND		56	ppb (v/v)
1,4-Dichlorobenzene	170		56	ppb (v/v)
1,2-Dichlorobenzene	ND		56	ppb (v/v)
1,2,4-Trichlorobenzene	ND		560	ppb (v/v)
Hexachlorobutadiene	ND		110	ppb (v/v)
1,3-Butadiene	ND		280	ppb (v/v)
1,4-Dioxane	ND		280	ppb (v/v)

ND = Not Detected

Quanterra
Environmental Services

Volatile Organics by GCMS - EPA TO14

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-66 136
LAB ID: 129361-0008-SA
Matrix: AIR — Sampled: 05 NOV 97 — Received: 14 NOV 97
Authorized: 14 NOV 97 — Prepared: N/A — Analyzed: 15 NOV 97
Instrument: GC/MS-B — Dilution: 32

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	2500		63	ppb (v/v)
Chloromethane	ND		130	ppb (v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	7200		63	ppb (v/v)
Vinyl chloride	ND		63	ppb (v/v)
Bromomethane	ND		63	ppb (v/v)
Chloroethane	ND		130	ppb (v/v)
Trichlorofluoromethane	ND		63	ppb (v/v)
1,1-Dichloroethene	ND		63	ppb (v/v)
Carbon disulfide	ND		320	ppb (v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		63	ppb (v/v)
Acetone	ND		320	ppb (v/v)
Methylene chloride	ND		63	ppb (v/v)
trans-1,2-Dichloroethene	ND		63	ppb (v/v)
1,1-Dichloroethane	ND		63	ppb (v/v)
Vinyl acetate	ND		320	ppb (v/v)
cis-1,2-Dichloroethene	ND		63	ppb (v/v)
2-Butanone	ND		320	ppb (v/v)
Chloroform	ND		63	ppb (v/v)
1,1,1-Trichloroethane	ND		63	ppb (v/v)
Carbon tetrachloride	ND		63	ppb (v/v)
Benzene	100		63	ppb (v/v)
1,2-Dichloroethane	ND		63	ppb (v/v)
Trichloroethene	ND		63	ppb (v/v)
1,2-Dichloropropane	ND		63	ppb (v/v)
Bromodichloromethane	ND		63	ppb (v/v)
cis-1,3-Dichloropropene	ND		63	ppb (v/v)
4-Methyl-2-pentanone	ND		320	ppb (v/v)
Toluene	ND		63	ppb (v/v)
trans-1,3-Dichloropropene	ND		63	ppb (v/v)
1,1,2-Trichloroethane	ND		63	ppb (v/v)
Tetrachloroethene	ND		63	ppb (v/v)
2-Hexanone	ND		950	ppb (v/v)
Dibromochloromethane	ND		63	ppb (v/v)
1,2-Dibromoethane (EDB)	ND		63	ppb (v/v)
Chlorobenzene	100		63	ppb (v/v)
Ethylbenzene	ND		63	ppb (v/v)
Xylenes (total)	76		63	ppb (v/v)
Styrene	ND		63	ppb (v/v)
Bromoform	ND		63	ppb (v/v)
1,1,2,2-Tetrachloroethane	ND		63	ppb (v/v)
Benzyl chloride	ND		320	ppb (v/v)
4-Ethyltoluene	ND		63	ppb (v/v)
1,3,5-Trimethylbenzene	ND		63	ppb (v/v)
1,2,4-Trimethylbenzene	ND		63	ppb (v/v)

ND = Not Detected

Quanterra Environmental Services

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-66 136
LAB ID: 129361-0008-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC/MS-B Dilution: 32

Parameter	Result	Qualifier	RL	Units
1,3-Dichlorobenzene	ND		63	ppb (v/v)
1,4-Dichlorobenzene	120		63	ppb (v/v)
1,2-Dichlorobenzene	ND		63	ppb (v/v)
1,2,4-Trichlorobenzene	ND		630	ppb (v/v)
Hexachlorobutadiene	ND		130	ppb (v/v)
1,3-Butadiene	ND		320	ppb (v/v)
1,4-Dioxane	ND		320	ppb (v/v)

ND = Not Detected

Quanterra
Environmental Services

EPA Method 25C
TCA/FID Analysis

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-45 12841		
LAB ID:	129361-0001-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 14 NOV 97
Instrument:	GC-1	Dilution: 2.1	

Parameter	Avg. Result	RSD	Qualifier	RL	Units
Total Gaseous Nonmethane Organics as Carbon	120	8.6		21	ppm-c

Quanterra
Environmental Services

EPA Method 25C
TCA/FID Analysis

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-26 9323BB		
LAB ID:	129361-0002-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 14 NOV 97
Instrument:	GC-1	Dilution: 3.4	

Parameter	Avg. Result	RSD	Qualifier	RL	Units
Total Gaseous Nonmethane Organics as Carbon	290	17		34	ppm-c

Quanterra
Environmental Services

EPA Method 25C
TCA/FID Analysis

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-25 9530BB		
LAB ID:	129361-0003-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 14 NOV 97
Instrument:	GC-1	Dilution: 3.4	

Parameter	Avg. Result	RSD	Qualifier	RL	Units
Total Gaseous Nonmethane Organics as Carbon	290	4.4		34	ppm-c

Quanterra
Environmental Services

EPA Method 25C
TCA/FID Analysis

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-11 93298		
LAB ID:	129361-0004-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 14 NOV 97
Instrument:	GC-1	Dilution: 3.4	

Parameter	Avg. Result	RSD	Qualifier	RL	Units
Total Gaseous Nonmethane Organics as Carbon	370	10		34	ppm-c

Quanterra
Environmental Services

EPA Method 25C
TCA/FID Analysis

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-28 93085		
LAB ID:	129361-0005-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 15 NOV 97
Instrument:	GC-1	Dilution: 3.6	

Parameter	Avg. Result	RSD	Qualifier	RL	Units
Total Gaseous Nonmethane Organics as Carbon	340	7.4		36	ppm-c

Quanterra
Environmental Services

EPA Method 25C
TCA/FID Analysis

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-27 9695B		
LAB ID:	129361-0006-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 15 NOV 97
Instrument:	GC-1	Dilution: 3.4	

Parameter	Avg. Result	RSD	Qualifier	RL	Units
Total Gaseous Nonmethane Organics as Carbon	310	10		34	ppm-c

Quanterra
Environmental Services

EPA Method 25C
TCA/FID Analysis

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-57 A-286		
LAB ID:	129361-0007-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 15 NOV 97
Instrument:	GC-1	Dilution: 2.8	

Parameter	Avg. Result	RSD	Qualifier	RL	Units
Total Gaseous Nonmethane Organics as Carbon	290	2.8		28	ppm-c

Quanterra
Environmental Services

EPA Method 25C
TCA/FID Analysis

Client Name: O'Brien & Gere Engineers, Inc.
Client ID: GW-66 136
LAB ID: 129361-0008-SA
Matrix: AIR Sampled: 05 NOV 97 Received: 14 NOV 97
Authorized: 14 NOV 97 Prepared: N/A Analyzed: 15 NOV 97
Instrument: GC-1 Dilution: 3.2

Parameter	Avg. Result	RSD	Qualifier	RL	Units
Total Gaseous Nonmethane Organics as Carbon	310	1.5		32	ppm-c

Quanterra
Environmental Services

Fixed Gases
Method 3C

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-45 12841		
LAB ID:	129361-0001-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 14 NOV 97
Instrument:	GC-1	Dilution: 2.1	

Parameter	Avg. Result	RPD	Qualifier	RL	Units
Nitrogen	38	0.32		2.1	% (v/v)

Quanterra
Environmental Services

Fixed Gases
Method 3C

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-26 9323BB		
LAB ID:	129361-0002-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 14 NOV 97
Instrument:	GC-1	Dilution: 3.4	

Parameter	Avg. Result	RPD	Qualifier	RL	Units
Nitrogen	7.1	0.071		3.4	% (v/v)

Quanterra Environmental Services

Fixed Gases
Method 3C

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-25 9530BB		
LAB ID:	129361-0003-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 14 NOV 97
Instrument:	GC-1	Dilution: 3.4	

Parameter	Avg. Result	RPD	Qualifier	RL	Units
Nitrogen	27	0.14		3.4	% (v/v)

Quanterra
Environmental Services

Fixed Gases
Method 3C

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-11 93298		
LAB ID:	129361-0004-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 14 NOV 97
Instrument:	GC-1	Dilution: 3.4	

Parameter	Avg. Result	RPD	Qualifier	RL	Units
Nitrogen	ND			3.4	% (v/v)

Quanterra
Environmental Services

Fixed Gases
Method 3C

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-28 93085		
LAB ID:	129361-0005-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 15 NOV 97
Instrument:	GC-1	Dilution: 3.6	

Parameter	Avg. Result	RPD	Qualifier	RL	Units
Nitrogen	9.4	2.8		3.6	% (v/v)

Quanterra
Environmental Services

Fixed Gases
Method 3C

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-27 9695B		
LAB ID:	129361-0006-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 15 NOV 97
Instrument:	GC-1	Dilution: 3.4	

Parameter	Avg. Result	RPD	Qualifier	RL	Units
Nitrogen	11	1.2		3.4	% (v/v)

Quanterra
Environmental Services

Fixed Gases
Method 3C

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-57 A-286		
LAB ID:	129361-0007-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 15 NOV 97
Instrument:	GC-1	Dilution: 2.8	

Parameter	Avg. Result	RPD	Qualifier	RL	Units
Nitrogen	36	0.66		2.8	% (v/v)

Quanterra
Environmental Services

Fixed Gases
Method 3C

Client Name:	O'Brien & Gere Engineers, Inc.		
Client ID:	GW-66 136		
LAB ID:	129361-0008-SA		
Matrix:	AIR	Sampled: 05 NOV 97	Received: 14 NOV 97
Authorized:	14 NOV 97	Prepared: N/A	Analyzed: 15 NOV 97
Instrument:	GC-1	Dilution: 3.2	

Parameter	Avg. Result	RPD	Qualifier	RL	Units
Nitrogen	49	0.78		3.2	% (v/v)

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT - MS QC
Air Toxics

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
129361-0001-SA	AIR	TO-14	15 NOV 97-A1	15 NOV 97-A1	
129361-0002-SA	AIR	TO-14	15 NOV 97-A1	15 NOV 97-A1	
129361-0003-SA	AIR	TO-14	15 NOV 97-A1	15 NOV 97-A1	
129361-0004-SA	AIR	TO-14	15 NOV 97-A1	15 NOV 97-A1	
129361-0005-SA	AIR	TO-14	15 NOV 97-A1	15 NOV 97-A1	
129361-0006-SA	AIR	TO-14	15 NOV 97-A1	15 NOV 97-A1	
129361-0007-SA	AIR	TO-14	15 NOV 97-A1	15 NOV 97-A1	
129361-0008-SA	AIR	TO-14	15 NOV 97-B1	15 NOV 97-B1	
129361-0001-SA	AIR	E25C-NMO-G		14 NOV 97-B1	
129361-0002-SA	AIR	E25C-NMO-G		14 NOV 97-B1	
129361-0003-SA	AIR	E25C-NMO-G		14 NOV 97-B1	
129361-0004-SA	AIR	E25C-NMO-G		14 NOV 97-B1	
129361-0005-SA	AIR	E25C-NMO-G		14 NOV 97-B1	
129361-0006-SA	AIR	E25C-NMO-G		14 NOV 97-B1	
129361-0007-SA	AIR	E25C-NMO-G		14 NOV 97-B1	
129361-0008-SA	AIR	E25C-NMO-G		14 NOV 97-B1	
129361-0001-SA	AIR	EPA3C-G		14 NOV 97-B1	
129361-0002-SA	AIR	EPA3C-G		14 NOV 97-B1	
129361-0003-SA	AIR	EPA3C-G		14 NOV 97-B1	
129361-0004-SA	AIR	EPA3C-G		14 NOV 97-B1	
129361-0005-SA	AIR	EPA3C-G		14 NOV 97-B1	
129361-0006-SA	AIR	EPA3C-G		14 NOV 97-B1	
129361-0007-SA	AIR	EPA3C-G		14 NOV 97-B1	
129361-0008-SA	AIR	EPA3C-G		14 NOV 97-B1	

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Air Toxics
Project: 129361

Category: TO-14 Method TO-14 - Volatile Organics
Matrix: AIR
QC Lot: 15 NOV 97-A1 Date Analyzed: 15 NOV 97
Concentration Units: ppb (v/v)

Analyte	Spiked	Concentration Measured DCS1	Concentration Measured DCS2	%Recovery DCS1	%Recovery DCS2	RPD	Acceptance Limits Recov.	Acceptance Limits RPD
Methylene chloride	48.4	50.3	50.0	104	103	0.7	80-120	20
1,1-Dichloroethene	48.4	49.0	49.4	101	102	0.7	70-120	20
Trichloroethene	36.8	37.8	37.8	103	103	0.1	80-120	20
Toluene	48.4	55.0	57.3	114	118	4.1	70-120	20
1,1,2,2-Tetrachloroethane	55.6	56.2	57.5	101	103	2.3	60-130	20

Category: TO-14 Method TO-14 - Volatile Organics
Matrix: AIR
QC Lot: 15 NOV 97-B1 Date Analyzed: 15 NOV 97
Concentration Units: ppb (v/v)

Analyte	Spiked	Concentration Measured DCS1	Concentration Measured DCS2	%Recovery DCS1	%Recovery DCS2	RPD	Acceptance Limits Recov.	Acceptance Limits RPD
Methylene chloride	51.5	49.2	47.9	96	93	2.6	80-120	20
1,1-Dichloroethene	50.5	46.9	46.1	93	91	1.8	70-120	20
Trichloroethene	52.5	49.8	50.1	95	95	0.6	80-120	20
Toluene	52.5	49.7	51.2	95	98	3.0	70-120	20
1,1,2,2-Tetrachloroethane	50.5	60.6	61.7	120	122	1.7	60-130	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental
Services

METHOD BLANK REPORT
Air Toxics
Project: 129361

Test: TO-14-G Volatile Organics by GCMS - EPA TO-14
Matrix: AIR
QC Run: 15 NOV 97-A1 Date Analyzed: 15 NOV 97

Analyte	Result	Units	Reporting Limit
Dichlorodifluoromethane	ND	ppb (v/v)	2.0
Chloromethane	ND	ppb (v/v)	4.0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ppb (v/v)	2.0
Vinyl chloride	ND	ppb (v/v)	2.0
Bromomethane	ND	ppb (v/v)	2.0
Chloroethane	ND	ppb (v/v)	4.0
Trichlorofluoromethane	ND	ppb (v/v)	2.0
1,1-Dichloroethene	ND	ppb (v/v)	2.0
Carbon disulfide	ND	ppb (v/v)	10
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	2.0
Acetone	ND	ppb (v/v)	10
Methylene chloride	ND	ppb (v/v)	2.0
trans-1,2-Dichloroethene	ND	ppb (v/v)	2.0
1,1-Dichloroethane	ND	ppb (v/v)	2.0
Vinyl acetate	ND	ppb (v/v)	10
cis-1,2-Dichloroethene	ND	ppb (v/v)	2.0
2-Butanone	ND	ppb (v/v)	10
Chloroform	ND	ppb (v/v)	2.0
1,1,1-Trichloroethane	ND	ppb (v/v)	2.0
Carbon tetrachloride	ND	ppb (v/v)	2.0
Benzene	ND	ppb (v/v)	2.0
1,2-Dichloroethane	ND	ppb (v/v)	2.0
Trichloroethene	ND	ppb (v/v)	2.0
1,2-Dichloropropane	ND	ppb (v/v)	2.0
Bromodichloromethane	ND	ppb (v/v)	2.0
cis-1,3-Dichloropropene	ND	ppb (v/v)	2.0
4-Methyl-2-pentanone	ND	ppb (v/v)	10
Toluene	ND	ppb (v/v)	2.0
trans-1,3-Dichloropropene	ND	ppb (v/v)	2.0
1,1,2-Trichloroethane	ND	ppb (v/v)	2.0
Tetrachloroethene	ND	ppb (v/v)	2.0
2-Hexanone	ND	ppb (v/v)	30
Dibromochloromethane	ND	ppb (v/v)	2.0
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	2.0
Chlorobenzene	ND	ppb (v/v)	2.0
Ethylbenzene	ND	ppb (v/v)	2.0
Xylenes (total)	ND	ppb (v/v)	2.0
Styrene	ND	ppb (v/v)	2.0
Bromoform	ND	ppb (v/v)	2.0
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	2.0
Benzyl chloride	ND	ppb (v/v)	10
4-Ethyltoluene	ND	ppb (v/v)	2.0
1,3,5-Trimethylbenzene	ND	ppb (v/v)	2.0
1,2,4-Trimethylbenzene	ND	ppb (v/v)	2.0
1,3-Dichlorobenzene	ND	ppb (v/v)	2.0
1,4-Dichlorobenzene	ND	ppb (v/v)	2.0
1,2-Dichlorobenzene	ND	ppb (v/v)	2.0

ND = Not Detected

Quanterra
Environmental Services

METHOD BLANK REPORT (cont.)
Air Toxics
Project: 129361

Test: TO-14-G Volatile Organics by GCMS - EPA TO-14 (cont.)
Matrix: AIR
QC Run: 15 NOV 97-A1 Date Analyzed: 15 NOV 97

Analyte	Result	Units	Reporting Limit
1,2,4-Trichlorobenzene	ND	ppb (v/v)	20
Hexachlorobutadiene	ND	ppb (v/v)	4.0
1,3-Butadiene	ND	ppb (v/v)	10
1,4-Dioxane	ND	ppb (v/v)	10

ND = Not Detected

Quanterra
Environmental Services

METHOD BLANK REPORT (cont.)
Air Toxics
Project: 129361

Test: TO-14-G Volatile Organics by GCMS - EPA TO-14 (cont.)
Matrix: AIR

QC Run: 15 NOV 97-B1 Date Analyzed: 15 NOV 97

Analyte	Result	Units	Reporting Limit
Dichlorodifluoromethane	ND	ppb (v/v)	2.0
Chloromethane	ND	ppb (v/v)	4.0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ppb (v/v)	2.0
Vinyl chloride	ND	ppb (v/v)	2.0
Bromomethane	ND	ppb (v/v)	2.0
Chloroethane	ND	ppb (v/v)	4.0
Trichlorofluoromethane	ND	ppb (v/v)	2.0
1,1-Dichloroethene	ND	ppb (v/v)	2.0
Carbon disulfide	ND	ppb (v/v)	10
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ppb (v/v)	2.0
Acetone	ND	ppb (v/v)	10
Methylene chloride	ND	ppb (v/v)	2.0
trans-1,2-Dichloroethene	ND	ppb (v/v)	2.0
1,1-Dichloroethane	ND	ppb (v/v)	2.0
Vinyl acetate	ND	ppb (v/v)	10
cis-1,2-Dichloroethene	ND	ppb (v/v)	2.0
2-Butanone	ND	ppb (v/v)	10
Chloroform	ND	ppb (v/v)	2.0
1,1,1-Trichloroethane	ND	ppb (v/v)	2.0
Carbon tetrachloride	ND	ppb (v/v)	2.0
Benzene	ND	ppb (v/v)	2.0
1,2-Dichloroethane	ND	ppb (v/v)	2.0
Trichloroethene	ND	ppb (v/v)	2.0
1,2-Dichloropropane	ND	ppb (v/v)	2.0
Bromodichloromethane	ND	ppb (v/v)	2.0
cis-1,3-Dichloropropene	ND	ppb (v/v)	2.0
4-Methyl-2-pentanone	ND	ppb (v/v)	10
Toluene	ND	ppb (v/v)	2.0
trans-1,3-Dichloropropene	ND	ppb (v/v)	2.0
1,1,2-Trichloroethane	ND	ppb (v/v)	2.0
Tetrachloroethene	ND	ppb (v/v)	2.0
2-Hexanone	ND	ppb (v/v)	30
Dibromochloromethane	ND	ppb (v/v)	2.0
1,2-Dibromoethane (EDB)	ND	ppb (v/v)	2.0
Chlorobenzene	ND	ppb (v/v)	2.0
Ethylbenzene	ND	ppb (v/v)	2.0
Xylenes (total)	ND	ppb (v/v)	2.0
Styrene	ND	ppb (v/v)	2.0
Bromoform	ND	ppb (v/v)	2.0
1,1,2,2-Tetrachloroethane	ND	ppb (v/v)	2.0
Benzyl chloride	ND	ppb (v/v)	10
4-Ethyltoluene	ND	ppb (v/v)	2.0
1,3,5-Trimethylbenzene	ND	ppb (v/v)	2.0
1,2,4-Trimethylbenzene	ND	ppb (v/v)	2.0
1,3-Dichlorobenzene	ND	ppb (v/v)	2.0
1,4-Dichlorobenzene	ND	ppb (v/v)	2.0

ND = Not Detected

METHOD BLANK REPORT (cont.)
Air Toxics
Project: 129361

Test: TO-14-G Volatile Organics by GCMS - EPA TO-14 (cont.)
Matrix: AIR

QC Run: 15 NOV 97-B1 Date Analyzed: 15 NOV 97

Analyte	Result	Units	Reporting Limit
1,2-Dichlorobenzene	ND	ppb (v/v)	2.0
1,2,4-Trichlorobenzene	ND	ppb (v/v)	20
Hexachlorobutadiene	ND	ppb (v/v)	4.0
1,3-Butadiene	ND	ppb (v/v)	10
1,4-Dioxane	ND	ppb (v/v)	10

Test: EPA-25C-NMO-G Method EPA 25C
Matrix: AIR
QC Run: 14 NOV 97-B1 Date Analyzed: 14 NOV 97

Analyte	Result	Units	Reporting Limit
Total Gaseous Nonmethane Organics as Carbon	ND	ppm-c	10

Test: EPA3C-G Method EPA 3C - Fixed Gases
Matrix: AIR
QC Run: 14 NOV 97-B1 Date Analyzed: 14 NOV 97

Analyte	Result	Units	Reporting Limit
Nitrogen	ND	% (v/v)	1.0

ND = Not Detected

Quanterra
Environmental Services

CANISTER FIELD DATA RECORD

~1

CLIENT: OBG

CANISTER SERIAL #: 1284 1

DATE CLEANED: 10/23/97 A

CLIENT SAMPLE #: GW-45

SITE LOCATION: COMBS FILL SOUTH

VER ID: IT-42

Duration of sample: 5 hrs/min

Flow setting: 500 ml/min (500 ml/min)

Initials: RN LC / Ran FOR JD

READING	TIME	VAC. (Inches Hg) or PRESS. (psig)	DATE	INITIALS
INITIAL VACUUM CHECK	. .	30"	10/30/97	RN
INITIAL FIELD VACUUM	731	30"	11/5/97	RMN
FINAL FIELD READING	1545	16	11/5/97	RM
GAUGE READING UPON RECEIPT				

LABORATORY CANISTER PRESSURIZATION

INITIAL VACUUM (inches Hg and PSIA)	6"	11/14/97	do
FINAL PRESSURE (PSIA)	24.6	11/14/97	do

Pressurization gas: He

COMMENTS

Cont. Time (Hours)	Flow rate Range (ml/min)
0.5	153 - 166.7
1	76.2 - 83.3
2	38.3 - 41.7
4	19.3 - 20.9
6	12.7 - 13.9
8	9.5 - 10.4
10	7.62 - 8.3
12	6.3 - 6.9
24	3.2 - 3.5

Quanterra
Environmental Services

CANISTER FIELD DATA RECORD

- 2

CLIENT: OBG

CANISTER SERIAL #: 3323BB

DATE CLEANED: 10/23/97 A

CLIENT SAMPLE #: GW-26

SITE LOCATION: Combe Fill South

VER ID: EAS-4

Duration of cond.: 5 psig/min.

Flow setting: 500 ml/min (500 ml/min)

Initials: RN LC / Run for JD

READING	TIME	VAC. (inches Hg) or PRESS. (psia)	DATE	INITIALS
INITIAL VACUUM CHECK	. .	30"	10/30/97	RN
INITIAL FIELD VACUUM	740	30"	11/5/97	RmN
FINAL FIELD READING	1547	15"	11/5/97	RmN
GAUGE READING UPON RECEIPT				
LABORATORY CANISTER PRESSURIZATION				
INITIAL VACUUM (inches Hg and PSIA)		15 Y	11/14/97	db
FINAL PRESSURE (PSIA)		24.6	11/14/97	db

Pressurization gas: He

COMMENTS

Cond. Time (Hours)	Flow rate Range (ml/min)
0.5	153 - 166.7
1	79.2 - 83.3
2	38.5 - 41.7
4	19.3 - 20.8
6	13.2 - 13.9
8	9.8 - 10.4
10	7.92 - 8.3
12	6.6 - 6.9
24	3.2 - 3.5

Quanterra
Environmental Services

CANISTER FIELD DATA RECORD -3

CLIENT: OBG
CANISTER SERIAL #: 9530 BB
DATE CLEANED: 10/23/97 A
CLIENT SAMPLE #: GW-25
SITE LOCATION: Com GE FILL SOUTH

VER ID: IT-213
Duration of sample: 5 days/min.
Flow setting: √80 ml/min (500 ml/min)
Initials: RN LC/RMN FOR JD

READING	TIME	VAC. (inches Hg) or PRESS. (psia)	DATE	INITIALS
INITIAL VACUUM CHECK	. .	30"	10/30/97	RN
INITIAL FIELD VACUUM	745	30"	11/5/97	RMN
FINAL FIELD READING	1551	16"	11/5/97	RMN
GAUGE READING UPON RECEIPT				
LABORATORY CANISTER PRESSURIZATION				
INITIAL VACUUM (inches Hg and PSIA)		15"	11/14/97	dd
FINAL PRESSURE (PSIA)		24.6	11/14/97	dd

Pressurization gas: Ne

COMMENTS

Cont. Time (Hours)	Flow rate Range (ml/min)
0.5	188 - 188.7
1	79.2 - 82.2
2	38.8 - 41.7
4	19.3 - 20.2
6	12.2 - 12.9
8	9.3 - 10.4
10	7.82 - 8.2
12	6.3 - 6.9
24	3.2 - 3.5

Quanterra
Environmental Services

-4

CANISTER FIELD DATA RECORD

CLIENT: OBG

CANISTER SERIAL #: 93298

DATE CLEANED: 10/23/97 A

CLIENT SAMPLE #: GW-11

SITE LOCATION: Camp FILL SOUTH

VER ID: HT-42

Duration of sample: 5 hrs/min

Flow setting: 500 ml/min (500 ml/min)

Initials: RN LC / RCM FOR JD

READING	TIME	VAC. (Inches Hg) or PRESS. (psia)	DATE	INITIALS
INITIAL VACUUM CHECK	. .	30"	10/30/97	RN
INITIAL FIELD VACUUM	735	30"	11/5/97	RMN
FINAL FIELD READING	1555	16	11/5/97	RMN
GAUGE READING UPON RECEIPT				
LABORATORY CANISTER PRESSURIZATION				
INITIAL VACUUM (inches Hg and PSIA)		15"	11/14/97	do
FINAL PRESSURE (PSIA)		24.6	11/14/97	do

Pressurization gas: He

COMMENTS

Cond. Time (Hours)	Flow rate Range (ml/min)
0.5	188 - 188.7
1	79.2 - 82.2
2	38.8 - 41.7
4	19.3 - 20.8
8	13.2 - 13.9
8	9.8 - 10.4
10	7.82 - 8.2
12	6.8 - 6.9
24	3.2 - 3.5

Quanterra
Environmental Services

CANISTER FIELD DATA RECORD HT-43 -5

CLIENT: OBG

CANISTER SERIAL #: 93085

DATE CLEANED: 10/23/97 A

CLIENT SAMPLE #: GW-20

SITE LOCATION: Com Bx Fld South

VER ID: ~~IT-28A~~

Duration of comp.: 5 hrs/min.

Flow setting: 500 ml/min (500 ml/min)

Initials: [illegible] LC / Rm FOR JD

READING	TIME	VAC. (inches Hg) or PRESS. (psia)	DATE	INITIALS
INITIAL VACUUM CHECK	. .	30"	10/30/97	[illegible]
INITIAL FIELD VACUUM	727	30"	11/3/97	RMN
FINAL FIELD READING	1601	16"	11/3/97	RMN
GAUGE READING UPON RECEIPT				
LABORATORY CANISTER PRESSURIZATION				
INITIAL VACUUM (inches Hg and PSIA)		16"	11/14/97	do
FINAL PRESSURE (PSIA)		24.6	11/14/97	do

Pressurization gas: He

COMMENTS

Canc. Time (Hours)	Flow rate Range (ml/min)
0.5	188 - 166.7
1	79.2 - 83.3
2	38.5 - 41.7
4	19.2 - 20.8
6	13.2 - 13.9
8	9.6 - 10.4
10	7.69 - 8.3
12	6.6 - 6.9
24	3.3 - 3.5

Quanterra
Environmental Services

CANISTER FIELD DATA RECORD

-6

CLIENT: OBG

CANISTER SERIAL #: 9695B

DATE CLEANED: 10/23/97 A

CLIENT SAMPLE #: GW-27

SITE LOCATION: COMBE FILL SOUTH

VFR ID: IT-51

Duration of sample: 5 hrs/min

Flow setting: 500 ml/min (500 ml/min)

Initials: RN LC / RMN FOR JD

READING	TIME	VAC. (Inches Hg) or PRESS. (psia)	DATE	INITIALS
INITIAL VACUUM CHECK	. .	30"	10/30/97	RN
INITIAL FIELD VACUUM	751	30"	11/5/97	RMN
FINAL FIELD READING	1606	16"	11/5/97	RMN
GAUGE READING UPON RECEIPT				
LABORATORY CANISTER PRESSURIZATION				
INITIAL VACUUM (inches Hg and PSIA)		15"	11/14/97	dh
FINAL PRESSURE (PSIA)		24.6	11/14/97	dh

Pressurization gas: N2

COMMENTS

Canister Time (Hours)	Flow rate Range (ml/min)
0.5	188 - 188.7
1	79.2 - 82.2
2	38.8 - 41.7
4	19.8 - 20.9
8	13.2 - 13.9
8	9.8 - 10.4
10	7.92 - 8.3
12	6.6 - 6.9
24	3.2 - 3.5

Quanterra
Environmental Services

CANISTER FIELD DATA RECORD

-7

CLIENT: OBG
CANISTER SERIAL #: A-286
DATE CLEANED: 10/23/97 A
CLIENT SAMPLE #: GW-57
SITE LOCATION: Comby Fill South

VFR ID: HT-40
Duration of sample: 5 hrs/min
Flow setting: 508 ml/min (500 ml/min)
Initials: [illegible] LC/RMN FOR JD

READING	TIME	VAC. (inches Hg or PRESS. (psia)	DATE	INITIALS
INITIAL VACUUM CHECK	. .	30"	10/30/97	[illegible]
INITIAL FIELD VACUUM	708 ~~1145~~	30"	11/5/97	RMN
FINAL FIELD READING	1611	12"	11/5/97	RMN
GAUGE READING UPON RECEIPT				
LABORATORY CANISTER PRESSURIZATION				
INITIAL VACUUM (inches Hg and PSIA)		12"	11/14/97	do
FINAL PRESSURE (PSIA)		24.6	11/14/97	do

Pressurization gas: He

COMMENTS: Damaged threads. Cap not on properly at arrival do

Conc. Time (Hours)	Flow rate Range (ml/min)
0.5	188 - 188.7
1	78.2 - 80.2
2	38.8 - 41.7
4	19.3 - 20.8
8	13.2 - 13.9
8	9.9 - 10.4
10	7.82 - 8.2
12	6.6 - 6.9
24	3.2 - 3.5

Quanterra
Environmental Services

-8

CANISTER FIELD DATA RECORD

CLIENT: OBG
CANISTER SERIAL #: 136
DATE CLEANED: 10/23/97 A
CLIENT SAMPLE #: GW-66
SITE LOCATION: Combe Hill South

VFR ID: HT-52
Duration of sample: 5 hrs/min
Flow setting: 200 ml/min (200 ml/min)
Initials: [illegible] LC / RMN FOR JD

READING	TIME	VAC. (inches Hg) or PRESS. (psia)	DATE	INITIALS
INITIAL VACUUM CHECK	. .	30"	10/30/97	[illegible]
INITIAL FIELD VACUUM	720	30"	11/5/97	RMN
FINAL FIELD READING	1600	15"	11/5/97	RMN
GAUGE READING UPON RECEIPT				
LABORATORY CANISTER PRESSURIZATION				
INITIAL VACUUM (inches Hg and PSIA)		14"	11/14/97	dk
FINAL PRESSURE (PSIA)		24.6	11/14/97	dk

Pressurization gas: He

COMMENTS

Canc. Time (Hours)	Flow rate Range (ml/min)
0.5	188 - 188.7
1	78.2 - 80.2
2	38.8 - 41.7
4	19.8 - 20.8
6	13.2 - 13.8
8	9.8 - 10.4
10	7.82 - 8.2
12	6.8 - 6.9
24	3.2 - 3.5

Chain of Custody Record

Quanterra Environmental Services

QUA-4124-1

Client	Project Manager	Date	Chain Of Custody Number
O'BRIEN & GERE ENGINEERS	Rob Neimeier	11/6/97	75058
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
5000 Brittonfield Parkway	315 437-6100 315 463-7554	129861	
City / State / Zip Code	**Site Contact**	**Lab Contact**	
East Syracuse / NY / 13057	NA	NA	
Project Name	**Carrier/Waybill Number**		
Combe Fill South			
Contract/Purchase Order/Quote No.			
Job # 3013-015-968, PO # to follow			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Aqueous	Sed.	Soil	Air	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Summa	Analysis: M25C - TNMOC	TO-14 - Full Scan	N2 - M3C	Special Instructions/ Conditions of Receipt
GW-45 12841	11/5/97	1058				X							X	X	X	X	
GW-26 93233B	11/5/97	1140				X							X	X	X	X	
GW-25 9530 BB	11/5/97	1217				X							X	X	X	X	
GW11 93298	11/5/97	1259				X							X	X	X	X	
GW-28 93085	11/5/97	1332				X							X	X	X	X	
GW-27 9695B	11/5/97	1404				X							X	X	X	X	
GW-57 A-286	11/5/97	1446				X							X	X	X	X	
GW-66 136	11/5/97	1521				X							X	X	X	X	

Possible Hazard Identification

☐ Non-Hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☑ 7 Days ☐ ~~14 Days~~ ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Relinquished By	Date	Time	Received By	Date	Time
1.	[signature]	11/6/97	1700	/	/	/
2.	/	/	/	/	/	/
3.	/	/	/	[signature]	11/14/97	11:00

Comments

Please analyze w/in 14 days of sampling time. (UPS)

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

ATTACHMENT B

Gas well
Field data sheets

O'Brien & Gere Engineers, Inc.
Gas Well Field Data Sheet

Client: NJDEP
Location: Combe Fill Landfill, Chester, NJ
Gas Well No: 45 12841
Date: 11/5/97
Sampler: RMN

SUMMA Canister Samples:
Sample parameters: NMHC, TXS, TVOC, N2
Sample time start: 1053
Sample time end: 1058

Hydrogen Sulfide Monitoring:
Sample time: 1050 Result = 0.0 ppm
Hydrogen Sulfide meter name: Industrial Scientific
Meter model number: HMX 271
Meter serial number: 9206077-155

LEL = 18-20% at 1051
O_2 = 5.8% at 1051
H_2S = 0.0 ppm

Air Velocity Data (ft/min)
Monitoring time: 1040
Velocity meter name: SOLOMAT - Hot WIRE 129 MSX - NJDEP
Meter model number: MPM 500E
Meter serial number: 232431
Gas well temperature: 59°F

- Flows below detectable range on ALNOR + VANE of solomat

Traverse Point	ft/min reading	
1	51	63 - 1100
2	57	40
3	54	24
4	32	10
5	0	5
6	2	0
7	1	1
8	1	0 1110
average	(25 + 19)/2 = 22	

- Very slight plume visible

0

This equipment has been calibrated using standards whose accuracies are traceable to the National Institute of Standards & Technology (NIST) within the limits of the Institute's calibration service.

O'Brien & Gere Engineers, Inc.
Gas Well Field Data Sheet

Client:	NJDEP
Location:	Combe Fill Landfill, Chester, NJ
Gas Well No:	26 9323 BB
Date:	11/5/97
Sampler:	RMN

Ambient Temp = 52°F

SUMMA Canister Samples:

Sample parameters:	NMHC, TXS, TVOC, N2
Sample time start:	1135
Sample time end:	1140

Hydrogen Sulfide Monitoring:

Sample time:	1130
Hydrogen Sulfide meter name:	Industrial Scientific
Meter model number:	ITX x 271
Meter serial number:	9206077-155

H_2S = 1 ppm
LEL = 100 %
O_2 = 0.3%

Air Velocity Data (ft/min)

Monitoring time:	1120, 1144
Velocity meter name:	Solomat - Hotwire 129 MSX - NJDEP
Meter model number:	MPM 500E
Meter serial number:	23243
Gas well temperature:	67°F

Traverse Point		ft/min reading	
1	1120	316	253
2		351	275
3		345	248
4		396	270
5		345	241
6		314	212
7		239	193
8		189	108
average		266	

- distinct heat plume visible

This equipment has been calibrated using standards whose accuracies are traceable to the National Institute of Standards & Technology (NIST) within the limits of the Institute's calibration service.

O'Brien & Gere Engineers, Inc.
Gas Well Field Data Sheet

Client:	NJDEP
Location:	Combe Fill Landfill, Chester, NJ
Gas Well No:	25
Date:	11-5-97
Sampler:	RMN

SUMMA Canister Samples:

Sample parameters:	NMHC, TXS, TVOC, N2
Sample time start:	1212
Sample time end:	1217

Hydrogen Sulfide Monitoring:

Sample time:	1210
Hydrogen Sulfide meter name:	Industrial Scientific
Meter model number:	Hmx 271
Meter serial number:	9206077-155

H_2S = 9 to 10 ppm
LEL = 28 to 49%
O_2 = 8 to 9%

Air Velocity Data (ft/min)

Monitoring time:	1200, 1219
Velocity meter name:	NJDEP Solomat Honwire 129 MSL
Meter model number:	MPM 500E
Meter serial number:	232431
Gas well temperature:	68 °F

Traverse Point	ft/min reading	
1	9	11
2	5	7
3	4	6
4	7	9
5	11	17
6	14	20
7	9	17
8	3	18
average	10.4	

Slight heat plume noticed

This equipment has been calibrated using standards whose accuracies are traceable to the National Institute of Standards & Technology (NIST) within the limits of the Institute's calibration service.

O'Brien & Gere Engineers, Inc.
Gas Well Field Data Sheet

Client:	NJDEP
Location:	Combe Fill Landfill, Chester, NJ
Gas Well No:	11
Date:	11-5-97
Sampler:	RMN

SUMMA Canister Samples:

Sample parameters:	NMHC, TXS, TVOC, N2
Sample time start:	1254
Sample time end:	1259

Hydrogen Sulfide Monitoring:

Sample time:	1251
Hydrogen Sulfide meter name:	Indus Scientific
Meter model number:	Hmx 271
Meter serial number:	9206 077 -155

H_2S : 9 to 10 ppm
LEL : ~~20%~~ 100%
O_2 : 0.1%

Air Velocity Data (ft/min)

Monitoring time:	1238 1305
Velocity meter name:	NJDEP Solomat Hotwire 129 msx
Meter model number:	MPM 500E
Meter serial number:	232431
Gas well temperature:	62

Traverse Point	ft/min reading	
1	115	83
2	89	76
3	81	65
4	52	53
5	34	20
6	32	23
7	28	16
8	33	15
average	51	

moderate plume visible

This equipment has been calibrated using standards whose accuracies are traceable to the National Institute of Standards & Technology (NIST) within the limits of the Institute's calibration service.

O'Brien & Gere Engineers, Inc.
Gas Well Field Data Sheet

Client:	NJDEP
Location:	Combe Fill Landfill, Chester, NJ
Gas Well No:	28
Date:	11-5-97
Sampler:	RMN

SUMMA Canister Samples:

Sample parameters:	NMHC, TXS, TVOC, N2
Sample time start:	1327
Sample time end:	1332

Hydrogen Sulfide Monitoring:

Sample time:	1325
Hydrogen Sulfide meter name:	Industrial Scientific
Meter model number:	tmx 271
Meter serial number:	920607?-125

LEL 100%
O_2 = 0.2 to 0.4%
H_2S = 0.0 ppm

Air Velocity Data (ft/min)

Monitoring time:	1315, 1334
Velocity meter name:	NJDEP Solomat HOT WIRE 129 MSX
Meter model number:	MPM 500E
Meter serial number:	232431
Gas well temperature:	66 °F

Traverse Point	ft/min reading	
1	168	204
2	216	214
3	191	198
4	207	188
5	198	167
6	183	135
7	122	111
8	165	54
average	164	

Distinct plume visible

This equipment has been calibrated using standards whose accuracies are traceable to the National Institute of Standards & Technology (NIST) within the limits of the Institute's calibration service.

O'Brien & Gere Engineers, Inc.
Gas Well Field Data Sheet

Client: NJDEP
Location: Combe Fill Landfill, Chester, NJ
Gas Well No: 57
Date: 11-5-97
Sampler: RMN

SUMMA Canister Samples:
Sample parameters: NMHC, TXS, TVOC, N2
Sample time start: 1441
Sample time end: 1446

Hydrogen Sulfide Monitoring:
Sample time: 1435
Hydrogen Sulfide meter name: Industrial Scientific
Meter model number: Hmx 271
Meter serial number: 9206077-125

H_2S : 0 - 1 ppm
LEL : 100%
O_2 : 0.2 to 0.3%

Air Velocity Data (ft/min)
Monitoring time: 1426 1448
Velocity meter name: NSDI F SOLOMAT HOT WIRE 129 MSX
Meter model number: MPM 500E
Meter serial number: 232431
Gas well temperature: 63°F

Traverse Point	ft/min reading	
1	100	135
2	116	129
3	115	117
4	106	102
5	80	73
6	78	65
7	54	52
8	53	55
average	89	

Slight plume

This equipment has been calibrated using standards whose accuracies are traceable to the National Institute of Standards & Technology (NIST) within the limits of the Institute's calibration service.

O'Brien & Gere Engineers, Inc.
Gas Well Field Data Sheet

Client:	NJDEP
Location:	Combe Fill Landfill, Chester, NJ
Gas Well No:	66
Date:	11-5-97
Sampler:	RMN

SUMMA Canister Samples:

Sample parameters:	NMHC, TXS, TVOC, N2
Sample time start:	1516
Sample time end:	1521

Hydrogen Sulfide Monitoring:

Sample time:	1511
Hydrogen Sulfide meter name:	Industrial Scientific
Meter model number:	Hmx 271
Meter serial number:	9206077-125

H_2S : 1 ppm
LEL : 100%
O_2 : 0.2 to 0.3 %

Air Velocity Data (ft/min)

Monitoring time:	1502, 1522
Velocity meter name:	NJDEP, Solomat Hot wire 129 mmx
Meter model number:	MPM 500E
Meter serial number:	232431
Gas well temperature:	57°F

Traverse Point	ft/min reading	
1	109	139
2	117	144
3	98	136
4	73	121
5	72	71
6	77	68
7	72	62
8	63	64
average	98	

Slight Plume

This equipment has been calibrated using standards whose accuracies are traceable to the National Institute of Standards & Technology (NIST) within the limits of the Institute's calibration service.

O'Brien & Gere Engineers, Inc.
Gas Well Field Data Sheet

Client:	NJDEP
Location:	Combe Fill Landfill, Chester, NJ
Gas Well No:	27
Date:	11-5-97
Sampler:	RmN

SUMMA Canister Samples:

Sample parameters:	NMHC, TXS, TVOC, N2
Sample time start:	1359
Sample time end:	1404

Hydrogen Sulfide Monitoring:

Sample time:	1357
Hydrogen Sulfide meter name:	IND SCIENTIFIC
Meter model number:	ITX x 271
Meter serial number:	920607-125

H_2S - 0.0 ppm
LEL - 100%
O_2 - 0.4-0.5%

Air Velocity Data (ft/min)

Monitoring time:	1346, 1405
Velocity meter name:	NJDEP SOLOMAT
Meter model number:	MPM500E
Meter serial number:	232431
Gas well temperature:	69°F

HOT WIRE 129 MSX

Traverse Point	ft/min reading	
1	160	217
2	188	214
3	183	201
4	131	200
5	84	162
6	68	114
7	25	60
8	38	40
average	130	

VISIBLE FUME

This equipment has been calibrated using standards whose accuracies are traceable to the National Institute of Standards & Technology (NIST) within the limits of the Institute's calibration service.

O'BRIEN & GERE
ENGINEERS, INC.

FILE A.6 12.4

RECEIVED
JUL 28 1994
FW ENVIRESPONSE

cc. R. Mis
R. Hall
S. Gallone
N. Volpe
CN#52

July 27, 1994

Foster Wheeler Enviresponse, Inc. (FWEI)
Combe Fill South Landfill
P.O. Box 504
Chester, NJ 07930

Attention: Mr. Ron Mis

Re: Combe Fill South Landfill

Subj: CN-52: Landfill Gas Treatment - Reduction in Scope of Work

File: 3013.015.603

Gentlemen:

O'Brien & Gere has completed its review of certain landfill gas analytical data, which was discussed in our letter dated 6/14/94. Consistent with the results of the recent landfill gas testing, no collection and treatment systems will be constructed for landfill gas or landfill gas condensate on this project. Landfill gas will be passively vented only. This letter will serve as notice that NJDEP is exercising its rights under Article 12 for a reduction in scope of work. Note that the Gas Extraction Building is not going to be eliminated.

The Pay Items for the affected work are noted below. The format of FWEI's approved subitem price breakdown (FWEI Transmittal 464, January 10, 1994) is used to describe the reductions to Pay Items 33 and 44 (ref. "Item Nos." below)

Pay Item & Item No (if Applicable)	Item Description	Item Change
Pay Item 31	Gas Header Piping and Fittings	Eliminated
Pay Item 32	Condensate Collection System	Eliminated
Pay Item 33	Landfill Gas Treatment System	See Below
- Item No. 27	Flare System Equipment	Eliminated
- Item Nos. 28 - 31	Landfill Gas Exhausters	Eliminated
- Item Nos. 37 - 42	Pipe/Valves to/from Exhausters	Eliminated
- Item Nos. 59 - 76	Electrical	Modified

O'Brien & Gere Engineers, Inc., an O'Brien & Gere Company
5000 Brittonfield Parkway / P.O. Box 4873 / Syracuse, NY 13221 / (315) 437-6100 FAX (315) 463-7554
and offices in major U.S. cities

Pay Item & Item No (if Applicable)	Item Description	Item Change
Pay Item 44	Ground Water Treatment System	See Below
- Item Nos. 2, 3	U/G Pipe to T 102	Eliminated
- Item Nos. 4 - 6	U/G Plant Drainage Pipe	Elim/Mod*
- Item No. 22	Skimmer Piping @ T-102	Eliminated
- Item No. 74	SBR System - Tanks - T-102	Eliminated
- Item Nos. 81, 86, 94	T-102 Concrete Work	Eliminated
- Item Nos. 119, 122	Framing (Trim, Exterior): T-102	Eliminated
- Item No. 125	Submersible Mixer	Eliminated
- Item No. 130	Floating Skimmer	Eliminated
- Item Nos. 143, 144	Pumps: P-102 A/B	Eliminated
- Item No. 170	MCC	Modified

*(Elimination outside limits shown on drawing G-1, modification within drawing G-1 limits)

A modification identifying details of the affected work will be issued to FWEI in the near future. Subsequently, an on site meeting will be held to discuss the affected work items. Should FWEI identify any other items which may be affected by the elimination of either the landfill gas or landfill gas condensate collection and treatment systems, please notify us accordingly.

O'Brien & Gere and NJDEP recognize this notification as a substantial change with major cost reduction and possible time reduction impacts. Please be advised that all changes in contract price as a result of the forthcoming modification will be made in accordance with Article 13, and will not necessarily reflect FWEI's subitem price breakdown. The subitem price breakdown above was only used above to facilitate communication of the affected work.

Should you have further questions, please contact the undersigned.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Wayne Hoagland, P.E.
Resident Project Representative

cc: Site - NJDEPE
D. Prince - NJDEPE
P. McMaster - O'Brien & Gere
R.Bowers - O'Brien & Gere

fwi167.wp/ejk

O'BRIEN & GERE
ENGINEERS, INC

FILE 2.6
LN 5.2
R. Hall
S. Gangemi
A. Gargiulo
N. Volpe

RECEIVED
AUG 19 1994
FW ENVIRESPONSE

August 19, 1994

Foster Wheeler Envirespons, Inc.
Combe Fill South Landfill
P.O. Box 504
Chester, NJ 07930

Attention: Mr. Richard A. Hall

Re: Combe Fill South Landfill

Subj: Modification No. 32;
Change Notice No. 32

File: 3013.015.603

Gentlemen:

Transmitted herewith are the scope of work and drawings Z-45 through Z-66 for Modification No. 32, which pertains to the elimination of the landfill gas and gas condensate collection and treatment systems. Please provide O'Brien & Gere Engineers, Inc. (O'Brien & Gere) and NJDEP with a lump sum cost proposal for this modification. The proposal should include a breakdown of any labor, material, and equipment costs associated with the original Contract work, as well as a similar breakdown for the work encompassed under Modification No. 32.

The following clarifications are noted for Modification No. 32:

1. The enclosed drawings pertain specifically to Modification No. 32. Certain facets of the work, which are unrelated to landfill gas and condensate collection and treatment, have been revised via other modifications such as Modification Nos. 30 and 31; however, these unrelated changes may not be reflected on the enclosed drawings. Foster Wheeler Envirespons, Inc. (FWEI) is to disregard the work that is unrelated to Modification No. 32 when preparing a proposal for this modification;

2. The plant drain pipe profile that is shown on drawing Z-46 is being revised because it identifies the deleted Tank T-102 in the profile. The revised drawing will be transmitted to FWEI in the near future;

3. The ground water equilization pumps, P-101A and B, were inadvertently deleted on drawing Z-57. FWEI is directed to disregard this deletion and to provide P-101A and B in accordance with the Contract; and

4. Consistent with drawing Z-55, delete disconnect switch DS-30 that is scheduled on drawing Z-63 for the Tank T-102 blower.

9408-185

O'Brien & Gere Engineers, Inc., an O'Brien & Gere Company
5000 Brittonfield Parkway / P.O. Box 4873 / Syracuse, NY 13221 / (315) 437-6100 FAX (315) 463-7554
and offices in major U.S. cities

The enclosed modification fulfills O'Brien & Gere's obligations to FWEI, as outlined in the O'Brien & Gere letter dated 8/11/94. As FWEI was informed in the aforementioned letter, a stop work order will not be issued relative to Change Notice No. 52 because such an order is neither appropriate nor necessary for work that is deleted from the Contract. Please consider the above to be O'Brien & Gere's formal response to FWEI letter No. 1112 dated 8/18/94.

As discussed in O'Brien & Gere's 8/11/94 letter, O'Brien & Gere wishes to schedule a meeting with FWEI during the week of 8/22/94 to review the scope of the modification, as well as FWEI's efforts to prepare a cost proposal. Please advise me of an acceptable date for this meeting at your earliest convenience.

Should you have any further questions regarding this matter, please contact the undersigned.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Wayne G. Hoagland, P.E.
Resident Project Representative
cc: Site - NJDEP
D. Prince - NJDEP
R. Bowers - O'Brien & Gere
P. McMaster - O'Brien & Gere

fwl184.wp/cjk

COMBE FILL SOUTH SUPERFUND SITE August 17, 1994
Modification No. 32

The technical scope of this modification is described below together with modification Drawings Z-45 through Z-66, identified on the attached list.

The landfill gas and condensate collection and treatment systems and related equipment, as shown and specified in the Contract Documents, shall be deleted and modified as follows:

1. **DELETE ALL:**
   - 4", 6" and 8" gas extraction piping
   - 4" gravity condensate piping
   - 3" condensate force main piping
   - 3 - condensate collection manholes
   - 2 - gravity condensate collection manholes
   - 1 - condensate drain clean-out including the fiberglass marker and sign
   - 5 - gas piping access manholes

   as shown on Drawings 3, 6 through 20, G-1 (Z-45), M-2 (Z-47), M-3 (Z-48), M-7 (Z-49), M-10 (Z-50), E-1 (Z-53), E-7 (Z-58), E-10, E-12 (Z-56), E-18 (Z-62), HV-5, P-1 (Z-17) and any other drawings where this piping or manholes are shown. Included is deletion of all associated excavation, spoil disposal, backfill, compaction, Type F select fill, concrete structures, valves, fittings, manhole steps and frames and covers.

2. **DELETE**, in its entirety, the Multiple Gas Header Condensate Collection Vault including all associated excavation, spoil disposal, backfill, compaction, Type F select fill, concrete structure, piping, fittings, valves, 4" drain pipe between the Multiple Gas Header Condensate Collection Vault and Condensate Pump Station No. 2, manhole steps and three 36"x36" hinged aluminum access doors. This deletion applies to Drawings 3, 10, 19 and any other drawings where this collection vault is shown.

3. **DELETE**, in its entirety, Condensate Pump Station No. 1 and associated valve structure, including all associated excavation, spoil disposal, backfill, compaction, Type F select fill, concrete structures, piping, fittings, valves, couplings, supports, floor drain, submersible pumps, power and control circuits (including control panel), manhole steps, 30"x48" double-leaf aluminum access door and 36"x36" hinged access door. This deletion applies to Drawings 3, 19, 20, E-1 (Z-53), E-3 (Z-55), E-17 (Z-61), E-18 (Z-62) and any other drawings where this pump station is shown.

4. **DELETE**, in its entirety, Condensate Pump Station No. 2 and associated valve structure including all associated excavation, spoil disposal, backfill, compaction, Type F select fill, concrete structures, piping, fittings, valves, couplings, supports, floor drain, submersible pumps, power and control circuits, manhole steps, 30"x48" double-leaf aluminum access door and 36"x36" hinged access door. This deletion applies to Drawings 3, 10, 19, 20, G-2 (Z-46), M-2 (Z-47), E-1 (Z-53), E-3 (Z-55), E-7 (Z-58), E-17 (Z-61), E-18 (Z-62) and any other drawings where this pump station is shown.

5. **DELETE** the Landfill Gas Condensate Equalization Tank and associated equipment (T-102); the Landfill Gas Condensate Equalization Pumps (P-102A and P-102B) and associated piping fittings and valves; all landfill gas condensate piping and fittings, tank drain piping, and modify outside piping to remain, as shown and noted on Drawings Z-45 and Z-46, including all associated excavation, spoil disposal, backfill, compaction, foundations, pads and supports. Further included is deletion of all power and controls to T-102, P-102 A/B and associated equipment. Note that the connection on the Inclined Plate Settler unit, specification Section 13409, to accept landfill gas condensate is no longer required and contractor shall coordinate with the unit manufacturer to delete or plug this connection. This deletion applies to Drawings 3, 11, 14, A-1, A-5 (Z-66), M-2 (Z-47), M-3 (Z-48), M-7 (Z-49),M-9, M-11, E-1 (Z-53), E-2 (Z-54), E-3 (Z-55), E-4 (Z-56), E-6 (Z-57), E-12 (Z-59), E-16 (Z-60), E-19 (Z-63), E-20 (Z-64), HV-2, HV-4 (AD-2), P-1 (Z-17) and any other drawing where the tank or associated equipment is shown. Included is the deletion of 17'-0" of catwalk structure located above Tank T-102. The access ladder, originally located at the end of the catwalk system shall be relocated as shown on Drawing Z-66. This change shall also be noted on drawings G1, A1 (Z-19), M-7 (Z-42), M-11, E-1, E-2, E-6, P-1 (Z-17) and any other drawings where the catwalk or associated structures are shown.

6. **DELETE** from all air valve manholes the embedded 3" condensate force main pipe and tee, and the connected combination air release and vacuum valve. This deletion applies to Drawings 7, 11 through 13, 23, 24 and any other drawings where the air valve manholes are shown.

7. **DELETE** all piping, fittings, valves and equipment associated with landfill gas treatment, including all associated supports, wall and roof penetrations, equipment pads, power and controls, as shown and noted on Drawing Z-50. Included is the deletion of the landfill gas exhausters and enclosed flare. This deletion also applies to Drawing G-1 (Z-45), M-7 (Z-49), E-2 (Z-54), E-3 (Z-55), E-4 (Z-56), E-6 (Z-57), E-7 (Z-58), E-10, HV-5, P-1 (Z-17) and any other drawings where gas treatment equipment is shown.

8. **DELETE** all 2" and 4" condensate drain piping, fittings and valves in the interior of the Gas Extraction Building, as shown on Drawing Z-47, to Condensate Pump Station No. 2. This deletion also applies to Drawing E-6 (Z-57), E-7 (Z-58), E-10, HV-5, P-1 (Z-17) and any other drawings where gas treatment equipment is shown.

9. **MODIFY** all Gas Extraction Wells, as shown and noted on Drawing Z-51.

10. **FURNISH AND INSTALL** the Plant Drainage Pump Station and the Plant Drainage Pump Station Force Main; and connect these facilities to the piping contained in the original contract, all as shown and noted on Drawings Z-45 through Z-49 and Z-52, including extension of the 3" HDPE (underground)/DI (above ground) drain line to T-101. Also, modify specification section 11300, 1.03D and E, deleting the original pump characteristics and substituting the required characteristics of the Plant Drainage Pump Station submersible pumps as follows:

D. Design Criteria:

1. Plant Drainage Pump Station -

a. Pumps — Submersible

Type Water	Process Drainage
Number	2
Size	3" Discharge
Service	Heavy Duty
Impeller	S.S.
Max. Sphere	1.77"

b. Motor

Type	Submersible
Max. Hp	3
Rated Speed	3480
Power	230V, 60Hz, 3pH
Service Factor	1.25
Insulation	Class F

E. Design Operating Point:

Flow	100 GPM
Head	38.5 Feet

This change also applies to Drawings 3, 11, M-7 (Z-49), M-11, E-1 (Z-53) E-2 (Z-54), E-3 (Z-55), E-17 (Z-61), E-18 (Z-62) and any other drawings where the location of the plant drainage pump station is shown.

11. **DELETE** the 4" HDPE natural gas line and 4" ball valve with valve box from Parker Road to the Process Equipment Building and Gas Extraction Building, as shown on Drawings 11A, 14A, and G-1 (Z-45). **FURNISH AND INSTALL**, on the same line and grade, a 2" HDPE natural gas line and 2" ball valve with valve box from Parker Road to the Process Equipment Building. Also, **DELETE** the 1" gas line from the Process Equipment Building to the Gas Extraction Building, as shown on M-7 (Z-49). (Note that gas lines to the enclosed flare from the gas extraction building were deleted by Addendum No. 2)

12. **DELETE** the 4" incoming gas main as shown on the Gas Meter Detail on Drawing P-1 (Z-17). **FURNISH AND INSTALL**, on the same line and grade, a 2" incoming gas main.

13. **DELETE** in its entirety, exhaust fan EF-8, added by Addendum 4, E18.b and as shown on Drawing HV-5. Also, **DELETE**, in its entirety, the control circuit wiring and equipment associated with EF-8 as shown on the EF-8 Wiring Diagram on Drawing HV-8/AD-3.

14. **DELETE** and **MODIFY** the electrical and control system as shown and noted on Drawings Z-53 through Z-65.

15. **DELETE** the gas monitoring / detection equipment located in the Gas Extraction Building, including control panel and all associated conduit and wiring, as shown on Drawings M-10 (Z-50), E-4/Z-12 (Z-56), E-7 (Z-58), HV-5 and any other drawings where this equipment is shown.

Combe Fill South Landfill
Modification No. 32
Drawing List

Drawing Number	Drawing Name
Z-45 (G-1)	Ground Water Treatment Facility Site Plan
Z-46 (G-2)	Miscellaneous Details
Z-47 (M-2)	Process Flow Schematic
Z-48 (M-3)	Equalization and Metals Removal Flow Diagram
Z-49 (M-7)	Ground Water Treatment Facility Outside Piping Plan
Z-50 (M-10)	Gas Extraction Building Plan Section and Details
Z-51 (18)	Gas Extraction Well Modified Layout
Z-52 (19)	Plant Drainage Pump Station
Z-53 (E-1)	Site Plan
Z-54 (E-2)	Groundwater Treatment Facility Partial Site Plan
Z-55 (E-3)	Power Distribution One Line Diagram
Z-56 (E-4)	Power Schedules
Z-57 (E-6)	Power & Control Process Equipment Building
Z-58 (E-7)	Process Equipment Building and Gas Extraction Building Partial Plan
Z-59 (E-12)	Equalization & Metals Removal P&ID
Z-60 (E-16)	Electrical Details
Z-61 (E-17)	Details & Wire Diagram
Z-62 (E-18)	Electrical Details
Z-63 (E-19)	Electrical Details
Z-64 (E-20)	Elementary Details
Z-65 (Z-32)	Layouts & Panel Schedules
Z-66 (A-5)	Process Equipment Building Roof Plan

FILE 2.8/2 4 / CN52
Tim Laucher R Bowers
O Toft R Hall
G Schaffer S Saraceni

O'BRIEN & GERE

Transmittal

5000 Brittonfield Parkway / PO Box 4873 / Syracuse, NY 13221 / (315) 437-6100 FAX (315) 463-7554

RECEIVED
APR 1 2 1995
ENVIRESPONSE

To: Foster Wheeler Enviresponse, Inc.
PO Box 504
Chester, NJ 07930

Attention: Mr. Richard A. Hall, P.E.

Date: 4/12/95

File: 3013.015.603

Re: Combe Fill South Landfill

Gentlemen: We are sending you __X__ herewith ______ under separate cover

______ drawings __X__ descriptive literature ______ letters

Quan	Identifying Number	Title	Action*
		Revised Credit Calculation for CN #52 to be substituted for	I
		one transmitted on 3/23/95	
		(The change in PI 61 & 62 is related to significant digits	
		in percent completed)	

*Action lettercode: R-reviewed N-reviewed and noted I-for your information
S-resubmit J-rejected Y-for your approval

Remarks

If material received is not as listed, please notify us at once.

cc Site - NJDEP
D. Prince - NJDEP
P. McMaster - O'Brien & Gere
R. Bowers - O'Brien & Gere

Very truly yours,
O'Brien & Gere Engineers, Inc

Wayne G. Hoagland, P.E.
Resident Project Representative

FOSTER 006 5083

REVISED CREDIT CALCULATION FOR CN 52 Revised: 04/12/95
Basis is the Unit Pricing and Subitem Breakdown of FWEI

Pay Item & Item No. (IF APPLICABLE)	Item Description	Item Cost	Percentage Completed	Total Payment	Total Reduction
Pay Item 31:	Gas Header Piping / Fittings:	$510,073.24	5.00%	$25,503.66	$484,569.58
Pay Item 32:	Condensate Collection System:	$217,838.49	5.00%	$10,891.92	$206,946.57
Pay Item 33:	LFG Treatment System:	See Below	5.00%	$0.00	$0.00
Item No. 27:	Flare System Equipment:	$342,212.00	5.00%	$17,110.60	$325,101.40
Item Nos. 28 - 31:	Landfill Gas Exhausters:	$105,296.00	5.00%	$5,264.80	$100,031.20
Item Nos. 37 - 42:	Pipe/Valves to/from Exhausters:	$236,914.00	5.00%	$11,845.70	$225,068.30
Item Nos. 64 - 77:	Electrical:	$128,613.00	85.00%	$109,321.05	$19,291.95
Pay Item 44:	GWTS:	See Below			
Item No. 2:	U/G Pipe to T-102:	$3,333.33	5.00%	$166.67	$3,166.66
Item No. 3:	Plant Drainage Pipe:	$3,333.33	5.00%	$166.67	$3,166.66
Item No. 22:	Skimmer Piping @ T-102:	$5,245.00	5.00%	$262.25	$4,982.75
Item No. 74:	SBR System - Tanks - T-102:	$26,220.00	5.00%	$1,311.00	$24,909.00
Item Nos. 81, 86, 91:	T-102 Concrete Work:	$16,651.00	5.00%	$832.55	$15,818.45
Item No. 119:	Trim T-102:	$10,488.00	5.00%	$524.40	$9,963.60
Item No. 122:	Catwalk T-102:	$10,488.00	5.00%	$524.40	$9,963.60
Item No. 125:	Submersible Mixer:	$10,488.00	5.00%	$524.40	$9,963.60
Item No. 130:	Floating Skimmer:	$26,000.00	5.00%	$1,300.00	$24,700.00
Item Nos. 143, 144:	Pumps: P-102 A/B:	$9,198.00	5.00%	$459.90	$8,738.10
Pay Item 61:	O&M yr 1	$982,186.22	94.81%	$931,218.28	$50,967.94
Pay Item 62:	O&M yr 2	$982,186.22	94.81%	$931,218.28	$50,967.94
	Subtotal	**$3,626,763.83**		**$2,048,446.53**	**$1,578,317.30**

FOSTER 006 5084