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Tracer Research Corporation

PREPARED FOR:

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SHALLOW SOIL GAS AND STORM SEWER WATER INVESTIGATION MILLER BREWING COMPANY FULTON CONTAINER PLANT FULTON, NEW YORK

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SUBMITTED BY:

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Tracer Research Corporation

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INTRODUCTION

A shallow soil gas and storm sewer water investigation was performed by Tracer Research Corporation (TRC) at the Miller Brewing Company Fulton Container Plant located in Fulton, New York. The investigation was conducted July 23-27, 30-31, and August 1-3, 1990 under contract to Malcolm Pirnie. The purpose of the investigation was to determine the source and extent of possible contamination in the subsurface.

During this survey, a total of one-hundred sixty-five soil gas samples and five storm sewer water samples were collected and analyzed. One groundwater sample was collected for the client, but not analyzed by TRC. Samples were analyzed for compounds from the following suite:

benzene
toluene
ethylbenzene
xylenes
total hydrocarbons (THC)
methylene chloride (CH_2Cl_2)
chloroform ($CHCl_3$)
trichloroethane (TCA)
carbon tetrachloride (CCl_4)
trichloroethene (TCE)
tetrachloroethene (PCE)

Xylenes are reported as the total of the three xylene isomers and total hydrocarbons are reported as gasoline range compounds consisting of approximately C_4-C_9 aliphatic, alicyclic, and aromatic compounds.

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

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 data base. 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 a substitute for conventional methodology, but rather to enable conventional methods to be used efficiently.

EQUIPMENT

Tracer Research Corporation utilized a one ton Ford analytical field van that was equipped with one gas chromatograph and two Spectra Physics computing integrators. In addition, the van has 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 consist of 7-14 foot lengths of 3/4 inch diameter hollow steel pipe that are fitted with detachable drive tips. Soil gas probes were advanced to 2-13 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 is monitored by a vacuum gauge to insure that an adequate flow is obtained.

To adequately purge the volume of air within the probe, 2 to 5 liters of gas is evacuated with a vacuum pump. During the soil gas evacuation, samples are 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 are collected for immediate analysis in the TRC analytical field van. Soil gas is subsampled (duplicate injections) in volumes ranging from 1 uL to 2 mL, depending on the VOC concentration at any particular location.

Sample probe vacuums ranged from two to thirteen inches Hg. The maximum pump vacuum was measured at twenty-three inches Hg.

GROUNDWATER AND STORM SEWER WATER SAMPLING PROCEDURES

The groundwater sample was collected by driving a hollow probe with detachable drive point below the water table. Once at the desired depth the probe was withdrawn several inches to permit water inflow into the resulting hole. The sample was collected at a depth of 6 feet below grade. Once inserted into the ground, the above-ground end of the sampling probe was fitted with a vacuum adaptor (metal reducer) and a length of polyethylene tubing leading to a vacuum pump. A vacuum of up to 23 inches of mercury was applied to the interior of the probe and open hole for 10 to 15 minutes or until the water was drawn up the probe. The water thus accumulated was then removed by drawing a vacuum on a 1/4 inch polyethylene tube inserted down the probe to the bottom of the open hole. Loss of volatile compounds by evaporation is accordingly reduced when water is induced to flow into the very narrow hole, because it can be sampled with little exposure to air. The polyethylene tubing was only used once and then discarded to avoid any cross-contamination problems.

The storm sewer water samples were collected by lowering a 7 or 14 foot sampling probe into the storm sewer system and then inserting a 1/4 inch polyethylene tube down to the bottom of the probe. A vacuum was applied to the polyethylene tube to draw the water into the tubing. The polyethylene tubing was only used once and then discarded to avoid any cross-contamination problems.

The groundwater and storm sewer water samples were collected in 40 mL VOC vials that are filled to exclude any air and then capped with Teflon-lined septa caps. The storm sewer samples were analyzed by injecting headspace in the sample container created by decanting off approximately half of the liquid in the bottle. Headspace analysis is the preferred technique when a large number of water samples are to be performed daily. The method is more time efficient for the measurement of volatile organics than direct injection because there is less chance for semi-volatile and non-volatile organics to contaminate the system as there is with direct injection. Depending upon the partitioning coefficient of a

given compound, the headspace analysis technique can also yield greater sensitivity than the direct injection technique. Both methods are similar in terms of precision and accuracy.

ANALYTICAL PROCEDURES

A Varian 3300 gas chromatograph, equipped with a flame ionization detector (FID) and electron capture detector (ECD), was used for the soil gas and storm sewer water analyses. Compounds were separated on 6' by 1/8" OD packed column with OV-101 as the stationary phase in a temperature controlled oven of 50°C. Nitrogen was used as the carrier gas.

Hydrocarbon and halocarbon 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.

The GC was calibrated for water headspace analysis by decanting 10 to 20 mL off of the known aqueous standard so as to leave approximately the same amount of headspace that was in the storm sewer water headspace samples. The bottle was then resealed and shaken vigorously for 30 seconds. An analysis of the headspace in the vial determines the Response Factor (RF) which is then used to estimate water concentrations.

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

The detection limits for the selected compounds were approximately 0.04 ug/L for hydrocarbons and 0.00003 ug/L for halocarbons detected in the soil gas samples and 0.3 ug/L for hydrocarbons and 0.0001 ug/L for halocarbons detected in the storm sewer water samples, depending on the conditions of the measurement, in particular, the sample size. If any component being analyzed is 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 are 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 and water samples.

- 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 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 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 a concurrently sampled ambient air analysis.
- All sampling and subsampling syringes are 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 one-hundred and sixty-five soil gas samples and five storm sewer water samples were collected and analyzed in the field. Analytical data is condensed in Appendix

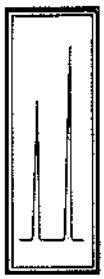
A. Isoconcentration contour maps with sampling locations and compound concentrations (Figures 1-12) are attached. Figure 1 is a map showing the sampling locations.

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. Several of the selected compounds were detected in the ambient air samples: TCA ranged from 0.00005 to 0.006 ug/L; CCl_4 ranged from 0.00002 to 0.0005 ug/L; and PCE ranged from 0.00009 to 0.003 ug/L. TCE (0.0001 ug/L), $CHCl_3$ (0.0001 ug/L), benzene (0.07 ug/L), toluene (0.1 ug/L), and THC (0.2 ug/L) were only detected once in the ambient air samples. 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. For example, soil gas concentrations of benzene, toluene, ethylbenzene, xylenes and THC greater than 0.1 ug/L may indicate possible VOC contamination in the vicinity.

The investigation was conducted in four general areas: north of the Container building, south of the Container building, along the underground sewer system line, and west of Route 57.

Concentrations of benzene, toluene, THC, CH_2Cl_2, $CHCl_3$, TCA, CCl_4, TCE, and PCE were detected at or above the level of significance in several samples collected north of the Container building. The highest concentrations of THC in this area were detected at sampling locations SG-172 (90 ug/L), SG-178 (30 ug/L), SG-176 (10 ug/L), and SG-192 (2 ug/L). CH_2Cl_2 was detected at SG-178 (30 ug/L) and SG-172 (19 ug/L). Elevated concentrations of TCA were detected at SG-178 (100 ug/L) and SG-172 (1,100 ug/L). The highest TCE and PCE concentrations in the area were detected at SG-176 (26 ug/L and 60 ug/L), SG-178 (22 ug/L and 500 ug/L), and SG-195 (4 ug/L and 14 ug/L).

South of the Container building, elevated concentrations of benzene, THC, TCA,



TCE, and PCE were detected. The higher concentrations of these compounds were detected at sampling locations SG-241, SG-242, SG-219. Elevated concentrations ranged from 2 to 400 ug/L for benzene, 3 to 5,300 ug/L for THC, 0.5 to 1,700 ug/L for TCA, 2 to 8,100 ug/L for TCE, and 2 to 120,000 ug/L for PCE. These locations are next to the small shed on the southwest corner of the Container building.

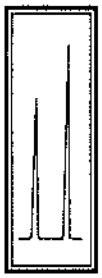
Isolated concentrations of the selected compounds, except for ethylbenzene and xylenes, were detected in the soil gas samples collected along the storm sewer line. The higher concentrations were detected near the west end at sampling location SG-218. THC concentrations at ranged from 0.5 ug/L at SG-214 to 20 ug/L at SG-218. PCE concentrations ranged from 2 ug/L at SG-215 to 90 ug/L at SG-218. THC, CH_2Cl_2, $CHCl_3$, TCA, CCL_4, TCA, TCE, and PCE were detected in the water samples collected from manholes along the storm sewer line. THC and CH_2Cl_2 concentrations increased from the east at WS-2 (88 ug/L and 0.05 ug/L) to the west at WS-4 (2,500 ug/L and 1 ug/L). The other detected compound concentrations generally remained the same along the storm sewer line.

Low levels of the selected compounds were detected in the area west of Route 57. Most of the THC detections were in the area south of Kellar Well #2. The highest THC concentrations detected were at sampling locations SG-130 (12 ug/L) and SG-131 (2 ug/L). Detected concentrations of TCA and PCE near Kellar Well #2 ranged from 0.01 to 2 ug/L. Low levels of TCA was also detected along the east side of Route 57.

CONCLUSIONS

Significant concentrations of benzene, toluene, THC, CH_2Cl_2, $CHCl_3$, TCA, CCl_4, TCE, and PCE were detected in the soil gas and storm sewer water samples at the Miller Brewing Company Fulton Container Division. The isoconcentration contours for the selected compounds show two areas of highly elevated concentrations. One area is next to the small shed on the south side of the Container building. The other area is north of the parking lot that is on the north side of the Container building. The storm sewer water

samples indicate a possible source area at the west end of the line. Further investigation is needed to better determine the source of the possible subsurface contamination to the north and south of the Container building and at the west end of the storm sewer line.



APPENDIX A: CONDENSED DATA

MALCOLM PIRNIE/MILLER BREWING COMPANY FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-605-S

07/23/90

CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL-BENZENE ug/l	XYLENES ug/l	TPH ug/l	TCA ug/l	CCL4 ug/l	TCE ug/l	PCE ug/l
AIR	<0.02	<0.02	<0.02	<0.02	<0.02	<0.00007	<0.00001	<0.0002	<0.0001
SG-90-3'	<0.03	0.1	<0.04	<0.04	0.1	0.005	0.00006	<0.0003	0.03
SG-90-6'	<0.03	<0.03	<0.04	<0.04	0.1	0.1	0.02	<0.0003	0.9
SG-91-3'	<0.03	0.08	<0.04	<0.04	0.1	0.06	<0.00002	<0.0003	0.5
SG-91-6'	<0.2	0.7	<0.2	<0.2	1	0.4	<0.0001	<0.002	2
SG-92-3'	<0.03	0.1	<0.04	<0.04	0.4	0.05	<0.00002	<0.0003	0.6
SG-92-6'	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.0001	<0.002	3
SG-93-6'	<0.3	<0.3	<0.4	<0.4	<0.3	0.2	<0.0003	<0.003	0.9
SG-94-6'	<0.03	<0.03	<0.04	<0.04	0.3	0.9	<0.0006	<0.006	0.8
SG-95-6'	<0.03	<0.03	<0.04	<0.04	<0.03	0.003	<0.00005	<0.0006	<0.0004
AIR	<0.02	<0.02	<0.02	<0.02	<0.02	<0.00007	<0.00001	<0.0002	<0.0001
SG-96-6'	0.2	0.2	<0.04	<0.04	0.5	0.07	<0.00005	<0.0006	0.08
SG-97-6'	<0.03	<0.03	<0.04	<0.04	<0.03	0.0009	<0.00005	<0.0006	0.002
SG-98-3'	<0.03	<0.03	<0.04	<0.04	<0.03	0.02	<0.00002	<0.0003	0.03
SG-99-3'	<0.03	<0.03	<0.04	<0.04	<0.03	0.002	0.0001	<0.0003	0.0008
SG-100-6'	<0.03	<0.03	<0.04	<0.04	<0.03	0.02	<0.00002	<0.0003	0.0004
SG-101-6'	0.07	<0.02	<0.02	<0.02	0.4	0.5	<0.00001	0.002	2
AIR	<0.02	<0.02	<0.03	<0.02	<0.02	0.0005	0.0004	<0.0002	0.0001

Analyzed by: O. Schuh
Checked by: J. Cook
Proofed by: R. Russ

MALCOLM PIRNIE/MILLER BREWING COMPANY FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-605-S

07/24/90

CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL-BENZENE ug/l	XYLENES ug/l	TPH ug/l	TCA ug/l	CCL4 ug/l	TCE ug/l	PCE ug/l
AIR	<0.02	<0.02	<0.02	<0.02	<0.02	0.0006	0.0003	0.0001	0.00009
SG-102-4'	<0.06	<0.07	<0.09	<0.08	<0.08	0.002	0.0006	0.007	<0.0002
SG-103-5'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0002	0.00002	<0.0002	<0.0001
SG-104-5'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0002	0.00002	0.0004	0.0001
SG-105-4'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0004	0.0002	<0.0002	0.0001
SG-106-4'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0006	0.0002	<0.0002	0.0001
SG-107-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.002	0.00004	<0.0002	<0.0001
SG-108-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.2	<0.0004	<0.004	2
SG-109-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.004	0.0001	<0.0002	0.0003
SG-110-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.004	0.00002	<0.0002	0.0003
SG-111-5'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0008	0.00002	<0.0002	0.0001
SG-112-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0006	0.0003	<0.0002	0.001
SG-113-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.001	0.00002	<0.0002	<0.0001
SG-114-6'	0.03	0.1	<0.04	<0.04	0.2	0.0009	0.0002	<0.0002	0.0001
AIR	<0.02	<0.02	<0.02	<0.02	<0.02	0.00005	0.0002	<0.0001	<0.00005
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SG-115-4'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0004	0.0003	<0.0003	<0.0001
SG-116-3'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0005	0.0002	<0.0003	0.0002
SG-117-4'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0002	0.0002	<0.0003	<0.0001
SG-118-3'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0002	0.00009	<0.0003	<0.0001
SG-119-3'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0002	0.00003	<0.0003	<0.0001
SG-120-4.5'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0002	0.00003	<0.0003	<0.0001
SG-121-3'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0005	<0.00002	<0.0003	<0.0001
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	0.0001	0.0003	<0.0003	<0.0001

Analyzed by: O. Schuh
Checked by: J. Cook
Proofed by: _____

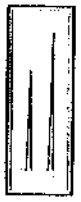
MALCOLM PIRNIE/MILLER BREWING COMPANY FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-605-S

07/25/90

CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL-BENZENE ug/l	XYLENES ug/l	TPH ug/l	TCA ug/l	CCL4 ug/l	TCE ug/l	PCE ug/l
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	0.00008	0.00002	<0.0004	<0.0002
SG-122-3'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0006	0.00003	<0.0004	<0.0002
SG-123-3'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0004	0.00006	<0.0004	<0.0002
SG-124-5'	<0.6	<0.7	<0.9	<0.8	<0.8	0.003	0.0001	<0.0004	0.02
SG-125-5'	<0.03	<0.04	<0.04	<0.04	<0.04	0.05	<0.00003	<0.0004	0.6
SG-126-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0008	0.0002	<0.0004	0.0002
SG-127-4'	<0.03	<0.04	<0.04	<0.04	<0.04	0.03	<0.00003	<0.0004	0.06
SG-128-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.02	<0.00003	<0.0004	0.002
SG-129-5'	<0.03	<0.04	<0.04	<0.04	0.06	0.1	<0.00003	<0.0004	0.7
SG-130-5'	<0.03	4	<0.04	8	12	0.001	0.0004	<0.0004	0.0004
SG-131-6'	0.04	2	<0.04	2	2	0.07	<0.00003	<0.0004	0.0002
SG-131B-4'	0.06	0.04	<0.04	<0.04	0.1	0.04	<0.00003	<0.0004	0.0006
SG-132-6'	0.06	<0.04	<0.04	<0.04	0.2	0.2	<0.00003	<0.0004	0.5
SG-130B-4'	0.2	0.2	<0.04	0.2	1	0.0008	0.0003	<0.0004	0.0002
SG-133-5'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0004	0.00003	0.0006	0.0003
SG-134-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.002	0.00003	0.0007	0.001
SG-135-3'	0.08	0.2	0.2	0.04	0.4	0.0006	0.0004	<0.0004	<0.0002
SG-136-5'	<0.03	<0.04	<0.04	<0.04	<0.04	0.0005	0.00002	0.0005	<0.0002
SG-137-5'	<0.03	<0.04	<0.04	<0.04	<0.04	0.001	0.00005	<0.0004	<0.0002
SG-138-5'	<0.03	<0.04	<0.04	<0.04	<0.04	0.001	0.0001	<0.0004	<0.0002
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	0.0006	0.0004	<0.0004	<0.0002

Analyzed by: O. Schuh
Checked by: J. Cook
Proofed by: R. Sweet



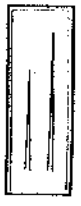
MALCOLM PIRNIE/MILLER BREWING COMPANY FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-605-S

07/26/90

CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL-BENZENE ug/l	XYLENES ug/l	TPH ug/l	CH2CL2 ug/l	CHCL3 ug/l	TCA ug/l	CCL4 ug/l	TCE ug/l	PCE ug/l
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	<0.004	<0.0002	0.0007	0.0003	<0.0002	0.0002
SG-140-4'	0.03	0.06	<0.04	<0.04	0.09	<0.004	0.0002	0.002	0.0003	<0.0002	0.0002
SG-141-4'	<0.03	0.06	<0.04	<0.04	0.06	<0.004	0.0002	0.001	0.0003	<0.0002	0.0002
SG-142-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.004	<0.0002	0.0002	<0.00002	<0.0002	<0.0002
SG-143-3'	0.2	0.4	<0.04	0.2	2	<0.004	<0.0002	0.001	0.0003	<0.0002	0.0002
SG-144-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.004	<0.0002	0.00008	0.00002	<0.0002	<0.0002
SG-145-3'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.004	0.0004	0.002	<0.00002	<0.0002	0.0002
SG-147-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.004	0.01	0.005	0.00004	<0.0002	0.0004
SG-148-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.008	<0.0004	0.0006	<0.00002	<0.0002	<0.0002
SG-149-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.008	<0.0004	0.01	0.00006	<0.0002	<0.0002
SG-150-5'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.008	0.0005	0.06	0.00003	<0.0002	0.03
SG-151-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.008	0.002	0.006	0.00003	<0.0002	0.0002
SG-152-6'	<0.03	<0.04	<0.04	<0.04	<0.04	0.4	0.9	0.06	0.04	<0.0002	0.004
SG-153-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.008	0.0006	0.002	<0.00002	<0.0002	0.002
SG-154-5'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.008	0.001	0.007	<0.00002	<0.0002	0.0006
SG-155-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.008	0.008	0.02	<0.00002	0.006	0.08
SG-156-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.008	0.0008	<0.0001	<0.00002	<0.0002	<0.0002
AIR	<0.02	<0.02	<0.02	<0.02	<0.02	<0.008	<0.0004	0.001	0.0004	<0.0002	0.0002

Analyzed by: O. Schuh
Checked by: J. Cook
Proofed by: _____



MALCOLM PIRNIE/MILLER BREWING COMPANY FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-605-S
07/27/90
CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL-BENZENE ug/l	XYLENES ug/l	TPH ug/l	CH2CL2 ug/l	CHCL3 ug/l	TCA ug/l	CCL4 ug/l	TCE ug/l	PCE ug/l
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.002	0.0003	<0.0002	<0.0001
SG-157-4'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.004	0.00004	<0.0002	<0.0001
SG-158-3'	<0.03	<0.04	<0.04	<0.04	<0.04	0.1	0.001	0.04	<0.00002	0.0003	0.002
SG-159-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.005	0.0002	<0.0002	0.002
SG-160-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.001	0.5	<0.0004	0.0003	0.5
SG-160-11'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.0009	0.5	<0.00002	<0.0002	0.3
SG-161-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.002	0.01	0.00002	<0.0002	0.0006
SG-162-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.1	<0.00002	<0.0002	0.008
SG-163-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.0006	0.06	<0.00002	<0.0002	0.0004
SG-164-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.0006	0.06	<0.00002	<0.0002	<0.0001
SG-165-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.01	0.00002	0.0006	0.0008
SG-166-6'	0.08	<0.04	<0.04	<0.04	0.4	<0.002	0.002	0.8	<0.00002	0.008	1
SG-167-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.04	<0.00002	0.002	0.02
SG-168-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.02	<0.00002	<0.0002	0.0002
SG-169-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.0006	0.001	0.0003	<0.0002	0.0003
SG-170-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.06	<0.00002	0.0005	0.004
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0005	0.0003	<0.0002	<0.0001

Analyzed by: O. Schuh
Checked by: J. Cook
Proofed by: K. Lucas

MALCOLM PIRNIE/MILLER BREWING COMPANY FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-605-S

07/30/90

CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL-BENZENE ug/l	XYLENES ug/l	TPH ug/l	CH2CL2 ug/l	CHCL3 ug/l	TCA ug/l	CCL4 ug/l	TCE ug/l	PCE ug/l
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0008	0.00004	<0.0002	0.0002
SG-171-6'	<0.03	<0.04	<0.04	<0.04	0.2	0.002	0.0004	0.2	<0.00002	<0.0002	0.01
SG-172-2'	64	<0.1	<0.2	<0.2	90	19	<0.0001	1100	<0.00002	<0.0002	<0.0001
SG-173-2'	0.4	0.1	<0.04	<0.04	2	<0.02	0.01	4	<0.0002	0.4	2
SG-174-4'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.003	0.002	0.04	0.0003	0.01	0.4
SG-176-4'	0.6	0.2	<0.04	<0.04	10	<0.4	<0.04	6	<0.00006	26	60
SG-177-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0008	0.0004	0.0006	0.0002
SG-178-4'	4	<0.04	<0.04	<0.04	30	6	<0.6	100	<0.09	22	500
SG-179-5'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.0001	0.002	0.0003	<0.0002	0.02
SG-180-3'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.01	0.0004	0.00005	<0.0002	0.004
SG-181-4'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.02	0.002	0.00004	0.0007	0.004
SG-182-3'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.0003	0.0007	0.0003	<0.0002	0.0004
SG-183-4'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.0003	0.0006	0.0003	<0.0002	0.0004
SG-184-2'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0006	0.0004	<0.0002	0.0002
SG-185-3'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0005	0.0002	<0.0002	0.0002
SG-186-3'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0002	0.0004	<0.0002	0.0006
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0002	0.0004	<0.0002	0.0002

Analyzed by: O. Schuh
Checked by: J. Cook
Proofed by: R. Lewis

Tracer Research Corporation

MALCOLM PIRNIE/MILLER BREWING COMPANY FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-605-S

07/31/90

CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL-BENZENE ug/l	XYLENES ug/l	TPH ug/l	CH2CL2 ug/l	CHCL3 ug/l	TCA ug/l	CCL4 ug/l	TCE ug/l	PCE ug/l
AIR	0.07	0.1	<0.04	<0.05	0.2	<0.002	<0.0001	0.0009	0.0005	<0.0002	<0.0001
SG-187-4'	<0.03	<0.04	<0.04	<0.05	<0.04	<0.002	0.0004	0.01	<0.00002	<0.0002	0.01
SG-188-6'	<0.03	<0.04	<0.04	<0.05	<0.04	<0.002	<0.0001	0.0007	<0.00002	0.0002	0.002
SG-189-6'	<0.03	<0.04	<0.04	<0.05	<0.04	<0.002	<0.0001	0.0005	<0.00002	<0.0002	<0.0001
SG-190-5'	<0.03	<0.04	<0.04	<0.05	<0.04	<0.002	<0.0001	0.01	<0.00002	<0.0002	<0.0001
SG-191-5'	<0.03	<0.04	<0.04	<0.05	<0.04	<0.002	<0.0001	0.1	<0.00002	<0.0002	0.04
SG-192-5'	0.06	0.1	<0.04	<0.05	2	<0.01	<0.0007	0.0006	0.0003	0.8	0.4
SG-193-5'	0.04	0.1	<0.04	<0.05	0.6	<0.004	0.002	0.03	0.0002	0.09	0.2
SG-194-5'	0.1	0.2	<0.04	<0.05	0.9	<0.002	<0.0001	0.0005	0.0003	0.001	<0.0001
SG-195-4'	0.1	0.2	<0.04	<0.05	0.4	<0.002	<0.0001	0.0005	0.0004	0.0002	<0.0001
SG-195-7'	0.03	<0.04	<0.04	<0.05	1	<0.002	0.006	0.3	<0.00002	4	14
SG-196-5'	0.2	0.2	<0.04	<0.05	0.6	<0.002	<0.0001	0.002	0.0004	<0.0002	0.0004
SG-197-2.5'	0.3	0.3	<0.04	<0.05	0.8	<0.002	<0.0001	0.001	<0.0004	<0.0002	0.0005
WS-2	<0.3	<0.3	<0.3	<0.6	88	0.05	1	0.1	0.002	0.2	0.04
WS-3	<0.3	<0.3	<0.3	<0.6	640	0.8	1	0.09	0.001	0.2	0.01
WS-4	<1	<1	<1	<3	2500	1	1	0.08	0.001	0.1	0.01

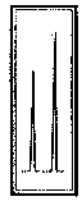
Analyzed by: O. Schuh
Checked by: J. Cook
Proofed by: R. Lucas

Tracer Research Corporation

MALCOLM PIRNIE/MILLER BREWING COMPANY FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-605-S
08/01/90
CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL-BENZENE ug/l	XYLENES ug/l	TPH ug/l	CH2CL2 ug/l	CHCL3 ug/l	TCA ug/l	CCL4 ug/l	TCE ug/l	PCE ug/l
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0005	0.0004	<0.0002	<0.0001
SG-198-6'	0.03	0.04	<0.04	<0.04	0.07	<0.002	<0.0001	0.0006	0.0004	<0.0002	<0.0001
SG-198-12'	<0.03	<0.04	<0.04	<0.04	<0.04	0.07	0.008	0.007	0.0002	0.008	0.05
SG-199-6'	<0.03	0.1	<0.04	<0.04	0.4	<0.002	<0.0001	0.0003	0.00007	<0.0002	<0.0001
SG-199-13'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0001	0.0008	<0.0002	0.004
SG-200-9'	<0.03	0.08	<0.04	<0.04	0.05	<0.002	<0.0001	0.0004	0.0002	<0.0002	<0.0001
SG-201-6'	<0.03	0.5	<0.04	<0.04	0.5	<0.002	<0.0001	0.0006	0.0004	<0.0002	0.0005
SG-202-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.002	0.06	0.00003	0.0006	0.007
SG-203-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.002	0.0002	<0.0002	0.008
SG-204-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0003	<0.00002	<0.0002	0.0002
SG-205-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	0.0001	0.004	<0.00002	<0.0002	0.0003
SG-206-5'	0.03	0.04	<0.04	<0.04	0.08	<0.002	0.0001	0.0005	0.0004	<0.0002	<0.0001
SG-207-6'	0.03	<0.04	<0.04	<0.04	0.2	<0.002	0.001	0.08	<0.00002	0.005	0.2
SG-208-5'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0004	0.0003	<0.0002	<0.001
SG-209-6'	<0.03	<0.04	<0.04	<0.04	0.1	<0.001	<0.00008	0.0005	0.00004	<0.0001	<0.0001
SG-210-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0002	0.03	<0.00002	<0.0002	0.03
WS-5	<0.3	<0.3	<0.3	<0.6	1500	1	2	0.2	0.001	1	0.01
WS-6	<0.3	<0.3	<0.3	<0.6	400	2	2	0.1	0.001	1	0.02

Analyzed by: O. Schuh
Checked by: J. Cook
Proofed by: L. Lucas



Tracer Research Corporation

MALCOLM PIRNIE/MILLER BREWING COMPANY FULTON CONTAINER PLANT/FULTON, NEW YORK JOB#2-90-605-S
08/02/90
CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL-BENZENE ug/l	XYLENES ug/l	TPH ug/l	CH2CL2 ug/l	CHCL3 ug/l	TCA ug/l	CCL4 ug/l	TCE ug/l	PCE ug/l
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.0007	0.0004	<0.0002	0.0002
SG-211-6'	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.002	0.00007	<0.0002	0.004
SG-212-3'	0.1	0.2	<0.04	<0.04	0.3	<0.002	<0.0001	0.0006	0.0003	<0.0002	0.0001
SG-213-6'	<0.03	<0.04	<0.04	<0.04	<0.1	<0.006	<0.0001	0.0003	0.00006	<0.0002	<0.0001
SG-214-4'	0.1	0.2	<0.04	<0.04	0.5	0.002	0.0001	0.0006	0.0003	<0.0002	0.0002
SG-215-6'	0.03	<0.04	<0.04	<0.04	0.4	<0.002	0.0003	0.1	<0.00002	0.001	2
SG-216-6'	0.03	<0.04	<0.04	<0.04	1	<0.002	<0.0001	0.2	<0.00002	<0.002	3
SG-216-13'	<0.03	<0.04	<0.04	<0.04	1	<0.002	<0.0001	0.2	<0.00002	0.009	6
SG-217-6'	<0.03	<0.04	<0.04	<0.04	0.8	<0.002	<0.0001	0.2	<0.00002	<0.0002	5
SG-218-6'	0.8	0.6	<0.04	<0.04	20	<0.002	<0.0001	0.9	<0.00002	0.09	90
SG-219-4'	400	<150	<170	<170	5300	<70	<5	1700	<0.9	90	19000
SG-220-3'	5	<0.8	<0.9	<0.9	60	<7	<0.5	20	<0.9	<9	140
SG-221-5'	30	0.2	<0.2	<0.2	60	<7	<0.5	320	<9	70	150
SG-222-4'	2	0.1	<0.04	<0.04	3	<0.04	<0.003	20	0.005	0.004	2
SG-223-3'	0.1	<0.04	<0.04	<0.04	0.3	<0.007	<0.0003	0.5	<0.00004	0.004	0.5
AIR	<0.03	<0.04	<0.04	<0.04	<0.04	<0.002	<0.0001	0.006	0.0004	<0.0002	0.003

Analyzed by: O. Schuh
Checked by: J. Cook
Proofed by:

Tracer Research Corporation