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Tracer Research Corporation



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**SHALLOW SOIL GAS INVESTIGATION
MILLER BREWING
FULTON CONTAINER PLANT**

FULTON, NEW YORK

OCTOBER 1990

SUBMITTED BY:

Kaufman
Tracer Research Corporation

**774BREW.MSG
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INTRODUCTION

A shallow soil gas investigation was performed by Tracer Research Corporation (TRC) at the Miller Brewing Fulton Container Plant located in Fulton, New York. The investigation was conducted September 24-28, 1990 and October 2-5, 1990 under contract to Malcolm Pirnie, Inc. The purpose of the investigation was to delineate the extent of possible contamination in the subsurface.

During this survey, a total of 125 soil gas samples were collected and analyzed. Samples were analyzed for volatile organic compounds from the following suite:

<u>COMPOUND</u>	<u>DETECTOR</u>
1,1-dichloroethene (1,1-DCE)	ECD
methylene chloride (CH_2Cl_2)	ECD
1,1-dichloroethane (1,1-DCA)	ECD
chloroform (CHCl_3)	ECD
1,1,1-trichloroethane (TCA)	ECD
carbon tetrachloride (CCl_4)	ECD
trichloroethene (TCE)	ECD
tetrachloroethene (PCE)	ECD
benzene	FID
toluene	FID
ethylbenzene	FID
xylenes	FID
total hydrocarbons (TPHC)	FID

Xylenes are reported as the total of the three xylene isomers. Total hydrocarbons are reported as gasoline range compounds consisting of approximately C₄-C₉ aliphatic, alicyclic, and aromatic compounds.

The compounds in this suite were chosen as target compounds because of their suspected presence in the subsurface and amenability to soil gas technology. Soil gas samples were screened on a gas chromatograph equipped with an electron capture detector (ECD) and a flame ionization detector (FID).



SHALLOW SOIL GAS INVESTIGATION - METHODOLOGY

Shallow soil gas investigation refers to a method developed by TRC for investigating underground contamination from volatile organic chemicals (VOCs) such as industrial solvents, cleaning fluids and petroleum products by looking for their vapors in the shallow soil gas. The method involves pumping a small amount of soil gas out of the ground through a hollow probe driven into the ground and analyzing the gas for the presence of volatile contaminants. The presence of VOCs in shallow soil gas indicates the observed compounds may either be in the vadose zone near the probe or in groundwater below the probe. The soil gas technology is most effective in mapping low molecular weight halogenated solvent chemicals and petroleum hydrocarbons possessing high vapor pressures and low aqueous solubilities. These compounds readily partition out of the groundwater and into the soil gas as a result of their high gas/liquid partitioning coefficients. Once in the soil gas, VOCs diffuse vertically and horizontally through the soil to the ground surface where they dissipate into the atmosphere. The contamination acts as a source and the above ground atmosphere acts as a sink, and typically a concentration gradient develops between the two. The concentration gradient in soil gas between the source and ground surface may be locally distorted by hydrologic and geologic anomalies (e.g. clays, perched water); however, soil gas mapping generally remains effective because distribution of the contamination is usually broader in areal extent than the local geologic barriers and is defined using a large database. The presence of geologic obstructions on a small scale tends to create anomalies in the soil gas-groundwater correlation, but generally does not obscure the broader areal picture of the contaminant distribution.

Soil gas contaminant mapping helps to reduce the time and cost required to delineate underground contamination by volatile contaminants. The soil gas investigation does this by outlining the general areal extent of contamination. Conventional bore holes or observation wells are used to verify both the presence and extent of the subsurface



contamination as indicated in the soil gas survey. In this manner, soil gas contaminant mapping can assist in determining the placement of monitoring wells. Thus the likelihood of drilling unnecessary monitoring wells is reduced. The soil gas survey is not intended to be substitute for conventional methodology, but rather to enable conventional methods to be used efficiently.

EQUIPMENT

Tracer Research Corporation utilized a one ton Ford analytical van that was equipped with one gas chromatograph and two Spectra Physics computing integrators. In addition, the van had two built-in gasoline powered generators that provide the electrical power (110 volts AC) to operate all of the gas chromatographic instruments and field equipment. A specialized hydraulic mechanism consisting of two cylinders and a set of jaws was used to drive and withdraw the sampling probes. A hydraulic hammer was used to assist in driving probes past cobbles and through unusually hard soil.

SOIL GAS SAMPLING PROCEDURES

Sampling probes consisted of 7-14 foot lengths of 3/4 inch diameter hollow steel pipe that were fitted with detachable drive tips. Soil gas probes were advanced 4-14 feet below grade. Once inserted into the ground, the above-ground end of the sampling probes were fitted with a steel reducer and a length of polyethylene tubing leading to a vacuum pump. Gas flow was monitored by a vacuum gauge to insure that an adequate flow was obtained.

To adequately purge the volume of air within the probe, 2 to 5 liters of gas was evacuated with a vacuum pump. During the soil gas evacuation, samples were collected in a glass syringe by inserting a syringe needle through a silicone rubber segment in the evacuation line and down into the steel probe. Ten milliliters of gas were collected for immediate analysis in the TRC analytical field van. Soil gas was subsampled (duplicate



injections) in volumes ranging from 1 μL to 2 mL, depending on the VOC concentration at any particular location.

Sample probe vacuums ranged from 1-15 inches Hg. The maximum pump vacuum was measured at 25 inches Hg.

ANALYTICAL PROCEDURES

A Varian 3300 gas chromatograph was used for the soil gas analyses. It was equipped with an electron capture detector (ECD) and a flame ionization detector (FID). Compounds were separated on a 3' or 6' by 1/8" OD packed column with OV-101 as the stationary phase in a temperature controlled oven. Nitrogen was used as the carrier gas.

Halocarbon and hydrocarbon compounds detected in the samples were identified by chromatographic retention time. Quantification of compounds was achieved by comparison of the detector response of the sample with the response measured for calibration standards (external standardization). Instrument calibration checks were run periodically throughout the day and system blanks were run at the beginning of the day to check for contamination in the soil gas sampling equipment. Air samples were also routinely analyzed to check for background levels in the atmosphere.

Detection limits for the compounds of interest were a function of the injection volume as well as the detector sensitivity for individual compounds. Thus the detection limit varied with the sample size. Generally, the larger the injection size the greater the sensitivity. However, peaks for compounds of interest were kept within the linear range of the analytical equipment. If any compound had a high concentration, it was necessary to use small injections, and in some cases to dilute the sample to keep it within linear range. This may have caused decreased detection limits for other compounds in the analyses.

The detection limits for the halocarbon compounds were approximately 0.0002 ug/L. The detection limits for the hydrocarbon compounds were approximately 0.08 ug/L.



Detection limits were dependant upon the conditions of the measurement, in particular, the sample size. If any component being analyzed was not detected, the detection limit for that compound in that analysis is given as a "less than" value (e.g. < 0.1 ug/L). Detection limits obtained from GC analyses were calculated from the current response factor, the sample size, and the estimated minimum peak size (area) that would have been visible under the conditions of the measurement.

QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Tracer Research Corporation's normal quality assurance procedures were followed in order to prevent any cross-contamination of soil gas samples. These procedures are described below:

- . Steel probes are used only once during the day and then washed with high pressure soap and hot water spray or steam-cleaned to eliminate the possibility of cross-contamination. Enough probes are carried on each van to avoid the need to reuse any during the day.
- . Probe adaptors (TRC's patented design) are used to connect the sample probe to the vacuum pump. The adaptor is designed to eliminate the possibility of exposing the sample stream to any part of the adaptor. Associated tubing connecting the adaptor to the vacuum pump is replaced periodically as needed during the job to insure cleanliness and good fit. At the end of each day the adaptor is cleaned with soap and water and baked in the GC oven.
- . Silicone tubing (which acts as a septum for the syringe needle) is replaced as needed to insure proper sealing around the syringe needle. This tubing does not directly contact soil gas samples.



- Glass syringes are usually used for only one sample per day and are washed and baked out at night. If they must be used twice, they are purged with carrier gas (nitrogen) and baked out between probe samplings.
- Injector port septa through which soil gas samples are injected into the chromatograph are replaced on a daily basis to prevent possible gas leaks from the chromatographic column.
- Analytical instruments are calibrated each day by analytical standards from Chem Service, Inc. Calibration checks are also run after approximately every five soil gas sampling locations.
- Subsampling syringes are checked for contamination prior to sampling each day by injecting nitrogen carrier gas into the gas chromatograph.
- Prior to sampling each day, system blanks are run to check the sampling apparatus (probe, adaptor, 10 cc syringe) for contamination by drawing ambient air from above ground through the system and comparing the analysis to concurrently sampled ambient air analysis.
- All sampling and subsampling syringes are decontaminated each day and no such equipment is reused before being decontaminated each day and no such equipment is reused before being decontaminated. Microliter size subsampling syringes are reused only after a nitrogen carrier gas blank is run to insure it is not contaminated by the previous sample.
- Soil gas pumping is monitored by a vacuum gauge to insure that an adequate gas flow from the vadose zone is maintained. A reliable gas sample can be obtained if the sample vacuum gauge reading is at least 2 inches Hg less than the maximum pump vacuum.



RESULTS

A total of 125 soil gas samples were collected and analyzed in the field. Analytical data is condensed in Appendix A. Isoconcentration contour maps with sampling locations and compound concentrations (Figures 1-12) are attached. Figure 1 is a map showing the sampling locations.

Ambient air samples were collected during the course of the investigation to help evaluate the level of significance for the selected VOC's. The level of significance is simply the level above which concentrations are considered to be significant in terms of groundwater or soil contamination. TCA, CCl₄, TCE, and PCE were detected in the ambient air samples. Concentrations ranged from 0.0004 to 0.002 ug/L for TCA, 0.0002 to 0.0007 ug/L for CCl₄, and 0.0001 to 0.0008 ug/L for PCE. TCE was only detected once at a concentration of 0.0002 ug/L. The level of significance for each target compound is based on several factors; concentrations in ambient air, background levels, and TRC's past experience. Based on the evaluation of these factors, the level of significance for the selected target compounds was determined to be approximately 0.1 ug/L for hydrocarbons and 0.01 ug/L for halocarbons. In other words, soil gas concentrations of benzene, toluene, ethylbenzene, xylenes and TPHC greater than 0.1 ug/L may indicate possible VOC contamination in the vicinity.

This third phase of the soil gas investigation was performed in the area bounded by Route 57 and the two entrances to the Fulton Container Plant. Isolated concentrations of toluene, TPHC, methylene chloride, TCA, and TCE were detected in the survey area.

Elevated concentrations TPHC, TCA, and PCE were also detected around storm sewer sampling location WS-5 from phase 2. TPHC concentrations were detected at sampling locations SG-316 (2 ug/L), SG-244B (10 ug/L), and SG-244 (62 ug/L). TCA concentrations detected at several sampling locations ranged from 0.1 to 0.8 ug/L. PCE concentrations detected around WS-5 ranged from 0.2 at several locations to 510 ug/L at



SG-244. Sampling locations SG-244-249 were resampled due to the possibility of PCE contamination in the GC system. The resampled concentrations ranged from non-detect (<0.0001 ug/L) to 78 ug/L at SG-244. The PCE isoconcentration map (Figure 12) indicates that the plume extends south to SG-247, however, it is more likely that the plume doesn't extend past SG-249 as indicated by the resampled concentrations. The isoconcentration contours for TPHC, TCA, and PCE were connected with those drawn during the phase 2 investigation.

CONCLUSIONS

Significant concentrations of toluene, TPHC, CH_2Cl_2 , TCA, TCE, and PCE were detected in the soil gas in the phase 3 survey area. The isoconcentration contours for TPHC, TCA, and PCE indicate a possible source area, for subsurface contamination, near the elbow of the storm sewer line where turns to it parallel Route 57. Further investigations are needed to better determine the source of subsurface contamination.



APPENDIX A: ANALYTICAL DATA

MALCOLM PIRNIE/MILLER BREWING FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-774-S

09-24-90

CONDENSED DATA

SAMPLE	CH2Cl2	1,1-DCE	1,1-DCA	CHCl3	TCA	CCl4	TCE	PCE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES	TPH
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
AIR	<0.01	<0.005	<0.02	<0.0005	0.002	0.0007	<0.0004	<0.0003	<0.09	<0.07	<0.07	<0.07	<0.3
SG-244-6'	<0.01	0.005	<0.02	0.004	0.7	<0.04	0.5	510	<0.09	<0.07	<0.07	<0.07	62
SG-245-5'	<0.01	<0.005	<0.02	<0.0005	0.01	0.00009	0.003	0.2	<0.09	<0.07	<0.07	<0.07	<0.3
SG-246-6'	<0.3	<0.1	<0.3	<0.009	<0.003	<0.0009	<0.009	0.5	<0.09	<0.07	<0.07	<0.07	<0.3
SG-247-6'	<0.3	<0.1	<0.3	<0.009	<0.003	<0.0009	<0.009	2	<0.09	<0.07	<0.07	<0.07	<0.3
SG-248-6'	<0.3	<0.1	<0.3	<0.009	0.01	<0.0009	<0.009	2	<0.09	<0.07	<0.07	<0.07	<0.3
SG-249-6'	<0.01	<0.005	<0.02	<0.0005	0.02	0.0001	<0.0004	0.2	<0.09	<0.07	<0.07	<0.07	<0.3
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09-25-90													
AIR	<0.02	N/A	N/A	<0.0004	0.0006	0.0004	<0.0004	<0.0001	<0.04	<0.03	<0.03	<0.03	<0.1
SG-244B-6'	<18	N/A	N/A	<0.4	1	<0.03	<0.4	78	<0.04	<0.03	<0.03	<0.03	10
SG-250-6'	<0.02	N/A	N/A	<0.0004	0.0006	0.0004	<0.0004	0.0002	<0.04	<0.03	<0.03	<0.03	<0.1
SG-251-6'	<0.02	N/A	N/A	<0.0004	0.001	0.0001	<0.0004	0.0009	<0.04	<0.03	<0.03	<0.03	<0.1
SG-252-6'	<0.02	N/A	N/A	<0.0004	0.1	0.0002	<0.0004	<0.0001	<0.04	<0.03	<0.03	<0.03	<0.1
SG-253-13.5'	<0.02	N/A	N/A	<0.0004	0.6	<0.0002	<0.0004	0.0003	<0.04	<0.03	<0.03	<0.03	<0.1

N/A: not analyzed

Analyzed by: S. Cherba

Checked by: K. Ptak

Proofed by: K. Ptak

MALCOLM PIRNIE/MILLER BREWING FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-774-S

09-25-90

CONDENSED DATA

SAMPLE	CH2Cl2 ug/l	CHCl3 ug/l	TCA ug/l	CCl4 ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES ug/l	TPHC ug/l
SG-253-6'	<0.009	<0.0003	0.02	0.00003	<0.0003	<0.0002	<0.04	<0.03	<0.03	<0.03	<0.1
SG-253-13.5'	<0.009	<0.0003	0.1	<0.0001	<0.0003	<0.0002	<0.04	<0.03	<0.03	<0.03	<0.1
SG-254-6'	<0.009	<0.0003	0.001	0.00003	<0.0003	<0.0002	<0.04	<0.03	<0.03	<0.03	<0.1
SG-254-13.5'	<0.009	<0.0003	0.001	0.00008	<0.0003	<0.0002	<0.04	<0.03	<0.03	<0.03	<0.1
SG-255-6'	<0.009	<0.0003	0.0006	0.0001	<0.0003	<0.0002	<0.04	<0.03	<0.03	<0.03	<0.1
SG-255-12'	<0.009	<0.0003	0.002	0.0002	<0.0003	<0.0002	<0.04	<0.03	<0.03	<0.03	<0.1
SG-256-6.5'	<0.009	<0.0003	0.0008	0.0002	<0.0003	<0.0002	<0.04	<0.03	<0.03	<0.03	<0.1
SG-256-13.5'	<0.02	<0.0008	0.002	0.0004	0.002	<0.0002	<0.04	<0.03	<0.03	<0.03	<0.1
SG-257-6'	<0.02	<0.0008	0.0008	0.0002	0.0006	0.0004	<0.04	<0.03	<0.03	<0.03	<0.1
SG-257-13.5'	<0.02	<0.0008	0.0009	0.0004	<0.0006	0.0005	<0.04	<0.03	<0.03	<0.03	<0.1
AIR	<0.02	<0.0008	0.0008	0.0006	<0.0006	0.0002	<0.04	<0.03	<0.03	<0.03	<0.1

Analyzed by: S. Cherba

Checked by: K. Ptak

Proofed by: K. Ptak

MALCOLM PIRNIE/MILLER BREWING FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-774-S

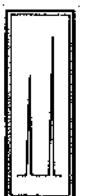
09-26-90

CONDENSED DATA

SAMPLE	CH2CL2 ug/l	CHCl3 ug/l	TCA ug/l	CCl4 ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES ug/l	TPHC ug/l
AIR	<0.03	<0.0008	0.0009	0.0006	<0.0007	0.0002	<0.1	<0.09	<0.1	<0.1	<0.4
SG-258-6'	<0.04	0.0003	0.002	0.0003	<0.0002	0.0004	<0.1	<0.09	<0.1	<0.1	<0.4
SG-258-13.5'	<0.04	0.0003	0.003	0.0004	<0.0002	0.0004	<0.1	<0.09	<0.1	<0.1	<0.4
SG-259-13.5'	<0.04	<0.0006	0.1	0.0003	<0.0002	0.0006	<0.1	<0.09	<0.1	<0.1	<0.4
SG-260-13.5'	<0.04	<0.0006	0.02	0.0001	<0.0002	0.0004	<0.1	<0.09	<0.1	<0.1	<0.4
SG-261-6'	<0.04	<0.0006	0.002	0.0002	<0.0002	0.0004	<0.1	<0.09	<0.1	<0.1	<0.4
SG-262-6'	<0.04	<0.0006	0.0008	0.0001	<0.0002	0.0004	<0.1	<0.09	<0.1	<0.1	<0.4
SG-263-6'	<0.04	<0.0006	0.0009	0.0001	<0.0002	0.0004	<0.07	<0.05	<0.05	<0.05	<0.2
SG-264-5'	<0.04	<0.0006	0.001	0.0006	<0.0002	0.0006	<0.07	<0.05	<0.05	<0.05	<0.2
SG-265-6'	<0.04	0.0006	0.001	0.0001	0.0008	0.0006	<0.07	<0.05	<0.05	<0.05	<0.2
SG-266-6'	<0.04	0.06	0.006	0.0004	0.0005	0.002	<0.07	<0.05	<0.05	<0.05	<0.2
SG-267-5'	<0.04	<0.0006	0.003	0.0005	<0.0002	0.0008	<0.07	<0.05	<0.05	<0.05	<0.2
SG-267-11'	<0.04	<0.0006	0.07	0.0003	<0.0002	0.0003	<0.07	<0.05	<0.05	<0.05	<0.2
SG-268-4.5'	<0.04	<0.0006	0.0002	0.0004	<0.0002	0.002	<0.07	<0.05	<0.05	<0.05	<0.2
SG-269-6'	<0.04	0.0005	0.003	0.0002	<0.0002	0.0004	<0.07	<0.05	<0.05	<0.05	<0.2
SG-269-13.5'	<0.04	0.001	0.08	0.0002	<0.0002	0.0002	<0.07	<0.05	<0.05	<0.05	<0.2
SG-270-6'	<0.04	<0.0006	0.001	0.0004	<0.0002	0.0002	<0.07	<0.05	<0.05	<0.05	<0.2
SG-271-5.5'	<0.04	0.0004	0.0008	0.0002	<0.0002	0.0008	<0.07	<0.05	<0.05	<0.05	<0.2
SG-272-5.5'	<0.04	<0.0006	0.0008	0.0002	0.0003	0.0004	<0.07	<0.05	<0.05	<0.05	<0.2
SG-273-6'	<0.04	<0.0006	0.0006	0.0002	<0.0002	0.0004	<0.07	<0.05	<0.05	<0.05	<0.2
SG-274-6'	<0.04	<0.0006	0.002	0.0002	<0.0002	0.0002	<0.07	<0.05	<0.05	<0.05	<0.2
SG-274-13.5'	<0.04	<0.0006	0.002	0.0002	<0.0002	<0.0002	<0.07	<0.05	<0.05	<0.05	<0.2
SG-275-13.5'	<0.04	<0.0006	0.002	0.0004	<0.0002	0.0003	<0.07	<0.05	<0.05	<0.05	<0.2
AIR	<0.04	<0.0006	0.0008	0.0005	<0.0002	<0.0002	<0.07	<0.05	<0.05	<0.05	<0.2

Analyzed by: S. Cherba

Checked by: K. Ptak

Proofed by: K. Ptak

MALCOLM PIRNIE/MILLER BREWING FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-774-S

09-27-90

CONDENSED DATA

SAMPLE	CH ₂ Cl ₂ ug/l	CHCl ₃ ug/l	TCA ug/l	CCl ₄ ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES ug/l	TPHC ug/l
AIR	<0.03	<0.0002	0.002	0.0006	<0.0002	0.0004	<0.08	<0.06	<0.05	<0.06	<0.2
SG-276-13.5'	<0.03	<0.0002	0.002	0.0004	<0.0001	0.0003	<0.08	<0.06	<0.05	<0.06	<0.2
SG-277-13.5'	<0.03	<0.0002	0.001	0.0007	<0.0001	0.0002	<0.08	<0.06	<0.05	<0.06	<0.2
SG-278-13.5'	<0.03	<0.0002	0.003	0.0002	<0.0001	0.0006	<0.08	<0.06	<0.05	<0.06	<0.2
SG-279-6'	<0.03	<0.0002	0.002	0.0002	<0.0001	0.0004	<0.08	<0.06	<0.05	<0.06	<0.2
SG-279-13.5'	<0.03	<0.0002	0.004	0.0008	<0.0001	0.0009	<0.08	<0.06	<0.05	<0.06	<0.2
SG-280-6'	<0.1	<0.0006	0.002	0.0004	0.0004	0.001	<0.08	<0.06	<0.05	<0.06	<0.2
SG-280-13.5'	<0.1	<0.0006	0.004	0.002	0.0001	0.0004	<0.08	<0.06	<0.05	<0.06	<0.2
SG-281-13.5'	<0.1	<0.0002	0.002	0.001	<0.0001	0.0005	<0.08	<0.06	<0.05	<0.06	<0.2
SG-282-13.5'	<0.1	0.0006	0.1	0.0002	0.0004	0.0002	<0.08	<0.06	<0.05	<0.06	<0.2
SG-283-13.5'	<0.1	0.0007	0.001	0.0003	<0.0002	0.0004	<0.08	<0.06	<0.05	<0.06	<0.2
AIR	<0.1	<0.0006	0.002	0.0005	<0.0001	0.0006	<0.08	<0.06	<0.05	<0.06	<0.2
SG-284-13.5'	<0.1	<0.0005	0.001	0.0002	<0.0001	0.0002	<0.08	<0.06	<0.05	<0.06	<0.2
SG-285-6'	<0.07	<0.0004	0.001	0.0002	<0.0001	0.0004	<0.08	<0.06	<0.05	<0.06	<0.2
SG-286-6'	<0.07	<0.0006	0.001	0.0002	<0.0002	0.0004	<0.08	<0.06	<0.05	<0.06	<0.2
SG-287-6'	<0.07	<0.0002	0.0009	0.0001	<0.0002	0.0003	<0.08	<0.06	<0.05	<0.06	<0.2
SG-288-6'	<0.07	<0.0005	0.004	0.0002	0.0002	0.005	<0.08	<0.06	<0.05	<0.06	<0.2
SG-288-13.5'	<0.07	<0.0002	0.0008	0.0002	<0.0002	0.0003	<0.08	<0.06	<0.05	<0.06	<0.2
SG-289-13.5'	<0.07	<0.0002	0.001	0.0002	<0.0002	0.0002	<0.08	<0.06	<0.05	<0.06	<0.2
AIR	<0.08	<0.0002	0.001	0.0003	<0.0002	0.0004	<0.08	<0.06	<0.05	<0.06	<0.2

Analyzed by: S. Cherba

Checked by: K. Ptak

Proofed by: K. Ptak

MALCOLM PIRNIE/MILLER BREWING FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-774-S

09-28-90

CONDENSED DATA

SAMPLE	CH2Cl2 ug/l	CHCBr ug/l	TCA ug/l	CCl4 ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES ug/l	TPHC ug/l
AIR	<0.2	<0.0003	0.002	0.0006	0.0002	0.0008	<0.1	<0.07	<0.06	<0.06	<0.3
SG-290-13.5'	<0.2	<0.0005	0.002	0.0006	<0.0002	0.0005	<0.1	<0.07	<0.06	<0.06	<0.3
SG-291-13.5'	<0.2	0.006	0.002	0.001	<0.0002	0.001	<0.1	<0.07	<0.06	<0.06	<0.3
SG-292-13.5'	<0.2	<0.0005	0.004	0.002	0.0005	0.001	<0.1	<0.07	<0.06	<0.06	<0.3
SG-293-13'	<0.2	<0.0005	0.02	0.001	<0.0004	0.001	<0.1	<0.07	<0.06	<0.06	<0.3
AIR	<0.2	<0.0005	0.002	0.0005	<0.0004	0.0004	<0.1	<0.07	<0.06	<0.06	<0.3
SG-294-13'	<0.2	<0.0005	0.04	0.0004	<0.0002	0.0001	<0.1	<0.07	<0.06	<0.06	<0.3
SG-295-6'	<0.2	<0.0005	0.001	0.0002	<0.0002	0.0004	<0.1	<0.07	<0.06	<0.06	<0.3
SG-295-13.5'	<0.2	<0.0005	0.008	0.0009	<0.0002	0.0002	<0.1	<0.07	<0.06	<0.06	<0.3
SG-296-13.5'	<0.2	0.02	0.004	0.0008	0.2	0.002	<0.1	<0.07	<0.06	<0.06	<0.3
SG-297-13.5'	<0.2	0.001	0.002	0.0005	0.002	0.0004	<0.1	<0.07	<0.06	<0.06	<0.3
SG-298-5.5'	<0.2	<0.0005	0.0009	0.0001	0.0005	0.0004	<0.1	<0.07	<0.06	<0.06	<0.3
SG-298-13.5'	<0.2	<0.0005	0.003	0.0004	<0.0002	0.0002	<0.1	<0.07	<0.06	<0.06	<0.3
SG-299-5'	<0.2	<0.0005	0.001	0.0006	0.0002	0.0004	<0.1	<0.07	<0.06	<0.06	<0.3
SG-299-13.5'	<0.2	<0.0005	0.001	0.0002	<0.0002	0.0002	<0.1	<0.07	<0.06	<0.06	<0.3
SG-300-5'	<0.2	<0.0005	0.0008	0.00009	<0.0004	0.0005	<0.1	<0.07	<0.06	<0.06	<0.3
AIR	<0.2	<0.0005	0.001	0.0006	<0.0004	0.0004	<0.1	<0.07	<0.06	<0.06	<0.3

Analyzed by: S. Cherba

Checked by: K. Ptak

Proofed by: K. Ptak

MALCOLM PIRNIE/MILLER BREWING FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-774-S

10-02-90

CONDENSED DATA

SAMPLE	CH2CL2 ug/l	CHCl3 ug/l	TCA ug/l	CCl4 ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES ug/l	TPHC ug/l
AIR	<0.008	<0.0004	<0.0001	0.0003	<0.0002	<0.00005	<0.3	<0.2	<0.2	<0.2	<0.2
301-6'	<0.2	<0.0008	0.0008	0.0006	<0.0005	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
301-13.5'	<0.2	<0.0008	0.004	0.0004	<0.0005	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
302-14'	<0.2	<0.0008	0.004	0.0005	<0.0005	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
303-14'	<0.2	<0.0008	0.001	0.0002	<0.0005	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
304-14'	<0.2	0.03	0.006	0.0006	<0.0005	0.0003	<0.3	<0.2	<0.2	<0.2	<0.2
305-6'	<0.2	<0.0008	0.002	0.0002	<0.0005	0.0005	<0.3	<0.2	<0.2	<0.2	<0.2
305-14'	<0.2	<0.0008	0.004	0.0004	0.002	0.0009	<0.3	<0.2	<0.2	<0.2	<0.2
306-6'	<0.2	<0.0008	0.007	0.0002	<0.0005	0.0005	<0.3	<0.2	<0.2	<0.2	<0.2
306-14'	<0.2	<0.0008	0.01	0.0002	<0.0005	0.002	<0.3	<0.2	<0.2	<0.2	<0.2
307-6'	<0.2	<0.0004	0.03	0.0004	<0.0002	<0.00008	<0.3	0.5	<0.2	<0.2	0.5
307-14'	<0.2	<0.0008	0.2	<0.00005	<0.0005	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
308-7'	<0.2	<0.0008	0.001	0.0003	<0.0005	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
308-14'	0.3	<0.0008	0.002	0.0002	<0.0005	0.0005	<0.3	<0.2	<0.02	<0.2	<0.2
309-14'	0.4	<0.0008	0.006	0.0006	<0.0005	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
310-13'	<0.2	<0.0008	0.07	0.0003	<0.0005	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
AIR	<0.1	<0.0004	0.0008	0.0006	<0.0002	0.0001	<0.3	<0.2	<0.2	<0.2	<0.2

Analyzed by: J. Cook

Checked by: I. Harris

Proofed by: K. Luehrs

MALCOLM PIRNIE/MILLER BREWING FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-774-S

10-03-90

CONDENSED DATA

SAMPLE	CH2Cl2 ug/l	CHCl3 ug/l	TCA ug/l	CCl4 ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES ug/l	TPHC ug/l
AIR	<0.08	<0.0003	0.0009	0.0005	<0.0002	<0.00004	<0.3	<0.2	<0.2	<0.2	<0.2
311-7'	<0.2	<0.0006	0.02	0.0002	<0.0004	<0.00009	<0.3	<0.2	<0.2	<0.2	<0.2
312-6'	<0.2	<0.0006	0.04	0.0002	<0.0004	<0.00009	<0.3	<0.2	<0.2	<0.2	<0.2
313-10'	<0.2	<0.0003	0.02	0.0003	<0.0002	<0.00004	<0.3	<0.2	<0.2	<0.2	<0.2
314-7'	<0.2	<0.0006	0.001	0.0004	<0.0004	<0.00009	<0.3	<0.2	<0.2	<0.2	<0.2
314-13.5'	<0.2	<0.0006	0.002	0.0004	<0.0004	<0.00009	<0.3	<0.2	<0.2	<0.2	<0.2
305-20'	<0.3	<0.0004	0.001	0.0001	<0.0003	0.0002	<0.3	<0.2	<0.2	<0.2	<0.2

Analyzed by: J. Cook

Checked by: I. Harris

Proofed by: K. Lueess

MALCOLM PIRNIE/MILLER BREWING FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-774-S

10-04-90
CONDENSED DATA

SAMPLE	CH ₂ Cl ₂ ug/l	CHCl ₃ ug/l	TCA ug/l	CCl ₄ ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES ug/l	TPHC ug/l
AIR	<0.3	<0.0003	0.0004	0.0002	<0.0003	<0.00005	<0.3	<0.2	<0.2	<0.2	<0.2
315-12'	<0.3	<0.0007	0.002	0.0008	<0.0006	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
316-14'	<0.3	<0.0007	0.002	0.0006	<0.0006	<0.0001	0.8	<0.2	<0.2	<0.2	2.
317-14'	<0.3	<0.0007	0.04	<0.00004	<0.0006	0.004	<0.3	<0.2	<0.2	<0.2	<0.2
318-14'	<0.3	<0.0007	0.0002	0.0002	<0.0006	0.001	<0.3	<0.2	<0.2	<0.2	<0.2
319-6'	<0.3	<0.0007	0.0009	0.0008	<0.0006	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
319-14'	<1	<0.07	0.5	<0.005	<0.06	34	<0.3	<0.2	<0.2	<0.2	<0.2
320-14'	<0.3	<0.002	0.8	<0.0001	<0.001	0.4	<0.6	<0.4	<0.4	<0.4	<0.4
320-6'	<0.3	<0.002	0.04	0.0007	<0.001	0.1	<0.3	<0.2	<0.2	<0.2	<0.2
321-13'	<0.3	<0.0007	0.004	0.0004	<0.0006	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
322-7'	<0.3	<0.0007	0.02	0.0006	<0.0006	0.3	<0.3	<0.2	<0.2	<0.2	<0.2
323-14'	<0.3	<0.002	0.06	<0.0001	<0.001	0.4	<0.3	<0.2	<0.2	<0.2	<0.2
324-13'	<0.3	<0.002	0.02	<0.0001	<0.001	<0.0003	<0.03	<0.2	<0.2	<0.2	<0.2
320B-6'	<0.3	<0.0007	0.01	0.0006	<0.0006	0.06	<0.3	<0.2	<0.2	<0.2	<0.2
245B-6'	<0.3	<0.002	0.02	<0.0001	<0.001	<0.0003	<0.3	<0.2	<0.2	<0.2	<0.2
246B-6'	2	<0.0007	0.002	0.0004	<0.0006	<0.0001	<0.3	<0.2	<0.2	<0.2	<0.2
247B-6'	<0.3	<0.0007	0.001	0.0002	<0.0006	0.0008	<0.3	<0.2	<0.2	<0.2	<0.2
248B-6'	<0.3	<0.0007	0.004	0.0004	<0.0006	0.004	<0.3	<0.2	<0.2	<0.2	<0.2
249B-6'	<0.3	<0.0007	0.008	0.0004	<0.0006	0.04	<0.3	<0.2	<0.2	<0.2	<0.2
AIR	<0.3	<0.0003	0.001	0.0006	<0.0003	0.0002	<0.3	<0.2	<0.2	<0.2	<0.2

Analyzed by: J. Cook

Checked by: I. Harris

Proofed by: Z. Dusek

MALCOLM PIRNIE/MILLER BREWING FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-774-S

10-05-90

CONDENSED DATA

SAMPLE	CH ₂ Cl ₂ ug/l	CHCl ₃ ug/l	TCA ug/l	CCl ₄ ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES ug/l	TPHC ug/l
AIR	<0.1	<0.0002	0.0006	0.0005	<0.0002	<0.00003	<0.3	<0.2	<0.2	<0.2	<0.2
325-11'	<0.1	<0.001	0.1	<0.00008	<0.0008	0.3	<0.3	<0.2	<0.2	<0.2	<0.2
326-14'	<0.5	<0.05	0.1	<0.003	<0.03	2	<0.3	<0.2	<0.2	<0.2	<0.2
327-7'	<0.1	<0.002	<0.0007	<0.0002	<0.002	<0.0004	<0.6	<0.4	<0.3	<0.3	<0.4
328-14'	<0.1	<0.0005	0.0008	<0.00003	<0.0003	<0.00007	<0.3	<0.2	<0.2	<0.2	<0.2
329-14'	<0.1	<0.0005	0.04	<0.00003	<0.0003	0.001	<0.3	<0.2	<0.2	<0.2	<0.2
330-6'	<0.1	<0.0005	0.02	0.0006	<0.0003	<0.00007	<0.3	<0.2	<0.2	<0.2	0.6
330-14'	<0.1	<0.0005	0.03	0.0003	<0.0003	<0.00007	<0.3	<0.2	<0.2	<0.2	<0.2
331-6'	<0.1	<0.0005	0.0006	0.0006	<0.0003	<0.00007	<0.3	<0.2	<0.2	<0.2	<0.2
332-14'	<0.1	<0.0005	0.0008	0.0002	<0.0003	<0.00007	<0.3	<0.2	<0.2	<0.2	0.2
333-14'	<0.1	<0.0005	0.004	0.0002	<0.0003	0.001	<0.3	<0.2	<0.2	<0.2	<0.2
334-14'	<0.1	<0.0005	0.04	0.00008	<0.0003	<0.00007	<0.3	<0.2	<0.2	<0.2	<0.2
335-14'	<0.1	<0.0002	0.01	0.0002	<0.0002	<0.00003	<0.3	<0.2	<0.2	<0.2	<0.2
AIR	<0.1	<0.0002	0.0006	0.0005	<0.0002	<0.00003	<0.3	<0.2	<0.2	<0.2	<0.2

Analyzed by: J. Cook

Checked by: I. Harris

Proofed by: K. Ness