- Chain of custody forms and seals;
- Cooler(s) with double-bagged ice;
- Polyethylene sheeting, as appropriate;
- Decontamination materials;
- Personal protection equipment; and
- Field logbook and/or appropriate field form.

3.0 HEALTH AND SAFETY

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 APPLICATION OF SAMPLING METHOD

Low-flow is one of several acceptable sampling procedures and may be performed using bladder or peristaltic pumps. Peristaltic pumps may be used when the well depth is less than or equal to fifteen feet, in zones of high contamination, or as approved in a SSWP. The sampling method may be modified to demonstrate attainment of cleanup goals in the future. Low-flow sampling shall not be used when one or more of the following conditions are present:

- Well will not accept or allow placement of the sampling device;
- Non-aqueous phase liquids (NAPLs). Reference SOP SAS-08-07 when sampling wells with NAPL;
- Formation screened will not allow drawdown to stabilize; and
- Water column is less than 2 feet in height.

5.0 EXECUTION

To the extent practical, sampling shall begin at the monitoring well with the least contamination and proceed systematically to the monitoring wells with the most contamination using the procedure outlined in the following subsections unless otherwise required by the Site-Specific Work and/or FSPs.

5.1 Preparation

The sampler shall create a work area around the monitoring well to minimize the potential for cross-contamination. Work area preparations may include the placement of polyethylene sheeting prevent sampling equipment from coming in contact with the ground surface. The sampler shall barricade and/or flag the work area, if required by the Site-Specific HASP. The sampler shall also arrange the sampling equipment and supplies to facilitate efficient execution of groundwater sampling procedures.

5.2 Well Gauging

Groundwater and NAPL, if present, elevation measurements shall be obtained in accordance with SOP SAS-08-01 or as otherwise specified in the Site-Specific Work and/or FSPs. Following sampling, the sampler may obtain the total well depth from top of casing (in feet to the nearest 0.01-foot) using a water level indicator, interface probe, or steel tape, as detailed in SOP SAS-08-05 and as required by the Site-Specific Work and/or FSP or otherwise specified. Measuring the total well depth prior to sampling should be avoided. Total well depths may be obtained following sampling activities or at least two weeks prior to the sampling. If total well depth is required to be measured immediately prior to sampling, the sampler will take precautions to minimize the displacement of sediments, if present, within the well during gauging activities. In general, the use of an interface probe shall be limited to wells containing NAPL or elevated concentrations of constituents of concern. Groundwater and NAPL elevation measurements and total well depth measurements shall be recorded in the field logbook and/or on the appropriate field form.

5.3 Pump/Tubing Intake Positioning

The sampler should determine and place or position the pump/tubing intake as appropriate relative to the position of the water level, screened interval, and constituents of concern. The position the pump/tubing intake should be a minimum of one foot above the well sump to the extent practical and preferably at an elevation near the center of the well screen. The sampler shall slowly raise or lower the pump or tubing when

placing or positioning intake in order to minimize the displacement of sediments, if present, within the well. The pump model/type, tubing (type, inner diameter, and length), and pump/tubing intake depth/elevation shall be recorded in the field logbook and/or on the appropriate field form. If the water quality instruments can be programmed to calculate the one tubing volume, the data collected during pump/tubing intake placement/positioning shall be entered into the instrument. If the instrument cannot be programmed to calculate the tubing volume, this volume shall be calculated by the sampler using the following formula.

$$\text{Tubing Volume}_{(\text{Gallons})} = \text{Tubing Length}_{(\text{Feet})} \times \text{Volume per One Foot of Tubing}^{TDS}_{(\text{Gallons/Foot})}$$

Where: ^{TDS} = Tubing inner diameter-specific; tubing manufacturer provided information.

The calculated tubing volume shall also be recorded in the field logbook and/or on the appropriate field form.

5.4 Equipment Assembly and Calibration

The sampler shall connect the tubing from the well to the inflow fitting at the bottom of the flow-through cell. A length of tubing shall be connected to the outflow fitting at the top of the flow-through cell with the other end extending into a 5-gallon bucket. The 5-gallon bucket shall be used to collect the purge water. Groundwater quality/indicator parameter monitoring instruments will be calibrated in accordance with the instrument operation manual(s) and SOP SAS-02-01 using the manufacturer prescribed calibration standards. During instrument calibration, the instrument shall be set up to measure and record data in the units (e.g. microsiemens per centimeter (uS/cm), milligrams per liter (mg/L), etc.) specified in the Site-Specific Work and/or Sampling Plan(s). Calibration shall be documented in the field logbook and/or on the appropriated field form. Following calibration, the instruments shall be connected to the flow-through cell.

5.5 Flow Rate and Drawdown Determination

The sampler shall re-gauge the depth to groundwater from the top of well casing. The sampler shall turn on the pump at its lowest setting and determine the flow rate by measuring the volume of water removed over a one-minute period using a graduated cylinder and stop watch or other approved flow rate measuring device. The sampler shall monitor the water column drawdown and shall adjust the pump to avoid a drawdown of more than 0.1 meter or 0.3 feet (4 inches). The flow rate of the pump shall generally be adjusted to between 0.2 and 0.5 liters per minute (L/min). During pump start-up, drawdown may exceed 0.3 feet provided the drawdown stabilizes and the groundwater level does not fall below the intake level. The water level shall not

fall below the top of the well screen if the water level was greater than 0.5 feet above the well screen prior to commencing pumping activities. Pump adjustments shall be made within the first 15 minutes of purging. The final flow rate and stabilized drawdown shall be recorded in the field logbook and/or on the appropriated field form.

5.6 Purging and Groundwater Quality/Indicator Parameter Monitoring

The Site-Specific Work and/or FSPs shall specify the groundwater quality/indicator parameters to be monitored, which typically include temperature, pH, specific conductance or actual conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity. Parameter monitoring will begin after a minimum of tubing volume has been purged from the well. The sampler shall monitor and record in the field logbook and/or on the appropriate field form parameters every three to five minutes (during continuous purging) until parameters have stabilized. A generic groundwater sampling field form is provided in Appendix B. Five-minute intervals are typical; three-minute intervals are used during flow rates in highly permeable media that will allow pumping rates that exceed typical low-flow rates. Parameter stabilization is considered to be achieved when three consecutive readings, spaced approximately 2 to 10 minutes, or 0.5 well volumes or more apart, are within the parameter-specific limit listed in the table below or as specified in the Site-Specific Work and/or Sampling Plan(s).

Parameter	Stabilization Criteria[1]
Conductance, Specific Electrical	+/- 3% µS/cm @ 25°C
Conductivity, Actual[2]	+/- 3% µS/cm
Dissolved Oxygen	+/- 0.3 mg/L
Oxidation-Reduction Potential	+/- 10 mV
pH	+/- 0.1 standard units
Temperature	+/- 0.1 °C
Turbidity	<10 NTUs or ± 10% when turbidity is greater than 10 NTUs and/or visually clear water

[1] USEPA, 2002, Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, EPA 542-S-02-001
[2] Based on the stabilization criteria for specific electrical conductance as published in the documented cited above

Once the parameters have stabilized, purging is considered complete and sample collection shall commence.

5.7 Sample Collection

While water is being purged from the well, groundwater samples shall be collected directly into the laboratory provided sample containers from the tubing, before the water has passed through the flow-through cell. This shall be accomplished by using a by-pass assemble or disconnecting the flow-through cell to obtain the sample. Water collected for analysis requiring field filtration will be filtered with an in-line Nalgene© disposable 0.45 micron (µm) filter, or equivalent. Water will be discharged directly from the in-line filter into the sample container following a filter pre-rinse, which will be performed by passing water through the filter, minimum of 500 milliliter (mL), and discharging prior to collection of the sample(s). Samples collected with bailers will be collected in intermediated unpreserved laboratory-provided containers and immediately field filtered as previous described with in-line filters.

Samples shall be collected in order of analyte stability, as summarized below, unless otherwise specified by the Site-Specific Work and/or FSPs:

- Volatile organic compounds (VOCs);
- Semi-volatile organic compounds (SVOCs);
- Non-filtered, non-preserved samples (e.g. PCBs, sulfate, etc.);
- Non-filtered, preserved samples (e.g. phenols, nitrogen, cyanide, total metals, etc.);
- Filtered, non-preserved samples;
- Filtered, preserved samples (e.g. dissolved metals); and
- Miscellaneous parameters.

Quality Control (QC) samples, if required, will be collected consecutively to ensure appropriate duplicate sample collection in accordance with SOP SAS-04-03. Immediately following collection, samples shall be placed in an iced cooler.

5.8 Post-Sample Collection

Non-Dedicated and dedicated sampling equipment, which does not remain within the well casing, shall be removed from the monitoring well. The reusable and/or dedicated equipment and instruments shall be decontaminated in accordance with SOP SAS-04-04 or as otherwise specified by the Site-Specific Work and/or Sampling Plan(s). Disposable equipment and supplies shall be disposed of in accordance with procedures outlined in the Site-Specific Work and/or FSPs. The sampler shall secure the well casing using a slip or expandable well cap. The flush-mount lid shall be bolted down or the protective cover closed and locked, as appropriate.

6.0 DOCUMENTATION

Sample information, labeling, and custody control shall be performed in accordance with requirements specified in SOP SAS-03-01 and SAS-03-02. Sampling activities shall be recorded in the field logbook and/or on the appropriate field form as specified in SOP SAS-01-01 or as required by the Site-Specific Work and/or FSPs. A generic groundwater sampling field form is provided in Appendix B.

7.0 REFERENCES AND ADDITIONAL RESOURCES

USEPA, 2002, Ground-Water Sampling Guidelines for Superfund and RCRA Project Manager, Region 5 and Region 10, EPA 542-S-02-001.

USEPA, April 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/60/B-07/001.

STANDARD OPERATING PROCEDURE
NO. SAS-08-03

WELL-VOLUME APPROACH GROUNDWATER SAMPLING
Revision 2

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for obtaining groundwater samples using the well-volume approach from groundwater monitoring wells, recovery wells, or observation wells as described in the Site-Specific Work Plan or as otherwise specified for the purpose of determining groundwater quality. The well-volume approach involves the purging of the stagnant water within the well and stabilization of water quality indicator parameters prior to sampling.

2.0 EQUIPMENT AND MATERIALS

- Map of well locations;
- Tools and well keys, as required to facilitate access to wells;
- Water level measuring device (e.g. electronic water level indicator, interface probe, or weight steel tape);
- Well construction information, as appropriate;
- Calculator / Conversion Chart
- Pump, if required by the Site-Specific Work and/or Field Sampling Plan (FSP);
- Teflon®, polyvinyl chloride (PVC), or polypropylene pump-specific tubing, if applicable;
- Power Source, if applicable;
- Bailer – Disposable (disposable for purging and sampling), PVC (for purging only), and/or stainless steel (for purging and/or sample collection), if required by the Site-Specific Work and/or FSP;
- Rope, if applicable;
- Disposable plastic cups or stainless steel cup;
- Groundwater quality/indictor parameter monitoring instruments;
- Instrument operation manual(s);
- Instrument calibration standard(s);

- Container(s) for purge water volume measurements and storage (e.g. 5-gallon bucket, polyethylene storage tank, etc.);
- Sample containers and labels, as appropriate for the analytical method(s) selected;
- Field filtration equipment, if applicable;
- Chain of custody forms and seals;
- Cooler(s) with double-bagged ice;
- Polyethylene sheeting, as appropriate;
- Personal protective equipment;
- Decontamination materials and supplies;
- Field logbook and/or appropriate field form; and

3.0 HEALTH AND SAFETY WARNINGS

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 APPLICATION

The well-volume approach is one of several acceptable sampling procedures. The well-volume approach involves the purging of the stagnant water within the well and stabilization of water quality indicator parameters prior to sampling. While this method can be used in wells screened in any formation, it is generally used to sample low-permeability formations (i.e., low-yielding wells).

Newly constructed and developed wells shall be allowed a minimum of 48 to72 hours to stabilize before sampling is performed. Once a well is purged, it should be sampled within 2 hours. If a purged well is

allowed to sit longer than the prescribed 2 hours the water contained in the well casing may no longer be representative of aquifer conditions and the well shall be re-purged with one exception. If a water table well is purged dry, it should be sampled when a sufficient volume of water is present. In general, the sample collection shall take place within 24 hours of bailing or pumping the well dry. Purging a water table well dry should be avoided if possible. Wells screened below the water table should never be purged dry. Purging wells screened across water table must be performed at a rate that prevents significant reduction in the water table elevation. Wells that are purged dry should be sampled at least 2 hours after purging activities. Sampling of wells that are known to contain NAPL will follow procedures in SOP SAS-08-07.

5.0 EXECUTION

To the extent practical, sampling shall begin at the monitoring well with the least contamination and proceed systematically to the monitoring wells with the most contamination using the procedure outlined in the following subsections unless otherwise required by the Site-Specific Work and/or FSPs.

5.1 Preparation

The sampler shall create a work area around the monitoring well to minimize the potential for cross-contamination. Work area preparations may include the placement of polyethylene sheeting prevent sampling equipment from coming in contact with the ground surface. The sampler shall barricade and/or flag the work area, if required by the Site-Specific HASP. The sampler shall also arrange the sampling equipment and supplies to facilitate efficient execution of groundwater sampling procedures.

5.2 Well Gauging

Groundwater and non-aqueous phase liquid (NAPL), if present, elevation measurements shall be obtained in accordance with SOP SAS-08-01 or as otherwise specified in the Site-Specific Work and/or FSP. The sampler shall also obtain the total well depth from top of casing (in feet to the nearest 0.01-foot) using a water level indicator, interface probe, or steel tape, as required by the Site-Specific Work and/or FSP or otherwise specified. Total well depths may be obtained prior to the sampling and provided to the sampler. If total well depth is required to be measured immediately prior to sampling, the sampler will take precautions to minimize the displacement of sediments, if present, within the well during gauging activities. In general, the use of an interface probe shall be limited to wells containing NAPL or elevated concentrations of constituents

of concern. Groundwater and NAPL elevation measurements and total well depth measurements shall be recorded in the field logbook and/or on the appropriate field form.

5.3 Standing Water Column Calculation

The sampler shall calculate the standing water column using the following formula:

Standing Water Column $_{(Feet)}$ = TD $_{(FT\ BTOC)}$ – DTW $_{(FT\ BTOC)}$

Where: TD = Total Well Depth
FT BTOC = Feet below top of well casing
DTW = Depth to Water

The sampler shall record the calculation in the field logbook and/or on the appropriate field form.

5.4 Volume Calculations

The sampler shall calculate the volume of water required to be purged prior to sampling. Depending on data quality objectives, state- or regulatory program-specific requirements, and the Site-Specific Work and/or FSP, one of two methods may be used: casing volume or borehole volume. In general, a minimum of three volumes of water, casing or borehole, shall be purged prior to sample collection (see section 5.6 below) in addition to stabilization of groundwater quality indicator parameters.

5.4.1 Casing Volume Calculation:

The sampler shall calculate the casing volume, which is the volume of water inside the well casing only, using the following formula.

One Casing Volume $_{(Gallons)}$ = Standing Water Column $_{(Feet)}$ X Volume per One Foot of Casing ^{WDS} $_{(Gallons/Foot)}$

Where: ^{WDS} = Well diameter-specific (see table below)

Well Diameter-Specific Volume Per One Foot of Casing				
Well Diameter (Inches)	**Volume Per Foot of Casing (Gallons)**		**Well Diameter (Inches)**	**Volume Per Foot of Casing (Gallons)**
0.25	0.0026		4.0	0.6528
0.50	0.0102		6.0	1.469

Well Diameter-Specific Volume Per One Foot of Casing				
0.75	0.0230		8.0	2.611
1.0	0.0408		10.0	4.081
2.0	0.1632		12.0	5.876

The sampler shall record the calculation in the field logbook and/or on the appropriate field form.

5.4.2 Borehole Volume Calculation

The sampler shall calculate the borehole volume, which is the volume of water inside the well casing and volume of water inside the filter pack, using the following formula. Please note that this calculation requires the sampler to know the borehole diameter, filter pack height/elevation, and filter pack porosity.

One Borehole Volume $_{(Gallons)}$ = n ((A X B) – (A X C)) + (C X D)

Where: n = porosity of the filter pack (generally assumed to be 25% or 0.25)

A = height (in feet) of saturated filter pack

B = borehole diameter-specific volume (see table below)

C = well diameter-specific volume (see table below)

D = standing water column (see Section 5.4.1 above)

Diameter-Specific Volume Per One Foot of Borehole or Casing				
Diameter (Inches)	**Volume Per Foot of Borehole or Casing (Gallons)**		**Diameter (Inches)**	**Volume Per Foot of Borehole or Casing (Gallons)**
0.25	0.0026		4.0	0.6528
0.50	0.0102		6.0	1.469
0.75	0.0230		8.0	2.611
1.0	0.0408		10.0	4.081
2.0	0.1632		12.0	5.876

The sampler shall record the calculation in the field logbook and/or on the appropriate field form.

5.5 Equipment Assembly and Preparation

5.5.1 Pumps

Extreme caution should be exercised to ensure that the equipment does not cause cross-contamination from one well to the next. Therefore, dedicated tubing and pumps are preferred. Peristaltic pumps may be used when the well depth is less than or equal to fifteen feet, in zones of high contamination, or as approved in a SSWP. If it is not practical to dedicate a pump to a specific well, the pump shall be decontaminated in accordance with SOP ENV-04-04. Tubing should always be dedicated and never used for more than one well.

The sampler shall place or position the pump/tubing intake not greater than 6 feet below the dynamic water level in the well and a minimum of one foot above the well sump to the extent practical. Ideally, in non-water table wells, the pump shall be placed within the well screen section. The sampler shall slowly raise or lower the pump or tubing when placing or positioning intake in order to minimize the displacement of sediments, if present, within the well. The pump model/type, tubing (type, inner diameter, and length), and pump/tubing intake depth/elevation shall be recorded in the field logbook and/or on the appropriate field form.

5.5.2 Bailers

Bailers will be used for sampling activities when site-specific work plans provide rational and justification for the use. If a non-dedicated PVC and/or stainless steel bailer(s) is/are used, the bailer(s) must be decontaminated in accordance with SOP ENV-04-04 prior to well purging. The bailer shall be secured using rope to a purge water storage container, protective cover, flush-mount lid, or other object such that the bailer can be retrieved from the well. The rope that will enter the well casing shall not come in with the ground. Bailer samples will be collected using bottom valve sampling devices to limit sample aeration.

5.6 Purging and Groundwater Quality/Indicator Parameter Monitoring

The Site-Specific Work and/or FSP shall specify the groundwater quality/indicator parameters to be monitored, which typically include temperature, pH, specific conductance or actual conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity. Parameter monitoring will begin after a minimum of one volume, casing or borehole (as specified by the Site-Specific Work and/or FSP) has been purged from the well. The sampler shall monitor and record in the field logbook and/or on the appropriate field form

parameters a minimum of every well volume until parameters have stabilized. A generic Groundwater Sampling Field Form is provided in Appendix B. When pumps are utilized for purging, stabilization parameters will be monitored with a flow through cell in accordance with SOP SAS-08-02. Parameter stabilization is considered to be achieved when three consecutive readings, taken every well volume with bailer purging, are within the parameter-specific limit listed in the table below or as specified in the Site-Specific Work and/or FSP and a minimum of three volumes, casing or borehole (as specified by the Site-Specific Work and/or FSP), have been evacuated from the well or the well is purged dry, whichever occurs first. Purging methods are discussed in Sections 5.6.1 and 5.62 below.

Parameter	Stabilization Criteria[1]
Conductance, Specific Electrical	+/- 3% µS/cm @ 25°C
Conductivity, Actual[2]	+/- 3% µS/cm
pH	+/- 0.1 standard units
Dissolved Oxygen	+/- 0.3 mg/L
Oxidation-Reduction Potential	+/- 10 mV
Temperature	+/- 0.1 °C
Turbidity	<10 NTUs or ± 10% when turbidity is greater than 10 NTUs and/or visually clear water

Once the parameters have stabilized and a minimum of three volumes, casing or borehole (as specified by the Site-Specific Work and/or FSP), have been evacuated from the well or the well is purged dry, sample collection shall commence (see Section 5.7 below).

5.6.1 Pumps

Following pump/tubing intake placement, the sampler shall commence with purging by turning on the pump. During pumping, intermittently collect pump discharge in a container of known volume for a period of not less than 1 minute to determine the pump flow rate. The approximate pump flow rate shall be documented in the field logbook and/or on the appropriate field form. The sampler shall monitoring groundwater quality/indicator parameters, as described in above, preferably using a flow through cell in accordance with

[1] USEPA, 2002, Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, EPA 542-S-02-001
[2] Based on the stabilization criteria for specific electrical conductance as published in the documented cited above

SOP SAS-08-03. Groundwater quality/indicator parameters shall be recorded in the field logbook and/or on the appropriate field form along with the time and volume of water purged (to the gallon). Periodic measurements of the flow rate will also be recorded during sampling. The evacuated/purged water shall be containerized in an approved storage container as required by the Site-Specific Work and/or FSP.

5.6.2 Bailers

The sampler shall slowly lower and raise the bailer in the well in order to minimize the displacement of sediments, if present, within the well. The sampler shall monitoring groundwater quality/indicator parameters by collecting bailer discharge in a disposable plastic cup, stainless steel cup, or other manner befitting the monitoring instruments (e.g., down-hole probe). Groundwater quality/indicator parameters shall be recorded in the field logbook and/or on the appropriate field form along with the time and volume of water purged. The evacuated/purged water shall be containerized in an approved storage container as required by the Site-Specific Work and/or FSP.

5.7 Sample Collection

5.7.1 Pumps

In general, groundwater samples shall only be collected from adjusted rate peristaltic pumps or adjustable rate low-flow submersible or positive displacement pumps. Groundwater samples shall be collected directly into the laboratory provided sample containers from the tubing, before the water has passed through the flow-through cell. This shall be accomplished by using a by-pass assemble or disconnecting the flow-through cell to obtain the sample. Samples shall be collected in order of analyte stability, as summarized below, unless otherwise specified by the Site-Specific Work and/or FSP:

- Volatile organic compounds (VOCs);
- Semi-volatile organic compounds (SVOCs);
- Non-filtered, non-preserved samples (e.g. Polychlorinated biphenyls (PCBs), sulfate, etc.);
- Non-filtered, preserved samples (e.g. phenols, nitrogen, cyanide, total metals, etc.);
- Filtered (reference SAS-SOP-08-02), non-preserved samples;
- Filtered (reference SAS-SOP-08-02), preserved immediately samples (e.g. dissolved metals); and
- Miscellaneous parameters.

Immediately following collection, samples shall be placed in a cooler with double-bagged ice.

5.7.2 Bailers

In general, groundwater samples shall only be collected from disposable or stainless steel bailers, when pumps are not applicable for sample collection (e.g., low-yielding wells). Groundwater samples shall be collected directly into the laboratory provided sample containers from the bailer. Samples shall be collected in order of analyte stability, as summarized below, unless otherwise specified by the Site-Specific Work and/or FSP:

- VOCs;
- SVOCs;
- Non-filtered, non-preserved samples (e.g. PCBs, sulfate, etc.);
- Non-filtered, preserved samples (e.g. phenols, nitrogen, cyanide, total metals, etc.);
- Filtered (reference SAS-SOP-08-02), non-preserved samples;
- Filtered, (reference SAS-SOP-08-02) preserved samples (e.g. dissolved metals); and
- Miscellaneous parameters.

Immediately following collection, samples shall be placed a cooler with double-bagged ice.

5.7.3 Quality Control Samples

Quality Control (QC) samples, if required, will be collected consecutively to ensure appropriate duplicate sample collection in accordance with SOP SAS-04-03. Immediately following collection, samples shall be placed in a cooler with double-bagged ice.

5.8 Post-Sample Collection

Non-dedicated and dedicated sampling equipment, which does not remain within the well casing, shall be removed from the monitoring well. The reusable and/or dedicated equipment and instruments shall be decontaminated in accordance with SOP SAS-04-04 or as otherwise specified by the Site-Specific Work and/or FSP. Disposable equipment and supplies shall be disposed of in accordance with procedures outlined in the Site-Specific Work and/or FSP. The sampler shall secure the well casing using a slip or expandable

well cap. The flush-mount lid shall be bolted down or the protective cover lid closed and locked, as appropriate.

6.0 DOCUMENTATION

Sample information, labeling, and custody control shall be performed in accordance with requirements specified in SOP SAS-03-01 and SAS-03-02. Sampling activities shall be recorded in the field logbook and/or on the appropriate field form as specified in SOP SAS-01-01 or as required by the Site-Specific Work and/or FSP. A generic Groundwater Sampling Field Form is provided in Appendix B.

7.0 REFERENCES AND ADDITIONAL RESOURCES

ASTM International, D4448-01 Standard Guide for Sampling Groundwater Monitoring Wells

ASTM International, D5903-96(2001) Standard Guide for Planning and Preparing for a Groundwater Sampling Event

ASTM International, D6089-97(2003)e1 Standard Guide for Documenting a Ground-Water Sampling Event

ASTM International, D6301-03 Practice for the Collection of Samples of Filterable and Nonfilterable Matter in Water

ASTM International, D6452-99(2005) Standard Guide for Purging Methods for Wells Used for Ground-Water Quality Investigations

ASTM International, D6564-00(2005) Standard Guide for Field Filtration of Ground-Water Samples

ASTM International, D6634-01 Guide for the Selection of Purging and Sampling Devices for Ground- Water Monitoring Wells

ASTM International, D6771-02 Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations

USEPA, 2001, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), Region 4, Enforcement and Investigations Branch, SESD, Athens, Georgia, www.epa.gov/region4/sesd/eisopqam/eisopqam.html.

USEPA, 2002, Ground-Water Sampling Guidelines for Superfund and RCRA Project Manager, Region 5 and Region 10, EPA 542-S-02-001.

USEPA, April 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/60/B-07/001.

STANDARD OPERATING PROCEDURE
NO. SAS-08-04

AQUIFER TESTING
Revision 2

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for field evaluation of aquifer hydraulic conductivity. Variations in the hydraulic conductivity within or between formations or strata can create irregularities in groundwater flow paths. Formations of high hydraulic conductivity represent areas of greater groundwater flow and, therefore, zones of potential preferred contaminant migration. Further, anisotropy within strata or formations affects the magnitude and direction of groundwater flow. Thus, information on hydraulic conductivities is necessary to evaluate preferential flow paths and groundwater velocity.

Hydrogeologic assessments should contain data on the hydraulic conductivities of the significant formations underlying the site as measured in monitoring wells. It may be beneficial to use numerical or laboratory methods to augment results of field tests. However, field methods provide the best definition of the horizontal hydraulic conductivity in most cases. Field methods differ from laboratory methods which measure vertical hydraulic conductivity, typically in Shelby tube samples.

2.0 EQUIPMENT AND MATERIALS

- Pump (and generator if required) capable of withdrawal at a constant or predetermined variable rate that can meet the designed pumpage rate and lift requirements
- Water pressure transducers and data logger (bring transducers for the pumping well and each observation well as well as extras in case of malfunction)
- A flow meter or other type of water measuring device to accurately measure and monitor the discharge from the pumping well
- Sufficient hose or pipe to convey discharge outside the recharge area of the pumping well and observation wells
- Electric water level indicator(s) capable of measurement to the hundredth of a foot
- Watch or stopwatch with second hand

- Barometer (some groundwater multiprobes include a barometer)
- Tape Measure of appropriate length based on distance to observation wells.
- Flashlights, lanterns, alarm clock, electrical tape
- Semi-log graph paper, pens, and field book

3.0 HEALTH AND SAFETY WARNINGS

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 FIELD METHODS

Varieties of procedures are available for evaluating hydraulic conductivity in the field. ASTM D4043-96(2004) Guide for Selection of Aquifer Test Method in Determining Hydraulic Properties by Well Techniques should be consulted in selecting an appropriate test method. Field methods for collecting hydraulic conductivity data are described in a number of ASTM standard practices:

- D2434-68(2000) Test Method for Permeability of Granular Soils (Constant Head)
- D4044-96(2002) Test Method (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers
- D4050-96(2002) Test Method (Field Procedure) for Withdrawal and Injection Well Tests for Determining Hydraulic Properties of Aquifer Systems
- D4104-96(2004) Test Method (Analytical Procedure) for Determining Transmissivity of Nonleaky Confined Aquifers by Overdamped Well Response to Instantaneous Change in Head (Slug Tests)
- D4105-96(2002) Test Method (Analytical Procedure) for Determining Transmissivity and Storage Coefficient of Nonleaky Confined Aquifers by the Modified Theis Nonequilibrium Method

- D4106-96(2002) Test Method (Analytical Procedure) for Determining Transmissivity and Storage Coefficient of Nonleaky Confined Aquifers by the Theis Nonequilibrium Method
- D4511-00 Test Method for Hydraulic Conductivity of Essentially Saturated Peat
- D4630-96(2002) Test Method for Determining Transmissivity and Storage Coefficient of Low-Permeability Rocks by In Situ Measurements Using the Constant Head Injection Test
- D4631-95(2000) Test Method for Determining Transmissivity and Storativity of Low Permeability Rocks by In Situ Measurements Using Pressure Pulse Technique
- D5269-96(2002) Test Method for Determining Transmissivity of Nonleaky Confined Aquifers by the Theis Recovery Method
- D5270-96(2002) Test Method for Determining Transmissivity and Storage Coefficient of Bounded, Nonleaky, Confined Aquifers
- D5472-93(2005) Test Method for Determining Specific Capacity and Estimating Transmissivity at the Control Well
- D5473-93(2000) Test Method for (Analytical Procedure for) Analyzing the Effects of Partial Penetration of Control Well and Determining the Horizontal and Vertical Hydraulic Conductivity in a Nonleaky Confined Aquifer
- D5720-95(2002) Practice for Static Calibration of Electronic Transducer-Based Pressure Measurement Systems for Geotechnical Purposes
- D5785-95(2000) Test Method for (Analytical Procedure) for Determining Transmissivity of Confined Nonleaky Aquifers by Underdamped Well Response to Instantaneous Change in Head (Slug Test)
- D5786-95(2000) Practice for (Field Procedure) for Constant Drawdown Tests in Flowing Wells for Determining Hydraulic Properties of Aquifer Systems
- D5850-95(2000) Test Method for (Analytical Procedure) Determining Transmissivity, Storage Coefficient, and Anisotropy Ratio from a Network of Partially Penetrating Wells
- D5855-95(2000) Test Method for (Analytical Procedure) for Determining Transmissivity and Storage Coefficient of a Confined Nonleaky or Leaky Aquifer by Constant Drawdown Method in a Flowing Well
- D5881-95(2005) Test Method for (Analytical Procedure) Determining Transmissivity of Confined Nonleaky Aquifers by Critically Damped Well Response to Instantaneous Change in Head (Slug)
- D5912-96(2004) Test Method for (Analytical Procedure) Determining Hydraulic Conductivity of an Unconfined Aquifer by Overdamped Well Response to Instantaneous Change in Head (Slug)

- D5920-96(2005) Test Method (Analytical Procedure) for Tests of Anisotropic Unconfined Aquifers by Neuman Method
- D6028-96(2004) Test Method (Analytical Procedure) for Determining Hydraulic Properties of a Confined Aquifer Taking into Consideration Storage of Water in Leaky Confining Beds by Modified Hantush Method
- D6029-96(2004) Test Method (Analytical Procedure) for Determining Hydraulic Properties of a Confined Aquifer and a Leaky Confining Bed with Negligible Storage by the Hantush-Jacob Method
- D6030-96(2002) Guide for Selection of Methods for Assessing Groundwater or Aquifer Sensitivity and Vulnerability
- D6034-96(2004) Test Method (Analytical Procedure) for Determining the Efficiency of a Production Well in a Confined Aquifer from a Constant Rate Pumping Test
- D6391-99(2004) Test Method for Field Measurement of Hydraulic Conductivity Limits of Porous Materials Using Two Stages of Infiltration from a Borehole

5.0 SINGLE WELL TESTS

Hydraulic conductivity can be determined in the field using a variety of test methods, each addressing specific conditions, and/or data collection objectives. These methods are commonly referred to as bail down or slug tests and are performed by adding or removing a slug (known volume of water or solid inert material) from a well and observing the recovery of the water surface to its original level. Similar results can be achieved by pressurizing the well casing, depressing the water level, and suddenly releasing the pressure to simulate removal of water from the well. One method is described by McLane, et. al. (1990) and is contained in references to the Standard Practices.

When reviewing information obtained from slug tests, several criteria should be considered. First, they are run on one well and, as such, the information is limited to the geologic area directly adjacent to the screen. Second, the vertical extent of screen will control the part of the geologic formation that the test analyzes. Portions of the geologic formation(s) above or below the screen and sand filter pack and seal intervals may also require separate hydraulic conductivity testing. Third, the methods used to collect single well test data should accurately measure parameters such as changing static water (prior to initiation, during, and following completion of the test), the amount of water removed from the well (or slug volume introduced), and the

elapsed time of recovery. The use of pressure transducers and high speed recording equipment is critical in highly permeable formations.

Observation wells with screens that intersect the water table (i.e. water table wells) will be tested only by methods involving removal of water or a slug from the well in order to minimize the potential for well screen filter pack interference. The addition of water to any monitoring well shall be avoided whenever possible, since the addition may affect water quality in sampling events. When addition of water to a well is unavoidable, the water must be of documentable quality and three times the volume added to the well must be removed immediately upon completion of the test. Addition of water to an observation well is appropriate only to piezometer installation when the dynamic water level is above the well screen and sand filter pack and seal elevations.

Full development of the well screen and filter pack adjacent to the interval under examination, in accordance with SOP SAS-05-04, should be completed following well construction to ensure the removal of fines or correct deleterious drilling effects. Determination of well integrity, SOP SAS-08-05, should be determined prior to performance of the well test.

It is important that slug tests be of sufficient duration to provide representative measures of hydraulic conductivity. Slug tests will range in length from less than a minute to several hours. The time required for a test is a function of the volume of the slug added or removed the formation hydraulic conductivity, and well construction.

Slug tests should be performed at least twice to ensure the accuracy of data collection. General procedures for a slug test are summarized below. The procedures required for a slug test may vary, depending on site-specific-conditions. Modifications to the test procedures will be contained in site-specific work plans.

5.1 Slug Test Procedures with Pressure Transducer and Data Logger

An individual Slug Test Field Form (Appendix B) should be completed for each well tested and should contain at least:

- Project ID - A number assigned to identify a specific site.
- Well ID - The location of the well in which water level measurements are being taken.
- Personnel - The personnel conducting the pumping test.
- Measurement Methods - Type of pump, type of data logger(s) used to record water levels, transducer ID number, and acquisition rate (i.e. data recorded on a log scale). The transducer psi range should be appropriate to the test (e.g. 0 to 5 or 0 to 10 psi).
- Initial Static Water Level (Test Start) - Depth to water, to the nearest 0.01 feet, in the observation well at the beginning of the slug test.
- Slug Withdrawal / Addition Start Time - The date when the test began, and start time using a 24-hour clock.
- Test End Date/Time - The date and time when water level readings were discontinued.
- Final Static Water Level (Test End) - Depth to water, to the nearest 0.01 feet, in the observation well at the end of the slug test.
- Elapsed Time (min) - Time of manual measurement record from time 0.00 (start of test) recorded in minutes and seconds.
- Notes - Appropriate observations or information that has not been recorded elsewhere, including notes on sampling, pH readings, and conductivity readings.

Prior to commencing the slug test, enter site-specific information in the data logger per manufacturer instructions. Store all logger data internally; and on laptop computer and/or portable data key. The data should be transferred to the chosen backup storage device as soon as practical after the test is completed.

Water levels should be measured as specified in the SOP SAS-08-02. Manual measurements are required as a backup to and verification of the data logger(s). It is critical that depth to water readings be measured accurately and the exact time of readings is recorded. Determine the static water level in the well; measure the depth to water periodically for several minutes to several hours, and taking the average of the readings (see SOP SAS-07-02). Record information on the Slug Test Field Form (Attachment B). Additional information should be recorded on the Daily Activity Log in SOP SAS-01-04.

5.2 Slug Test Preparation

- Lower the transducer and cable in the well below the estimated target drawdown depth, ensuring the depth of submergence is within the transducer design range.
- Tape the transducer cable to the exterior of the well casing or protective cover to hold the transducer at a constant depth
- Connect the transducer cable to the data logger.
- Check the transducer accuracy by raising and lowering the transducer and comparing the change in water level from the transducer reading to the distance the transducer is raised or lowered.
- Enter the initial water level and transducer design range into the recording device according to the manufacturer's operating instructions.
- Allow the static water level to equilibrate to within 0.1 feet of the initial water level.

5.3 Slug Test with Transducer Procedure

- Turn the data logger on and begin collecting data points.
- Smoothly lower the slug/bailer into the well and allow the water level to stabilize within 0.1 feet of the initial water level.
- Remove the slug/bailer as quickly and smoothly as practical. A smooth, rapid removal is required as slug test analysis assumes an instantaneous change in volume is created in the well when the slug is removed.
- The moment the volume is removed is time zero. Collect hand measured water level measurements (Table 1) as a data backup and to verify transducer data.
- Continue measuring and recording depth/time measurements until the water level returns to equilibrium conditions or a sufficient number of readings have been made to show a trend on a plot of water level recovery versus the logarithm of time in accordance with the chosen analysis method. Time will range from less than 1 minute to a few hours.
- Repeat the slug test once the static water level has recovered to within 95 % of the original water level.

Table 1: Time Intervals for Measuring Recovery in Slug Test Well

Elapsed Time Since Start or Stop of Test (Minutes)	OR (which ever is greater)	Percent Water Level Recovery (%)	Interval Between Measurements (Minutes)
0-2		0-30	0.1
2-5		30-50	0.5
5-10		50-60	1
10-60		60-70	5
60-120		70-80	10
120-240		80-100	30

5.4 Slug Test with Water Level Meter

This slug test method should only be used if a transducer/data recorder cannot be obtained or are malfunctioning. This method cannot be used for saturated zones with high hydraulic conductivities because stabilization of groundwater will occur rapidly. Slug test data should be recorded on the Slug Test Data form (Attachment B) in accordance with the completion instructions. Follow the same procedures for Slug Test with Transducer with increased data collection frequency.

Table 2: Time Intervals for Measuring Recovery in Slug Test Well

Elapsed Time Since Start or Stop of Test (Minutes)	Interval Between Measurements (Minutes)
0-2	0.1
2-10	0.5
10-30	1
30-60	5
60-120	10
120-240	30

The interpretation of the single well test data should be consistent with the existing geologic information (boring log data). Staff should be aware of initial rapid water level recovery during a slug test may represent drainage of the filter pack material around the well screen. This is of particular concern in wells screened in low hydraulic conductivity formations (e.g. silty clay, shale). These data points should be ignored when selecting the appropriate data points to establish a water level recovery slope.

6.0 MULTIPLE WELL TESTS

Multiple well tests, more commonly referred to as pumping tests, are performed by pumping water from one well and observing the resulting drawdown in nearby wells. Tests conducted with wells screened in the same water-bearing formation provide hydraulic conductivity data. Tests conducted with wells screened in different water-bearing zones furnish information concerning hydraulic communication between units. Multiple well tests for hydraulic conductivity are advantageous because they characterize a greater proportion of the subsurface and thus provide a greater amount of detail. Multiple well tests are subject to similar constraints to those listed above for single well tests. Some additional problems that should have been considered in conducting a multiple well test include: (1) storage of potentially contaminated water pumped from the well system, and (2) potential effects of groundwater pumping on existing waste plumes. The geologic constraints should be considered to interpret the pumping test results. Incorrect assumptions regarding geology may translate into incorrect estimations of hydraulic conductivity.

7.0 LABORATORY METHODS

Laboratory analysis of undisturbed samples (e.g. Shelby tube) provides values of vertical hydraulic conductivity. When laboratory methods are to be used, the specific ASTM Standard Practice shall be referenced in samples provided to subcontractors. ASTM methods shall be consulted to assure that test methods specified are applicable to the sample to be tested.

8.0 CONTROLLED PUMPING TESTS

The most representative method for determining aquifer characteristics is by controlled aquifer pumping tests, because these tests stress a much larger volume of the formation than slug tests and laboratory tests. Pumping tests require a higher level of effort and expense than other types of aquifer tests, and are not always justified.

As an example, slug tests may be acceptable for site characterization, whereas pumping tests may be performed to support remedial design or modeling.

Aquifer characteristics that may be obtained from pumping tests include transmissivity (T), hydraulic conductivity (K), specific yield (Sy) for unconfined aquifers, and storage coefficient (S) for confined aquifers. These parameters can be determined by graphical solutions and computerized programs, such as Aqtesolv®.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required dependent on site conditions, equipment limitations, or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

8.1 Summary

If possible, continuously monitor pre-test water levels at the test site for about one week prior to performance of the pump test. This information allows for the determination of the barometric efficiency of the aquifer, as well as noting changes in head due to recharge or pumping in the area adjacent to the well. Prior to initiating the long-term pump test, a step test (Section 5.5) is performed to estimate the greatest flow rate that may be sustained by the pump well.

After the pumping well has recovered from the step test, the long-term pumping test begins. At the beginning of the test, the discharge rate is set as quickly and accurately as possible. The water levels in the pumping well and observation wells are recorded following a set schedule. The duration of the test is determined by project needs and aquifer properties; typically three days or until water levels becomes constant.

8.2 Interferences and Potential Problems

Prior to conducting a pumping test, efforts should be made to anticipate and resolve interferences and potential problems that could affect the aquifer or the test. These problems could be caused by changing atmospheric conditions, impact of local potable wells, contaminants in the aquifer, etc. Note that if it is necessary for a neighboring well to pump during the test, pumping should commence as early as feasible prior to start of the test at a constant rate and not started or stopped for the duration of the test.

8.3 Pumping Discharge

If a pumping test will be conducted in an area with contaminated groundwater, special arrangements must be made for proper handling, treatment, and disposal of the water. The preferred method is to discharge to a sanitary sewer, with prior approval.

Uncontaminated groundwater discharge generated during a pumping test should be sent to storm or sanitary sewers, abiding by all applicable regulations. If there are no sewers in the vicinity of the pumping well, the discharge may be sent to a river or pond. If the previously mentioned discharge options are not available, the groundwater may be discharged to the ground surface under either of the following conditions:

- The aquifer being tested is confined; or
- The end of the discharge hose/pipe is outside of the cone of depression created by the pumping well when testing an unconfined aquifer.

8.4 Pre-Test Procedures

The hydrostratigraphy of the aquifer should be fully characterized prior to performance of the test to identify formation thickness, whether it is confined or unconfined, whether confining layers are leaky and to identify any lateral boundaries that may influence results.

If the pumping test occurs at a site where existing production and/or monitoring wells will be used, confirm that the locations and screened intervals of the wells are within the same aquifer, and meet the requirements of the method of analysis.

If possible, continuously measure water levels in the pumping well and all observation wells for a period at least equal to the length of the test. Trends should be similar in all wells. A well with an unusual trend may indicate some local stress in the aquifer.

The magnitude of water-level fluctuations due to changes in barometric pressure will change throughout the test and should be adjusted based on the changes in the barometric pressure recorded during the test. Changes in barometric pressure will be recorded during the test in order to correct water levels for any possible

fluctuations that may occur due to changing atmospheric conditions. These barometric changes are used to "correct" water levels during the test so they are representative of the hydraulic response of the aquifer due to pumping of the test well. Ideally, water levels should be measured in a well outside of the cone of depression before, during, and after pumping to determine background changes in water levels during the test and to establish correction factors for the wells within the cone of depression.

8.5 Step Test

The step drawdown test is performed to determine the maximum pumping rate that the pumping well can sustain and the minimum pumping rate necessary to assure drawdown in the observation wells. The pumping and observation wells are equipped with transducers prior to the test. Check the transducer accuracy by raising and lowering the transducer and comparing the change in water level from the transducer reading to the distance the transducer is raised or lowered.. The test is then performed by pumping at a low rate, relative to the expected final rate of pumpage, until drawdown in the pumping well stabilizes. The rate is then increased again until drawdown in the pumping well stabilizes (step 2). A minimum of three steps will be tested; the duration of each step will be similar, and should be between 30 minutes and 2 hours.

The data are then plotted on semi-log paper or on a computer. The maximum sustainable pumping rate that yields drawdown in the closest observation wells will be used as the target-pumping rate for the long-term test. These data may also be used to determine aquifer properties and well loss in the pumping well.

8.6 Pump Test Time Intervals

Commence the long-term pumping test after the pumping well has fully recovered from the step test. Place transducers into the observation wells prior to starting the test and allow time for them to equilibrate to the water temperature within the well and to collect pre-test water level data. At the beginning of the test, the discharge rate should be set as quickly and accurately as possible. Record the pumping and observation well water levels with transducers and a data logger(s) set to record logarithmically. As backup in case of transducer malfunction, manually record water levels on field forms and/or field notebooks according to the schedules in Tables 3 and 4:

Table 3: Time Intervals for Measuring Drawdown in the Pumped Well

Elapsed Time Since Start or Stop of Test (Minutes)	Interval Between Measurements (Minutes)
0-10	0.5-1
10-15	1
15-60	5
60-300	30
300-1440	60
1440-termination	480

Table4: Time Intervals for Measuring Drawdown in an Observation Well

Elapsed Time Since Start or Stop of Test (Minutes)	Interval Between Measurements (Minutes)
0-60	2
60-120	5
120-240	10
240-360	30
360-1440	60
1440-termination	480

For wells with a transducer malfunction, water levels records should be manually recorded on field forms and/or field notebooks according to the schedule in Table 5:

Table 5: Time Intervals for Measuring Drawdown in the Observation Wells with Transducer Malfunction

Elapsed Time Since Start or Stop of Test (Minutes)	Interval Between Measurements (Minutes)
0-2	0.1
2-10	0.5
10-20	1
20-100	5
100-200	10
200-300	30
300-1440	60
1440-termination	480

8.7 Water Level Measurements

Water levels will be measured as specified in the SAS-08-02. During the early part of the test, sufficient personnel are required to initiate the pumping test data loggers and assist with manual water level measurements of the pumping well and flow rate measurements. Manual measurements are required as a backup to and verification of the data logger(s). After the first two hours, one to two people are usually sufficient to continue the test. It is not necessary that readings at the wells be taken simultaneously. It is very important that depth to water readings be measured accurately and the exact time of readings is recorded.

During a pumping test, the following data must be recorded accurately on the log book and/or the aquifer test data form.

- Project ID - A number assigned to identify a specific site.
- Well ID - The location of the well in which water level measurements are being taken.
- Distance and Direction from Pumped Well - Distance and azimuth to each observation well from the pumping well in feet.
- Personnel - The personnel conducting the pumping test.

- Pumping Start and End Date/Time - The date when the pumping began, and start time using a 24-hour clock.
- Initial Static Water Level (Test Start) - Depth to water, to the nearest 0.01 feet, in the observation well at the beginning of the pumping test.
- Test End Date/Time - The date and time when water level readings were discontinued.
- Final Static Water Level (Test End) - Depth to water, to the nearest 0.01 feet, in the observation well at the end of the pumping test.
- Target Pumping Rate
- Measurement Methods - Type of pump, type of data logger(s) used to record water levels, transducer ID number, and acquisition rate (i.e. data recorded on a log scale). The transducer psi range should be appropriate to the test (e.g. 0 to 5 or 0 to 10 psi).
- Notes - Appropriate observations or information that has not been recorded elsewhere, including notes on sampling, pH readings, and conductivity readings.
- Elapsed Time (min) - Time of manual measurement record from time 0.00 (start of test) recorded in minutes and seconds.
- Depth to Water (ft) – Manual depth to water measurement, to the nearest 0.01 feet, in the observation well at the time of the water level measurement.
- Flow Rate (gal/min) - Flow rate of pump measured from an orifice, weir, flow meter, container, or other type of water measuring device.

8.8 Pump Test Duration

The duration of the test is determined by the needs of the project and properties of the aquifer. One simple test for determining adequacy of data is when the log-time versus drawdown for the most distant observation well begins to plot as a straight line on the semi-log graph paper. There are several exceptions to this simple rule of thumb; therefore, it should be considered a minimum criterion. Different hydrogeologic conditions can produce straight-line trends on log-time versus drawdown plots. In general, longer tests produce results that are more definitive. Duration of one to three days is desirable, followed by a similar period of monitoring the recovery of the water level. Unconfined aquifers and partially penetrating wells may have shorter test durations. Knowledge of the local hydrogeology, combined with a clear understanding of the

overall project objectives is necessary in judging appropriate test duration. There is no need to continue the test once the water levels in the observation wells stabilize.

The recovery of water levels following pumping phase may be measured and recorded for a period equal to the pumping phase. The frequency of the water level measurements should be similar to the frequency of water level measurements during the pumping phase (Table 1).

9.0 POST OPERATION

The following activities are performed after completion of water level recovery measurements following a slug or pumping/recovery test:

- Decontaminate and/or dispose of equipment per SAS-04-05.
- When using an electronic data-logger, use the following procedures:
    - Stop logging sequence
    - Check file size, print data, and/or save memory to a reliable storage device (i.e. hard drive or USB drive): Backup the data as soon as possible upon completion of a test!
    - Do not clear the memory of the transducer until the data has been saved onto a hard drive
- Review field forms for completeness.
- Replace testing equipment in storage containers
- Check sampling equipment and supplies. Repair or replace all broken or damaged equipment.
- Interpret slug or pumping/recovery test field results.

10.0 CALCULATIONS

Upload the data from the test into a spreadsheet to be entered into a computerized program, such as Aqtesolv®. Use the information entered into the Data Acquisition Form to complete the computer analysis of the data. There are several accepted methods for determining aquifer properties such as transmissivity, storativity, and conductivity. The appropriate method to use is dependent on the characteristics of the aquifer being tested (confined, unconfined, leaky confining layer etc.). When reviewing slug and pump test data, the following text and/or documents may be used to determine the method most appropriate to your case:

- Analysis and Evaluation of Pumping Test Data (Kruseman and Ridder, 1989)
- Applied Hydrogeology (Fetter, 2000)

- Groundwater and Wells (Driscoll, 1986)
- ASTM D4105-96(2002)
- ASTM D4106-96(2002)

11.0 QUALITY ASSURANCE/ QUALITY CONTROL (QA/QC)

Gauges, transducers, flow meters, and other equipment used in the pumping tests will be calibrated before use at the site. Copies of the documentation of instrumentation calibration will be filed with the test data records. The calibration records will consist of laboratory measurements and, if necessary, any on-site zero adjustment and/or calibration that were performed. Where possible, all flow and measurement meters will be checked on-site using a container of measured volume and stopwatch; the accuracy of the meters must be verified before testing proceeds. For QA/QC purposes, a minimum of two single well tests (slug test) should be performed in each well that hydraulic conductivity testing is performed.

12.0 DATA REDUCTION AND INTERPRETATION

Slug and multiple well test data can be analyzed by a variety of methods, depending on the responses observed, geologic conditions, and specific well parameters. Texts such as Driscoll (1986) or other well hydraulics references should be consulted for selection of the proper method of data analysis. In reviewing hydraulic conductivity measurements, the following criteria should be considered to evaluate the accuracy or completeness of information.

- Values of hydraulic conductivity between wells in similar lithologies should generally not exceed one order of magnitude difference.
- Hydraulic conductivity determinations based upon multiple well tests are preferred. Multiple well tests provide more complete information because they characterize a greater portion of the subsurface.
- Use of single well tests will require that more individual tests be conducted at different locations to sufficiently define hydraulic conductivity variation across the site.
- Hydraulic conductivity information generally provides average values for the entire area across a well screen. For more depth discrete information, well screens will have to be shorter. If the average hydraulic conductivity for a formation is required, entire formations may have to be screened, or data taken from overlapping clusters.

It is important that measurements define hydraulic conductivity both vertically and horizontally across the site. Laboratory tests may be necessary to ascertain vertical hydraulic conductivity in saturated formations or strata. Results from boring logs should also be used to characterize the site geology. Zones of high permeability or fractures identified from drilling logs should be considered in the determination of hydraulic conductivity. Additionally, information from boring logs can be used to refine the data generated by single well or pumping tests.

13.0 REFERENCES AND ADDITIONAL RESOURCES

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McLane, G. A., D. A. Harrity, K. O. Thomsen, "Slug Testing In Highly Permeable Aquifers Using a Pneumatic Method", Hazardous Materials Control Research Institute, Conference Proceedings, November, 1990, pp 300-303.

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ASTM International, D4050-96(2002) Test Method (Field Procedure) for Withdrawal and Injection Well Tests for Determining Hydraulic Properties of Aquifer Systems

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ASTM International, D5270-96(2002) Test Method for Determining Transmissivity and Storage Coefficient of Bounded, Nonleaky, Confined Aquifers

ASTM International, D5472-93(2005) Test Method for Determining Specific Capacity and Estimating Transmissivity at the Control Well

ASTM International, D5473-93(2000) Test Method for (Analytical Procedure for) Analyzing the Effects of Partial Penetration of Control Well and Determining the Horizontal and Vertical Hydraulic Conductivity in a Nonleaky Confined Aquifer

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ASTM International, D5850-95(2000) Test Method for (Analytical Procedure) Determining Transmissivity, Storage Coefficient, and Anisotropy Ratio from a Network of Partially Penetrating Wells

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ASTM International, D5912-96(2004) Test Method for (Analytical Procedure) Determining Hydraulic Conductivity of an Unconfined Aquifer by Overdamped Well Response to Instantaneous Change in Head (Slug)

ASTM International, D5920-96(2005) Test Method (Analytical Procedure) for Tests of Anisotropic Unconfined Aquifers by Neuman Method

ASTM International, D6028-96(2004) Test Method (Analytical Procedure) for Determining Hydraulic Properties of a Confined Aquifer Taking into Consideration Storage of Water in Leaky Confining Beds by Modified Hantush Method

ASTM International, D6029-96(2004) Test Method (Analytical Procedure) for Determining Hydraulic Properties of a Confined Aquifer and a Leaky Confining Bed with Negligible Storage by the Hantush-Jacob Method

ASTM International, D6030-96(2002) Guide for Selection of Methods for Assessing Groundwater or Aquifer Sensitivity and Vulnerability

ASTM International, D6034-96(2004) Test Method (Analytical Procedure) for Determining the Efficiency of a Production Well in a Confined Aquifer from a Constant Rate Pumping Test

ASTM International, D6391-99(2004) Test Method for Field Measurement of Hydraulic Conductivity Limits of Porous Materials Using Two Stages of Infiltration from a Borehole

USEPA, April 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/60/B-07/001.

STANDARD OPERATING PROCEDURE
NO. SAS-08-05

WELL INTEGRITY INSPECTION, MAINTENANCE, AND REHABILITATION
Revision 1

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for inspecting groundwater monitoring well integrity. The well integrity inspection identifies wells that in their current condition are not suitable for obtaining groundwater/product elevations, water quality and/or hydraulic information, groundwater/product samples and/or other data obtained using the well. The results of the evaluation shall be used to ensure the integrity of wells over extended periods of time by identifying conditions that warrant well maintenance and/or rehabilitation. This SOP also describes well maintenance and rehabilitation.

2.0 EQUIPMENT AND MATERIALS

- Map of well locations;
- Tools and well keys, as required to facilitate access to wells;
- Water level measuring device (electronic water level indicator, interface probe, or weighted steel tape);
- Adjustable rate pump, adjustable rate submersible or positive displacement bladder pump (Note: The Site-Specific Work and/or Field Sampling Plan (FSP) shall specify the type of pump required);
- 1/4 to 3/8-inch Teflon®, polyvinyl chloride (PVC), or polypropylene tubing, if applicable;
- Power source, if applicable;
- Compressed inert gas source (for use with bladder pump), if applicable;
- PVC or stainless steel bailer or solid slug;
- Rope;
- Pressure transducer and automatic data logger, if applicable;
- Container(s) for purge water storage (e.g. 5-gallon buckets, polyethylene storage tank, etc.);
- Existing well boring/construction logs, if available;
- Groundwater elevation table, if available;
- Polyethylene sheeting, as appropriate;

- Camera;
- Personal protection equipment; and
- Field logbook and/or appropriate field forms.

3.0 HEALTH AND SAFETY WARNINGS

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 EXECUTION

Inspections shall be performed at the frequencies described below or as required by the Site-Specific Work Plan to 1) verify the structural integrity of the wells above and below ground, 2) identify significant silt/sediment buildup in wells, and 3) identify biofouling that could contribute to corrosion of structures or decrease in the efficiency of recovery and pumping operations.

4.1 Well Location Verification

The location of each well shall be compared to that given on the site map. If the well location is found to be in error, the well shall be resurveyed and/or re-delineated relative to site features and its position adjusted on the map.

4.2 Aboveground Structural Integrity Inspection

The physical condition of the well will be determined by visually inspecting aboveground components during each monitoring and/or sampling event. Components to be inspected include:

- Protective casing/flush-mount cover;
- Bumper posts, if applicable;
- Concrete pad or apron, if applicable;
- Well cap (expandable or slip);
- Locking mechanism;
- Exposed top of casing; and
- Surface drainage around the wells.

If the aboveground components are damaged, well maintenance or rehabilitation is required (see Section 4.3).

4.3 Below Ground Well Structural Integrity Inspection

4.3.1 General

Total depth measurements shall be obtained annually in accordance with SOP ENV-08-01 and compared to the baseline total depth measurements obtained at the time of well installation, development, and/or start of the project. If a significant amount of silt/sediment is present, well maintenance or rehabilitation is required (see Section 4.4). Additionally, single well aquifer testing may be performed to determine if silt/sediment has decreased the well hydraulic conductivity, indicating well maintenance or rehabilitation is necessary for collection of representative data. Use of this test will be determined on a site-specific basis or as otherwise determine in the SSWPs.

4.3.2 Monitoring Wells

A stainless steel or PVC bailer or slug, with a diameter and length equivalent to a sampling pump or bailer, shall be lowered the entire length of the well to identify obstructions or damage to the well casing and screen. If the bailer or slug cannot be lowered to within the screened interval, an obstruction or damage exists that requires well maintenance or rehabilitation (see Section 4.4). If well yield decreases significantly, well

integrity may be assessed using a single well aquifer test to determine if well maintenance or rehabilitation is required.

4.3.3 Vapor Extraction Wells

Vacuum and air flow rates shall be measured periodically in accordance with system-specific procedures and compared to previous steady-state measurements and the current operational status of the system. If a significant change in vacuum and/or air flow rates is observed and not substantiated by the current operational status of the system, well maintenance or rehabilitation is required (see Section 4.4).

4.3.4 Recovery Wells

Recovery rates shall be evaluated at least once every quarter and compared to previous measurements. If a significant change in rates is observed and not substantiated by current product/water levels, well maintenance or rehabilitation is required (see Section 4.4).

4.4 Well Maintenance or Rehabilitation

Deficiencies or damage identified during aboveground and below ground well integrity inspections shall be evaluated on a case-by-case basis. Well maintenance or rehabilitation that cannot be implemented at the time of inspection shall be implemented within a reasonable period of time. Well maintenance or rehabilitation may include, but is not limited to, the following:

- Replacement of aboveground components;
- Silt/sediment removal;
- Well surging and redevelopment;
- Biomass removal and/or cleaning with an approved biocide; and
- Equipment (e.g. pumps, etc.) repair or replacement.

If deficiency or damage cannot be corrected through well maintenance or rehabilitation, the well shall be abandoned in accordance with SOP ENV-05-05 and applicable federal, state, and local regulations. Wells critical to site activities and/or operations shall be replaced in accordance with SOPs ENV-05-03 and ENV-05-04, applicable federal, state, and local regulations, and the Site-Specific Work Plan.

4.5 Decontamination

Non-Dedicated and dedicated equipment used for inspection and/or corrective action activities, which does not remain within the well casing, shall be removed from the well. The reusable and/or dedicated equipment and instruments shall be decontaminated in accordance with SOP ENV-04-04 or as otherwise specified by the Site-Specific Work Plan. Disposable equipment and supplies shall be disposed of in accordance with procedures outlined in the Site-Specific Work Plan.

5.0 DOCUMENTATION

Inspection, maintenance, and rehabilitation activities shall be recorded in the field logbook and/or on the appropriate field form as specified in SOP ENV-01-01 or as otherwise required by the Site-Specific Work Plan.

6.0 REFERENCES AND ADDITIONAL RESOURCES

ASTM International, D6089-97(2003) Standard Guide for Documenting a Ground-Water Sampling Event

ASTM International, D4448-01 Standard Guide for Sampling Groundwater Monitoring Wells

USEPA, 2001, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), Region 4, Enforcement and Investigations Branch, SESD, Athens, Georgia, www.epa.gov/region4/sesd/eisopqam/eisopqam.html.

USEPA, April 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/600/B-07/001.

Authors: J. Sapp / T.Gilles Q2R & Approval By: A. Bazan Q3R & Approval By: M. Kelley

STANDARD OPERATING PROCEDURE
NO. SAS-08-06

POTABLE WATER WELL SAMPLING
Revision 1

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for the collection of water samples from water supply wells. Potable water samples are collected to evaluate the potable water supply. In some cases, potable water samples may be collected to evaluate the delivery system (e.g. well casing, pump, piping, etc.). The sampling guidelines described in the SOP are intended to facilitate the collection of representative samples.

2.0 EQUIPMENT AND MATERIALS

- Hand tools (e.g. crescent wrenches, pipe wrenches, and slip joint pliers), as needed;
- Garden water hose;
- Plastic sheeting;
- Graduated cylinder;
- Stopwatch;
- Sample containers and labels;
- Cooler with ice;
- Chain of custody forms and seals; and
- Personal protective equipment.

3.0 HEALTH AND SAFETY WARNINGS

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read

and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 PREPARATIONS

4.1 Sample Location Selection

In general, the installation of a sampling tap to obtain samples shall not be warranted. Potable water samples shall be collected from taps or spigots on the existing delivery system. Prior to sampling, the tap closest to the well shall be identified for sample collection. This location, to the extent practical, should be upstream of any filtration or water treatment device(s). If the location is not upstream of any filtration or water treatment device, the sampler shall recorded the type, manufacturer, and model of each filtration or water treatment device in the field logbook and/or on the appropriate field form. On rare occasions a tap or spigot may not be available for sampling. In these instances, the closest access point to the wellhead shall be selected for sampling. When project objectives include an evaluation of the water delivery, a representative location downstream of filtration or water treatment devices, may be selected. The selected or preferred sample locations shall be described in the Site-Specific Work and/or Field Sampling Plan (FSP).

4.2 Groundwater Elevation and Well Depth Measurements

In general, it is preferred to not obtain groundwater elevations and well depth measurements from public or private water supply wells. In most cases, groundwater elevation and well depth shall be estimated based on the driller's log and/or well completion report. In rare instances it may be necessary to measure groundwater elevation. In these cases, measurements shall be obtained using an electronic water level indicator or an un-weighted steel tape with the loop removed, which has been dedicated for use in potable water wells only and has been properly decontaminated and stored to prevent the introduction of contamination into the well. In addition, the water level indicator shall not be lowered any deeper than is necessary to obtain the groundwater elevation measurement. The need to use chlorine pellets to sanitize the well after measurements are collected will be evaluated on a site-specific basis, as described in SSWPs.

4.3 Calculation of the Pre-Sample Purge Volume

When potable water samples are being collected to evaluate the potable water source, all standing/stagnant water shall be purged from the delivery system immediately prior to sample collection. The volume of water contained in the well casing, pressure or holding tanks, and other plumbing and appurtenances (pipes, hoses, etc.) shall be estimated by the sampler. All estimated volumes of water contained in plumbing and appurtenances, assumptions, and calculations shall be recorded in the field logbook and/or on the appropriate field form.

5.0 EXCUTION

5.1 Pre-Sample Purging

If sample(s) are being collected to evaluate the delivery system, a first draw sample shall be collected prior to the purging (see Section 5.3 below). If samples are being collected to evaluate the potable water supply, the system shall then be purged with a minimum of three times the calculated purge volume before sampling commences. If no information regarding well depth is available, purging shall be performed a minimum of 15 minutes after the well pump engages prior to sampling in addition to the time required to evacuate pre-sample port systems (e.g. pressure tank, water softener, etc.). Pre-sample purging shall also take into account the following, if known:

- Pump intake level;
- Specific capacity of the aquifer; and
- Well efficiency.

Purged water if discharged to the ground surface shall be done in a manner that prevents icy conditions or damage on the property. In addition, the sampler shall divert purge water away from the wellhead or building using hoses, plastic sheeting, irrigation pipe, or other appropriate means, to the extent practical. Purge waters shall be disposed at the nearest sump or drain available whenever possible.

If samples are being collected to evaluate the delivery system, the initial/first draw sample shall be collected prior to purging activities.

5.2 Groundwater Quality/Indicator Parameter Monitoring

The Site-Specific Work and/or Sampling Plan(s) shall specify the groundwater quality/indicator parameters to be monitored, which typically include temperature, pH, specific conductance or actual conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity. Parameter monitoring will begin at the start of purging from the delivery system. The sampler shall monitor and record in the field logbook and/or on the appropriate field form parameters every five to ten minutes (during continuous purging) until parameters have stabilized. Parameter stabilization is considered to be achieved when three consecutive readings, taken within 2 to 3 minute intervals are within the parameter-specific limit listed in the table below or as specified in the Site-Specific Work and/or Sampling Plan(s).

Parameter	Stabilization Criteria[1]
Conductance, Specific Electrical	+/- 3% µS/cm @ 25°C
Conductivity, Actual[2]	+/- 3% µS/cm
Dissolved Oxygen	+/- 0.3 mg/L
Oxidation-Reduction Potential	+/- 10 mV
pH	+/- 0.1 standard units
Temperature	+/- 0.1 ^{o}C
Turbidity	+/- 10% NTUs or three consecutive readings less than or equal to 10 NTUs

Once the parameters have stabilized, purging is considered complete and sample collection shall commence, with the exception of the collection of a first draw sample. The first draw sample shall be collected prior to delivery system purging.

[1] USEPA, 2002, Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, EPA 542-S-02-001
[2] Based on the stabilization criteria for specific electrical conductance as published in the documented cited above

5.3 SAMPLING PROCEDURES

The sampler shall collect the potable water sample(s) from a tap or spigot on the existing delivery system, which is closest to the well. This location, to the extent practical, should be upstream of any filtration or water treatment device(s). If the location is not upstream of any filtration or water treatment device, the sampler shall recorded the type, manufacturer, and model of each filtration or water treatment device in the field logbook and/or on the appropriate field form. The location, including a sketch, shall also be documented in the field logbook and/or on the appropriate field form.

Following purging activities, the sampling tap shall be shut off. The tap shall be turned on and adjusted to an approximate flow of 100 ml/min using a graduated cylinder and a stopwatch. The flow rate shall be recorded in the field logbook and/or on the appropriate field form. Sample bottles shall be filled in a manner which minimizes aeration. The sample bottles shall be filled as required in order of decreasing volatility. Any pertinent field observations (e.g. odors, discoloration, etc.) shall also be recorded in the field logbook and/or on the appropriate field form.

6.0 POST-SAMPLING PROCEDURES

Following sample collection, any filters, aerators, and/or treatment systems disconnected prior to sampling activities shall be reconnected. In addition, the sampling site shall be cleaned before leaving the vicinity.

7.0 DECONTAMINATION

Following sample collection, all equipment shall be decontamination as described in SOP ENV-04-04 or as otherwise specified by the Site-Specific Work and/or Sampling Plan(s).

8.0 DOCUMENTATION

Sample information, labeling, and custody control shall be performed in accordance with requirements specified in SOP ENV-03-01 and ENV-03-02. Sampling activities, including pertinent field information and observations, shall be recorded in the field logbook and/or on the appropriate field form as specified in SOP ENV-01-01 or as required by the Site-Specific Work and/or FSP including, but not limited to, the following:

- Condition of the well and dedicated equipment;
- Owner’s and occupant’s name(s);

- Facility name and address;
- Sampling location (specific tap or spigot);
- Filtering or treatment systems on delivery systems (if applicable);
- Aerator or filter on sampling tap;
- Pressure on holding tank volume (if applicable);
- Purge flow rate;
- Purge time;
- Total purge volume;
- Sample appearance (odor, color, turbidity, etc.); and
- Calculations for purge volumes.

9.0 REFERENCES AND ADDITIONAL RESOURCES

ASTM International, 1994, D5612-94R03 Guide for Quality Planning and Field Implementation of a Water Quality Measurement Program

ASTM International, 1995, D5851-95R00 Guide for Planning and Implementing a Water Monitoring Program

ASTM International, 2001, D5903-96(2001) Standard Guide for Planning and Preparing for a Groundwater Sampling Event

USEPA, 2001, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), Region 4, Enforcement and Investigations Branch, SESD, Athens, Georgia.

USEPA, April 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/600/B-07/001.

STANDARD OPERATING PROCEDURE
NO. SAS-08-07

NON-AQUEOUS PHASE LIQUID SAMPLING
Revision 1

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for the collection of non-aqueous phase liquid (NAPL) samples from monitoring, observation, and/or recovery wells. NAPL samples are collected to support plume characterization and/or treatment/recovery system design. Light and dense NAPL, also referred to as LNAPL and DNAPL, may be collected for physical parameter determination (e.g. density, viscosity, etc.), simulated distillation, fingerprinting, waste characterization, etc.

2.0 EQUIPMENT AND MATERIALS

Equipment and materials may vary based on the type of NAPL being sampled (light or dense). In general, the following equipment and materials shall be required unless otherwise specified by the Site-Specific Work and/or Field Sampling Plan (FSP):

LNAPL Sample Collection:

- Bailer (disposable or dedicated);
- Rope;
- Peristaltic pump;
- Polyvinyl chloride or Teflon tubing (disposable or dedicated), as appropriate; and
- Silicone tubing (disposable or dedicated).

DNAPL Sample Collection:

- Solinst Model 425 Discrete Interval Sampler or equivalent;
- Low density polyethylene (LDPE) tubing;
- Solinst Reel or equivalent;
- High pressure hand pump or compressed air source with regulator; and
- Rope.

General:

- Water and NAPL gauging equipment (see SOP ENV-08-01);
- 5-gallon bucket;
- Approved storage container(s) (55-gallon drum, polyethylene tank, etc.);
- Sample containers and labels;
- Chain of custody forms and seals;
- Decontamination materials/equipment;
- Personal protective equipment; and
- Field logbook and/or appropriate field form.

3.0 HEALTH AND SAFETY

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 EXECUTION

4.1 Preparation

The sampler shall create a work area around the monitoring well to minimize the potential for cross-contamination. Work area preparations may include the placement of polyethylene sheeting prevent sampling equipment from coming in contact with the ground surface. The sampler shall barricade and/or flag the work area, if required by the Site-Specific HASP. The sampler shall also arrange the sampling equipment and supplies to facilitate efficient execution of NAPL sampling procedures.

4.2 Well Gauging

Groundwater and NAPL elevation measurements shall be obtained in accordance with SOP ENV-08-01 or as otherwise specified in the Site-Specific Work and/or FSP. Following sampling activities, the sampler shall also obtain the total well depth from top of casing (in feet to the nearest 0.01-foot) using a water level indicator, interface probe, or steel tape, as required by the Site-Specific Work and/or FSP or otherwise specified. Total well depths may be obtained prior to the sampling (at least one to two weeks in advance) and provided to the sampler. Groundwater and NAPL elevation measurements and total well depth measurements shall be recorded in the field logbook and/or on the appropriate field form.

4.3 Standing NAPL Column and Casing Volume Calculations

The sampler shall calculate the standing NAPL column and casing volume using the following formulas:

4.3.1 LNAPL Column

$$\text{Standing LNAPL Column}_{(\text{Feet})} = \text{DTW}_{(\text{FT BTOC})} - \text{DTP}_{\text{L}\ (\text{FT BTOC})}$$

Where: DTW = Depth to Water
FT BTOC = Feet below top of well casing
DTP_{L} = Depth to Product (LNAPL)

4.3.2 DNAPL Column

$$\text{Standing DNAPL Column}_{(\text{Feet})} = \text{TD}_{(\text{FT BTOC})} - \text{DTP}_{\text{D}\ (\text{FT BTOC})}$$

Where: TD = Total Well Depth
FT BTOC = Feet below top of well casing
DTP_{D} = Depth to Product (DNAPL)

4.3.3 Casing Volume

$$\text{Casing Volume}_{(\text{Gallons})} = \text{Standing NAPL Column}_{(\text{Feet})} \ \text{X} \ \text{Volume per One Foot of Casing}^{\text{WDS}}{}_{(\text{Gallons/Foot})}$$

Where: ^{WDS} = Well diameter-specific (see table below)

Well Diameter-Specific Volume Per One Foot of Casing				
Well Diameter (Inches)	Volume Per Foot of Casing (Gallons)		Well Diameter (Inches)	Volume Per Foot of Casing (Gallons)
0.25	0.0026		4.0	0.6528
0.50	0.0102		6.0	1.469
0.75	0.0230		8.0	2.611
1.0	0.0408		10.0	4.081
2.0	0.1632		12.0	5.876

The sampler shall recorded calculations in the field logbook and/or on the appropriate field form.

4.4 Bailer/Tubing/Sampler Intake Position Determination

The sampler should determine the position/depth of the bailer/tubing/sampler intake, using the water and NAPL elevation measurements, such that the intake will be positioned within the bottom quarter of the NAPL column. The intake position (depth/elevation) shall be recorded in the field logbook and/or on the appropriate field form. In addition, the sampling equipment shall also be recorded in the field logbook and/or on the appropriate field form.

4.5 Well Evacuation

In order to obtain a representative NAPL sample from an existing well, the product that has stagnated and/or may have chemically changed in the well casing shall be removed prior to sampling. The evacuation will allow fresh NAPL to enter the well from the formation.

4.5.1 LNAPL Evacuation

If using a bailer, the sampler shall slowly lower the bailer to the intake position. The bailer shall be slowly retrieved from the well and the contents emptied into a 5-gallon bucket or an approved storage container. This process shall continue until no measurable amount (< 0.01 foot) of LNAPL remains or one casing volume of LNAPL has been removed, whichever occurs first. If using a peristaltic pump, the sampler shall

slowly lower the tubing to the intake position. The pump shall be turned on and the removed LNAPL shall be collected in a 5-gallon bucket or an approved storage container. The pump process shall continue until no measurable amount (< 0.01 foot) of LNAPL remains or one casing volume of LNAPL has been removed, whichever occurs first.

The volume of LNAPL evacuated from the well shall be recorded in the field logbook and/or on the appropriate field form.

4.5.2 DNAPL Evacuation

The discrete interval sampler shall be connected to the tubing and reel. The high pressure hand pump or compressed air shall be connected to the reel. The sampler shall be pressured to the recommended operating pressure for the intake position/depth according to the following unless otherwise specified by the sampler operations manual and/or Site-Specific Work and/or FSP.

Recommended Operating Pressure[1]			
Depth		Pressure	
Feet	Meters	psi	kPa
25	8	20	148
50	15	30	217
100	30	50	364
200	61	95	670
300	90	140	952
500	150	225	1,495

Notes: 1. Operating pressure = (Sample depth in feet X 0.43) + 10 psi
2. Operating pressure = (Sample depth in meters X 9.8) + 70 kPa
3. psi = pounds per square inch
4. kPa = kiloPascals

[1] http://www.groundwatersoftware.com/Equipment/solinst_model_425.htm

While pressurized, the sampler shall then be lowered to the intake position/depth. At the desire depth, the pressure shall be released, which will allow the sampler to fill by hydrostatic pressure. The sampler shall then be re-pressurized to the recommended operating pressure. Following, re-pressurization, the sampler shall be slowly raised to the surface. The contents shall be transferred to the 5-gallon bucket or approved storage container via the sample release device. This process shall continue until no measurable amount (< 0.01 foot) of DNAPL remains or one casing volume of DNAPL has been removed, whichever occurs first.

4.6 Post NAPL Evacuation Activities

Groundwater and NAPL elevation measurements shall be measured and monitored in accordance with SOP ENV-08-01 or as otherwise specified in the Site-Specific Work and/or FSP. Once the NAPL column has recovered to a level equivalent or greater than the prescribed sample volume, sampling may commence.

4.7 Sample Collection

4.7.1 LNAPL Sample Collection

If using a bailer, the sampler shall slowly lower the bailer to the intake position. The bailer shall be slowly retrieved from the well and the contents emptied into the appropriate sample container(s).

If using a peristaltic pump, the sampler shall slowly lower the tubing to the intake position. The pump shall be turned on and the removed LNAPL shall be emptied into the appropriate sample container(s).

4.7.2 DNAPL Sample Collection

The discrete interval sampler shall be connected to the tubing and reel. The high pressure hand pump or compressed air shall be connected to the reel. The sampler shall be pressured to the recommended operating pressure for the intake position/depth according to the following unless otherwise specified by the sampler operations manual and/or Site-Specific Work and/or FSP (see Section 4.5.2). While pressurized, the sampler shall then be lowered to the intake position/depth. At the desire depth, the pressure shall be released, which will allow the sampler to fill by hydrostatic pressure. The sampler shall then be re-pressurized to the recommended operating pressure. Following, re-pressurization, the sampler shall be slowly raised to the

surface. The contents shall be transferred to the appropriate sample container(s) via the sample release device.

4.8 Post Sample Collection

Non-Dedicated and dedicated sampling equipment, which does not remain within the well casing, shall be removed from the monitoring well. The reusable and/or dedicated equipment and instruments shall be decontaminated in accordance with SOP ENV-04-04 or as otherwise specified by the Site-Specific Work and/or FSP. Disposable equipment and supplies shall be disposed of in accordance with procedures outlined in the Site-Specific Work and/or FSP. The sampler shall secure the well casing using a slip or expandable well cap. The flush-mount lid shall be bolted down or the protective cover lid closed and locked, as appropriate.

5.0 Documentation

Sample information, labeling, and custody control shall be performed in accordance with requirements specified in SOP ENV-03-01 and ENV-03-02. Sampling activities shall be recorded in the field logbook and/or on the appropriate field form as specified in SOP ENV-01-01 or as required by the Site-Specific Work and/or FSP.

6.0 REFERENCES AND ADDITIONAL RESOURCES

http://www.groundwatersoftware.com/Equipment/solinst_model_425.htm

USEPA, 2002, Ground-Water Sampling Guidelines for Superfund and RCRA Project Manager, Region 5 and Region 10, EPA 542-S-02-001.

USEPA, April 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/60/B-07/001.

SOP SERIES SAS-09

SURFACE WATER SAMPLING AND MEASUREMENT PROCEDURES

STANDARD OPERATING PROCEDURE
NO. SAS-09-01

SURFACE WATER SAMPLING FOR CHEMICAL AND BIOLOGICAL ANALYSIS
Revision 1

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for the collection of grab surface water samples for chemical and biological analysis using manual sampling techniques. The collection of composite surface water samples using automatic samplers shall be address in an equipment-specific SOP or the Site-Specific Work Plan, as needed. Surface water samples are utilized for the characterization of surface water and assessment of human and ecological receptors.

2.0 EQUIPMENT AND MATERIALS

Sampling equipment and materials vary by collection method. However, some standard equipment and materials are required regardless of collection method:

- Hip or chest waders, as appropriate;
- Boat and personal floatation devices (PFDs), as needed;
- Sample bottles/containers and labels;
- Field logbook and/or the appropriate field form(s);
- Pens with waterproof, non-erasable ink;
- Chain of custody forms;
- Depth and length measurement devices;
- Survey stakes, flags, or buoys and anchors;
- Decontamination materials;
- Coolers and ice packs/double-bagged ice;
- Personal protective equipment; and
- Camera.

3.0 HEALTH AND SAFETY WARNINGS

Aquatic environments present unique health and safety concerns ranging from accessibility to water depth and velocity to indigenous species. Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Work on water requires that marine health and safety procedures are used in addition to standard health and safety procedures. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 PERMITTING

Sampling performed within navigable waters and critical habitats may fall under the jurisdiction of one or more federal, state, or local agencies, including by not limited to the United States Army Corp of Engineers (USACOE), US Department of Fish and Wildlife, and State Departments of Natural Resources. Prior to the commencement of sampling activities, appropriate permit(s), if applicable, shall be obtained.

5.0 EXECUTION

5.1 General Considerations

The scope or extent of the sampling effort, data quality objectives, type(s) of samples (e.g. surface or depth grab), and sampling technique shall be determined prior to sample site selection and sample collection. In addition, the hydrology and morphometrics of a stream or impoundment shall be determined to the extent practical prior to sample collection. Water quality data (e.g. dissolved oxygen, pH, and temperature, etc.) shall be collected prior to sample collection, to the extent practical, to determine if stratification is present. These sampling activities should be restricted to seasons when ice is not present, unless specified by a Site-Specific Work Plan and/or Field Sampling Plan (FSP). The Site-Specific Work Plan and/or FSP, as appropriate, shall specify the type(s) of samples to be collected and the collection technique(s).

5.2 Sample Site Selection

An initial reconnaissance shall be performed, to the extent practical, identify suitable sampling locations. Bridges and piers shall generally be deemed acceptable sampling locations since they provide ready access and permit water sampling at any point across the width of the water body. However, data quality objectives (DQOs) must be reviewed prior to final acceptance of these structures as sampling locations, since these structures alter the nature of water flow. When samples will be collected by wading in lakes, ponds, and slow-moving rivers and streams, sampling locations shall be selected that allow the sampler to approach the location from downstream in order to minimize the disturbance of sediments. Sampling station locations shall be selected without regard to other means of access if the stream is navigable by boat. However, other factors including but not limited to the following shall be considered in the sample site selection process:

- Project goals and DQOs;
- Field personnel health and safety;
- Manmade structures that alter the nature of water flow and mixing;
- General water environment characteristics (e.g. flow, depth, stratification, etc.);
- Potential disturbance of threatened or endangered species or critical habitat; and
- Type of water environment: river, streams, creeks; lakes, ponds, impoundments, estuarine, etc.

5.3 Surface Grab Sample Collection Procedures

Surface grab samples shall be collected from the top 12 inches of the water column. Samples shall be collected in a manner that avoids skimming of the surface and disturbance of sediments. If sample collection is performed by wading in the stream, the location shall be approached from a downstream location and efforts shall be made to minimize sediment disturbance, which has the potential to bias the sample. Wading shall be deemed acceptable if a noticeable current is present and the samples can be collected directly into the bottle from a location upstream of the field personnel. The field personnel shall approach the sample location slowly from downstream in order to minimize sediment disruption and sample corruption.

5.3.1 Direct Grab Sampling

Where practical, use of the actual sample container as the collection device is preferred since the same container can be submitted for laboratory analysis. This procedure reduces sample handling and potential loss of analytes or contamination from the sample from other sources. The following procedure shall be used for direct grab sample collection using unpreserved sample containers:

1. Remove the container cap or lid.
2. Slowly submerge the container, opening first, into the water.
3. Invert the container so the opening is upright and pointing towards the direction of water flow (if applicable) and allow water to slowly run into and fill the container.
4. Return the filled container to the surface.
5. If field preservation is required, proceed to Step 6; otherwise, secure the container cap or lid and proceed to Step 10.
6. Pour out a small volume of sample away from and downstream of the sampling location. (Do not use this step for volatile organics or other analytes that require zero headspace.)
7. Add the appropriate volume of the analytical method-prescribed preservative and secure the container cap or lid.
8. Invert the container several times to ensure sufficient mixing of the sample and preservative.
9. Check the preservation of the sample; adjust the pH of the sample with additional preservative, if necessary; and re-secure the cap or lid.
10. Label the sample container in accordance with SOP ENV-03-01 and place in cooler with double-bagged ice for in preparation for transportation to the analytical laboratory.

5.3.2 Sampling with an Intermediate Vessel or Container

If the sample cannot be collected directly in the sample container(s), an unpreserved sample container or an intermediate vessel (e.g. beaker, bucket, or dipper with or without an extension arm) shall be used to obtain the sample using the following procedure:

1. Decontamination the intermediate vessel in accordance with SOP ENV-04-04 or use certified clean, laboratory provided, unpreserved bottles.
2. Fill the intermediate vessel or container by slowly dipping it into the water with the opening pointing towards the direction of water flow (if applicable);

3. Allow water to slowly run into and fill the intermediate vessel or container in a manner that minimizes agitation of the sample;
4. If field preservation is required, ensure the preservative is present in the sample container prior to transfering water from the intermediate vessel;
5. Remove the sample container lid and fill the sample container(s) from the intermediate vessel or container while avoid direct contact between them;
6. Secure the sample container lid.
7. Label the sample container in accordance with SOP ENV-03-01 and place in cooler with double-bagged ice for in preparation for transportation to the analytical laboratory.

5.3.3 Sampling with a Pump and Tubing

The following procedure shall be used for the collection of a surface grab sample using a pump and dedicated tubing:

1. Decontaminate the pump in accordance with SOP ENV-04-04, as appropriate.
2. Lower the tubing or pump intake to a depth of 6 to 12 inches below the water surface, where possible. The pump intake or intake tubing shall be maintained below the water surface during sample collection.
3. Pump several tubing volumes through the system prior to collecting the first sample.
4. If field preservation is required, ensure the preservative is present in the sample container prior to filling the sample container;
5. Fill the sample container(s) from the discharge tubing.
6. Secure the sample container lid.
7. Label the sample container in accordance with SOP ENV-03-01 and place in cooler with double-bagged ice for in preparation for transportation to the analytical laboratory.

5.4 Depth Grab Sample Collection Procedures

Depth grab samples shall be collected from at least below the top 12 inches of the water column to within 6 inches of the stream or impoundment bed, at depths to satisfy the DQOs specified by a Site-Specific Work Plan and/or determined in the field based on field encountered conditions (i.e., stratification, water column depth, etc.). Specific sample collection procedures for depth grab samples are presented below. If sample collection is performed by wading in the stream, the location shall be approached from a downstream location

and efforts made to minimize sediment disturbance, which has the potential to bias the sample. Wading shall be deemed acceptable if a noticeable current is present and the samples can be collected from a location upstream of the field personnel. The field personnel shall approach the sample location slowly from downstream in order to minimize sediment disruption and sample corruption.

5.4.1 Sampling with Kemmerer, Niskin, or Van Dorn Type Devices

To the extent practical, devices constructed of stainless steel or Teflon or with Teflon-coated surfaces shall be used. Samplers that are constructed of plastic and rubber shall not be used to collect samples for extractable organics or volatile organic compound (VOC) analysis. The following procedure shall be used to collect depth grab samples using these devices:

1. Decontaminate the device in accordance with SOP ENV-04-04;
2. Measure the water column to determine the maximum depth and sampling depths;
3. Mark the line attached to the device with depth increments so that the sampling depth can be accurately recorded;
4. Slowly lower the device to the desired sampling depth in a manner that minimizes sediment disturbance;
5. At the desired depth, send the messenger weight down to trip the closure mechanism;
6. Slowly retrieve the device;
7. Rinse the outside of the device with distilled water;
8. Remove the sample container cap or lid and fill the container via the discharge tube;
9. If field preservation is required, follow Step 6 through Step 9 in Section 5.3.1 above; otherwise, proceed to Step 10 below.
10. Secure the sample container lid.
11. Label the sample container in accordance with SOP ENV-03-01 and place in cooler with double-bagged ice for in preparation for transportation to the analytical laboratory.

5.4.2 Sampling with Double Check-Valve Bailers

If DQOs do not necessitate a sample from a strictly discrete interval of the water column, a double check-valve bailer may be used. The following procedure shall be used to collect a depth grab sample with a double check-valve bailer:

1. Decontaminate the bailer in accordance with SOP ENV-04-04, or use a clean disposable bailer at each sampling location.
2. Measure the water column to determine the maximum depth and sampling depths.
3. Mark the line attached to the bailer with depth increments so that the sampling depth can be recorded.
4. Slowly lower the bailer to the desired sampling depth in a manner that minimize sediment disturbance.
5. Slowly retrieve the bailer.
6. Rinse the outside of the bailer with distilled water.
7. Remove the sample container cap or lid and fill the containers via the discharge port.
8. If field preservation is required, follow Step 6 through Step 9 in Section 5.3.1 above; otherwise, proceed to Step #9 below.
9. Secure the sample container lid.
10. Label the sample container in accordance with SOP ENV-03-01 and place in cooler with double-bagged ice for in preparation for transportation to the analytical laboratory.

5.4.3 Sampling with a Pump and Tubing

The following procedure shall be used for the collection of a depth grab sample using a pump and dedicated tubing:

1. Decontaminate the pump in accordance with SOP ENV-04-04, as appropriate.
2. Measure the water column to determine the maximum depth and sampling depths.
3. Secure the pump intake or intake tubing to a stiff pole or weight.
4. Lower the pump intake or intake tubing to the desire sample depth.
5. Pump several tubing volumes through the system prior to collecting the first sample.
6. Remove the sample container cap or lid and fill the sample container from the discharge tubing.
7. If field preservation is required, follow Step 6 through Step 9 in Section 5.3.1 above; otherwise, proceed to Step 8 below;
8. Secure the sample container lid.
9. Label the sample container in accordance with SOP ENV-03-01 and place in cooler with double-bagged ice for in preparation for transportation to the analytical laboratory.

5.5 Sampling for Biological Analysis

When sampling for biological or bacteriological examination, the procedures described above shall be followed with one exception, unless otherwise specified in the Site-Specific Work and/or FSP. Samples shall be collected in bottles properly sterilized and protected against contamination. As with any sample collection procedure, while the bottle is open, both the bottle and stopper shall be protected against contamination from other sources and the bottle closed at once following sample collection.

6.0 DOCUMENTATION

Sample information, labeling, and custody control shall be performed in accordance with requirements specified in SOP ENV-03-01 and ENV-03-02. Sampling activities shall be recorded in the field logbook and/or on the appropriate field form as specified in SOP ENV-01-01 or as required by the Site-Specific Work and/or FSP.

7.0 REFERENCES

ASTM International, D3977-97 (2002), Standard Test Methods for Determining Sediment Concentration in Water Samples.

ASTM International, D4581-86 (2005), Guide for Measurement of Morphologic Characteristics of Surface Water Bodies.

ASTM International, D5073-02, Practice for Depth Measurement of Surface Water.

Florida Department of Environmental Protection, February 2004, DEP-SOP-001/01 FS 2100 Surface Water Sampling.

USEPA, November 1994, SOP 2013: Surface Water Sampling, Rev. 0.0, Environmental Response Team.

USEPA, July 2002. Standard Operating Procedures for the Collection of Chemical and Biological Ambient Water Samples. Revision 1.

USEPA. 40 CFR Part 136.3 (e) Table II

USEPA, April 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/600/B-07/001.

STANDARD OPERATING PROCEDURE
NO. SAS-09-02

STREAMFLOW MEASUREMENT
Revision 1

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes guidelines for the calculation of velocity and stream discharge measurements in rivers and streams. Procedures are given for measurements that can be conducted from water vessels (i.e. boats or barges), bridges (if traversing a representatives section of the river) or by wading with assistance from other field personnel working from the stream bank.

2.0 EQUIPMENT AND MATERIALS

- Flow Meter;
- Top-setting wading rod (measured in tenths of a foot);
- Tape measure or tagline (long enough to traverse the stream bed)
- Stakes to anchor tape to shore;
- Mallet or hammer;
- Field logbook and applicable field data sheets;
- Pen(s) with waterproof, non-erasable ink;
- Waders; and
- Personal protective equipment.

3.0 HEALTH AND SAFETY WARNINGS

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Work on water requires that marine health and safety procedures are used in addition to standard health and safety procedures. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and

subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 GENERAL PROCEDURES

4.1 Standard Field Procedures

Streamflow measurements shall be conducted only by a trained technician. Field data and observations associated with streamflow measurements shall be documented in accordance with SOP ENV-01-01, if not otherwise specified in this SOP. All activities should be recorded in a field logbook and/or on a streamflow measurement field form.

4.2 Site Selection

The stream transect location is a critical component of streamflow measurement. A site where the stream is most consistent in depth and flow rate across its width is easier to sample and provides more accurate results. Flow sites should be free of eddies, slack water, and excessive turbulence. Avoid areas where islands, ox-bows, piles of debris, aquatic plants or tributaries are present.

4.3 Flow Meter Selection

Several flow meters are available for measuring stream velocity. Some specific meters are the Price Model #1210 (AA); Price Model #1205 (Pygmy) for small, shallow streams; the March-McBirney 201D; and the March-McBirney Flo-Mate 2000. Selection of an appropriate flow meter will depend on the width and depth of the stream being measured, as well as stream features and irregularities. Additional guidance for selection of flow meters may be given in the Site-specific Work Plan.

4.4 Calculation of Stream Discharge

Stream discharge is determined by multiplying the mean stream velocity by the cross sectional area of the flow. The general form of the discharge equation is:

$$Q = A \text{ x } v$$

Where: Q = discharge in cubic feet per second (cfs)
A = cross section area of the channel at the transect in square feet (ft^2)
v = mean water column velocity at the transect in feet per second (ft/s)

To measure discharge (Q), a transect of the stream is divided into subsections and velocity, width and depth measurements are made within each subsection. Discharge of the stream at the transect is calculated by a form of the general equation:

$$Q = \sum_{i=1}^{n} (A_i \, x \, v_i)$$

Where: Q = discharge (cfs)
A_i = cross-sectional area of subsection I (ft^2)
v_i = velocity of subsection (ft/s)

A variation of this equation for mid-section method from Rantz (1982) is presented is Section 7.0 below. Other variations can be found in references listed at the end of this SOP and may be used as specified in the Site-specific Work Plan.

5.0 FIELD MEASUREMENT PROCEDURES

1. Calibrate the flow meter as specified in the manufacturer's instructions.
2. Attach the flow meter to the top set wading rod.
3. Measure the width of the stream at the selected transect location is measured by staking one end of the tape measure or pre-measured and incrementally marked tagline on the right bank. Pull the tape measure across the stream keeping it perpendicular to the flow and stake it on the left bank or use GPS to establish a transect location if sampling from a vessel. Measure the width of the stream from left edge of water (LEW) to right edge of water (REW). LEW is defined as the point where water flow begins on the transect as you face downstream. REW is where water flows ends on the transect.

4. Determine the spacing of transect subsections to be used for velocity measurements. Each subsection should have a width of 5% to 10% of the stream width. For an accurate measurement of discharge, velocity should be measured in 20 to 30 subsections. If inconsistencies in flow rate or streambed topography are present, the number and sizes of subsections can be adjusted to accommodate the differences. Additional guidance on subdividing the transect may be given in the Site-specific Work Plan.
5. Determine the mid-point of each subsection. Use a cumulative measurement. If the stream is 30 feet wide with 20 subsections, the first mid-point is located at 0.75 feet from LEW, the second is located at 2.25 feet from LEW, etc. Draw a rough sketch of the transect with subsections and mid-point measurements in the field logbook and/or on the appropriate field form.
6. Begin the velocity and depth measurements at the first subsection mid-point as measured from the LEW. Measure the total depth of water using the scale on the lower portion of the wading rod or 2-inch diameter graduated aluminum pole. Single indentations on the rod indicate 0.1 foot, double indentations indicate 0.5 foot and triple indentations indicate 1.0 foot. Depending on water depths, velocity measurements will be taken at one or two depths as follows:
    - Depths ≤ 2.5 feet – one measurement is taken at 60% of the total depth when measured from the surface of the water. To set the sensor of the flow meter at 60% of the depth, line up the foot scale on the sliding rod with the tenth scale on the top of the depth gauge rod. For example, if the first subsection is 1.5 feet deep, line up the 1 foot indentation on the sliding rod with the 5 on the tenth scale on the depth gauge rod.
    - Depths > 2.5 feet – two measurements are taken: one at 20% of the total depth and one at 80% of the total depth when measured from the surface of the water. To set the 20% depth point, multiply the depth of the water by two and move the sliding rod so that the foot measurement on it lines up with the tenth of a foot measure on the depth gauge rod. For example, if the first subsection is 2.8 feet deep, twice the depth is 5.6 feet. Line up the number 5 on the sliding rod with the 6 on the depth gauge rod. To set the 80% depth point, divide the depth of the water by two and move the sliding rod to line up with the depth gauge rod based on the results. For example, 2.8 feet divided by 2 equals 1.4 feet. Line up the number 1 on the sliding rod with the 4 on the depth gauge rod. The average of the two velocity measurements are used in the flow calculation.

Take the velocity measurement(s) following the manufacturer's instructions and record them in the field logbook or on the field log form. Proceed to the next subsection of the transect and repeat the procedure across the stream towards the REW.

7. If required, continue to next transect location and repeat the measurement procedures.

6.0 DISCHARGE CALCULATIONS

Calculate the discharge in each transect subsection by multiplying the average velocity (>2.5-foot depth subsection) or single velocity (≤ 2.5-foot depth) by the subsection width and average depth using the equation:

$$Q = \left(\frac{D_1 + D_2}{2}\right)\left(\frac{v_1 + v_2}{2}\right)W_1 + \ldots + \left(\frac{D_m + D_n}{2}\right)\left(\frac{v_m + v_n}{2}\right)W_m$$

Where: Q = discharge (cfs)
v = velocity of subsection (ft/s)
W = width of subsection (ft)

Note: The first and last subsections are located at the edges of the stream and have a depth and velocity of zero (D_1, D_n, v_1 and v_n).

7.0 QUALITY ASSURANCE/QUALITY CONTROL

7.1 Equipment Calibration, Operation, and Maintenance

All field equipment shall be calibrated, operated, and maintained in accordance with SOP ENV-02-01 and manufacturer's instructions.

7.2 Calculations

All calculations shall be checked by another person for correctness and use of appropriate equations. Any corrections required will be made by the person originally performing the calculations. These corrections will be checked for correctness and approved for publication.

8.0 REFERENCES AND ADDITIONAL RESOURCES

Carter, R. W. and Davidian, J., 1969, General Procedure for Gaging Streams: Techniques of Water Resources Investigations of the U.S. Geological Survey, Book 3.

California Department of Pesticide Regulation, Environmental Monitoring Branch, 2004, Standard Operating Procedure for Determining Wadable Stream Discharge with Price Current Meters, SOP Number: FSWA009.01.

Rantz, S.E., 1982, *Measurement and Computation of Streamflow: Volumes 1 and 2*, "Measurement of Stage and Discharge", U.S. Geological Survey Water-Supply Paper 2175.

Florida Department of Environmental Protection, Bureau of Watershed Management, Watershed Assessment Section, February 2004, FT 1800 Field Measurement of Water Flow and Velocity. DEP-SOP-001/01.

USEPA, Region 6, January 2003, Standard Operating Procedure for Streamflow Measurement.

USEPA, April 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/600/B-07/001.

SOP SERIES SAS-10

WITHHELD - NOT RELEVANT TO STUDY ACTIVITIES

SOP SERIES SAS-11

SOIL VAPOR SAMPLING AND MEASUREMENT PROCEDURES

STANDARD OPERATING PROCEDURE
NO. SAS-11-01

SUB-SLAB SAMPLE PORT INSTALLATION, SAMPLING, AND ABANDONMENT
Revision 1

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for installation and sampling of sub-slab sample ports. Soil gas sampling is a useful tool to evaluate the potential for vapor intrusion at sites with subsurface chemical impacts and existing buildings. Sub-slab sampling is conducted directly beneath the building's slab to provide measurements of soil gas that may potentially enter a building.

2.0 EQUIPMENT AND MATERIALS

- Rotary hammer drill (or equivalent) with 1-inch and 5/16-inch diameter bits;
- Hand tools, including a hammer, needle-nose pliers, and trowel;
- "T" Swagelok® (compression) or equivalent fitting;
- 3-way and 2-way stopcocks;
- ¼-inch O.D. Teflon™ tubing;
- Tedlar™ bags;
- Plastic helium shroud;
- Broom and dust pan or hand vacuum;
- Beeswax;
- Nitrile gloves;
- Summa™ canisters with flow controllers, particulate filters, vacuum gauges, and shipping container;
- Sample labels;
- Chain of custody forms and seals;
- Field air monitoring instruments, as specified in the Work Plan (e.g. photoionization detector (PID), multi-gas monitors, etc.)
- Location markers (e.g. pin flags, wooden stakes, flagging tape, etc.);

- Asphalt cold patch or cement, as appropriate for site restoration; and
- Field logbook and/or appropriate field forms

3.0 HEALTH AND SAFETY

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 CONSIDERATIONS

Variations in chemical-specific characteristics, geologic conditions, and atmospheric influences can affect soil-gas sampling results. For this reason, it is important to understand factors the may influence the reported data when collecting soil-gas data. In all cases, site-specific factors should be carefully evaluated prior to initiation of sampling to obtain representative soil-gas data.

Prior to any soil-gas sampling, soil type must be evaluated for suitability of sampling. Soils with smaller grain sizes have smaller pore spaces and are less permeable, which may reduce the ability for soil gas to be released from the subsurface. For example, clays have the smallest grain size and significantly restrict soil gas migration. Soil moisture also limits the ability for soil gas to be released from the subsurface because moisture trapped in the pore space of sediments can inhibit or block soil-gas flow. Seasonal and geographical variations in soil moisture content can affect air permeabilities. In addition, manmade and naturally occurring preferential pathways (e.g. utility corridors, lenses of coarse-grained materials within fine-grained materials, etc.) may also affect soil-gas migration and shall be considered prior to soil-gas sampling.

Reliability of soil-gas sampling may be improved by using fixed probes and by ensuring that leakage of atmospheric air into the samples is avoided during purging or sampling. To avoid dilution of the sampling region from leakage, the minimum purge volume deemed adequate to flush the sampling system should be removed, and soil-gas samples should be collected from the most permeable zones in the vadose zone when possible. Site-specific information concerning soil lithology, grain size analysis, soil moisture, and soil-gas permeability may be obtained by performing three soil borings in the immediate area of the sampling locations in advance of the soil-gas sampling. In addition, previous site investigation sample results, when available, should be used to determine the placement of the soil-gas sampling locations.

Since oxygen, carbon dioxide, and nitrogen can be sampled using a multi-gas monitor to give real-time results, parallel analysis of oxygen, carbon dioxide, and nitrogen in soil-gas may also be used to help assess the reliability of a given sample result.

5.0 EXECUTION

The active soil-gas sampling approach consists of withdrawing an aliquot of soil gas from the subsurface, followed by the analysis of the withdrawn gas. Active soil-gas systems use mechanical equipment to create a small-diameter hole in the ground and then use a vacuum to "actively" withdraw a soil gas sample through Teflon tubing within the vadose zone. The soil gas sample is collected in a Summa canister and sent to a laboratory for analysis. Samples are analyzed using USEPA's Ambient Air Compendium Method TO-15 (USEPA, 1999) for determining organic compounds in ambient air. The results provided by active soil-gas systems are quantitative and are reported in units of concentration per volume (micrograms per cubic meter [$\mu g/m^3$], or parts per billion volume [ppb_v]).

The following active soil-gas sampling methodologies (port installation and sampling) are based on established methods as outlined in the *USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* (USEPA, 2002) and the ASTM International (ASTM) standard guide D 5314-01 (ASTM, 2001). Additional guidelines were provided from the San Diego County Site Assessment and Mitigation (SAM) Manual, "Overview of Soil Vapor Survey Methods" (San Diego County, 2002 and 2004) and the California Regional Water Quality

Control Board (CRWQCB), Los Angeles Region (LARWQCB) (CRWQCB, 2002 and 2003) and the Department of Toxic Substances Control (DTSC) guidelines (DTSC, 2004).

5.1 PRE-SAMPLING ACTIVITIES

Before starting field activities, attempts should be made to obtain as-built drawings for each building to determine foundation thickness and utility locations. The as-built drawings should be used to finalize probe placement in each of the buildings.

Prior to installing the sub-slab vapor probes, a building survey will be completed. The purpose of the building survey is to document general building structural and use information, including describing the general building uses, presence/absence of wells or sumps, presence/absence of a basement, and documenting potential indoor VOC sources by identifying what chemicals are used or are present in the building. Rooms where probes are proposed should be screened with a PID. If available, Material Safety Data Sheets (MSDSs) for products used in the building will be obtained. The initial building survey will also include identifying the points at which subsurface utilities enter the building. A Building Questionnaire (See Attachments) form should be used for the initial building survey.

5.2 SUB-SLAB SOIL VAPOR PROBE CONSTRUCTION AND INSTALLATION

The sub-slab soil vapor probe installation procedures were derived primarily from the USEPA's *Draft Standard Operating Procedure for Installation of Sub-Slab Vapor Probes and Sampling Using EPA Method TO-15 to Support Vapor Intrusion Investigations* (USEPA, 2002). The sub-slab probes described in the USEPA SOP and in the following procedures are permanent sampling probes that will remain in place after completion of the sampling event. Permanent sampling probes are preferred because they provide higher quality and more consistent data. The individual probes will be removed and the holes sealed upon determining that further sub-slab soil vapor sampling will not be required at a given location.

Use a rotary hammer drill and a clean drill bit to create a shallow (2.5 centimeters (cm) or 1 inch) outer hole that partially penetrates the slab. Areas of visible staining or known previous chemical spills will be avoided. Use a small brush and dust pan or hand vacuum to collect concrete dust and cuttings from the hole. Since the outer hole does not penetrate the floor slab, a dedicated drill bit is not required.

After completing the outer hole, a rotary hammer drill will be used to create a smaller diameter inner hole (0.8 cm or 5/16 inch) through the remainder of the slab and approximately 7 to 8 cm or 3 inches into sub-slab material. The inner hole should be drilled using a dedicated drill bit. Drilling into sub-slab material will create an open cavity which will prevent obstruction of probe inlets during vapor sampling. After completing drilling, the outer hole should be cleaned using a towel moistened with deionized water to increase the potential of obtaining a good seal during cement application.

Probes should be constructed of stainless steel, brass, or Teflon™ tubing and fittings to ensure that construction materials are not a source of VOCs. Metal probe materials should be cleaned with detergent and water prior to installation to remove cutting oils that may have been used in manufacturing. Once the thickness of the slab is known, stainless steel or Teflon™ tubing should be cut to ensure that probes "float" in the slab to avoid obstruction of the probe with sub-slab material. Construct sub-slab vapor probes from small diameter (0.64 cm or 1/4 inch outer diameter x 0.46 cm or 0.18 inch inner diameter) chromatography grade 316 stainless steel or brass tubing and stainless-steel or brass compression to thread fittings (e.g., 0.64 cm or 1/4 inch outer diameter x 0.32 cm or 1/8 inch NPT (National Pipe Tapered) Swagelok® female thread connectors). The probes will be closed using 0.32 cm (1/8 inch) recessed stainless steel or brass socket plugs.

Set sub-slab vapor probes in holes such that the fittings rest at the base of the outer hole and the top of the probes are completed flush with the slab. Each probe will have recessed stainless steel or brass plugs so as not to interfere with day-to-day use of buildings. Mix a quick-drying portland cement that expands upon drying (to ensure a tight seal) with deionized water to form a slurry and inject or push into the annular space between the probe and outside of the outer hole. Allow cement to cure for at least 24 hours prior to sampling.

5.3 SUB-SLAB SAMPLING PROCEDURES

Subsurface vapor will not be sampled if measurable precipitation or irrigation near the sampling location has occurred within the previous five days. The increased soil moisture can reduce soil permeability and cause the soil vapor sample results to be biased low.

5.3.1 Sample Train Assembly

Samples will be collected from the previously installed soil vapor probes using evacuated batch-certified 1 liter (L) or smaller Summa™ canisters equipped with dedicated flow regulators and integrated particulate

filters. A flow regulator/particulate filter and vacuum gauge will be attached to each canister as described in the Summa Canister Instructions provided by the laboratory. Canisters, flow regulators/particulate filters, and vacuum gauges will be supplied by the laboratory.

A helium shroud, consisting of a solid plastic container with a height of less than 6 inches and a volume less than 6L, will be placed around the exposed portion of the soil vapor probe. A dedicated stainless-steel fitting and Teflon™ tubing will be connected to the soil vapor probe while passing through a ¼-inch hole in the side of the helium shroud, no more than three inches above the base of the shroud. All fittings and tubing will be dedicated in order to avoid cross-contamination between probes. A second length of Teflon™ tubing will be inserted into the side of the shroud and connected to a helium cylinder on the outside of the shroud. The Teflon™ tubing attached to the soil vapor probe will be connected to a two-way stopcock. The two-way stopcock will be attached to a three-way stopcock. The other two outlets on the three-way stopcock will be attached to Teflon™ tubing. The tubing from one outlet of the three-way stopcock will be connected to the Summa™ canister assembly, and the tubing from the other outlet will be connected to a 1L Tedlar™ (or equivalent) bag. The Tedlar™ bag will be placed in a lung box. An air pump will be used to evacuate the air inside the lung box and collect a sub-slab soil gas sample in the 1L Tedlar™ bag. A new pair of Nitrile gloves should be worn while connecting the sample assembly for each soil vapor probe. The total length of Teflon™ tubing should not exceed 5 feet.

When collecting duplicate or QA split samples, two separate canister assemblies are connected using a stainless steel “T” fitting, and the “T” fitting is then connected to the three-way stopcock using Teflon™ tubing. The “T” fitting will be provided by the laboratory.

5.3.2 Helium Leak Testing

The purpose of the chemical leak test is to ensure that the sub slab sample port and probe assembly is properly set and not leaking. A leaking sub slab probe assembly could result in a leakage of indoor air into the sub slab sample, potentially biasing the sample. Prior to sampling, a chemical leak test will be performed using helium as a tracer gas. The ambient air inside the shroud will be replaced with helium graded at 99.9 percent purity or higher until the atmosphere consists of a minimum of 20 percent helium. It should be noted that concentrations of 60 percent to 80 percent helium have routinely been observed in the shroud during prior field testing. This will be accomplished by inserting Teflon™ tubing through a ¼ inch hole in the shroud and

attaching the other end to the helium canister. The helium canister will then be opened, and the shroud atmosphere will be continuously monitored by a Dielectric Technologies Model MGD-2002 Multi-Gas Detector (or equivalent) until the percentage of helium inside the shroud reaches a minimum of 20 percent and the readings on the Multi-Gas Detector (or equivalent) stop increasing. The final helium concentration inside the shroud will be recorded on the Field Data Air Sampling Form. The final helium concentration inside the shroud will be multiplied by 10 percent (0.1) to determine the allowable concentration of helium in the Tedlar™ bag sample. Both the final helium concentration inside the shroud and the calculated allowable concentration in the Tedlar™ bag will be recorded on the Field Data Air Sampling Form (See Attachments).

After the target atmosphere is established, the two-way and three-way stopcocks will be opened to the lung box, which contains a 1 L Tedlar™ bag. An air pump attached to the lung box via Teflon™ tubing will be used to evacuate the existing air inside the lung box, which will in turn cause the 1 L Tedlar™ bag to fill. Once filled, the 1 L Tedlar™ bag will be removed from the lung box and the air inside will be measured using the Model MGD-2002 Multi-Gas Detector (or equivalent) for the presence of helium. The concentration of helium measured inside the Tedlar™ bag will be recorded on the Field Data Air Sampling Form. If the concentration of helium in the sample is below the calculated allowable concentration (i.e., less than 10 percent of the concentration inside the helium shroud), proceed with the mechanical leak test and sample collection as described in Sections 5.3.3 and 5.3.4.

Corrective actions to mitigate leaks in the sub-slab soil vapor probe will be performed when the helium concentration in the Tedlar™ bag sample exceeds 10 percent of the starting concentration in the helium shroud. Corrective actions will be performed in the field and will initially involve resealing the probe base with beeswax and repeating the helium leak test. If resealing and retesting fails to produce acceptable leak test results after two attempts, the probe will be abandoned and a new probe will be installed. Samples will not be collected for submittal for laboratory analysis when the helium concentration in the Tedlar™ bag sample exceeds 10 percent of the starting helium concentration in the shroud.

5.3.3 Mechanical Leak Testing

The mechanical leak test will be performed immediately after completing the helium leak test. The mechanical leak test will be completed by closing the two-way stopcock and turning the valve on the three-

way stopcock to close the tubing connected to the lung box assembly. This will close the connection between the two-way stopcock and the lung box assembly and open the connection between the two-way stopcock and the Summa™ canister. Vacuum test the connections between the Summa™ canister and stopcock by opening the canister valve to place a test vacuum on the assembly for 10 minutes. The start time and initial vacuum, as well as the stop time and final vacuum, will be recorded on the Field Data Air Sampling Form and in the field logbook. If gauge vacuum can not be maintained for 10 minutes, work shall be suspended and all fittings in the sample assembly will be checked. Retest the sample assembly. If vacuum still can not be maintained by 10 minutes, sampling activities will be discontinued until leak can be identified and addressed.

If gauge vacuum was maintained for 10 minutes, close the canister valve and immediately proceed with sample collection as described in Section 5.3.4. Since the fitting that connects the tubing from the sub-slab probe to the two-way stopcock cannot be leak tested through either the helium or mechanical leak tests, this fitting will be sealed with Teflon™ tape and beeswax.

5.3.4 Sample Collection

Sample location information and meteorological conditions (temperature, barometric pressure, wind speed/direction, and relative humidity) shall be recorded on a Field Data Air Sampling Form. Meteorological data will be obtained online from the nearest National Weather Service measuring station. Digital photos will be taken of each sample location and sample assembly.

Open the two-way stopcock connecting the Summa™ canister assembly to the soil vapor probe. Open the canister valve to begin sample collection. The time and initial vacuum when sample collection starts shall be recorded on the Field Data Air Sampling Form. The laboratory-provided flow regulators will be calibrated for a 5- to 10-minute sample duration, which correlates to a flow rate of 100 to 200 mL/min. Close the sample canister valve when the vacuum gauge indicates approximately 3-5 inches Hg (mercury) of vacuum remain in the canister. Sample collection should take approximately 5 minutes for a 1L Summa™ canister connected to a 200 mL/min flow regulator. The time sample collection was stopped and final vacuum shall be recorded on the Field Data Air Sampling Form. Remove the flow regulator/particulate filter and vacuum gauge assembly and replace the laboratory-supplied brass plug on the canister. Disconnect the sample tubing assembly and replace the plug on the soil vapor probe.

Label the sample canister and record on the COC the sample name, date and time the sample was collected, the canister and flow controller serial numbers, and the final vacuum gauge reading. Samples shall not be chilled or subjected to extreme temperature or pressure fluctuations. Samples will be shipped to the laboratory for analysis of VOCs by USEPA Method TO-15.

5.3.5 Quality Control

Trip blanks, field duplicates, and QA samples will be collected during soil vapor sampling activities. Field duplicates and QA split samples will be collected at the rate of one duplicate/QA sample per 10 soil vapor samples (i.e., 10 percent). Normally, field duplicates and QA samples are collected from the same location; however, the "T" connectors used to collect duplicate samples can not be used to collect three simultaneous samples. Therefore, the duplicate and QA samples will be collected from separate locations.

A trip blank, consisting of an unopened evacuated canister, will be sent with each shipment of sub-slab vapor samples. Trip blanks can consist of either unopened fully evacuated canisters or canisters that have been fully charged with zero grade air by the laboratory. Since a fully charged canister has no vacuum with which to pull contaminants into the canister, a fully evacuated canister has a better likelihood of capturing potential transit-related contamination. The trip blank will be provided by the laboratory.

6.0 EQUIPMENT DECONTAMINATION PROCEDURES

All decontamination will be performed according to SAS-04-04.

7.0 INVESTIGATION-DERIVED WASTE (IDW)

The sub-slab vapor probe installation and sampling will generate small amounts of solid IDW including concrete dust, gloves, drill bits, and tubing. This material will be bagged and disposed of as a municipal waste in accordance with applicable regulations. No liquid IDW will be generated. Further discussion of IDW can be found in Section 9 of the *Multi-Site Field Sampling Plan, Former Manufactured Gas Plant Sites, Revision 3", February 20, 2008.*

8.0 REFERENCES

ASTM International, 2001, ASTM Standard D 5314-92 (2001) Standard Guide for Soil Gas Monitoring in the Vadose Zone.

California Regional Water Quality Control Board, Los Angeles Region, 2002, General Laboratory Testing Requirements for Petroleum Hydrocarbon Impacted Sites.

California Regional Water Quality Control Board, Los Angeles Region, 1997, Interim Guidance for Active Soil Gas Investigation, Advisory issued January 28, 2003.

Department of Toxic Substance Control-California Environmental Protection Agency, 2004, Interim Final Guidance to the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air, Revised February 7, 2005.

San Diego County, Site Assessment and Mitigation (SAM) Manual, "Overview of Soil Vapor Survey Methods" Final Draft 8/20/2002.

San Diego County, 2004, Site Assessment and Mitigation (SAM) Manual, "Overview of Soil Vapor Survey Methods".

United States Environmental Protection Agency (USEPA), 2002. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).* Office of Solid Waste and Emergency Response. November 29.

USEPA, 1999, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry GC/MS) in *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air,* 2nd Ed., EPA Publication 625/R-96/010b.

STANDARD OPERATING PROCEDURE
NO. SAS-11-02

POST-RUN TUBING SYSTEM SAMPLING
Revision 0

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for Post-Run Tubing (PRT) System sampling. Soil-gas (soil vapor) sampling is a useful tool to evaluate potential subsurface soil and groundwater impacts that can partition into gas and affect indoor air quality. PRT sampling is conducted above the water table at a depth of five feet below ground surface (bgs) or deeper to provide measurements of soil-gas that may potentially enter a building and affect indoor air quality.

2.0 EQUIPMENT AND MATERIALS

- Rotary hammer drill (or equivalent) with a 1 3/8-inch diameter bit;
- Retractable gas vapor tip (GVP);
- Expendable GVP replacements;
- Hand Tools, including a hammer, needle-nose pliers, and trowel;
- Tubing receptacle;
- Teflon compression fittings to connect sampling points at “T” connection;
- “T” Swagelok (compression) or equivalent fitting;
- Gas sampling pump capable of extracting 200 milliliters per minute (mL/min);
- 4-way Teflon micro-valve;
- 1/4-inch O.D. Teflon tubing;
- VOC-free caulk;
- Nitrile gloves;
- Summa canisters with flow controllers, vacuum gauge, and shipping container;
- Sample labels;
- Chain of custody forms and seals;

- Field air monitoring instruments, as specified in the Work Plan (e.g. photo ionization detector, multi-gas monitors, etc.);
- Location markers (e.g. pin flags, wooden stakes, flagging tape, etc.);
- Granular bentonite;
- Asphalt cold patch or cement, as appropriate for site restoration;
- Decontamination materials;
- DOT-specified 55-gallon drum; and
- Field logbook and/or appropriate field form(s);

3.0 HEALTH AND SAFETY

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 CONSIDERATIONS

Variations in chemical-specific characteristics, geologic conditions, and atmospheric influences can affect soil-gas sampling results. For this reason, it is important to understand factors the may influence the reported data when collecting soil-gas data. In all cases, site-specific factors should be carefully evaluated prior to initiation of sampling to obtain representative soil-gas data.

Prior to any soil-gas sampling, soil type must be evaluated for suitability of sampling. Soils with smaller grain sizes have smaller pore spaces and are less permeable, which may reduce the ability for soil gas to be released from the subsurface. For example, clays have the smallest grain size and significantly restrict soil gas migration. Soil moisture also limits the ability for soil gas to be released from the subsurface because

moisture trapped in the pore space of sediments can inhibit or block soil-gas flow. Seasonal and geographical variations in soil moisture content can affect air permeabilities. In addition, manmade and naturally occurring preferential pathways (e.g. utility corridors, lenses of coarse-grained materials within fine-grained materials, etc.) may also affect soil-gas migration and shall be considered prior to soil-gas sampling.

Reliability of soil-gas sampling may be improved by using fixed probes and by ensuring that leakage of atmospheric air into the samples is avoided during purging or sampling. To avoid dilution of the sampling region from leakage, the minimum purge volume deemed adequate to flush the sampling system should be removed, and soil-gas samples should be collected from the most permeable zones in the vadose zone when possible. Site-specific information concerning soil lithology, grain size analysis, soil moisture, and soil-gas permeability may be obtained by performing three soil borings in the immediate area of the sampling locations in advance of the soil-gas sampling. In addition, previous site investigation sample results, when available, should be used to determine the placement of the soil-gas sampling locations.

Since oxygen, carbon dioxide and nitrogen can be sampled using a multi-gas monitor to give real-time results, parallel analysis of oxygen, carbon dioxide and nitrogen in soil-gas may also be used to help assess the reliability of a given sample result.

5.0 EXECUTION

The active soil-gas sampling approach consists of withdrawing an aliquot of soil gas from the subsurface, followed by the analysis of the withdrawn gas. Active soil-gas systems use mechanical equipment to create a small-diameter hole in the ground and then use a vacuum to “actively” withdraw a soil gas sample through stainless steel or Teflon tubing within the vadose zone. The soil gas sample is collected in a Summa canister and sent to a laboratory for analysis. Samples are analyzed using USEPA’s Ambient Air Compendium Method TO-15 (USEPA 1999) for determining organic compounds in ambient air. The results provided by active soil-gas systems are quantitative and are reported in units of concentration per volume (micrograms per cubic meter [$\mu g/m^3$], or parts per billion volume [ppb_v]).

The following active soil-gas sampling methodologies (emplacement, purging, sampling, leak testing, field screening, and abandonment) are based on established methods as outlined in the USEPA Standard Operating

Procedure (SOP) Number 2042 (USEPA 1996) and the ASTM International (ASTM) standard guide D 5314-01 (ASTM 2001). Additional guidelines were provided from the San Diego County Site Assessment and Mitigation (SAM) Manual, "Overview of Soil Vapor Survey Methods" (San Diego County 2002 and 2004) and the California Regional Water Quality Control Board (CRWQCB), Los Angeles Region (LARWQCB) (CRWQCB 2002 and 2003) and the Department of Toxic Substances Control (DTSC) guidelines (DTSC 2004 and 2005).

5.1 Summa Canister Preparation, QA/QC, and Set Up

A Summa canister is a stainless steel container which has had its internal surfaces passivated using a "Summa" process. The process uses an electro polishing step in conjunction with chemical deactivation. The overall process results in a chemically inert interior surface of the media which allows for the collection and subsequent analysis of samples containing very low concentrations of volatile organic compounds (VOCs). The Summa media is available in a number of different sizes. Typically, 6-liter Summa media are used for the collection of soil-gas because this volume should allow for low detection limits and facilitate more complex analyses.

Once the laboratory cleaning process is completed per USEPA SOP 1703 (USEPA 1994), the Summa media are prepared by the laboratory for use in the field. Each canister is evacuated to achieve a vacuum pressure of approximately -30 inches of mercury (" Hg). The pressure differential between the canister and atmosphere allows for the Summa media to sample without the use of a separate sample pump. Depending on the project requirements, either grab or integrated samples may be collected. The holding time (shelf life) for Summa canisters that have been prepared for use in the field is 30 days. If the canister has not been used within this time-period, it shall be returned to the contracted laboratory for re-conditioning.

Prior to collection, check all canisters for the proper certification issued by the analytical laboratory, as per USEPA SOP 1703 (USEPA 1994). The sampler shall complete the sample set-up of a Summa (or equivalent) canister prior to sample collection. Each six-liter (6.0 L) Summa (or equivalent) canister shall be fitted with a dedicated sample flow controller (regulator). After verification that the valve on the canister is in the "off" position, the brass cap shall be removed from the canister inlet fitting and the sample flow controller shall be attached to the canister inlet. The brass cap shall then be installed onto the inlet of the flow controller and

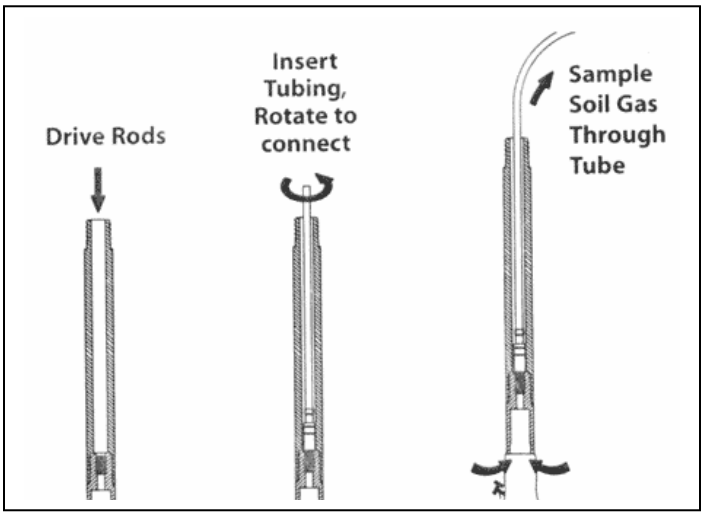
tighten. *Note: The sample flow controller (regulator) is a complete assembly that shall be attached directly to the canister.* The assembly shall then be leak-checked by opening the canister valve and noting the initial vacuum reading. The vacuum should indicate between -25" Hg and -30" Hg. The canister shall not be used if the starting vacuum is less than -25" Hg. The vacuum may fall a very small amount (1 to 2" Hg) due to the evacuation of the flow controller and then quickly stabilize. If the vacuum does not stabilize, the flow controller or associated fittings are leaking. If necessary, determine the location of the leak, and repair it accordingly. Any necessary repairs shall be document in the field logbook and/or on the appropriate field form.

5.2 Temporary Soil-Gas Probe Emplacement

The PRT system sampling methodology (see Figure below) shall be utilized to collect soil-gas samples within the vadose zone at a minimum sampling depth of 5 feet bgs.

FIGURE 1

PRT System Soil Gas Sampling



The sampler shall follow the general procedure for PRT system sampling as detailed below, unless otherwise required by the Site-Specific Work and/or Sampling Plan(s):

1. All subsurface activities shall only be performed following the clearance of each location for underground utilities in accordance with SOP ENV-05-01. In addition, a qualified contractor shall locate and mark private subsurface utilities.
2. Prior to drilling, the sampler shall clear vegetation or remove any floor coverings present, as appropriate.
3. If concrete or asphalt is present, a 1 3/8-inch diameter core hole shall be drilled through the entire thickness of the material until bare soil is reached.
4. Utilizing direct push technology, the sampler shall advance the 1.1-inch outer diameter (O.D.) expendable drive point attached to the 1.25-inch O.D. hollow push rods to target depth, which shall be a minimum of 5 feet bgs. Sample depths shall be chosen to minimize the transient effects of changes in barometric pressure, temperature, precipitation or breakthrough of ambient air from the surface to ensure that representative samples are collected. Sample depths shall be specified in the Site-Specific Work and/or Sampling Plan(s). No soil-gas sampling shall be conducted within 48 hours of a rainfall/irrigation event, due to excessive soil moisture content anticipated in the exposed surfaces.
5. Once the target depth is reached, the sampler shall insert the PRT and pull back the tool string approximately 3 inches (0.25 feet) thereby exposing the vapor inlet.
6. The sampler shall extend the 1/4-inch O.D. Teflon tubing through the slotted opening of the extension driver adapter, leaving 4 feet of tubing extending beyond the ground surface.
7. The sampler shall seal the end of the tubing with a protective cap to prevent air infiltration.
8. The sampler shall seal around the drive rods at the ground surface with hydrated bentonite slurry to prevent ambient air intrusion from occurring.
9. The sampler shall record the date and probe emplacement time in addition to the sample location in the field logbook and/or on the appropriate field form.

5.3 Pre-Sample Collection Activities

To help ensure a representative soil gas sample is being collected, the PRT system shall be purged of all ambient air and field screening shall be performed using a multiple gas detection monitor to establish that acceptable sampling conditions have been attained prior to sample collection. During probe emplacement, subsurface conditions are disturbed. To allow subsurface conditions to equilibrate, the sample system purge and soil gas screening shall not be conducted for at least 20 minutes following probe emplacement.

5.3.1 PRT System Purge

For a representative soil gas sample to be obtained, enough air shall be withdrawn prior to sample collection to purge the sampling system of all ambient air. The purge volume or "dead space volume" shall be estimated based on the internal volume of the tubing used and the annular space around the probe tip. Only the volume of air sufficient to flush the probe and sampling line shall be extracted before collecting the sample. The air contained in the Teflon tubing, vapor point holder and fittings forming the "sampling train" shall be evacuated using an air-sampling pump set at a rate not to exceed 200 ml/min. for the calculated period of time. System purging shall be performed consistently at each sampling location. An example of typical purge volumes and times is shown below.

Purge Volumes for PRT System

		5-foot Sample Depth	10-foot Sample Depth
One Purge Volume	**Volume**	46.14 ml	68.44 ml
	Time	13.8 sec	20.5 sec

The sampler shall calculate the volume of ambient air to be purged using the following factors and equations:

Purge Calculation Factors

1. Tubing (0.25-inch O.D., 0.17-inch I.D.) Volume = 4.46 ml per foot internal volume
2. Vapor Point Holder and Post Run Tubing Adapter Volume = 6 ml internal volume
3. Calculations assume a 4-foot section of tubing extends from the boring surface to the canister.

Volume Equation:

$A \times ((B \times C) + D) = E$

Where:
- A = Number of Purge Volumes
- B = 1 foot of tubing, 4.46 ml
- C = Depth
- D = Point Holder Volume, 6 ml
- E = Volume to be purged

Time Equation:

$(E \div F) \times G = H$

Where:
- E = Volume to be purged
- F = Purge Rate, 200 ml/min.
- G = 60 seconds
- H = Purge Time in seconds at 200 ml/min.

5.3.2 Screening with Field Instruments

Analysis of oxygen, carbon dioxide and nitrogen in soil-gas samples can often be used to help assess the reliability of a given sample result. It is recommended that one or all of the aforementioned analytes be monitored using a multiple gas detector. After completion of the system purge, the monitoring instrument shall be connected at the "T" connection using the 0.25-inch O.D. Teflon tubing. When the monitoring instrument readings are stable or peak, the values shall be recorded in the field logbook and/or on the appropriate field form.

5.4 Sample Collection

After the sampling train has been adequately purged and field screened; samples shall be collected using a 6-liter Summa canister. Due to the disruption of soil gas equilibrium during purging and field screening, a period of equilibrium (at least 20 minutes in length) shall be allowed for subsurface conditions to equilibrate. To minimize the potential desorption of contaminants from the soil, Summa canisters should be filled at a rate that minimizes the vacuum applied to the soil and the turbulent flow at the probe tip. The San Diego County Site Assessment and Mitigation (SAM) Manual, "Overview of Soil Vapor Survey Methods" guidance (San Diego County 2004) requires this rate to be less than 200 ml/min. Summa canisters shall be filled using a flow regulator set at a constant rate within the range of 50 to 200 ml/min. The sampler shall follow the step-by-step procedure for PRT system sampling as outlined below, unless otherwise required by the Site-Specific Work and/or Sampling Plan(s):

1. The sampler shall attach an in-line particulate filter to the sample train, if deemed necessary given site conditions.
2. The sampler shall record the initial Summa canister vacuum reading from the line gauge in the field logbook and/or on the appropriate field form.
3. The valve on the Summa canister shall be opened allowing the soil-gas sample to be drawn into the canister by pressure equilibration. If condensation is observed in the sample tubing, the sample shall be discarded and the observation shall be documented in the field logbook and/or on the appropriate field form.
4. When the line gauge reads approximately -4 to -5" Hg remaining, the sampler shall close the Summa canister valve.

5. The sampler shall record the final Summa canister vacuum reading from the line gauge in the field logbook and/or on the appropriate field form.
6. The sampler shall fill out and attach the sample tag to the Summa Canister along with any additional information requested by the laboratory. This information shall also be recorded in the field logbook and/or on the appropriate field form.
7. The sample shall be packaged and shipped under chain of custody to the laboratory for analysis. The samples shall not be chilled during storage or transport to the laboratory. To minimize potential effects on the sample integrity, the sample analysis shall be conducted within 72 hours of the collection time.

5.5 Temporary Probe Removal and Borehole Abandonment

After sample collection, both the drive rod and tubing shall be removed. Soil-gas probes shall then be sealed using granular bentonite to fill the annular space of the hole. Soil-gas probes performed within residential or industrial/commercial structures shall also be filled with granular bentonite to the base of the core hole and a 1-inch thick caulk vapor seal shall be applied at the base of the core hole. The remainder of the core hole shall be filled with a neat cement (coarse aggregate free) mix or asphalt cold patch, as appropriate for site restoration. Any floor covering removed shall be replaced and the area restored to its pre-sampling condition to the extent practicable.

All investigation-derived waste is placed in Department of Transportation (DOT)-specified 55-gallon drums and properly labeled. The drums are placed in a secure on-site location for temporary storage prior to appropriate off-site disposal. Disposable sampling equipment and health & safety materials that are not visibly impacted are double-bagged in plastic trash bags and disposed of in a solid waste disposal location (i.e. trash dumpster or container).

6.0 QUALITY ASSURANCE/QUALITY CONTROL

6.1 Equipment Calibration, Operation, and Maintenance

Field air monitoring instruments, as specified in the Work Plan (e.g. photo ionization detector, multi-gas monitors, etc.) shall be calibrated, operated, and maintained in accordance with SOP ENV-02-01.

6.2 Leak Testing

Leakage during soil vapor sampling may dilute samples with ambient air and produce results that underestimate actual site soil vapor concentrations. Leak testing, if any is required, shall be based on data quality objectives as specified in the Site-Specific Work Plan. The following paragraph describes a direct leak detection method that is suitable for use during soil gas sampling.

Seal integrity can be evaluated directly using an inert tracer gas (e.g. laboratory grade helium). Inert gas selection shall be conducted in conjunction with the laboratory. The sampler shall construct an air tent using polyethylene sheet or assemble a commercially available air tent which encompasses the top of the probe/well casing and the entire sample train. During sampling, the tracer gas shall be allowed to flow around the sample train connections and the bentonite or grout seal at the ground surface. Following sample collection, the air tent shall be dismantled. The soil vapor sample shall be analyzed for inert trace gas in addition to the other requested analysis. If the tracer gas is detected in the soil vapor sample, the seal integrity was compromised and the analytical results, which are not representative of the stratigraphic unit or zone within the stratigraphic unit, shall be considered invalid.

6.3 Decontamination

Equipment decontamination procedures shall be implemented, in accordance with SOP ENV-04-04, to avoid cross-contamination between sampling locations.

6.3.1 Sample Probe Decontamination

Sample probe contamination shall be checked between each sample by drawing ambient air through the probe via a gas sampling pump and checking the response of the PID. If readings are higher than background, replacement or decontamination shall be necessary. Sample probes shall be decontaminated simply by drawing ambient air through the probe until the PID reading is at background. More persistent contamination shall be washed out using methanol and water, and then air drying. For persistent volatile contamination, use of a portable propane torch may be needed. If use of a portable propane torch is deemed necessary, the sampler shall use a pair of pliers to hold the probe while running the torch up and down the length of the sample probe for approximately 1 to 2 minutes. The probe shall be allowed cool before handling. When

using this method, the sampler shall wear gloves that are capable of preventing burns. Having more than one probe per sample team is advisable as it will reduce lag times between sample stations while probes are decontaminated.

6.3.2 Drive Rod Decontamination

After each use, drive rods and other reusable components are properly decontaminated to prevent cross contamination in accordance with SOP ENV-04-04.

6.3.3 Sample Train Decontamination

All elements of the sample train shall be dedicated to each sampling location to avoid potential cross-contamination. If visible contamination (soil or water) is drawn into the sampling train, it shall be changed immediately.

6.4 Duplicate Samples

If required by the Site-Specific Work and/or Sampling Plan(s), duplicate samples shall be collected with the addition of a “T” splitter being attached to the 4-way micro valve with a Teflon nut, and one canister attached to each end of the “T” Swagelok (compression) or equivalent fitting and in accordance with SOP ENV-04-03.

7.0 REFERENCES AND ADDITIONAL RESOURCES

ASTM International, 2001, ASTM Standard D 5314-92 (2001) Standard Guide for Soil Gas Monitoring in the Vadose Zone.

California Regional Water Quality Control Board, Los Angeles Region, 2002, General Laboratory Testing Requirements for Petroleum Hydrocarbon Impacted Sites.

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USEPA, 1999, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry GC/MS) in *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*, 2nd Ed., EPA Publication 625/R-96/010b.

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STANDARD OPERATING PROCEDURE
NO. SAS-11-03

INSTALLATION OF PROBES/WELLS FOR SVE SYSTEM EFFECTIVENESS AND VAPOR MIGRATION MONITORING
Revision 0

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for the installation of semi-permanent to permanent soil vapor monitoring probes/wells for the evaluation of Soil Vapor Extraction (SVE) system effectiveness and subsurface vapor migration. This SOP also describes selection, including advantages and disadvantages, of drilling methods, probe/well materials and construction/configuration.

2.0 EQUIPMENT AND MATERIALS

- Drilling equipment and supplies (Drilling method specific);
- Well casing and screen materials (See Sections 4.3 & 4.4 below);
- Filter pack sand;
- Bentonite;
- Grout (optional);
- Portland cement;
- Asphalt (as necessary for surface restoration);
- Stick-up or flush-mount protective well covers;
- 4-way micro-valve (Probe/well less than 1 inch in diameter);
- Zip ties (Probe/well less than 1 inch in diameter);
- ¼-inch outside diameter (O.D.) silicone, Tygon, or Teflon tubing (Probe/well less than 1 inch in diameter);

- Expandable well cap retrofitted with a with a 1/8-Inch, NPT, chrome-plated brass, non-valved, coupling insert (herein referred to as "coupling insert") and vinyl slip cap (Probe/wells 1 inch or more in diameter);
- Metal well ID tag (optional);
- Probe/well location maps;
- Miscellaneous tools;
- Chain of custody forms and seals; and
- Field logbook and/or appropriate field form.

Coupling Insert

3.0 HEALTH AND SAFETY

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

Underground utilities, whether private, commercial, or public, shall be cleared in accordance with SOP ENV-05-01 prior to commencing drilling activities.

4.0 PROBE/WELL INSTALLATION

4.1 Considerations

Prior to the selection of drilling method(s), materials and diameters, screen length(s), and configuration, and installation of probes/wells, several key factors must be considered.

4.1.1 Project Objectives and Costs

Short- and long-term objectives shall be defined in the early stages of the project with respect to the type of data required, purpose, and mean(s) of evaluating the data. The project objectives shall define whether probes/wells shall be utilized for purposes other than SVE system effectiveness and vapor migration monitoring. While multiple purpose probes/wells can reduce drilling costs, effects on data quality shall be evaluated with respect to project objectives.

4.1.2 Site Conditions and Access

Site conditions and access shall also be considered to prevent project delays, increased project costs, and deviations from project objectives.

4.1.3 Surface and Subsurface Geological and Hydrologic Conditions

Geologic and hydrologic conditions are critical factors in the selection of drilling method(s), materials and diameters, screen length(s), and configuration, and installation of probes/wells. To the extent practical, surface and subsurface geologic and hydrologic conditions shall be characterized prior to probe/well material and construction/configuration selection and installation. Soil materials, variability within stratigraphic units, preferential pathways, confined/unconfined conditions, actual or potential perched water conditions, water table elevation and variability, and presence of constituents of concern or free phase product shall be considered prior to selection of probe/well material, diameter, screen length and configuration. If geologic and hydrologic conditions cannot be characterized prior to probe/well installation, anticipated conditions shall be discussed with the field staff prior to the commencement of field activities.

4.2 Drilling Method Selection

Common drilling methods include auger, rotary, and direct push technologies. Both hollow-stem and solid-stem auger methods can be used in unconsolidated soils and semi-consolidated (e.g. weathered rock) soils, but not in competent rock. Each method can be employed without introducing foreign materials (e.g. drilling fluids, etc.) into the borehole, thus minimizing the potential for cross contamination. This method consists of a drill pipe or drill stem coupled to a drilling bit that rotates and cuts through soils and competent rock. The

cuttings produced from the rotation of the drilling bit are transported to the surface by drilling fluids (e.g. water, drilling mud, or air) in all cases except for sonic rotary. Sonic rotary methods do not require the addition of any fluids in unconsolidated material because the vibration of the sonic rotary head allows the drill bit to cut without fluids. Consolidated materials may require some water to cool the drill bit. Direct push technology (DPT) use a hydraulic system to advance a 2- or 4-foot stainless steel sampler with a liner, typically acetate, attached to small-diameter, hollow drill rods into the subsurface. The sampler can be configured to allow for discrete interval sampling. Since the sampler is advanced hydraulically, soil cuttings generated by this method are minimal. DPT can be employed without introducing foreign materials (e.g. drilling fluids, etc.) into the borehole and in locations not accessible to most drill rigs. This method can be used in most unconsolidated soils, but not depositions consisting primarily of coarse gravel, cobbles, and/or weathered bedrock. Boreholes can be augured to depths of 40 feet or more (depending on the Geoprobe™ size and stratigraphy), but generally boreholes are advanced to depths of less than 30 feet. Due to the borehole diameter, probe/well installation is limited to small-diameter materials.

In general, air, water, and mud rotary drilling methods shall not be selected for probe/well installation since they introduce foreign materials into the borehole that have the potential to alter or inhibit vapor migration in the immediate vicinity of the probe/well and inhibit vapor migration into the probe/well screen. Table 1 (see Attachment A) shall be used as a guide in selecting drilling method(s).

4.3 Selection of Probe/Well Material and Diameter

Material and diameter selection shall be primarily based on well purpose (single or multiple uses), geologic and hydrologic conditions, and the anticipated probe/well construction/configuration. In general, well diameters greater than four inches, regardless of material, shall be deemed unsuitable due to the volume of air required to purge prior to sample collection. Table 2 (see Attachment B) shall be used as a guide in selecting probe/well materials and diameters.

4.4 Probe/Well Screen Length Selection

Screen length selection shall be based on probe/well purpose (single or multiple uses), geologic and hydrologic conditions, and type of data desired (discrete or composite). Single use probes/wells, those dedicated to SVE system effectiveness and vapor migration monitoring, generally offer more flexibility in screen length selection. Multiple use probes/wells generally offer less flexibility in screen length selection and typically require longer screen lengths to fulfill its various functions. Geologic and hydrologic conditions (e.g. zones of increased permeability/preferential contamination migration or groundwater pathways within a stratigraphic unit, variability in groundwater elevation, etc.) combined with the type of data desired strongly influence screen length selection.

Shorter screen lengths, generally one half to two feet in length, shall be preferred for the monitoring of zones of increased permeability/preferential pathways or discrete intervals with a stratigraphic unit, or the entire thickness of a thinner layer of soil material. Shorter screen lengths are generally preferred for single use probes/wells because they minimize 1) the potential to screen more than one stratigraphic unit or preferential pathway and 2) purge volumes required prior to sampling.

Medium screen lengths, generally two to ten feet in length, shall be preferred for the monitoring of the entire thickness of a stratigraphic unit or stratigraphic units prone to perched water and/or relatively moderate to high fluctuations in groundwater elevation. Medium screen lengths are generally preferred for multi-use probes/wells because they minimize the potential to screen more than one stratigraphic unit.

Long screen lengths, general ten feet or more in length, shall be preferred for multi-use probes/wells intended for regular groundwater and/or product monitoring and/or sampling, especially when relatively moderate to high fluctuations in groundwater elevation are anticipate. In general, probes/wells with screen lengths fifteen feet or longer shall not be deemed adequate for SVE system effectiveness and vapor migration monitoring because they 1) increase the potential to screen more than stratigraphic unit, 2) may not allow for the collection of a sample representative of the entire screened interval, and 3) require a larger purge volume prior to soil vapor sample collection.

4.5 Probe/Well Configuration Selection

The vertical and horizontal configuration of probes/wells shall be a function of their intended purpose(s). Probes/wells intended to evaluate vapor migration across a plane/boundary or within area may be installed within the anticipated radius of influence (ROI) of one or more soil vapor extraction wells. Probes/wells intended to evaluate the actual ROI of a soil vapor extraction well shall be, to the extent possible, installed within the anticipated ROI of only the soil vapor extraction well to be evaluated. In both cases, probes/wells shall generally be installed at set horizontal distances from soil vapor extraction well(s) (e.g. distances equivalent to ½, ¾, and/or the anticipated ROI). Single probes/wells, nested probes/wells, or a combination thereof shall be utilized to achieve project and data quality objectives. Single probes/wells are utilized to monitor one stratigraphic unit or one zone of increased permeability/preferential contamination migration or groundwater pathways within a stratigraphic unit. Nested probes/wells are utilized to monitor multiple stratigraphic units or zones of increased permeability/preferential contamination migration or groundwater pathways within a stratigraphic unit.

4.6 Execution

4.6.1 General

Probes/wells intended for SVE system effectiveness and vapor migration monitoring shall be installed in a manner similar to the installation of wells intended for groundwater monitoring/sampling with the following exceptions:

1. Water shall not be utilized to settle the filter pack (especially in confined stratigraphic units);
2. Bentonite grout shall generally be preferred over placing and then hydrating bentonite pellets/chips;
3. Probe/well screens and associated filter pack shall not, to the extent possible, extend into more than one stratigraphic unit;
4. Probe/well screens and associated filter pack shall not, to the extent possible, extend into more than one confining unit (e.g. clay layer);
5. To the extent possible, a minimum of five (5) feet of bentonite should be placed between the screens and filter packs of individual probes/wells that have been nested within the same borehole to prevent short-circuiting between probes/wells;

6. Probes/wells installed within or adjacent to utility corridors or building foundations shall be protected, to the extent possible, against short-circuiting with the ground surface.
7. Probes/wells installed with screens and/or filter pack within five (5) feet of ground surface shall be protected with impermeable materials (e.g. geotextile, plastic blankets, etc), to the extent possible, against short-circuiting with the ground surface; and
8. Probes/wells shall generally be installed using hollow-stem auger, sonic rotary, or direct push technology methods, unless otherwise required by the Site-Specific Work Plan or the Engineer of Record for the SVE System.

4.6.2 SVE System Effectiveness Monitoring

Probes/wells intended for SVE system effectiveness monitoring shall undergo pre-system start up (a.k.a. baseline) monitoring following the procedures described SOP ENV-11-03 to 1) establish a representative set of baseline data and 2) facilitate a defensible evaluation of post-system start up data set.

5.0 REFERENCES AND ADDITIONAL RESOURCES

ASTM International, 2001, ASTM Standard D 5314-92 (2001) Standard Guide for Soil Gas Monitoring in the Vadose Zone.

USEPA, 1994, SOP # 1703, Rev #: 0.0, Summa Canister Cleaning Procedure.

USEPA, 1995, SOP #1704, Rev. #: 0.0, Summa Canister Sampling.

USEPA, 1996, SOP # 2042, Rev. #: 0.0, Soil Gas Sampling

USEPA, 1999, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry GC/MS) in *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air,* 2nd Ed., EPA Publication 625/R-96/010b.

USEPA, 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/600/B-07/001.

ATTACHMENT A
TABLE 1 – DRILLING METHOD SELECTION

TABLE 1
Drilling Method Selection

SOP SAS-11-03 - ATTACHMENT A

DRILLING METHOD	ADVANTAGES	DISADVANTAGES	NOTES
Hollow-Stem Auger	● Can be used in unconsolidated and semi-consolidated soils ● No Introduction of foreign materials into the borehole ● Suited for soils that tend to collapse ● Probe/well can be installed inside the auger ● Can facilitate the installation of larger diameter probes/wells ● Can facilitate the installation of more than one small diameter probe/well in a single borehole ● Boreholes can be drilled to depths of 100 feet or more	● Cannot be used in competent rock ● Retracting augers in caving sand conditions can be extremely difficult ● Generates large amounts of soil cuttings	● Generally deemed suitable for the installation of probes/wells, intended for SVE system effectiveness and vapor migration monitoring, in unconsolidated and semi-consolidated soils ● Preferred drilling method for the installation of probes/wells with a diameter equal to or greater than one inch and/or nested probes/wells in a single borehole in unconsolidated and semi-consolidated soils
Solid-Stem Auger	● Can be used in unconsolidated and semi-consolidated soils ● No Introduction of foreign materials into the borehole ● Can facilitate the installation of larger diameter probes/wells ● Can facilitate the installation of more than one small diameter probe/well in a single borehole ● Boreholes can be drilled to depths of 150 feet or more	● Cannot be used in competent rock ● Not suited for soils that tend to collapse ● Generates large amounts of soil cuttings	● Generally deemed suitable for the installation of probes/wells, intended for SVE system effectiveness and vapor migration monitoring, in unconsolidated and semi-consolidated soils

TABLE 1
Drilling Method Selection

SOP SAS-11-03 - ATTACHMENT A

DRILLING METHOD	ADVANTAGES	DISADVANTAGES	NOTES
Air Rotary	● Can be used in unconsolidated and semi-consolidated soils and rock ● Can facilitate the installation of larger diameter probes/wells ● Can facilitate the installation of more than one small diameter probe/well in a single borehole ● Boreholes can be drilled to depths of 150 feet or more	● Introduces foreign materials into the borehole ● Generates large amounts of soil cuttings ● Conventional method does not control the blowing of cuttings out of the borehole	● Generally deemed unsuitable for the installation of probes/wells intended for SVE system effectiveness and vapor migration monitoring
Water Rotary	● Can be used in unconsolidated and semi-consolidated soils and rock ● Can facilitate the installation of larger diameter probes/wells ● Can facilitate the installation of more than one small diameter probe/well in a single borehole ● Boreholes can be drilled to depths of 150 feet or more	● Introduces foreign materials into the borehole ● Generates large amounts of soil cuttings ● Drilling fluids can carry contamination from a contaminated zone to an uncontaminated zone	● Generally deemed unsuitable for the installation of probes/wells intended for SVE system effectiveness and vapor migration monitoring
Mud Rotary	● Can be used in unconsolidated and semi-consolidated soils and rock ● Can facilitate the installation of larger diameter probes/wells ● Can facilitate the installation of more than one small diameter probe/well in a single borehole ● Boreholes can be drilled to depths of 150 feet or more	● Introduces foreign materials into the borehole ● Generates large amounts of soil cuttings ● Drilling fluids can carry contamination from a contaminated zone to an uncontaminated zone	● Generally deemed unsuitable for the installation of probes/wells intended for SVE system effectiveness and vapor migration monitoring

TABLE 1
Drilling Method Selection

SOP SAS-11-03 - ATTACHMENT A

DRILLING METHOD	ADVANTAGES	DISADVANTAGES	NOTES
Sonic Rotary	● Can be used in unconsolidated and semi-consolidated soils and rock ● Minimal smearing of formation materials ● Can facilitate the installation of larger diameter probes/wells ● Can facilitate the installation of more than one small diameter probe/well in a single borehole ● Boreholes can be drilled to depths of 150 feet or more	● Requires large open spaces for rig and support equipment ● Expensive compared to other methods ● In flowing sands, introduction of a foreign materials (potable water) is required	● Generally deemed suitable for the installation of probes/wells intended for SVE system effectiveness and vapor migration monitoring ● Preferred drilling method for the installation of probes/wells with a diameter equal to or greater than one inch and/or nested probes/wells in a single borehole in competent rock
Direct Push Technologies	● Can be used in unconsolidated and semi-consolidated soils and rock ● No Introduction of foreign materials into the borehole ● Can access locations not accessible by other drilling equipment ● Generates minimal amounts of soil cuttings	● Cannot be used in depositions consisting of coarse gravel, cobbles, and/or weathered or competent rock ● Cannot facilitate the installation of larger diameter probes/wells ● Cannot facilitate the installation of more than one small diameter probe/well in a single borehole ● Drilling depth is limited compared to other drilling methods	● Generally deemed suitable for the installation of small-diameter probes/wells intended for SVE system effectiveness and vapor migration monitoring ● Preferred drilling method for the installation of probes/wells with a diameter less than one inch in unconsolidated and semi-consolidated soils
Hand Auger	● Can be used in unconsolidated soils ● No Introduction of foreign materials into the borehole ● Can access locations not accessible by other drilling equipment ● Generates minimal amounts of soil cuttings	● Cannot be used in depositions consisting of coarse gravel, cobbles, and/or weathered or competent rock ● Cannot facilitate the installation of larger diameter probes/wells ● Cannot facilitate the installation of more than one small diameter probe/well in a single borehole ● Drilling depth is limited compared to other drilling methods	● Generally deemed suitable for the installation of shallow, small-diameter probes/wells intended for SVE system effectiveness and vapor migration monitoring, but is not the preferred drilling method

ATTACHMENT B
TABLE 2 – PROBE/WELL MATERIAL AND DIAMETER SELECTION

TABLE 2
Probe/Well Material and Diameter Selection

SOP SAS-11-03 - ATTACHMENT B

WELL MATERIAL	WELL DIAMETER	ADVANTAGES	DISADVANTAGES	NOTES
Polyvinyl Chloride (PVC)	1-Inch I.D.	● Suitable for single probe/well construction in small to large diameter boreholes ● Suitable for nested probes/wells in medium to large diameter boreholes ● Relatively low purge volume per foot of casing/screen ● Can be fitted with various screen lengths (1, 5, and 10 foot screens) ● Allows for fluid level gauging to confirm well screen masking by fluids ● Limited suitability for other purposes (e.g. groundwater/product gauging and sampling) ● Relatively inexpensive material	● Unsuitable for nested probes/wells in small diameter boreholes ● Limited suitability for other purposes	● Generally deemed suitable for the installation of single or nested probes/wells, intended for SVE system effectiveness and vapor migration monitoring, in unconsolidated and semi-consolidate soils and competent rock. ● Preferred material and diameter for monitoring within most depositional environments including fine grained materials, confined conditions, and the caprillary fringe
Polyvinyl Chloride (PVC)	2-Inch I.D.	● Suitable for single probe/well construction in large diameter boreholes ● Can be fitted with various screen lengths (1, 5, and 10 foot screens) ● Allows for fluid level gauging to confirm well screen masking by fluids ● Suitable for other purposes (e.g. groundwater/product gauging and sampling) ● Relatively inexpensive material	● Limited suitability for single probe/well construction in small and medium diameter boreholes ● Generally, unsuitable for nested probes/wells ● Relatively moderate purge volume per foot of casing/screen	● Generally deemed suitable for the installation of single or nested probes/wells, intended for SVE system effectiveness and vapor migration monitoring, in unconsolidated and semi-consolidate soils and competent rock. ● Preferred material and diameter for probes/wells intended for multiple uses in most depositional environments

TABLE 2
Probe/Well Material and Diameter Selection

SOP SAS-11-03 - ATTACHMENT B

WELL MATERIAL	WELL DIAMETER	ADVANTAGES	DISADVANTAGES	NOTES
Polyvinyl Chloride (PVC)	4-Inch I.D.	● Suitable for single probe/well construction in large diameter boreholes ● Can be fitted with various screen lengths (5, and 10 foot screens) ● Allows for fluid level gauging to confirm well screen masking by fluids ● Suitable for other purposes (e.g. groundwater/product gauging and sampling) ● Relatively inexpensive material	● Unsuitable for nested probes/wells ● Relatively high purge volume per foot of casing/screen	● Generally deemed unsuitable for SVE system effectiveness and vapor migration monitoring due to the high purge volume per foot of casing/ screen ● Limited suitability for vacuum/ pressure gauging
Stainless Steel	1/8-Inch O.D.	● Suitable for single probe/well construction in small to large diameter boreholes ● Suitable for nested probe/well construction in small to large diameter boreholes ● Minimal purge volume per foot of casing/screen	● Does not allow for fluid level gauging to confirm well screen masking by fluids ● Generally limited to a 0.5-foot well screen ● Extremely difficult to rehabilitate the well, when necessary ● Unsuitable for other purposes	● Generally deemed suitable for the installation of single or nested probes/wells, intended for SVE system effectiveness and vapor migration monitoring, in unconsolidated and semi-consolidate soils and competent rock. ● Preferred material and diameter for monitoring within depositional environments characterized by fine-grained materials and unconfined conditions well above the water table

TABLE 2
Probe/Well Material and Diameter Selection

SOP SAS-11-03 - ATTACHMENT B

WELL MATERIAL	WELL DIAMETER	ADVANTAGES	DISADVANTAGES	NOTES
Stainless Steel	1/4-Inch O.D.	● Suitable for single probe/well construction in small to large diameter boreholes ● Suitable for nested probe/well construction in small to large diameter boreholes ● Minimal purge volume per foot of casing/screen	● Does not allow for fluid level gauging to confirm well screen masking by fluids ● Generally limited to a 0.5-foot well screen ● Extremely difficult to rehabilitate the well, when necessary ● Unsuitable for other purposes	● Generally deemed suitable for the installation of single or nested probes/wells, intended for SVE system effectiveness and vapor migration monitoring, in unconsolidated and semi-consolidate soils and competent rock. ● Preferred material and diameter for monitoring within depositional environments characterized by fine-grained materials and unconfined conditions well above the water table
Stainless Steel	2-Inch I.D.	● Suitable for single probe/well construction in medium to large diameter boreholes ● Can be fitted with various screen lengths (1, 5, and 10 foot screens) ● Allows for fluid level gauging to confirm well screen masking by fluids ● Suitable for other purposes (e.g. groundwater/product gauging and sampling)	● Limited suitability for single probe/well construction in small diameter boreholes ● Generally, unsuitable for nested probes/wells ● Relatively moderate purge volume per foot of casing/screen ● Relatively expensive material	● Generally deemed suitable for the installation of single or nested probes/wells, intended for SVE system effectiveness and vapor migration monitoring, in unconsolidated and semi-consolidate soils and competent rock. ● Preferred diameter for probes/wells intended for multiple uses in most depositional environments

TABLE 2
Probe/Well Material and Diameter Selection

SOP SAS-11-03 - ATTACHMENT B

WELL MATERIAL	WELL DIAMETER	ADVANTAGES	DISADVANTAGES	NOTES
Stainless Steel	4-Inch I.D.	● Suitable for single probe/well construction in large diameter boreholes ● Can be fitted with various screen lengths (5, and 10 foot screens) ● Allows for fluid level gauging to confirm well screen masking by fluids ● Suitable for other purposes (e.g. groundwater/product gauging and sampling)	● Unsuitable for nested probes/wells ● Relatively high purge volume per foot of casing/screen ● Relatively expensive material	● Generally deemed unsuitable for SVE system effectiveness and vapor migration monitoring due to the high purge volume per foot of casing/ screen ● Limited suitability for vacuum/ pressure gauging

STANDARD OPERATING PROCEDURE
NO. SAS-11-04

SVE SYSTEM EFFECTIVENESS AND VAPOR MIGRATION MONITORING
Revision 0

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for the monitoring of semi-permanent to permanent soil vapor monitoring probes/wells for the evaluation of Soil Vapor Extraction (SVE) system effectiveness and subsurface vapor migration. This SOP also describes field measurements and soil vapor collection methods, and quality assurance procedures.

2.0 EQUIPMENT AND MATERIALS

- Digital manometer (Dwyer Series 475 Mark III Digital Manometer or equivalent) or magnehelic differential pressure gauge (0-20 inches of water);
- Digital manometer (Dwyer Series 475 Mark III Digital Manometer or equivalent)or magnehelic differential pressure gauge (0-200 inches of water);
- 1-liter Tedlar™ bags;
- Tygon™ or silicone tubing (cut to length);
- ¼-inch O.D. Teflon™, Polyethylene, or PVC tubing (cut to length);
- GeoTech Peristaltic Pump or equivalent;
- BIOS DC-LITE flow calibrator, calibrated rotometer, or equivalent;
- 60-mL syringe for purging (Probe/well less than 1 inch in diameter);
- Stainless-steel manual pump for purging (Probe/well equal to or greater than 1 inch in diameter);
- Extra vinyl slip covers;
- Clean (dedicated) 3/16-Inch hose barb, chrome-platted brass, non-valved, in-line coupling body (herein referred to as “coupling body”);
- New or dedicated 4-way valves for purging and sampling;
- Summa (or equivalent) canisters;

Coupling Body

- Sample flow controller;
- ¼-inch O.D. Teflon sample line;
- ¼-inch O.D. Teflon or stainless-steel compression fittings;
- Probe/well location maps;
- Miscellaneous tools (i.e. socket set to remove well/probe caps);
- Chain of custody forms and seals; and
- Field logbook and/or appropriate field form.

3.0 HEALTH AND SAFETY

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 EXECUTION

Probes/wells intended for SVE system effectiveness monitoring shall undergo pre-system start up (a.k.a. baseline) monitoring to 1) establish a representative set of baseline data and 2) facilitate a defensible evaluation of post-system start up data set. Procedures for baseline and post-system start up monitoring are described in the following sections.

4.1 Vacuum/Pressure Gauging

In order to evaluate the degree of influence that a soil vapor extraction (SVE) wells have on surrounding area, vacuum measurements shall be collected from designated monitoring locations prior to any soil vapor sampling. The Dwyer digital manometer or magnehelic differential pressure gauge or equivalent (herein referred to as the “gauging instrument”) shall be used for this measurement. Immediately prior to use, the

gauging instrument shall be zeroed at atmospheric pressure. Vacuum/pressure measurements shall be obtained using the of the following probe/well diameter-specific procedures.

4.1.1 Probe/Well Diameters Less Than One Inch

At probes/wells with a diameter of less than one-inch, the positive fitting on the gauging instrument shall be connected to the 4-way valve, previously installed to the top of the well riser, using small diameter silicone tubing of appropriate size. The negative fitting on the gauging instrument shall remain open to the atmosphere. The 4-way valve shall be opened to the well and closed to the atmosphere. The gauging instrument shall be allowed a maximum of thirty (30) minutes to stabilize before the vacuum/pressure is recorded. If the gauging instrument does not stabilize within the 30-minute period, the range in which the vacuum/pressure reading fluctuates over an additional one (1) minute period will be documented in the field logbook and/or on the appropriate field form. The highest reading observed within the observed range will be recorded in the field logbook and/or on the appropriate field form as the primary measurement. (*Please note: If the gauging instrument reading fluctuates between two vacuums, the lowest/weakest vacuum observed will be recorded as the primary measurement. If the gauging instrument reading fluctuates between a vacuum and a pressure, the highest pressure observed will be recorded as the primary measurement. If the manometer reading fluctuates between two pressures, the highest/strongest pressure observed will be recorded as the primary measurement. In all cases, the range in the gauging instrument readings over the additional one-minute period will be recorded in the field logbook and/or on the appropriate field form.)* The vacuum/pressure measurement shall be recorded to the nearest hundredth of an inch of water column in the field logbook and/or on the appropriate field form first, followed by any secondary data entry devices (i.e. PDA, laptop, etc.). Please note a field form, if used, is considered the record document. Immediately following the recording of the vacuum/pressure measurement, the 4-way valve shall be closed to the well and open to the atmosphere and the gauging instrument shall be detached from the silicone tubing and 4-way valve *(see Attachment A: Guide to the 4-Way Micro-Valve)*.

A picture of a typical vacuum/pressure gauging set-up is provided below.

4.1.2 Probe/Well Diameters Equal to or Greater Than One Inch

At probes/wells with a diameter equal to or greater than one-inch, the positive fitting on the gauging instrument shall be connected to a dedicated coupling body using silicone (or equivalent) tubing. The negative fitting on the gauging instrument shall remain open to the atmosphere. The coupling body shall then be connected to the coupling insert located on the expandable well cap, which will open the well to the gauging instrument. The gauging instrument shall be allowed a maximum of thirty (30) minutes to stabilize before the vacuum/pressure is recorded. If the gauging instrument does not stabilize within the 30-minute period, the range in which the vacuum/pressure reading fluctuates over an additional one (1) minute period will be documented in the field logbook and/or on the appropriate field form. The highest reading observed within the observed range will be recorded as the primary measurement. (*Please note: If the gauging instrument reading fluctuates between two vacuums, the lowest/weakest vacuum observed will be recorded as the primary measurement. If the gauging instrument reading fluctuates between a vacuum and a pressure, the highest pressure observed will be recorded as the primary measurement. If the manometer reading fluctuates between two pressures, the highest/strongest pressure observed will be recorded as the primary measurement. In all cases, the range in the gauging instrument readings over the additional one-minute period will be recorded in the field logbook and/or on the appropriate field form.)* The vacuum/pressure measurement shall be recorded to the nearest hundredth of an inch of water column in the field logbook and/or on the appropriate field form first, followed by any secondary data entry devices (i.e. PDA, laptop, etc.). Please note a field form, if used, is considered the record document. Immediately following the

recording of the vacuum/pressure measurement, the coupling body shall be disconnected from the coupling insert, which will close the well to the gauging instrument and the atmosphere. The gauging instrument and associated tubing shall then be detached from the dedicated coupling body.

4.2 Probe/Well Purging

Upon completion of any vacuum / pressure measurements and prior to soil vapor sample collection, each probe/well shall be purged a predetermined volume (in Liters or milliliters) based on the volume of the probe/well riser and screen. The purge volume shall be equivalent to a minimum of three probe/well volumes. The actual purge volume removed shall be recorded in the field logbook and/or on the appropriate field form. If the probe/well would not yield the full purge volume or water and/or product are encountered during purging, this observation shall be documented in the field logbook and/or on the appropriate field form.

4.2.1 Probe/Well Diameters Less Than One Inch

To purge the monitoring locations with a diameter less than one-inch, a 60-ml plastic syringe shall be attached to the 4-way valve, previously installed to the top of the well riser and the valve shall be configured (opened to the well and closed to the atmosphere) to allow the removal of the required purge volume. The syringe plunger shall be drawn back to evacuate a purge volume. The valve gate shall then be configured (closed to the well and opened to the atmosphere) and the syringe plunger shall be pushed in allowing the purged volume to be expelled to atmosphere. This process shall continue until a minimum of three probe/well volumes have been removed from the monitoring location. Care shall be taken to prevent the purged air from being reintroduced into the probe/well. At the completion of purging, the 4-way valve shall remain attached to the monitoring location with the valve configured so that the well is closed to atmosphere. Failure to close the 4-way valve to atmosphere prior to attaching the Tedlar™ bag or Summa canister will result in a volume of ambient air infiltrating back into the well riser and subsequently being collected as a sample *(see Attachment A: Guide to the 4-Way Micro-Valve)*.

4.2.2 Probe/Well Diameters Equal to or Greater Than One Inch

Purging probes/wells with diameters equal to or greater than one inch requires the use of a stainless steel hand pump in conjunction with silicone (or equivalent) tubing and a dedicated coupling body. The hand pump shall be tested prior to each sampling event by attaching a 1-liter Tedlar™ test bag to the hand pump outlet. The inlet of the hand pump shall remain open to atmosphere. Two strokes of a properly working hand pump should fill a 1-liter bag to approximately 75-percent of capacity. The 1-liter bag should not be completely filled because the bags are typically oversized in order to allow for expansion of the sample during shipment, storage, etc. The hand pump shall be rebuilt in accordance with manufacturer specifications if the hand pump fails to adequately fill the test bag.

The stainless steel hand pump shall be used in conjunction with silicone (or equivalent) tubing and a dedicated coupling body. The vacuum side of the hand pump shall be attached to a dedicated coupling body using silicone (or equivalent) tubing. The dedicated coupling body shall then be connected to the coupling insert located on the expandable well cap, which will allow for the removal of purge volumes from the probe/well. The hand pump has an internal one-way valve and, therefore, manipulation of the coupling body and coupling insert shall not be necessary. The purged volume is expelled to atmosphere from the positive side of the hand pump with every downward stroke of the pump handle (piston). Every upward stroke of the pump handle should remove approximately ½-liter of the purge volume from the well. Care shall be taken to fully extend the hand pump handle to ensure that the appropriate volume is removed from the probe/well with each pump stroke. When a minimum of three well volumes have been removed from the monitoring location, the coupling body shall be disconnected from the coupling insert, which closes the probe/well to atmosphere.

4.3 Soil Vapor Sample Collection

Upon completion of probe/well purging (evacuation of a minimum of three probe/well volumes of air), soil vapor sample collection using Tedlar™ sample media and/or summa (or equivalent) canisters shall commence. If water and/or product are encountered during sample collection, this observation shall be documented in the field logbook and/or on the appropriate field form.

4.3.1 Tedlar™ Bag Sample Media

Soil vapor samples for on-site analysis/field screening shall be collected using a Tedlar™ bag media and a peristaltic pump. For probes/wells with a diameter less than one-inch, the peristaltic pump shall be attached to a 4-way plastic micro valve using a combination of Tygon™ and silicone (or their respective equivalent) tubing. The valve, which was used for the well purging, should already be attached to the top of the well riser. For probes/wells with a diameter greater than or equal to one-inch, the peristaltic pump shall be attached to the dedicated coupling body using a combination of Tygon™ and silicone (or their respective equivalent) tubing. The outlet of the peristaltic pump shall be attached to the inlet side of the flow calibrator (or rotometer) using a combination of Tygon™ and silicone (or their respective equivalent) tubing. Prior to flow rate adjustment and sample collection, the sample identification, date, time, and vacuum/pressure reading (if applicable) shall be clearly documented on the Tedlar™ Bag.

4.3.1.1 Flow Rate Adjustment

The flow calibrator or calibrated rotometer shall be used to adjust the flow rate of the peristaltic pump to allow a flow rate of less than 200 mL/minute. For probes/wells with a diameter less than one-inch, this adjustment shall be performed by 1) configuring the micro valve to allow for sample removal from the well, 2) depressing the read button on the flow meter and noting the rate of sample flow or if a calibrated rotometer is used, simply observe the flow rate indicated by the ball height, and 3) quickly adjusting the peristaltic pump to allow a flow rate of 200-ml/minute or less. For probes/wells with a diameter greater than or equal to one-inch, this adjustment shall be performed by 1) connecting the coupling body to the coupling insert to allow for sample removal from the well, 2) depressing the read button on the flow meter and noting the rate of sample flow or if a calibrated rotometer is used, simply observe the flow rate indicated by the ball height, and 3) quickly adjusting the peristaltic pump to allow a flow rate of 200-ml/minute or less. *Notes: The initial settings on the pump should be set to allow for the minimum flow possible. It is important to set the flow rate as quickly as possible in order to minimize the amount of additional sample volume. An advantage that the use of a rotometer has over a flow meter is that an instantaneous flow reading will be displayed, allowing for a much quicker flow-rate adjustment to the peristaltic pump.* After setting the sample flow, sample collection shall be immediately initiated. Care shall be taken at this time to avoid unintentionally adjusting (by bumping or handling) the pump speed control.

4.3.1.2 Sample Collection

After setting the sample flow, the flow calibrator or calibrated rotometer shall be removed from the sample train and a new, clean, pre-labeled, one-liter Tedlar™ bag shall be connected to the tubing exiting from the positive-pressure (output) side of the peristaltic pump. A wire tie shall be used, if necessary, to make the connection between the bag and the pump a leak proof fitting. Immediately open the valve on the Tedlar™ bag approximately one turn. *Please note: Unless a vacuum/pressure reading was not collected, the sample time is the same time as the acquisition of the primary vacuum/pressure measurement. If a vacuum/pressure measurement was not collected, the sample-start time shall be documented in the field logbook and/or on the appropriate field form.* Based on the flow rate to collect a 1-liter vapor sample, the peristaltic pump shall be allowed approximately five (5) minutes to collect the sample. Total sample collection time, which may exceed five (5) minutes, is dependent on the soil characteristics of the stratigraphic unit (a.k.a. stratum) from which the sample is being collected. Upon retrieval of the one-liter sample volume, the valve on the Tedlar™ bag shall be closed and the peristaltic pump turned off. The micro valve shall then be configured such that the valve is closed to the well and open to the atmosphere (well diameters less than one-inch) or the coupling body shall be disconnected from the coupling insert (well diameters greater than or equal to one-inch). The sample bag shall be placed in a black trash bag or container that will not allow sunlight to pass through.

Duplicate samples shall be collected by repeating the preceding procedure detailed above. The duplicate sample shall be collected immediately after the first sample (original/main sample) has been collected. Due to the nature of the coarse-adjustment valves that are typically installed on Tedlar™ bags, the use of a sample splitter is not recommended since this will often result in the collection of unequal sample volumes.

4.3.1.3 Post-Sample Collection

The sample train shall be dismantled and all non-dedicated lines used for sample collection shall be disposed of. New sample lines at each sample location shall be used, except for dedicated equipment (4-way micro valves, fittings, and coupling bodies, etc.). The micro valve shall remain attached to probes/wells with a well diameter less than one-inch, however; the valve shall be configured so that the probe/well is closed to atmosphere *(see Attachment A: Guide to the 4-Way Micro-Valve)*. For probes/wells with a diameter equal to

or greater than one inch, the vinyl slip cover shall be fitted over the coupling insert on the expandable well cap following sampling collection. The dedicated equipment (coupling body) used for the monitoring locations with a probe/well diameter equal to or greater than one-inch shall be placed into a labeled, re-sealable bag. Non-dedicated, reusable equipment shall be cleaned / decontaminated in accordance with SOP ENV-04-04 or as otherwise required by the Site-Specific Work Plan.

4.3.2 Summa™ Canister Sample Media

Soil vapor samples for commercial laboratory analysis shall be obtained using Summa™ or equivalent canisters. For probes/wells with a diameter less than one-inch, the Summa (or equivalent) canister shall be attached directly to a 4-way plastic micro valve using silicone tubing. The valve, which was used for the well purging, should already be attached to the top of the well riser. For probes/wells with a diameter greater than or equal one-inch, the Summa™ (or equivalent) canister shall be attached directly to the dedicated coupling body located on the expandable well cap using silicone tubing.

4.3.2.1 Canister Preparation and QA/QC

A Summa canister is a stainless steel container which has had its internal surfaces passivated using the "Summa" process. The process uses an electro polishing step in conjunction with chemical deactivation. The overall process results in a chemically inert interior surface of the media which allows for the collection and subsequent analysis of samples containing very low concentrations of VOCs. The Summa media is available in a number of different sizes. Typically, 6-liter Summa canisters are used for the collection of soil vapor samples because this volume should allow for low detection limits and facilitate more complex analyses.

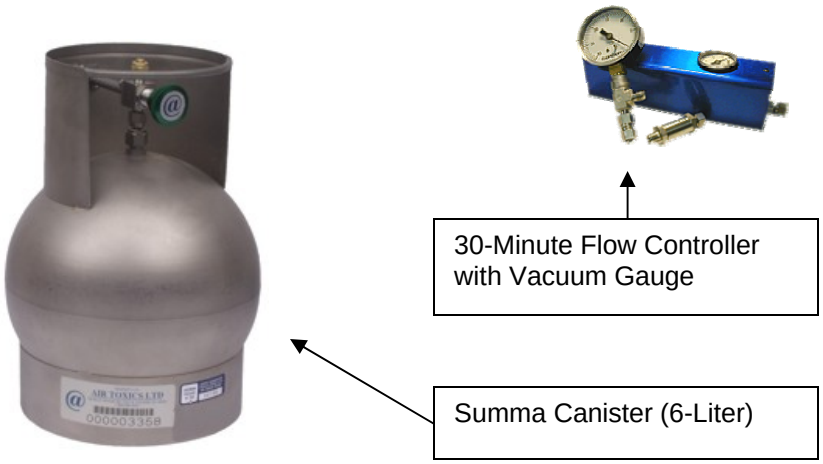
Once the laboratory cleaning process is completed, the Summa canisters are prepared by the laboratory for use in the field. Each canister is evacuated to achieve a vacuum pressure of approximately 30-inches of mercury. The pressure differential between the canister and atmosphere allows for the Summa canister to sample without the use of a separate sample pump. Depending on the project requirements, either grab or integrated samples may be collected. The holding time (shelf life) for Summa canisters that have been prepared for use in the field is 30-days. If the canister has not been used within this time-period, it shall be returned to the contracted laboratory for re-conditioning.

Summa canisters undergo either an individual or batch certification process. The individual certification process requires that each canister undergo a comprehensive Quality Assurance/Quality Control (QA/QC) procedure that results in analysis documentation for each canister, verifying that there are no residual compound concentrations above a pre-determined level. Typically, individually certified canisters are used for ambient air sampling programs that require a high level of QA/QC. Batch certified canisters undergo the same re-conditioning process as the individually certified canisters. However, only 5-percent of randomly chosen canisters are analyzed for residual constituents. If any of the selected canisters do not meet specific certification criteria, all of the canisters in that batch are required to undergo the entire cleaning and QA/QC process again. This process is repeated until all QA/QC re-conditioning criteria are met.

4.3.2.2 Sample Set Up

Field sampling staff shall complete the sample set-up of a Summa (or equivalent) canister prior to sample collection. Each six-liter (6.0 L) Summa (or equivalent) canister shall be fitted with a dedicated sample flow controller (regulator). After verification that the valve on the canister is in the "off" position, the brass cap shall be removed from the canister inlet fitting and the sample flow controller shall be attached to the canister inlet. The brass cap shall then be installed onto the inlet of the flow controller and tighten. *Note: The 30-minute sample flow controller (regulator) is a complete assembly that shall be attached directly to the canister*. The assembly shall then be leak-checked by opening the canister valve and noting the initial vacuum reading. The vacuum should indicate between 20 and 30-inches of mercury. The canister shall not be used if the starting vacuum is less than 20-inches of mercury. The vacuum may fall a very small amount (1 to 2-inches) due to the evacuation of the flow controller and then quickly stabilize. If the vacuum does not stabilize, the flow controller or associated fittings are leaking. If possible, determine the location of the leak, and repair it accordingly. Any necessary repairs shall be document in the field logbook and/or on the appropriate field form. If the leak cannot be quickly identified and repaired, the Summa canister and flow controller shall not be used.

A picture of a typical 6-liter Summa canister and a 30-minute sample flow controller are provided below.



4.3.2.3 Sample Collection

Upon completion of sample set up, soil vapor sample collection shall begin. A short length of dedicated Teflon™ tubing shall then be installed onto the top of the flow regulator with a Teflon™ Swagelok fitting or equivalent to form a leak proof connection. The Summa (or equivalent) canister shall be connected via the Teflon™ tubing and a small length of silicon tubing to the 4-way micro valve (probes/wells with a diameter less than one-inch or the dedicated coupling body (probes/wells with a diameter equal to or greater than one inch). If necessary, a wire tie shall be used on each connection where different tubing attaches to form a leak-proof seal. For probes/wells with a diameter less than one-inch, the 4-way micro valve shall then be configured to allow sample collection (valve open to the well and sample flow controller / regulator and closed to the atmosphere) and the valve on the canister opened approximately two (2) turns. For probes/wells with a diameter greater than or equal to one-inch, the coupling body shall be connected to the coupling insert located on the expandable well cap and the valve on the canister opened approximately two (2) turns. The sample start time and beginning canister vacuum (inches of mercury [Hg]) shall be recorded in the field logbook and/or on the appropriate field form. *Note: The typical initial canister vacuum is between 20 and 30 inches of Hg.*

A picture of a typical 6-liter Summa canister, 30-minute sample flow controller, and sample train is provided below for a probe/well with a diameter less than one-inch.

When the sampler has identified a minimum change/decrease of 15 inches of Hg in canister vacuum (Initial Vacuum – Final Vacuum) and the final canister vacuum is equal to or below five (5) inches of Hg, but above two (2) inches of Hg, the valve to the canister shall be closed. For probes/wells with a diameter less than one inch, the 4-way micro valve shall then be configured to be closed to the probe/well, sample flow controller / regulator, and the atmosphere. For probes/wells with a diameter equal to or greater than one inch, the coupling body shall be disconnected from the coupling insert. *NOTE: Based on the approximate flow rate (200 milliliters per minute [mL/min], approximately thirty (30) minutes is required to collect the specified sample volume.* The sample time, canister number, and sample flow controller / regulator number shall be recorded on the chain of custody and the final canister vacuum and sample end time recorded in the field logbook and/or on the appropriate field form. The sample flow controller / regulator shall be removed from the canister and the Teflon™ sample tubing shall be discarded after a single use to prevent cross-contamination between samples. Finally, the brass cap (used earlier) shall be attached to the inlet fitting on the Summa canister and a sample identification tag/label attached to the canister.

Duplicate samples shall be collected by repeating the procedure detailed above, with the addition of a "T" splitter, and one canister attached to each end of the "T" Swagelok (compression) or equivalent fitting.

A picture of a typical set-up for the collection of a duplicate sample at a probe/well with a diameter of less than one-inch is provided below.

4.3.2.4 Post-Sample Collection

The sample train shall be dismantled and all non-dedicated lines used for sample collection shall be disposed of. New sample lines at each sample location shall be used, except for dedicated equipment (4-way micro valves, fittings, and coupling bodies, etc.). The micro valve shall remain attached to probes/wells with a well diameter less than one-inch, however; the valve shall be configured so that the probe/well is closed to atmosphere *(see Attachment A: Guide to the 4-Way Micro-Valve)*. For probes/wells with a diameter equal to or greater than one inch, the vinyl slip cover shall be fitted over the coupling insert on the expandable well cap following sampling collection. The dedicated equipment (coupling body) used for the monitoring locations with a probe/well diameter equal to or greater than one-inch shall be placed into a labeled, re-sealable bag. Non-dedicated, reusable equipment shall be cleaned / decontaminated in accordance with SOP ENV-04-04 or as otherwise required by the Site-Specific Work Plan.

4.4 Soil Vapor Sample Handling

Tedlar™ bag samples shall be transported to the onsite field screening location. Field screening shall be performed in accordance with the SOP ENV-11-05. The holding time for a Tedlar™ bag sample shall not exceed thirty-six (36) hours.

Summa canisters samples shall be shipped to the contracted laboratory under strict chain of custody procedures for offsite laboratory analysis. The holding time for a Summa sample shall not exceed fourteen (14) days.

5.0 Quality Assurance/Quality Control

5.1 Leak Testing

Leakage during soil vapor sampling may dilute samples with ambient air and produce results that underestimate actual site soil vapor concentrations. Leak testing can be conducted using direct and indirect methods to evaluate seal integrity. The type of leak testing, if any, shall be based on data quality objectives as specified in the Site-Specific Work Plan.

5.1.1 Direct

Seal integrity can be evaluated directly using an inert tracer gas (e.g. laboratory grade helium). Inert gas selection shall be conducted in conjunction with the laboratory. The sampler shall construct an air tent using polyethylene sheet or assemble a commercially available air tent which encompasses the top of the probe/well casing and the entire sample train. During sampling, the tracer gas shall be allowed to flow around the sample train connections and the bentonite or grout seal at the ground surface. Following sample collection, the air tent shall be dismantled. The soil vapor sample shall be analyzed for inert trace gas in addition to the other requested analysis. If the tracer gas is detected in the soil vapor sample, the seal integrity was compromised and the analytical results, which are not representative of the stratigraphic unit or zone within the stratigraphic unit, shall be considered invalid.

5.1.2 Indirect

Seal integrity can be evaluated indirectly by measuring oxygen and carbon dioxide levels in the soil vapor sample. Oxygen and carbon dioxide levels shall be compared to levels in ambient air, project-specific criteria, and/or data trend(s). If the soil vapor sample levels are comparable to ambient air and/or project-specific criteria and/or do not fit data trend(s), the sample results shall be considered suspect. If soil vapor analysis is being performed by an offsite laboratory, this data shall be qualified appropriately. If soil vapor analysis is being performed onsite (either by a mobile laboratory or as field screening), then the probe/well shall be re-sampled within 24 to 36 hours of the original sample. The duplicate and original sample results shall be compared and evaluated based on project-specific criteria and data trend(s) to determine if the seal integrity was compromised and validity of the data collected. The reasons supporting the qualification or invalidation of data shall be documented in the field logbook and/or on the appropriate field form or as otherwise required by the Site-Specific Work Plan or Quality Assurance Project Plan (QAPP).

6.0 REFERENCES AND ADDITIONAL RESOURCES

ASTM International, 2001, ASTM Standard D 5314-92 (2001) Standard Guide for Soil Gas Monitoring in the Vadose Zone.

USEPA, 1994, SOP # 1703, Rev #: 0.0, Summa Canister Cleaning Procedure.

USEPA, 1995, SOP #1704, Rev. #: 0.0, Summa Canister Sampling.

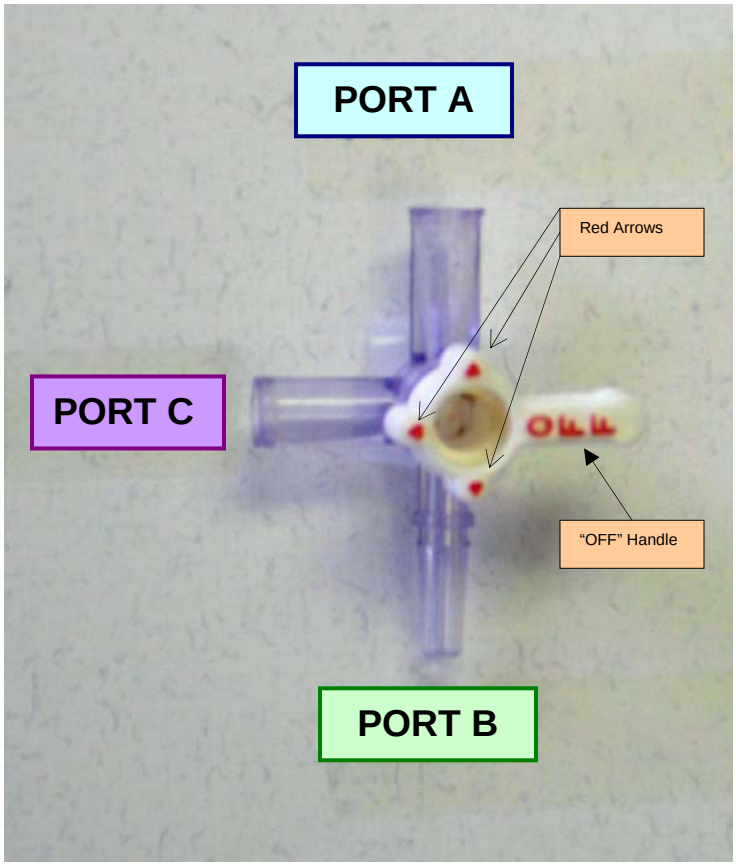
USEPA, 1996, SOP # 2042, Rev. #: 0.0, Soil Gas Sampling

USEPA, 1999, Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry GC/MS) in *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air,* 2nd Ed., EPA Publication 625/R-96/010b.

USEPA, 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/600/B-07/001.

ATTACHMENT A
GUIDE TO THE 4-WAY MICRO-VALVE

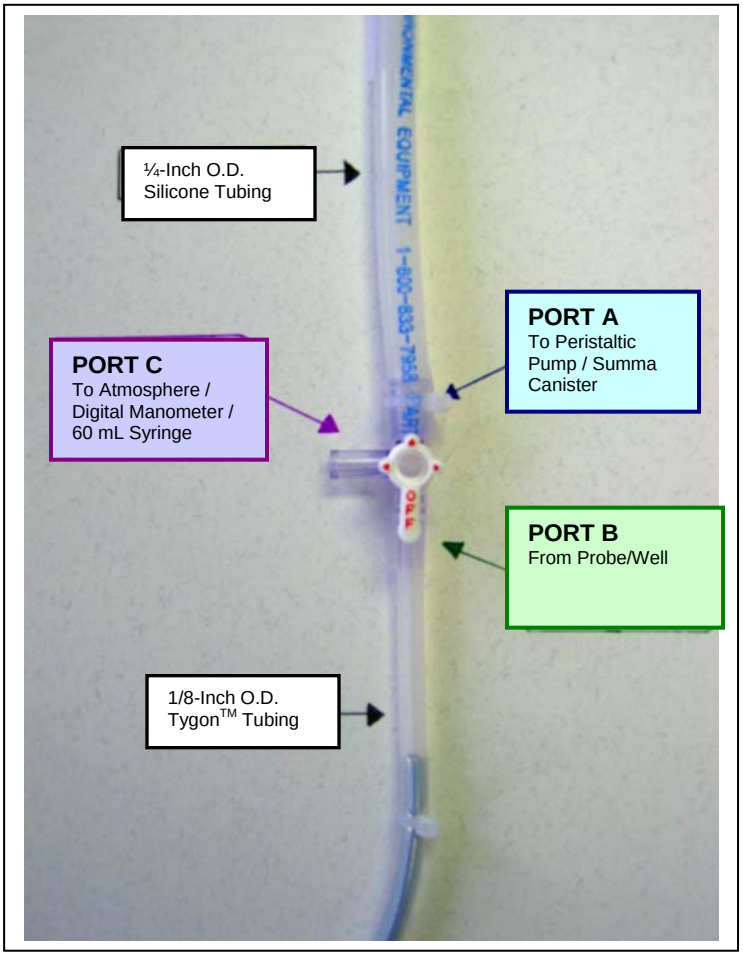
GUIDE TO THE 4-WAY MICRO-VALVE

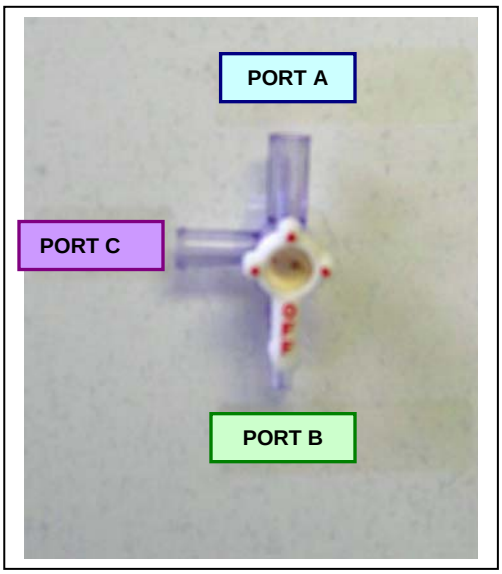


Notes:

1. Red arrows on the 4-way micro-valve indicate the ports that are currently open.
2. The "OFF" handle indicates the port that is currently closed.
3. The designation of ports is alphabetical from the top (opposite the probe/well) going in a clockwise direction.

Valve Position #1: Closed to Probe/Well





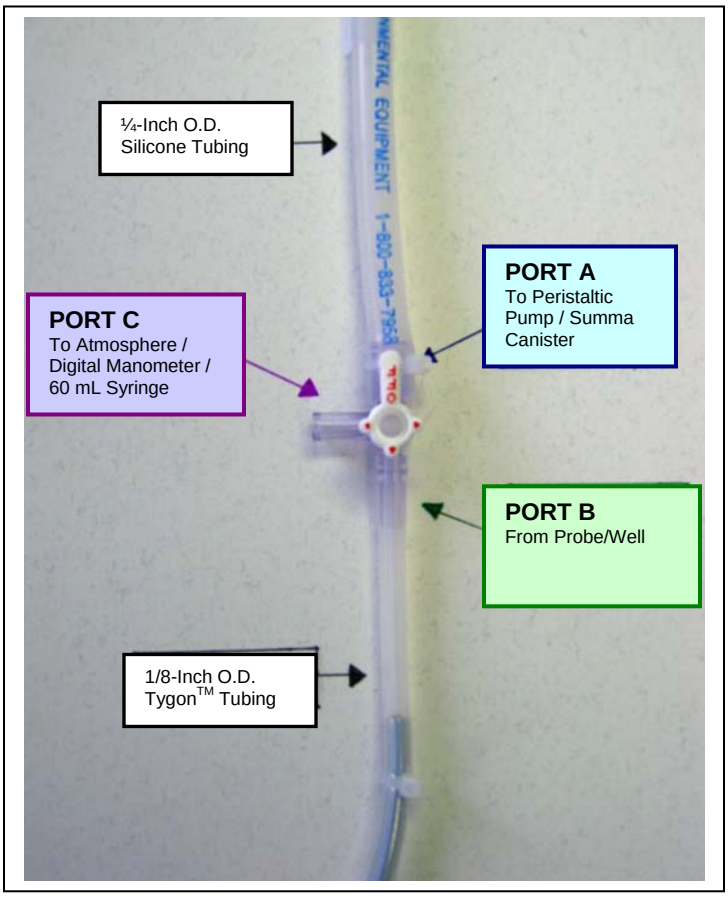
Valve Position #1:

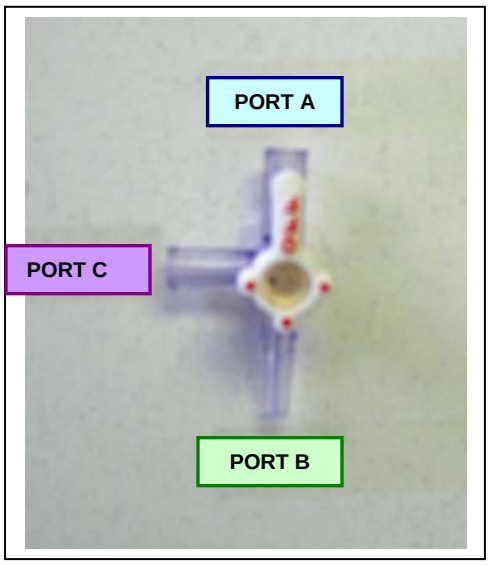
Closed to Port B (Probe/Well);
Open to Port A (Peristaltic Pump / Summa Canister)
Open to Port C (Atmosphere / Digital Manometer / 60 mL Syringe)

The "OFF" handle is turned in such a way that it is directly over Port B. The three small, red arrows opposite the "OFF" handle indicate which ports are open (Ports A & C).

In this valve position, the probe/well is not open to the atmosphere and, therefore, will not vent. If the valve is not in this position prior to the start of the monitoring (vacuum/pressure gauging, Tedlar™ bag sample collection, and/or summa canister sample collection, set the valve to Position #1 and return to this location at least 30 minutes later.

Valve Position #2: Open for Vacuum/Pressure Gauging & Purging





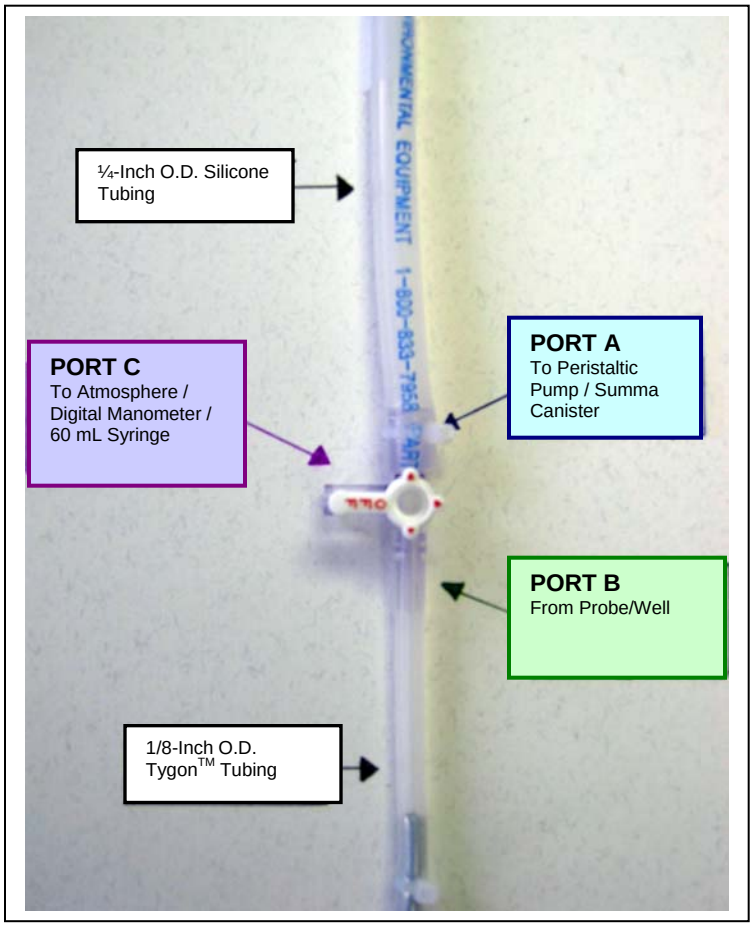
Valve Position #2:

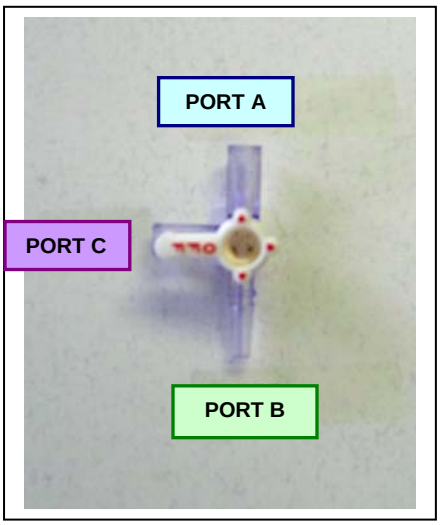
Closed to Port A (Peristaltic Pump / Summa Canister);
Open to Port B (Probe/Well)
Open to Port C (Atmosphere / Digital Manometer / 60 mL Syringe)

The "OFF" handle is turned in such a way that it is directly over Port A. The three small, red arrows opposite the "OFF" handle indicate which ports are open (Ports B & C).

In this valve position when the digital manometer is connected to Port C, a vacuum/pressure reading can be obtained from the probe/well. If the valve is in this position prior to the start of the monitoring (vacuum/pressure gauging, Tedlar™ bag sample collection, and/or summa canister sample collection, set the valve to Position #1 and return to this location at least 30 minutes later.

Valve Position #3: Open for Soil Vapor Sample Collection





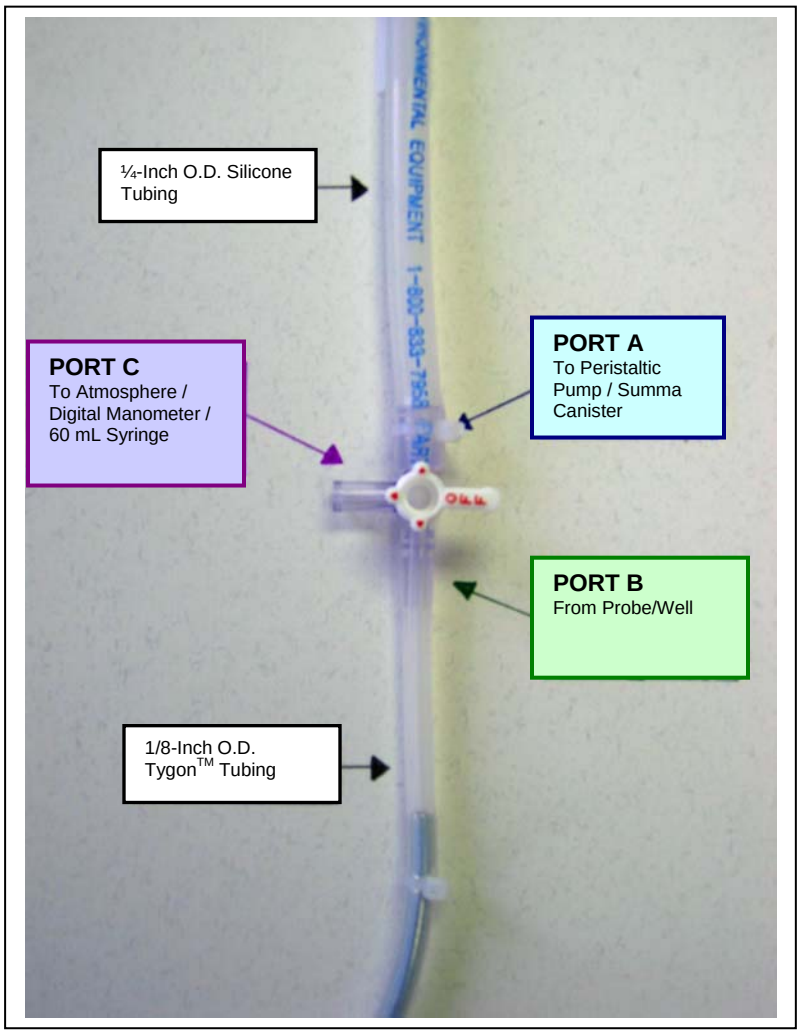
Valve Position #3:

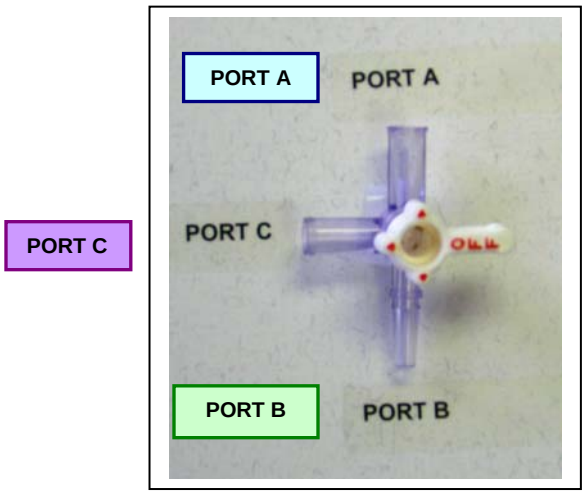
Closed to Port C (Atmosphere / Digital Manometer / 60 mL Syringe);
Open to Port A (Peristaltic Pump / Summa Canister)
Open to Port B (Probe/Well)

The "OFF" handle is turned in such a way that it is directly over Port C. The three small, red arrows opposite the "OFF" handle indicate which ports are open (Ports A & B).

In this valve position, a soil vapor sample can be collected from the probe/well using the peristaltic pump and Tedlar™ bag or a summa canister. If the valve is in this position prior to the start of the monitoring (vacuum/pressure gauging, Tedlar™ bag sample collection, and/or summa canister sample collection, set the valve to Position #1 and return to this location at least 30 minutes later.

Valve Position #4: Improper Valve Position





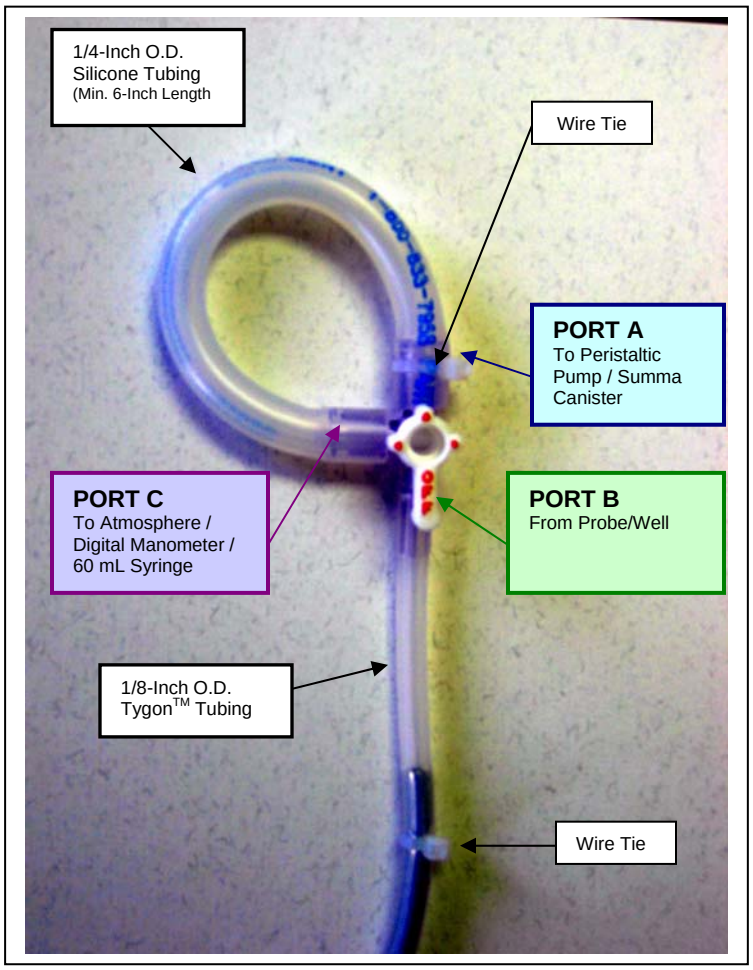
Valve Position #4:

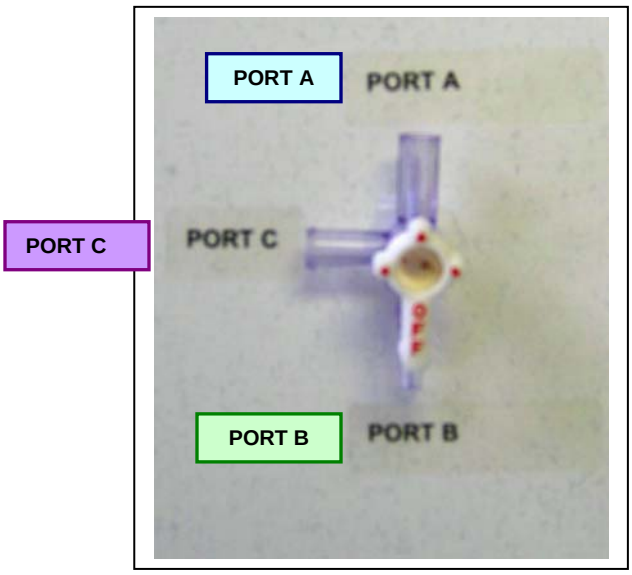
Open to Port A (Peristaltic Pump / Summa Canister);
Open to Port B (Probe/Well)
Open to Port C (Atmosphere / Digital Manometer / 60 mL Syringe)

The "OFF" handle is turned in such a way that it is opposite of Port C. The three small, red arrows opposite the "OFF" handle indicate all ports are open (Ports A, B & C).

In this valve position, the probe/well is open to the atmosphere and, therefore, will vent. In addition, this valve position will allow ambient air into the sample train and invalidate the data. If the valve is in this position prior to the start of the monitoring (vacuum/pressure gauging, Tedlar™ bag sample collection, and/or summa canister sample collection, set the valve to Position #1 and return to this location at least 30 minutes later. The valve should never be in this position.

Post-Monitoring Valve and Tubing Configuration





<u>Post-Monitoring Valve and Tubing Configuration</u>:

Closed to Port B (Probe/Well)
Open to Port A (Peristaltic Pump / Summa Canister);
Open to Port C (Atmosphere / Digital Manometer / 60 mL Syringe)

The 4-way micro-valve is set to position #1. The "OFF" handle is turned in such a way that it is directly over Port B. The three small, red arrows opposite the "OFF" handle indicate which ports are open (Ports A & C). In addition, the silicone tubing (minimum length of six (6) inches) is configured such that it forms a loop between Port A and Port C and a wire tie is used to secure the silicone tubing to Port A.

In this configuration, the probe/well is not open to the atmosphere and, therefore, will not vent. In addition, this configuration minimizes the water infiltration into the 4-way micro-valve. The valve and tubing should be placed in this configuration following vacuum/pressure gauging and soil vapor sample collection.

STANDARD OPERATING PROCEDURE
NO. SAS-11-05

FIELD SCREENING FOR FIXED GASES AND SOIL VAPOR CONCENTRATIONS
Revision 0

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for conducting the field screening soil vapor samples collected using Tedlar™ bag media. The field screening consists of instrument calibration, real-time determination of fixed gases (oxygen and carbon dioxide) levels, percent of lower explosive limit (% LEL), and soil vapor concentrations (as determined using a photoionization detector [PID] and flame ionization detector [FID]), and documentation of field screening results.

2.0 EQUIPMENT AND MATERIALS

- LandTec GA-90 Landfill Gas Analyzer or equivalent
- RAE Systems ppbRAE continuous monitoring PID or equivalent
- Thermo Electron TVA 1000B PID and FID or equivalent
- Calibration Gases:
  - Zero Gas – Hydrocarbon (HC) Free Air
  - Carbon dioxide (CO_2) at 35% by volume
  - Oxygen (O_2) at 4% by volume
  - Isobutylene at 0.5% by volume
  - Methane (CH_4) at 3.25% by volume
  - Isobutylene in air at concentrations of 10, 50 and 1,000 ppmv
  - Methane (CH_4) in air at concentrations of 50, 500, and 5,000 ppmv
- Regulators for gas cylinders
- 1-liter Tedlar™ bag sample media
- ¼-inch outer diameter (O.D.) Teflon™ or Tygon™ tubing cut to length
- Thermo Electron Dilutor Orifice 10:1 (a.k.a. 10-to-1 dilution probe)
- Thermo Electron Dilutor Orifice 25:1 (a.k.a. 25-to-1 dilution probe)

- Thermo Electron Dilutor Orifice 50:1 (a.k.a. 50-to-1 dilution probe)
- Metering valves
- Field Screening Calibration Forms
- Field Screening Spreadsheet and/or Forms
- Miscellaneous tools

3.0 HEALTH AND SAFETY

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 CONSIDERATIONS

- Calibration gas cylinders shall be stored in accordance with OSHA and site-specific regulations/guidelines.
- Field screening instruments shall be stored between uses and maintained in accordance with manufacturer guidelines.
- Field screening shall be performed at a fixed location, when practical, with adequate ventilation.
- A ppbRAE or equivalent may be used as an optional screening tool to confirm low level volatile organic compound (VOC) concentrations.

5.0 INSTRUMENT SPECIFICATIONS

Instrument specifications are intended as general guidelines only. Instruments may be substituted based on project/task specific needs.

5.1 LandTec GA-90 or Equivalent

A LandTec GA-90 or equivalent shall be used to measure O_2 and CO_2 levels as percent by volume (%) in soil vapor samples. If required by project/task specific requirements, this instrument may be used to measure the % LEL in soil vapor samples.

5.2 ppbRAE or Equivalent

A ppbRAE or equivalent may be used as an optional screening tool to measure and confirm low level VOCs in soil vapor samples. The ppbRAE or equivalent, when used, shall measure VOCs as parts per billion by volume (ppbv) and/or parts per million by volume (ppmv).

5.3 TVA 1000B or Equivalent

A Toxic Vapor Analyzer (TVA 1000B) or equivalent shall be used to measure low to high level VOCs as ppmv in soil vapor samples. The TVA 1000B or equivalent shall also be used to measure low to high level total hydrocarbons (THC) as ppmv or percent by volume ($\%_V$) in soil vapor samples.

6.0 INSTRUMENT CALIBRATION

In order to ensure the collection of valid levels of fixed gases, O_2 and CO_2, and soil vapor concentrations as total hydrocarbons (THC), proper calibration of the instruments is important. Instruments shall be calibrated prior to field screening in accordance with the manufacturers recommended procedures. Calibration gases shall be introduced directly at a rate of 0.5 liters per minute to the LandTec GA-90 or equivalent since the instrument pump is not required for calibration. Calibration standard gases shall be introduced to the ppbRAE, TVA 1000B PID, and TVA 1000B FID using Tedlar™ bag media which will allow the instrument pump to draw in the calibration gas at the appropriate flow. Following screening activities each day, a post-screening calibration check shall be performed. If the screening instruments are to be used continuously throughout the workday, mid-screening calibration checks shall also be performed. One-point bump

calibration checks shall also be performed on the TVA 1000B or equivalent and associated dilution probe(s) at a frequency of one per two-hours of field screening. Calibration gases with concentrations within the linear range of the instrument shall be used for the pre-screening calibration and post-screening calibration check in addition to the mid-screening and one-point bump calibration checks, when required.

6.1 Pre-Screening Calibration

6.1.1 LandTec GA-90 or equivalent

Prior to the start of field screening, the LandTec GA-90 or equivalent shall be calibrated in accordance with the manufacturers recommended procedures using 4.0% $_V$ O_2 and 35% $_V$ CO_2 standard gases (see Attachment A). The pre-screening calibration shall be documented on the appropriate instrument calibration form (see Attachment A).

6.1.2 ppbRAE or equivalent

Prior to the start of optional, confirmatory low level PID field screening, the ppbRAE or equivalent shall be calibrated in accordance with the manufacturers recommended procedures using hydrocarbon free air (0 ppmv THC by volume) and 10 ppmv isobutylene standard gas (see Attachment A). The pre-screening calibration shall be documented on the appropriate instrument calibration form (see Attachment A).

6.1.3 TVA 1000B or equivalent

Prior to the start of field screening, the PID portion of the TVA 1000B or equivalent shall be calibrated in accordance with the manufacturers recommended procedures using hydrocarbon free air (0% $_V$ THC) and 50 and 1,000 ppmv isobutylene standard gases. The FID portion of the TVA 1000 or equivalent shall be calibrated in accordance with the manufacturers recommended procedures using hydrocarbon free air (0% $_V$ THC) and 50, 500, and 5,000 ppmv methane standard gases (see Attachment A). The pre-screening calibration shall be documented on the appropriate instrument calibration form (see Attachment A).

6.1.4 Dilution Probes

Following the calibration of the TVA 1000B PID and FID, each dilution probe shall be calibrated by adjusting the associated metering valve until the concentration displayed on the instrument is within (+/-) 15% of the target concentration of the designated calibration gases. The following table summarizes the type and concentration of calibration gas, target displayed concentration, and acceptable range for each dilution probe and instrument. The pre-screening calibration shall be documented on the appropriate instrument calibration form (see Attachment A).

Instrument	Dilution Probe	Calibration Gas		Concentration Displayed on Instrument	
		Type	Concentration	Target (ppmv)	Acceptable Range (ppmv)
TVA 1000B PID	10-to-1	Isobutylene	0.5 $\%_V$	500	425 – 575
TVA 1000B FID	10-to-1	Methane	3.25$\%_V$	3,250	2,762 – 3,738
	25-to-1	Methane	3.25$\%_V$	1,300	1,105 – 1,495
	50-to-1	Methane	3.25$\%_V$	650	552 – 748

6.2 Mid- and Post-Screening Calibration Checks

Properly calibrated instruments may drift during the field screening period. In order to ensure the collection of valid data, calibration accuracy checks will be conducted at the conclusion of the field screening each day. If the screening instruments are to be used throughout the workday, mid-screening calibration checks shall also be performed.

6.2.1 LandTec GA-90 or equivalent

The calibration of the LandTec GA-90 or equivalent shall be checked using 4.0 $\%_V$ O_2 and 35% $_V$ CO_2 standard gases. If the observed concentration/level is within (+/-) 15% of the standard gases, the calibration shall be considered adequate. If the observed concentration/level is outside that range, the LandTec GA-90 or equivalent shall be recalibrated. Data obtained since the previous calibration check shall be flagged as estimated values. The following table summarizes the type and concentration of calibration gas, target displayed concentration, and acceptable range for each fixed gas. The calibration checks shall be documented on the appropriate instrument calibration form (see Attachment A).

Fixed Gas	Calibration Gas		Concentration Displayed on Instrument	
	Type	Concentration	Target (%)	Acceptable Range (%)
Oxygen	O_2 Standard	4.0% $_V$	4.0	3.4 – 4.6
Carbon Dioxide	CO_2 Standard	35.0%$_V$	35.0	29.75 – 40.25

6.2.2 ppbRAE or equivalent

The calibration of the ppbRAE or equivalent shall be checked using hydrocarbon free air (0 ppmv THC by volume) and 10 ppmv isobutylene standard gases, if the observed concentration/level is within (+/-) 15% of the calibration gases, the calibration shall be considered adequate. If the observed concentration/level is outside that range, the ppbRAE or equivalent shall be recalibrated. Data obtained since the previous calibration check shall be flagged as estimated values. The following table summarizes the type and concentration of calibration gas, target displayed concentration, and acceptable range for the ppbRAE. The calibration checks shall be documented on the appropriate instrument calibration form (see Attachment A).

Instrument	Calibration Gas		Concentration Displayed on Instrument	
	Type	Concentration	Target (ppmv)	Acceptable Range (ppmv)
ppbRAE	HC Free Air	0.0 ppmv	0.0	0.08 – 0.15
	Isobutylene	10.0 ppmv	10.0	8.5 – 11.5

6.2.3 TVA 1000B or equivalent

Given the wide range of hydrocarbons anticipated, the linearity of the PID response shall be checked using hydrocarbon free air (0% $_V$ THC) and 50 and 1,000 ppmv isobutylene standard gases. The FID response shall be checked using 50, 500, and 5000 ppmv methane standard gases. If the observed concentration/level is within (+/-) 15% of the standard gases, the calibration shall be considered adequate. If the observed concentration/level is outside that range, the TVA 1000B or equivalent shall be recalibrated. Data obtained since the previous calibration check shall be flagged as estimated values. The following table summarizes the type and concentration of calibration gases, target displayed concentration, and acceptable range for each

instrument. The calibration checks shall be documented on the appropriate instrument calibration form (see Attachment A).

Instrument	Dilution Probe	Calibration Gas		Concentration Displayed on Instrument	
		Type	Concentration	Target (ppmv)	Acceptable Range (ppmv)
TVA 1000B PID	None	HC Free Air	0.0 ppmv	0.0	0.08 – 0.15
		Isobutylene	50.0 ppmv	50.0	42.5 – 57.5
			1,000 ppmv	1,000	850 – 1150
TVA 1000B FID	None	HC Free Air	0.0 ppmv	0.0	0.08 – 0.15
		Methane	50.0 ppmv	50.0	42.5 – 57.5
			500 ppmv	500	425 – 575
			5,000 ppmv	5,000	4250 – 5750

6.2.4 Dilution Probes

Following the calibration check of the TVA 1000B PID and FID, each dilution probe and associated metering valve shall be shall be verified using designated type and concentration of standard gas. The dilution probe calibration is considered adequate if the concentration displayed on the instrument is within (+/-) 15% of the target concentration of the designated calibration gas. The following table summarizes the type and concentration of calibration gas, target displayed concentration, and acceptable range for each dilution probe and instrument. The calibration checks shall be documented on the appropriate instrument calibration form (see Attachment A)

Instrument	Dilution Probe	Calibration Gas		Concentration Displayed on Instrument	
		Type	Concentration	Target (ppmv)	Acceptable Range (ppmv)
TVA 1000B PID	10-to-1	Isobutylene	$0.5\%_V$	500	425 – 575
TVA 1000B FID	10-to-1	Methane	$3.25\%_V$	3,250	2,762.5 – 3,737.5
	25-to-1	Methane	$3.25\%_V$	1,300	1,105 – 1,495
	50-to-1	Methane	$3.25\%_V$	650	552.5 – 747.5

6.3 Periodic Bump Calibration Checks

Due to the negligible (< 5%) instrument drift throughout a day, the LandTec GA-90 and ppbRAE or equivalent(s) will not undergo periodic bump calibration checks. Given the wide range of hydrocarbons anticipated, one-point, calibration bump checks shall be performed on the TVA 1000B PID and FID, dilution probes, and associated metering valves or equivalents. The period bump calibration check shall be performed at a frequency of one per two-hours of field screening. The calibration is considered adequate if the concentration displayed on the instrument is within (+/-) 15% of the target concentration of the designated calibration gas. If the observed concentration is outside this range, the instrument and/or dilution probe and metering valve shall be recalibrated as appropriate. Data obtained since the previous bump calibration check shall be flagged as estimated values. The following table summarizes the type and concentration of calibration gas, target displayed concentration, and acceptable range for each dilution probe and instrument. The calibration checks shall be documented on the appropriate instrument calibration form (see Attachment A).

Instrument	Dilution Probe	Calibration Gas		Concentration Displayed on Instrument	
		Type	Concentration	Target (ppmv)	Acceptable Range (ppmv)
TVA 1000B PID	None	Isobutylene	50.0 ppmv	50.0	42.5 – 57.5
	10-to-1	Isobutylene	$0.5\%_V$	500	425 – 575
TVA 1000B FID	None	Methane	5,000 ppmv	5,000	4250 – 5750
	10-to-1	Methane	$3.25\%_V$	3,250	2,762 – 3,738
	25-to-1	Methane	$3.25\%_V$	1,300	1,105 – 1,495
	50-to-1	Methane	$3.25\%_V$	650	552 – 748

7.0 SAMPLE SCREENING

Soil vapor samples collected in Tedlar™ bags shall be screened at a fixed location, whenever practical. Since samples may have 1) concentrations above the measurement range of the instrument or 2) insufficient oxygen content to analyze reliably, the order of the screening is important to the identification of these situations. The screening order is also dictated by the sample flow rates, which vary by instrument, and the sample volume.

7.1 Screening Procedures

Prior to field screening, the well/sample ID, sample date, and sample time shall be recorded on the appropriate field form and/or spreadsheet (see Attachment C). Once the screening data and time have also been recorded on the appropriate field form and/or spreadsheet (see Attachment C), the field screening shall commence. The soil vapor samples shall be analyzed in the following order:

- Fixed gases (O_2 and CO_2)
- Percent of lower explosive limit (% LEL) - If required by the project or task
- Soil vapor concentrations (VOCs) as determined using a PID
- Soil vapor concentrations (THC) as determined using a FID

The field screening shall adhere to the procedure outlined in the Field Screening Procedure Flow Chart provided in Attachment B. Following screening the Tedlar™ bag sample media shall be discarded.

7.2 Reporting

Field screening results as observed on the instruments, fixed gases levels (O_2 & CO_2), percent lower explosive limit, and soil vapor concentrations, as determined using a PID and FID, shall be recorded in the appropriate spreadsheet or on the appropriate field form (see Attachment C). The use of a dilution probe shall also be documented in the appropriate spreadsheet or on the appropriate field form (see Attachment C). *Please note: Concentrations as determined using a PID and FID shall be corrected for the use of dilution probe(s).* If the concentration of the vapor sample exceeds the operating range of the instrument, with or without the use of a dilution probe, it shall be marked as “estimated”. If a flame-out of the FID occurs, “FO” shall be recorded as the default value for the affected sample. If the flame-out was not the result of 1) insufficient sample flow, 2) FID capsule contamination, or 3) insufficient oxygen in the sample (<14% when adjusted to account for the use or absence of a dilution probe), the upper dynamic range of the instrument, which has been adjusted for the use of or absence of a dilution probe, shall be used as the corrected FID reading. In this case, the reading shall be flagged as estimated. These situations shall be documented in the appropriate spreadsheet or on the appropriate field form.

8.0 SAMPLE HOLD TIMES

Soil vapor samples collected using Tedlar™ bag media shall be field screened at a fixed location, if practical, within thirty-six (36) hours of sample collection.

9.0 REFERENCES AND ADDITIONAL RESOURCES

Field Environmental Instruments, LANDTEC GA-90 Gas Analyzer Specifications and Features.

LANDTEC, GA-90 Landfill Gas Analyzer Operation Manual, Version MK2C1.12.

RAE Systems, 1999, Portable Continuous ppb VOC Detector Monitor Specifications and Features.

RAE Systems, 1999, Using the MiniRAE 2000 & ppbRAE plus.

Thermo Electron Corporation, 2003, Product Overview TVA-1000B Toxic Vapor Analyzer.

Thermo Electron Corporation, 2003, TVA-1000B Toxic Vapor Analyzer Instruction Manual P/N BK3500, December.

USEPA, 2007, Guidance for Preparing Standard Operating Procedures (SOPs), EPA/600/B-07/001.

ATTACHMENT A
INSTRUMENT CALIBRATION FORMS

Author: T. Gilles Q2R & Approval By: E. Gasca Q3R & Approval By: J. Pope

ATTACHMENT A-1
LANDTEC GA-90 LANDFILL GAS ANALYZER OR EQUIVALENT

FIELD SCREENING INSTRUMENT CALIBRATION FORM
LandTec GA-90 or Equivalent

Form Revision 0

PROJECT INFORMATION

Project Name: _____ Task Name: _____
Project Number: _____ Task/Project Manager: _____

FIELD SCREENING TEAM INFORMATION

Date: _____
Screener: _____
Assistant: _____

INSTRUMENT INFORMATION

Make: _____
Model: _____
Serial #: _____

CALIBRATION GAS INFORMATION

Manufacturer	Cal. Gas Type	Lot Number	Expiration Date

CALIBRATION AND CALIBRATION CHECK INFORMATION

Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response	Response within Tolerances (circle one)	Comments
		Type	Conc.			
	Pre-Screening Calibration[R]	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	
	Mid-Screening Calibration Check*	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	
	Post-Screening Calibration Check[R]	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	
	Mid-Screening Recalibration*	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	
	Mid-Screening Recalibration*	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	

Notes: 1. [R] = Required 2. * = If necessary 3. % = percent by volume

Author:	T. Gilles	Q2R & Approval By:	E. Gasca	Q3R & Approval By:	J. Pope

ATTACHMENT A-2
ppbRAE or EQUIVALENT

FIELD SCREENING INSTRUMENT CALIBRATION FORM
ppbRAE or Equivalent

Form Revision 0

PROJECT INFORMATION

Project Name: _____ Task Name: _____
Project Number: _____ Task/Project Manager: _____

FIELD SCREENING TEAM INFORMATION | **INSTRUMENT INFORMATION**

Date: _____ Make: _____
Screener: _____ Model: _____
Assistant: _____ Serial #: _____

CALIBRATION GAS INFORMATION

Manufacturer	Cal. Gas Type	Lot Number	Expiration Date

CALIBRATION AND CALIBRATION CHECK INFORMATION

Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response	Response within Tolerances (circle one)	Comments
		Type	Conc.			
	Pre-Screening Calibration[R]	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Mid-Screening Calibration Check*	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Post-Screening Calibration Check[R]	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	

Notes: 1. [R] = Required 2. * = If necessary 3. ppmv = parts per million by volume

Author:	T. Gilles	Q2R & Approval By:	E. Gasca	Q3R & Approval By:	J. Pope

ATTACHMENT A-3
TVA-1000B TOXIC VAPOR ANALYZER OR EQUIVALENT

FIELD SCREENING INSTRUMENT CALIBRATION FORM
TVA 1000 (FID) or Equivalent

Form Revision 0

PROJECT INFORMATION

Project Name: _____ Task Name: _____
Project Number: _____ Task/Project Manager: _____

FIELD SCREENING TEAM INFORMATION

Date: _____
Screener: _____
Assistant: _____

INSTRUMENT INFORMATION

Make: _____
Model: _____
Serial #: _____

CALIBRATION GAS INFORMATION

Manufacturer	Cal. Gas Type	Lot Number	Expiration Date

CALIBRATION AND CALIBRATION CHECK INFORMATION

Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response				Response(s) within Tolerances (circle one)	Comments
		Type	Conc.	w/o Dilution Probe	w/ 10-to-1 Dilution Probe	w/ 25-to-1 Dilution Probe	w/ 50-to-1 Dilution Probe		
	Pre-Screening Calibration[R]	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Mid-Screening Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	

CALIBRATION AND CALIBRATION CHECK INFORMATION (Continued)									
Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response				Response(s) within Tolerances (circle one)	Comments
		Type	Conc.	w/o Dilution Probe	w/ 10-to-1 Dilution Probe	w/ 25-to-1 Dilution Probe	w/ 50-to-1 Dilution Probe		
	Post-Screening Calibration Check[R]	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	

Notes: 1. [R] = Required 2. * = If necessary 3. ppmv = parts per million by volume 4. N/A = Not Applicable

FIELD SCREENING INSTRUMENT CALIBRATION FORM
TVA 1000 (PID) or Equivalent

Form Revision 0

PROJECT INFORMATION

Project Name: _____ Task Name: _____
Project Number: _____ Task/Project Manager: _____

FIELD SCREENING TEAM INFORMATION

Date: _____
Screener: _____
Assistant: _____

INSTRUMENT INFORMATION

Make: _____
Model: _____
Serial #: _____

CALIBRATION GAS INFORMATION

Manufacturer	Cal. Gas Type	Lot Number	Expiration Date

CALIBRATION AND CALIBRATION CHECK INFORMATION

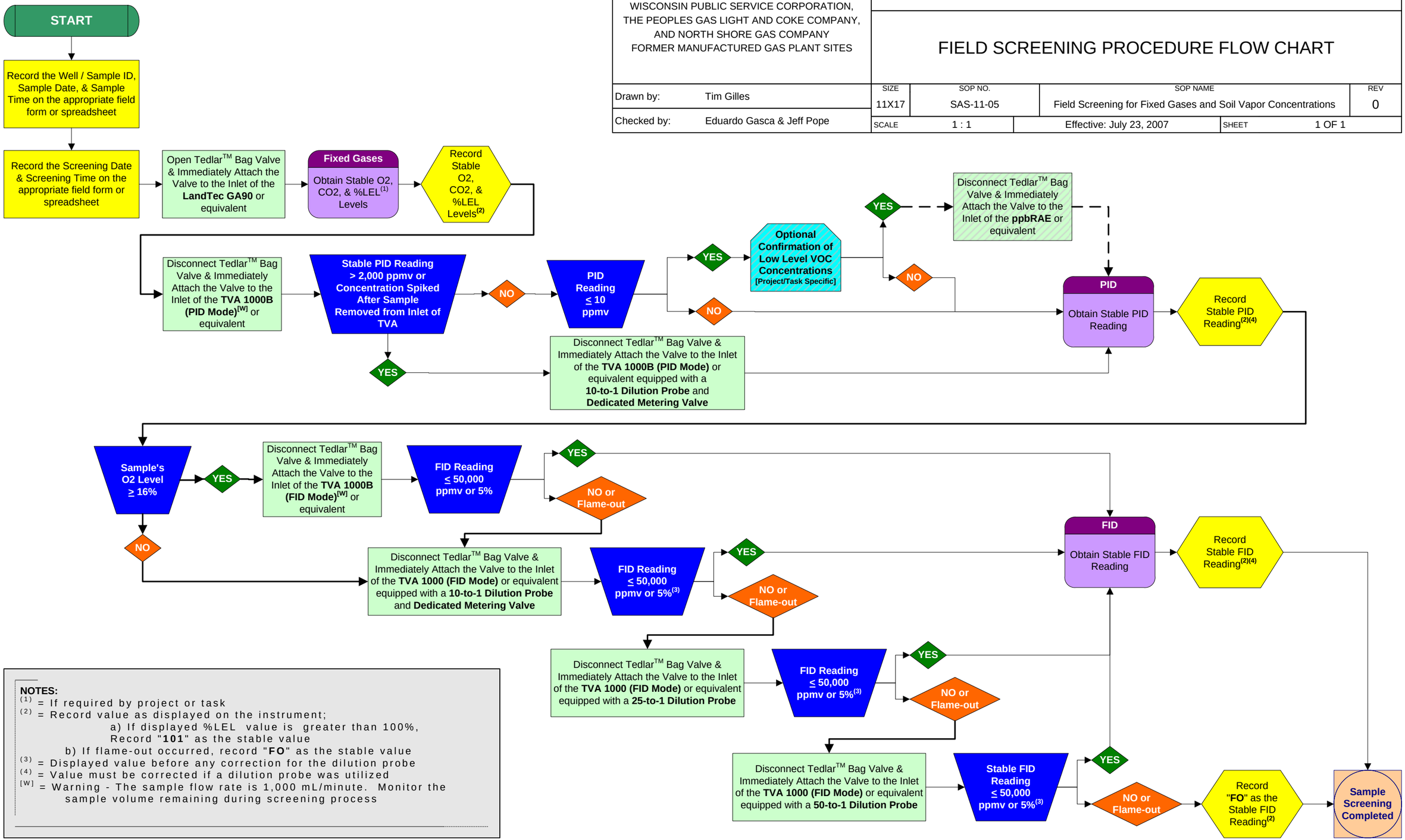
Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response		Response within Tolerances (circle one)	Comments
		Type	Conc.	w/o Dilution Probe	w/ 10-to-1 Dilution Probe		
	Pre-Screening Calibration[R]	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Mid-Screening Calibration Check*	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Post-Screening Calibration Check[R]	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	

CALIBRATION AND CALIBRATION CHECK INFORMATION (Continued)							
Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response		Response within Tolerances (circle one)	Comments
		Type	Conc.	w/o Dilution Probe	w/ 10-to-1 Dilution Probe		
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	

Notes: 1. R = Required 2. * = If necessary 3. ppmv = parts per million by volume

ATTACHMENT B
FIELD SCREENING PROCEDURE FLOW CHART

WISCONSIN PUBLIC SERVICE CORPORATION, THE PEOPLES GAS LIGHT AND COKE COMPANY, AND NORTH SHORE GAS COMPANY FORMER MANUFACTURED GAS PLANT SITES	SOP SAS-11-05 ATTACHMENT B			
	FIELD SCREENING PROCEDURE FLOW CHART			
Drawn by: Tim Gilles	SIZE 11X17	SOP NO. SAS-11-05	SOP NAME Field Screening for Fixed Gases and Soil Vapor Concentrations	REV 0
Checked by: Eduardo Gasca & Jeff Pope	SCALE 1 : 1	Effective: July 23, 2007	SHEET 1 OF 1	



NOTES:

(1) = If required by project or task

(2) = Record value as displayed on the instrument;
a) If displayed %LEL value is greater than 100%, Record "**101**" as the stable value
b) If flame-out occurred, record "**FO**" as the stable value

(3) = Displayed value before any correction for the dilution probe

(4) = Value must be corrected if a dilution probe was utilized

[W] = Warning - The sample flow rate is 1,000 mL/minute. Monitor the sample volume remaining during screening process

Author:	T. Gilles	Q2R & Approval By:	E. Gasca	Q3R & Approval By:	J. Pope

ATTACHMENT C
FIELD SCREENING RESULTS SPREADSHEET/FORM

FIXED GASES AND SOIL VAPOR CONCENTRATION FIELD SCREENING DATA

PROJECT INFORMATION		GENERAL INSTRUMENT INFORMATION		SCREENER INFORMATION	
Project Name:		Fixed Gases:		Screener's Name:	
Project Number:		PID (Low Level Confirmation):		Screener's Title:	
Task Name:		PID (Low-High Level):		Assistant's Name:	
Task/Project Manager:		FID (Low-High Level):		Assistant's Title:	

FIELD SCREENING RESULTS

WELL ID or SAMPLE ID	SAMPLE DATE	SAMPLE TIME (24-Hour)	SCREENING DATE	SCREENING TIME (24-Hour)	Observed Field Screening Values[1], Units, and Dilution Values[2]									Corrected Value[3]		COMMENTS
					O_2 (%)	CO_2 (%)	% LEL[4] (%)	PID	PID UNITS (circle one)	PID Dilution Value[2] (circle one)	FID	FID UNITS (circle one)	FID Dilution Value[2] (circle one)	PID (ppmv)	FID (ppmv)	
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
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									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			

FIELD SCREENING RESULTS

WELL ID or SAMPLE ID	SAMPLE DATE	SAMPLE TIME (24-Hour)	SCREENING DATE	SCREENING TIME (24-Hour)	Observed Field Screening Values[1], Units, and Dilution Values[2]									Corrected Value[3]		COMMENTS
					O_2 (%)	CO_2 (%)	% LEL[4] (%)	PID	PID UNITS (circle one)	PID Dilution Value[2] (circle one)	FID	FID UNITS (circle one)	FID Dilution Value[2] (circle one)	PID (ppmv)	FID (ppmv)	
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
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									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			

FIELD SCREENING RESULTS																
WELL ID or SAMPLE ID	SAMPLE DATE	SAMPLE TIME (24-Hour)	SCREENING DATE	SCREENING TIME (24-Hour)	Observed Field Screening Values[1], Units, and Dilution Values[2]									Corrected Value[3]		COMMENTS
					O_2 (%)	CO_2 (%)	% LEL[4] (%)	PID	PID UNITS (circle one)	PID Dilution Value[2] (circle one)	FID	FID UNITS (circle one)	FID Dilution Value[2] (circle one)	PID (ppmv)	FID (ppmv)	
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
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									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			

Notes: [1] = As observed on the instrument's display; If flame-out occurs, record "FO" as the default value.
[2] = Dilutions Values (Dilution Probe Specific): No Dilution Probe Used - Circle "1"; 10-to-1 Dilution Probe Used - Circle "10"; 25-to-1 Dilution Probe Used - Circle "25"; 50-to-1 Dilution Probe Used - Circle "50"
[3] = Calculated based on the units and dilution value or, in the case of a flame-out when sufficient oxygen is present, the upper dynamic range of the instrument multiplied by the dilution value.
[4] = If required by project or task
E = Estimated Value: Corrected value exceeds the upper dynamic range of the instrument or flame-out due to concentrations above the instruments range occurred.
ppbv = Parts per billion volume
ppmv = Parts per million volume
% = Percent by volume
N/A = Not Applicable
FO = Instrument Flame Out (FID Only)

STANDARD OPERATING PROCEDURE
NO. SAS-11-06

SOIL GAS SAMPLING
Revision 1

1.0 PURPOSE

This Standard Operating Procedure (SOP) provides information on soil-gas sampling using an active sampling approach to assess the vapor intrusion pathway. Soil gas will be sampled using dedicated gas vapor tips and the associated installation kit or direct-push rig. Soil gas samples will be collected from the unsaturated zone to provide measurements of soil gas that may potentially enter a building.

2.0 EQUIPMENT AND MATERIALS

- Rotary hammer drill (or equivalent) with a 1 3/8-inch diameter bit;
- Retractable gas vapor tip (GVP);
- Expendable GVP replacements;
- Hand Tools, including a hammer, needle-nose pliers, and trowel;
- Tubing receptacle;
- Teflon compression fittings to connect sampling points at “T” connection;
- “T” Swagelok (compression) or equivalent fitting;
- Stainless steel tubing;
- Gas sampling pump capable of extracting 200 milliliters per minute (mL/min);
- 4-way Teflon micro-valve;
- 1/4-inch O.D. Teflon tubing;
- VOC-free caulk;
- Nitrile gloves;
- Summa canisters with flow controllers, vacuum gauge, and shipping container;
- Sample labels;
- Chain of custody forms and seals;

- Field air monitoring instruments, as specified in the Work Plan (e.g. photo ionization detector, multi-gas monitors, etc.);
- Location markers (e.g. pin flags, wooden stakes, flagging tape, etc.);
- Granular bentonite;
- Asphalt cold patch or cement, as appropriate for site restoration;
- Decontamination materials;
- DOT-specified 55-gallon drum; and
- Field logbook and/or appropriate field form(s);

3.0 HEALTH AND SAFETY

Potentially hazardous conditions relating to chemicals under investigation, equipment and tools in use, utility services in investigation areas, or certain work activities may exist on the site. Protocols are established in each site-specific Health & Safety Plan (HASP) based on corporate health and safety policies and manuals, past field experience, specific site conditions, and chemical hazards known or anticipated to be present from available site data. Before site operations begin, all employees, and subcontractor personnel will have read and understood the HASP and all revisions. Before work begins, all site project staff will sign an agreement and acknowledgment form indicating that they have read and fully understood the HASP and their individual responsibilities, and fully agree to abide by the provisions of the HASP.

4.0 CONSIDERATIONS

Variations in chemical-specific characteristics, geologic conditions, and atmospheric influences can affect soil-gas sampling results. For this reason, it is important to understand factors the may influence the reported data when collecting soil-gas data. In all cases, site-specific factors should be carefully evaluated prior to initiation of sampling to obtain representative soil-gas data.

Prior to any soil-gas sampling, soil type must be evaluated for suitability of sampling. Soils with smaller grain sizes have smaller pore spaces and are less permeable, which may reduce the ability for soil gas to be released from the subsurface. For example, clays have the smallest grain size and significantly restrict soil gas migration. Soil moisture also limits the ability for soil gas to be released from the subsurface because moisture trapped in the pore space of sediments can inhibit or block soil-gas flow. Seasonal and geographical

variations in soil moisture content can affect air permeabilities. In addition, manmade and naturally occurring preferential pathways (e.g. utility corridors, lenses of coarse-grained materials within fine-grained materials, etc.) may also affect soil-gas migration and shall be considered prior to soil-gas sampling.

Reliability of soil-gas sampling may be improved by using fixed probes and by ensuring that leakage of atmospheric air into the samples is avoided during purging or sampling. To avoid dilution of the sampling region from leakage, the minimum purge volume deemed adequate to flush the sampling system should be removed, and soil-gas samples should be collected from the most permeable zones in the vadose zone when possible. Site-specific information concerning soil lithology, grain size analysis, soil moisture, and soil-gas permeability may be obtained by performing three soil borings in the immediate area of the sampling locations in advance of the soil-gas sampling. In addition, previous site investigation sample results, when available, should be used to determine the placement of the soil-gas sampling locations.

Since oxygen, carbon dioxide, and nitrogen can be sampled using a multi-gas monitor to give real-time results, parallel analysis of oxygen, carbon dioxide, and nitrogen in soil-gas may also be used to help assess the reliability of a given sample result.

5.0 SOIL VAPOR PROBE INSTALLATION

Prior to installation at each soil vapor probe location, the area will be inspected for clearance of existing utility lines and other obstructions near the sample location. The soil vapor probes will then be installed into the ground surface using a hammer drill connected to drive rods or a direct-push rig. Installation using a hammer drill should be used when depths of less than 10 feet are desired. For depths greater than 10 feet, a direct-push rig will more efficiently drive the probe rods. The soil vapor probes consist of a stainless steel drive tip which is connected to a screen with a length between 2 to 6 inches and diameter of at least 1/8-inch but no larger than 1/2-inch. At the top of the screen, a stainless steel hose barb allows for a connection to Teflon™ or stainless steel tubing for purging and sample collection. Soil gas probes installed at depths greater than 10 feet should be constructed with stainless steel tubing for durability and stability. After the probe is driven to the desired depth, the rods will be removed and a filter pack containing sand will be set to within 2 inches above and below the vapor probe. Above the sand filter pack, granular bentonite will be

placed and hydrated in two-foot lifts to ground surface. This bentonite will provide an airtight seal between the soil gas probe and the ambient air. Probes should not be installed shallower than two feet below ground surface (bgs). Each probe will be allowed to set for at least 24 hours before sampling takes place.

6.0 SOIL VAPOR SAMPLING PROCEDURES

Subsurface soil vapor will not be sampled if measurable precipitation or irrigation near the sampling location has occurred within the previous five days. The increased soil moisture can decrease soil permeability and cause the soil vapor sample results to be biased low.

6.1 SAMPLE TRAIN ASSEMBLY

Samples will be collected using evacuated batch-certified 1 liter (L) or smaller Summa™ canisters equipped with dedicated flow regulators and integrated particulate filters. A flow regulator/particulate filter and vacuum gauge will be attached to each canister as described in the *Summa Canister Instructions* provided by the laboratory. Canisters, flow regulators/particulate filters, and vacuum gauges will be supplied by the laboratory.

When probe installation is complete, Teflon™ tubing will extend from the probe to the ground surface. The Teflon™ tubing will be connected to a two-way and three-way stopcock assembly. One output of the stopcock assembly will be connected to the Summa™ canister using a Swagelok™ fitting. The other output of the stopcock assembly will be connected to a lung box containing a Tedlar™ bag. Use of dedicated tubing will avoid cross-contamination between probes. A new pair of Nitrile gloves should be worn while connecting the sample assembly for each soil vapor probe.

When collecting duplicate or QA split samples, two separate canister assemblies are connected using a stainless steel “T” fitting, and the “T” fitting is then connected to the Teflon™ tubing assembly described in the previous paragraph. The “T” fitting will be provided by the laboratory.

6.2 PURGING SOIL VAPOR PROBES

Allow the probe to equilibrate for a minimum of 24 hours from the time of installation before initiating purge procedures. Teflon™ tubing coming from the soil vapor probe will be connected to a lung box containing a Tedlar™ bag. The vapor probe will be purged during the chemical leak test by removing a volume of air

equal to three times the volume of the sample probe and tubing. Purging will be conducted using a flow rate of 100 to 200 milliliters per minute (mL/min). Given the small volume of the sample probes, purge air can be discharged to the atmosphere.

6.3 HELIUM LEAK TESTING

The purpose of the chemical leak test is to ensure that the sub slab sample port and probe assembly is properly set and not leaking. A leaking probe assembly could result in a leakage of ambient air into the sample, potentially biasing the sample. Prior to sampling, a chemical leak test will be performed using helium as a tracer gas. The ambient air inside the shroud will be replaced with helium graded at 99.9 percent purity or higher until the atmosphere consists of a minimum of 20 percent helium. It should be noted that concentrations of 60 percent to 80 percent helium have routinely been observed in the shroud during prior field testing. This will be accomplished by inserting Teflon™ tubing through a ¼ inch hole in the shroud and attaching the other end to the helium canister. The helium canister will then be opened, and the shroud atmosphere will be continuously monitored by a Dielectric Technologies Model MGD-2002 Multi-Gas Detector (or equivalent) until the percentage of helium inside the shroud reaches a minimum of 20 percent and the readings on the Multi-Gas Detector (or equivalent) stop increasing. The final helium concentration inside the shroud will be recorded on the Field Data Air Sampling Form. The final helium concentration inside the shroud will be multiplied by 10 percent (0.1) to determine the allowable concentration of helium in the Tedlar™ bag sample. Both the final helium concentration inside the shroud and the calculated allowable concentration in the Tedlar™ bag will be recorded on the Field Data Air Sampling Form (See Attachments).

After the target atmosphere is established, the two-way and three-way stopcocks will be opened to the lung box, which contains a 1 L Tedlar™ bag. An air pump attached to the lung box via Teflon™ tubing will be used to evacuate the existing air inside the lung box, which will in turn cause the 1 L Tedlar™ bag to fill. Once filled, the 1 L Tedlar™ bag will be removed from the lung box and the air inside will be measured using the Model MGD-2002 Multi-Gas Detector (or equivalent) for the presence of helium. The concentration of helium measured inside the Tedlar™ bag will be recorded on the Field Data Air Sampling Form. If the concentration of helium in the sample is below the calculated allowable concentration (i.e., less than 10 percent of the concentration inside the helium shroud), proceed with the mechanical leak test and sample collection as described in Sections 6.4 and 6.5.

Corrective actions to mitigate leaks in the sub-slab soil vapor probe will be performed when the helium concentration in the Tedlar™ bag sample exceeds 10 percent of the starting concentration in the helium shroud. Corrective actions will be performed in the field and will initially involve resealing the probe base with beeswax and repeating the helium leak test. If resealing and retesting fails to produce acceptable leak test results after two attempts, the probe will be abandoned and a new probe will be installed. Samples will not be collected for submittal for laboratory analysis when the helium concentration in the Tedlar™ bag sample exceeds 10 percent of the starting helium concentration in the shroud.

6.4 MECHANICAL LEAK TESTING

The mechanical leak test will be performed immediately after completing the helium leak test. The mechanical leak test will be completed by closing the two-way stopcock and turning the valve on the three-way stopcock to close the tubing connected to the lung box assembly. This will close the connection between the two-way stopcock and the lung box assembly and open the connection between the two-way stopcock and the Summa™ canister. Vacuum test the connections between the Summa™ canister and stopcock by opening the canister valve to place a test vacuum on the assembly for 10 minutes. The start time and initial vacuum, as well as the stop time and final vacuum, will be recorded on the Field Data Air Sampling Form and in the field logbook. If gauge vacuum can not be maintained for 10 minutes, work shall be suspended and all fittings in the sample assembly will be checked. Retest the sample assembly. If vacuum still can not be maintained by 10 minutes, sampling activities will be discontinued until leak can be identified and addressed.

If gauge vacuum was maintained for 10 minutes, close the canister valve and immediately proceed with sample collection as described in Section 6.5. Since the fitting that connects the tubing from the sub-slab probe to the two-way stopcock cannot be leak tested through either the helium or mechanical leak tests, this fitting will be sealed with Teflon™ tape and beeswax.

6.5 SAMPLE COLLECTION

Sample location information, meteorological conditions (temperature, barometric pressure, wind speed/direction, and relative humidity), and results of the field screening analysis shall be recorded on a Field

Data Air Sampling Form. Meteorological data will be obtained online from the nearest National Weather Service measuring station. Digital photos will be taken of each sample location and sample assembly.

Open the sample canister valve to begin sample collection. The time and initial vacuum when sample collection starts shall be recorded on the Field Data Air Sampling Form. The laboratory-provided flow regulators will be calibrated for a 5- to 10-minute sample duration, which correlates to a flow rate of 100 to 200 mL/min. Close the sample canister valve when the vacuum gauge indicates approximately 5 inches Hg (mercury) of vacuum remain in the canister. Sample collection should take approximately 5 minutes for a 1L Summa™ canister connected to a 200 mL/min flow regulator. The time sample collection was stopped and final vacuum shall be recorded on the Field Data Air Sampling Form. Remove the flow regulator/particulate filter and vacuum gauge assembly and replace the laboratory-supplied brass plug on the canister. Disconnect the sample tubing assembly and replace the plug on the soil vapor probe.

Label the sample canister and record on the COC the sample name, date and time the sample was collected, the canister and flow controller serial numbers, and the final vacuum gauge reading. Samples shall not be chilled or subjected to extreme temperature or pressure fluctuations. Samples will be shipped for analysis of VOCs by USEPA Method TO-15.

6.6 QUALITY CONTROL

QC samples will be collected during soil vapor sampling activities. Trip blanks and field duplicates will be collected as necessary. Field duplicates will be collected at the rate of one duplicate sample per 20 soil vapor samples.

A trip blank, consisting of an unopened evacuated canister, will be shipped with the sub-slab vapor samples with each sample shipment. Trip blanks can consist of either unopened fully evacuated canisters or canisters that have been fully charged with zero grade air by the laboratory. Since a fully charged canister has no vacuum with which to pull contaminants into the canister, a fully evacuated canister has a better likelihood of capturing potential transit-related contamination. The trip blank will be provided by the laboratory.

7.0 EQUIPMENT DECONTAMINATION PROCEDURES

All decontamination will be performed according to SAS-04-04.

8.0 INVESTIGATION-DERIVED WASTE (IDW)

The vapor probe installation and sampling will generate small amounts of solid IDW including, concrete dust, gloves, and tubing. This material will be bagged and disposed of as a municipal waste in accordance with applicable regulations. No liquid IDW will be generated. Further discussion of IDW can be found in Section 9 of the *Multi-Site Field Sampling Plan, Former Manufactured Gas Plant Sites, Revision 3", February 20, 2008.*

APPENDIX B

FIELD FORMS

BOREHOLE / WELL ABANDONMENT FIELD FORM

PROJECT INFORMATION

Site: _____ Client: _____

Project Number: _____ Task #: _____ Start Date: _____ Time: _____

Field Personnel: _____ Finish Date: _____ Time: _____

GENERAL INFORMATION

Ownership (Controlling Party): _____

Street Address: _____

City: _____

County: _____

State: _____ Zip: _____

Township: _____ Range: _____ Section: _____

_____ 1/4 of the _____ 1/4 of the _____ 1/4

If Known, Latitude: _____ Longitude: _____

If Known*, Northing: _____ Easting: _____

*Coordinate System: _____

Reason for Abandonment:

Permit Number (If applicable): _____

BOREHOLE / WELL INFORMATION

Borehole / Well ID: _____

Unique Well ID:

Installation Date: _____

☐ Borehole

☐ Monitoring Well

☐ Water Well

Attach Well Completion Report, if available

☐ Other (specify): _____

Construction Type:

☐ Drilled ☐ Driven (Sandpoint)

☐ Other (specify): _____

Formation Type:

☐ Unconsolidated Materials ☐ Bedrock

Borehole/Well Details:

Borehole Diameter: _____ Inches

Total Borehole Depth: _____ FT BGS

Casing Diameter: _____ Inches ☐ Not Applicable

Total Casing Depth: _____ FT BGS ☐ Not Applicable

Depth to Water: FT BGS ☐ Not Encountered

SEALING INFORMATION

Pump & Piping Removed? ☐ Yes ☐ No ☐ Not Applicable

Liner(s) Removed? ☐ Yes ☐ No ☐ Not Applicable

Screen Removed? ☐ Yes ☐ No ☐ Not Applicable

Entire Casing Removed? ☐ Yes ☐ No* ☐ Not Applicable

**If No, Upper 2 feet Removed?* ☐ Yes ☐ No

Method of Sealing Material Placement:

☐ Conductor Pipe - Gravity ☐ Tremie Pipe - Pumped

☐ Screened & Poured ☐ Other (specify): _____

Sealing Material Rose to Surface? ☐ Yes ☐ No

Material Settled After 24 Hours? ☐ Yes* ☐ No

*If Yes, Was Hole Re-Topped? ☐ Yes ☐ No

Sealing Material Used	From	To	Volume/Quantity
	Surface		

SEALING WORK PERFORMED BY

Individual's Name: _____

License Number:

Company Name: _____

Street Address: _____

City: _____ State: _____ Zip: _____

Request for Chemical Analysis and Chain of Custody Record

Send Results to:	Laboratory:	Document Control No.:
	Address:	Lab. Reference No. or Episode I
Attention:	City/State/ZIP:	
	Telephone:	
Project Number:		Sample Type
Site Name:		Matrix

Sample Number			Sample Event		Sample Depth (in feet)		Sample Collected		Matrix			Number of Containers	Parameter/Method Code						Remarks
Group or SWMU Name	Sample Point	Sample Designator	Round	Year	From	To	Date	Time	Liquid	Solid	Gas								

Sampler *(Print Name)*:	Sampler *(signature)*:	Custody Seal Number	Special Instructions

Relinquished By *(signature)*: 1.	Date/Time	Received By *(signature)*: 1.	Date/Time	Ice Present in Container: Yes ☐ No ☐	Temperature Upon Receipt:
Relinquished By (signature): 2.	Date/Time	Received By (signature): 2.	Date/Time	Laboratory Comments:	

DISTRIBUTION
Owner
Project Manager

Construction Progress Report

Owner _____ Page _____ of _____

Project Name _____ Project No. _____

Contract Name _____ Contract No. _____

Contractor _____

Construction Progress Report: Period _____ to _____

NOTES	REPORTED BY
1. Construction Progress Reports to be on daily, weekly, or monthly basis as determined by the project manager and owner. 2. Attach Project Weather Report, if applicable. 3. Report contractor's daily labor and equipment as required by the project manager and owner.	_____ Date _____

Drilling Log

	Project Name	Project No.	Boring/Monitoring Well Number
	Site-Specific Coordinates	Ground Elevation	Page 1 of 1
	Total Depth (feet) / Hole Size (inches)	Driller (s)	
Drilling Rig		Drilling Company	
Date / To	Logged By:	Reviewed by:	Approved by:

Elevation (feet)	Depth (feet)	Description	Graphic Log	SAMPLING: Sample Type	Sample Interval	Blow Counts per 0.5'	N Value	Sample Recovery/Length (feet)	Penetro-meter (TSF)	PID Reading (PPM)	Remarks (▽ Depth to water while drilling; ▼ Depth to water after drilling)
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										
	11										
	12										
	13										

ENVIRONMENTAL LOG COPY OF OSI 2003.GPJ BURNS_MO.GDT 8/30/07

FIELD SCREENING INSTRUMENT CALIBRATION FORM
LandTec GA-90 or Equivalent

Form Revision 0

PROJECT INFORMATION

Project Name: _____ **Task Name:** _____
Project Number: _____ **Task/Project Manager:** _____

FIELD SCREENING TEAM INFORMATION | **INSTRUMENT INFORMATION**

Date: _____ **Make:** _____
Screener: _____ **Model:** _____
Assistant: _____ **Serial #:** _____

CALIBRATION GAS INFORMATION

Manufacturer	Cal. Gas Type	Lot Number	Expiration Date

CALIBRATION AND CALIBRATION CHECK INFORMATION

Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response	Response within Tolerances (circle one)	Comments
		Type	Conc.			
	Pre-Screening Calibration[R]	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	
	Mid-Screening Calibration Check*	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	
	Post-Screening Calibration Check[R]	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	
	Mid-Screening Recalibration*	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	
	Mid-Screening Recalibration*	O2	4.0%		Yes / No	
		CO2	35.0%		Yes / No	

Notes: 1. [R] = Required 2. * = If necessary 3. % = percent by volume

FIELD SCREENING INSTRUMENT CALIBRATION FORM
ppbRAE or Equivalent

Form Revision 0

PROJECT INFORMATION

Project Name: _____ **Task Name:** _____
Project Number: _____ **Task/Project Manager:** _____

FIELD SCREENING TEAM INFORMATION | **INSTRUMENT INFORMATION**

Date: _____ **Make:** _____
Screener: _____ **Model:** _____
Assistant: _____ **Serial #:** _____

CALIBRATION GAS INFORMATION

Manufacturer	Cal. Gas Type	Lot Number	Expiration Date

CALIBRATION AND CALIBRATION CHECK INFORMATION

Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response	Response within Tolerances (circle one)	Comments
		Type	Conc.			
	Pre-Screening Calibration[R]	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Mid-Screening Calibration Check*	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Post-Screening Calibration Check[R]	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		Yes / No	
		Isobutylene	10.0 ppmv		Yes / No	

Notes: 1. [R] = Required 2. * = If necessary 3. ppmv = parts per million by volume

FIELD SCREENING INSTRUMENT CALIBRATION FORM
TVA 1000 (FID) or Equivalent

Form Revision 0

PROJECT INFORMATION

Project Name: _____ **Task Name:** _____
Project Number: _____ **Task/Project Manager:** _____

FIELD SCREENING TEAM INFORMATION | **INSTRUMENT INFORMATION**

Date: _____ **Make:** _____
Screener: _____ **Model:** _____
Assistant: _____ **Serial #:** _____

CALIBRATION GAS INFORMATION

Manufacturer	Cal. Gas Type	Lot Number	Expiration Date

CALIBRATION AND CALIBRATION CHECK INFORMATION

Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response				Response(s) within Tolerances (circle one)	Comments
		Type	Conc.	w/o Dilution Probe	w/ 10-to-1 Dilution Probe	w/ 25-to-1 Dilution Probe	w/ 50-to-1 Dilution Probe		
	Pre-Screening Calibration[R]	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Mid-Screening Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	

CALIBRATION AND CALIBRATION CHECK INFORMATION (Continued)									
Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response				Response(s) within Tolerances (circle one)	Comments
		Type	Conc.	w/o Dilution Probe	w/ 10-to-1 Dilution Probe	w/ 25-to-1 Dilution Probe	w/ 50-to-1 Dilution Probe		
	Post-Screening Calibration Check[R]	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	50.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	500 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	
	Bump Calibration Check*	Free Air	0.0 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	5,000 ppmv		N/A	N/A	N/A	Yes / No	
		Methane	32,500 ppmv	N/A				Yes / No	

Notes: 1. [R] = Required 2. * = If necessary 3. ppmv = parts per million by volume 4. N/A = Not Applicable

FIELD SCREENING INSTRUMENT CALIBRATION FORM
TVA 1000 (PID) or Equivalent

Form Revision 0

PROJECT INFORMATION

Project Name: _____ **Task Name:** _____
Project Number: _____ **Task/Project Manager:** _____

FIELD SCREENING TEAM INFORMATION | **INSTRUMENT INFORMATION**

Date: _____ **Make:** _____
Screener: _____ **Model:** _____
Assistant: _____ **Serial #:** _____

CALIBRATION GAS INFORMATION

Manufacturer	Cal. Gas Type	Lot Number	Expiration Date

CALIBRATION AND CALIBRATION CHECK INFORMATION

Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response		Response within Tolerances (circle one)	Comments
		Type	Conc.	w/o Dilution Probe	w/ 10-to-1 Dilution Probe		
	Pre-Screening Calibration[R]	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Mid-Screening Calibration Check*	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Post-Screening Calibration Check[R]	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	

CALIBRATION AND CALIBRATION CHECK INFORMATION (Continued)							
Time	Type of Calibration or Calibration Check	Calibration Standard		Instrument Response		Response within Tolerances (circle one)	Comments
		Type	Conc.	w/o Dilution Probe	w/ 10-to-1 Dilution Probe		
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Mid-Screening Recalibration*	Free Air	0.0 ppmv		N/A	Yes / No	
		Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	1,000 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	
	Single-Point Bump Calibration Check*	Isobutylene	50.0 ppmv		N/A	Yes / No	
		Isobutylene	5,000 ppmv	N/A		Yes / No	

Notes: 1. R = Required 2. * = If necessary 3. ppmv = parts per million by volume

FIXED GASES AND SOIL VAPOR CONCENTRATION FIELD SCREENING DATA

PROJECT INFORMATION		GENERAL INSTRUMENT INFORMATION		SCREENER INFORMATION	
Project Name:		Fixed Gases:		Screener's Name:	
Project Number:		PID (Low Level Confirmation):		Screener's Title:	
Task Name:		PID (Low-High Level):		Assistant's Name:	
Task/Project Manager:		FID (Low-High Level):		Assistant's Title:	

FIELD SCREENING RESULTS

WELL ID or SAMPLE ID	SAMPLE DATE	SAMPLE TIME (24-Hour)	SCREENING DATE	SCREENING TIME (24-Hour)	Observed Field Screening Values[1], Units, and Dilution Values[2]									Corrected Value[3]		COMMENTS
					O_2 (%)	CO_2 (%)	% LEL[4] (%)	PID	PID UNITS (circle one)	PID Dilution Value[2] (circle one)	FID	FID UNITS (circle one)	FID Dilution Value[2] (circle one)	PID (ppmv)	FID (ppmv)	
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
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									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
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									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
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									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
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									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			

FIELD SCREENING RESULTS

WELL ID or SAMPLE ID	SAMPLE DATE	SAMPLE TIME (24-Hour)	SCREENING DATE	SCREENING TIME (24-Hour)	Observed Field Screening Values[1], Units, and Dilution Values[2]									Corrected Value[3]		COMMENTS
					O_2 (%)	CO_2 (%)	% LEL[4] (%)	PID	PID UNITS (circle one)	PID Dilution Value[2] (circle one)	FID	FID UNITS (circle one)	FID Dilution Value[2] (circle one)	PID (ppmv)	FID (ppmv)	
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
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									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
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									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			

FIELD SCREENING RESULTS

WELL ID or SAMPLE ID	SAMPLE DATE	SAMPLE TIME (24-Hour)	SCREENING DATE	SCREENING TIME (24-Hour)	Observed Field Screening Values[1], Units, and Dilution Values[2]									Corrected Value[3]		COMMENTS
					O_2 (%)	CO_2 (%)	% LEL[4] (%)	PID	PID UNITS (circle one)	PID Dilution Value[2] (circle one)	FID	FID UNITS (circle one)	FID Dilution Value[2] (circle one)	PID (ppmv)	FID (ppmv)	
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			
									ppbv ppmv %	1 10		ppmv %	1 10 25 50			

Notes: [1] = As observed on the instrument's display; If flame-out occurs, record "FO" as the default value.
[2] = Dilutions Values (Dilution Probe Specific): No Dilution Probe Used - Circle "1"; 10-to-1 Dilution Probe Used - Circle "10"; 25-to-1 Dilution Probe Used - Circle "25"; 50-to-1 Dilution Probe Used - Circle "50"
[3] = Calculated based on the units and dilution value or, in the case of a flame-out when sufficient oxygen is present, the upper dynamic range of the instrument multiplied by the dilution value.
[4] = If required by project or task
E = Estimated Value: Corrected value exceeds the upper dynamic range of the instrument or flame-out due to concentrations above the instruments range occurred.
ppbv = Parts per billion volume
ppmv = Parts per million volume
% = Percent by volume
N/A = Not Applicable
FO = Instrument Flame Out (FID Only)

SOIL VAPOR SAMPLING FIELD FORM

PROJECT INFORMATION

Site: _____ Client: _____

Project Number: _____ Task #: _____ Date of Sampling: _____

Field Personnel: _____

SUMMA CANISTER SAMPLE INFORMATION

Probe / Well / Location ID	Sample ID	Canister ID Number	Flow Regulator ID Number	Canister Vacuum (In. Hg)		Sample Time (24-Hour)		Comments
				Initial	Final	Start	Finish	

NOTES

ABBREVIATIONS

In. Hg - Inches of Mercury
NA - Not Applicable
NM - Not Measured

PROJECT NAME:	PROJECT NO.:	LOGGER:	COMMENTS:	TEST PIT NO.:
				SHEET OF
LOCATION:				DATE EXCAVATED:
ELEVATION:	EXCAVATION METHOD:	CONTRACTOR:		
APPROXIMATE DIMENSIONS: LENGTH: WIDTH: DEPTH:				

DEPTH BELOW SURFACE	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	REMARKS/ WATER LEVEL
0'			
2'			
4'			
6'			WATER TABLE
8'			

PLAN VIEW

1'
1'

N

0' 5' 10' 15' 20' 25' 30' 35' 40'

CROSS-SECTION

1'
1'

ADDITIONAL COMMENTS:

I:\CAD\BMC\TEMPLATES\TEST PIT LOG NL

WELL DEVELOPMENT AND GROUNDWATER SAMPLING FIELD FORM

PROJECT INFORMATION

Site: _____ Client: _____

Project Number: _____ Task #: _____ Start Date: _____ Time: _____

Field Personnel: _____ Finish Date: _____ Time: _____

WELL INFORMATION

Well ID: _____

Casing ID: _____ Inches

Screen Interval: _____

Borehole Diameter: _____ Inches

Filter Pack Interval: _____

EVENT TYPE

- ☐ Well Development
- ☐ Low-Flow / Low-Stress Sampling
- ☐ Well Volume Approach Sampling
- ☐ Other (Specify below)

PURGE INFORMATION

Purge Method: ☐ Bailer ☐ Pump

Bailer Type: _____

Pump Type and Serial #: _____

Tube/Pump Intake Depth: _____

Stabilized Pumping Rate: _____

DEPTH MEASUREMENTS

	INITIAL		FINAL	
	Depth (_____)	Time (24-Hour)	Depth (_____)	Time (24-Hour)
LNAPL				
Groundwater				
DNAPL				
Casing Base				

VOLUME CALCULATION AND PRODUCTION INFORMATION

Volume Calculation Type: ☐ Well Casing ☐ Borehole

Volume Per Foot: _____

Standing Water Column: _____ feet

1 Well Volume: _____ Gallons 3 Well Volumes: _____ Gallons

5 Well Volumes: _____ Gallons 10 Well Volumes: _____ Gallons

Total Volumes Produced: _____ Gallons

Well Purged Dry? ☐ Yes ☐ No

Water Level Serial #: _____ Water Quality Probe Type and Serial # _____

WATER QUALITY INDICATOR PARAMETERS

Sampling Stage pre, purge, etc.	Time (24-Hour)	Volume Removed (_____)	Depth to Water (_____)	Drawdown (Feet)	Temp (_____)	pH (Std. Units)	SEC or Cond. (_____)	Dissolved Oxygen (_____)	Turbidity (_____)	ORP (_____)	Visual Clarity

NOTES

ABBREVIATIONS

Cond. - Actual Conductivity
FT BTOC - Feet Below Top of Casing
NA - Not Applicable
NM - Not Measured
ORP - Oxidation-Reduction Potential
SEC - Specific Electrical Conductance
Std. Units - Standard Units
Temp - Temperature

WELL DEVELOPMENT AND GROUNDWATER SAMPLING FIELD FORM

PROJECT INFORMATION

Site: _____ Client: _____

Project Number: _____ Task #: _____ Start Date: _____ Time: _____

Field Personnel: _____ Finish Date: _____ Time: _____

WELL INFORMATION

Well ID: _____

Casing ID: _____ inches

EVENT TYPE

☐ Well Development ☐ Low-Flow / Low Stress Sampling

☐ Well Volume Approach Sampling ☐ Other (Specify):

WATER QUALITY INDICATOR PARAMETERS (continued)

Sampling Stage pre, purge, etc.	Time (24-Hour)	Volume Removed (_____)	Depth to Water (_____)	Drawdown (Feet)	Temp. (_____)	pH (Std. Units)	SEC or Cond. (_____)	Dissolved Oxygen (_____)	Turbidity (_____)	ORP (_____)	Visual Clarity

NOTES (continued)

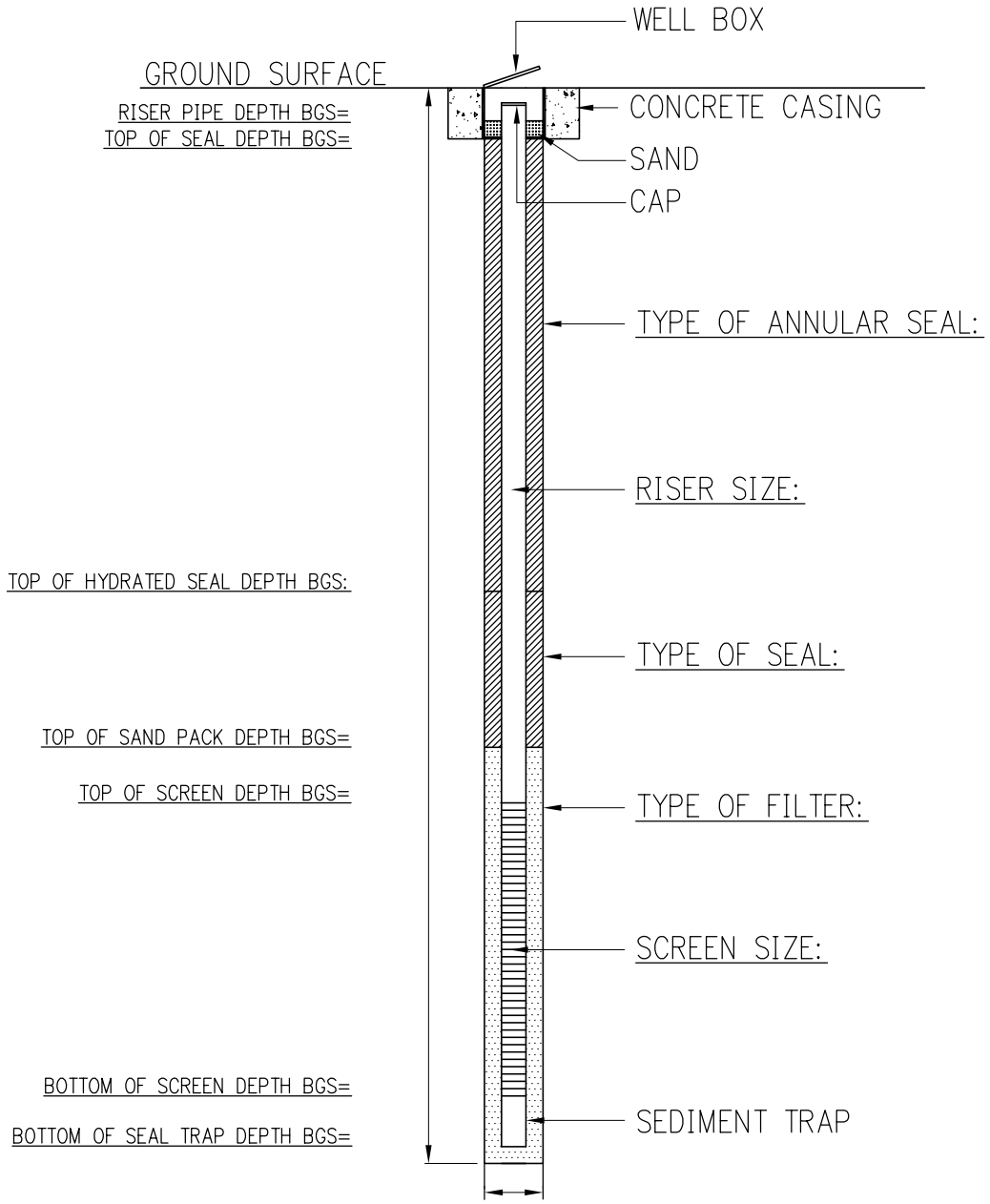
ABBREVIATIONS

Cond. - Actual Conductivity
FT BTOC - Feet Below Top of Casing
NA - Not Applicable
NM - Not Measured
ORP - Oxidation-Reduction Potential
SEC - Specific Electrical Conductance
Std. Units - Standard Units
Temp - Temperature

WELL INSTALLATION LOG

No. _____

CLIENT	COORDINATES N E	PROJECT	PROJECT NO.
PROJECT LOCATION		TOP OF RISER ELEVATION (DATUM)	DATE
STRATUM MONITORED		LOGGED BY	
DRILLING COMPANY		APPROVED BY	



NOT TO SCALE

METHOD OF INSTALLATION:

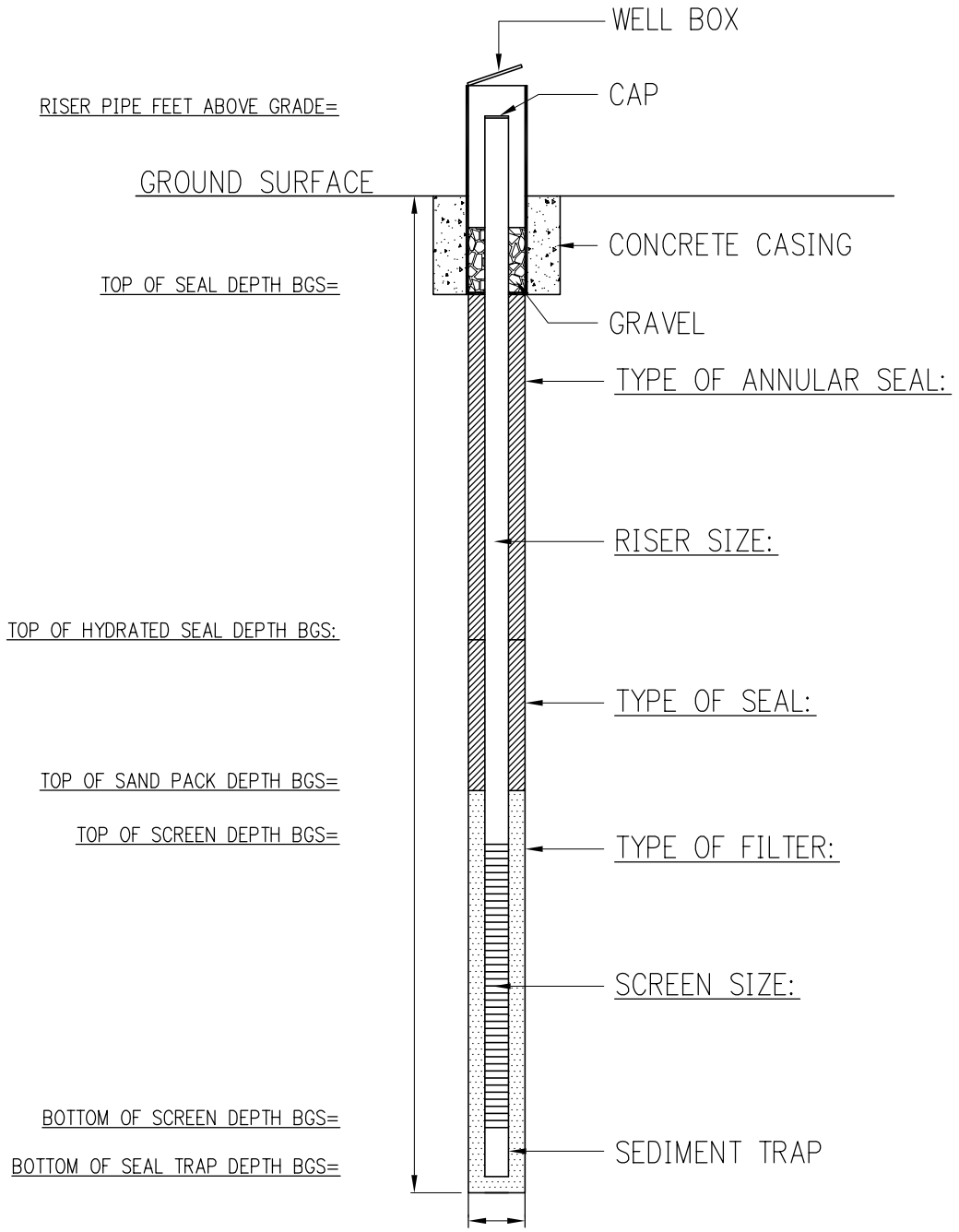
REMARKS:

I:\CAD\BMC\TEMPLATES\FLUSH MOUNT WELL LOG.NL

WELL INSTALLATION LOG

No. _____

CLIENT	COORDINATES N E	PROJECT	PROJECT NO.
PROJECT LOCATION		TOP OF RISER ELEVATION (DATUM)	DATE
STRATUM MONITORED		LOGGED BY	
DRILLING COMPANY		APPROVED BY	



NOT TO SCALE

METHOD OF INSTALLATION:

REMARKS:

I:\CAD\BMC\TEMPLATES\STICK UP WELL LOG.NL

Number : _____ Weather : _____ Total Depth (ft) : _____ Sampling Type : _____

Start : _____ End : _____ Logger(s) : _____ Borehole Dia. : _____

Site : _____ comments : _____ Drilling Type : _____ Abandonment : _____

Project # : _____ Task # : _____

2. Depth (ft)	Symbol / Name 1st	Symbol / Name 2nd	Percent, Number, Name 9-10. color	Percent, Number, Name 11-13. mottling	15. D 16. T 14. P	17. CONS	18. GRD	19-25. Particle Size (% and grn size) Trace <5%	Few 5-10%	Little 15-25%	Some 30-45%	Mostly 50-100%	26-27. ANG	STRC note thickness	CMT	HCl	Shape Enter %	Geologic Characteristic (sorting, HCl reaction, etc…)	Geologic Interpretation (till, outwash, overbank, etc…)	25. Odor	27-28. MST Min-Max	Additional Information

FIELD DATA AND OBSERVATIONS

PID, Pocket Penetrometer, Recovery, RQD, Sample Interval, etc…

EXAMPLE						
Sample Interval	Recov. (ft)	Blow Counts	Pock. Pen	PID eV __	Field Observ	
0-2	1.9	1/2/3/4	4:2	1.6		
2-4	1.3	1/2/3/4	5:1	0.2		
4-6	1.2	1/2/3/4	4:2	1.6		
6-8	0.9	2(50)	1:1	0.2	rough drilling, cobble in drill cuttings	

Grn (Grain Size): **FS** (fine sand - ≥75 µm; <425 µm) ; **MS** (medium sand - ≥425 µm; <2 mm) ; **CS** (coarse sand - ≥2 mm; <4.75 mm) ; **FG** (fine gravel - ≥4.75 mm (0.9"); <3/4") ; **CG** (coarse gravel - ≥3/4"; <3") ; **CC** (cobbles - ≥3"; <12") ; **BB** (boulders - ≥12")

D (Dilatency): **N**(none) ; **S**(slow) ; **R**(rapid)

T (Toughness): **L**(low) : **M**(medium) ; **H**(high)

P (Plasticity): **N**(non) ; **L**(low) ; **M**(medium) ; **H**(high)

CONS (Consistency): VS(very soft) ; **S**(soft) ; **F**(firm) ; **H**(hard) ; **VH**(very hard) (fine grained material only)

GRD (Grading): **W**(well-graded) ; **P**(poorly-graded)

%: **T**(trace <5%) ; **F**(few 5-10%) ; **L**(little 15-25%) ; **S**(some 30-45%) ; **M**(mostly 50-100%)

ANG (Angularity): **A**(angular) ; **SA**(subangular) ; **SR**(subrounded) ; **R**(rounded)

CMT (Cementation): **W**(weak) ; **M**(moderate) ; **S**(strong)

Shape (gravel, cobbles, & boulders <u>only</u>): **F**(flat) ; **E**(elongated) ; **FE**(flat & elongated)

STRC (Structure): **S**(Stratified - >6 mm) ; **LA**(laminated - <6 mm) ; **F**(fissured) ; **SS**(slickensided) ; **B**(blocky) ; **LE**(lensed) ; **HO**(homogenous) ; **HE**(heterogenous)

HCl (Reaction with HCl): **N**(none) ; **W**(weak) ; **S**(strong)

PP Pocket Penetrometer (fine grained material only)

Core Collection and Processing Log

General Information

Project Name/Site : _____

Project # : _____

Task # : _____

Date : _____

Samplers : _____

Sampling Equipment: _____

Coordinate System: _____

Datum: _____

Weather: _____

River Section/DMU: _____

Sample Location	Time (military)	Water Elevation (ft)	Water Depth (ft)	Core Penetration (ft)	Sediment Recovered (ft)	% Recovery	Proposed Sample Location (Northing)	Proposed Sample Location (Easting)	Actual Sample Location (Northing)	Actual Sample Location (Easting)	Sample Description/Notes (Color, Texture, Odor, etc.)

Core Intervals (in)	Core Description	Date Processed	Sample Core Intervals (in) TOP	Sample Core Intervals (in) BOTTOM	COC Sample ID Number

Additional Comments: _____

n/a : Not Applicable

COC: Chain of Custody

Sampling/Processing Personnel Signature: _____

APPENDIX C

LIF FIELD OPERATING PROCEDURES

TarGOST® User's Guide

The Tar-specific Green Optical Screening Tool (TarGOST®) is a laser-induced fluorescence (LIF) screening tool that is specifically designed to detect non-aqueous phase liquid (NAPL) in the subsurface. It responds almost exclusively to the NAPL found at former manufactured gas plants (MGPs) and creosote/pentachlorophenol sites. It does this by sensing the fluorescence of polycyclic aromatic hydrocarbons (PAHs) found in MGP and creosote NAPLs. TarGOST is a modification of the Ultra-Violet Optical Screening Tool (UVOST™). Dakota developed the UVOST early in the 1990's with U.S. Air Force funding. The UVOST platform is a mature technology that has been applied at hundreds of petroleum, oil, and lubricant (POL) contaminated sites in the U.S., Europe, and Japan since 1994. TarGOST has been in commercial use since March 2003.

General TarGOST Principles

The TarGOST system is, in its simplest sense, a front-face fluorometer that is coupled via fiber optics to a sapphire-windowed probe that is shoved into the ground. A front-face fluorometer is a device that shines excitation light onto, and collects emission from, the same surface. This is different from standard fluorometers, which operate with the excitation and emission beams at 90°. The TarGOST system makes continuous front-face fluorescence measurements of the soil matrix as the windowed probe is pushed slowly down into the subsurface.

The fluorescence measurements are made 20 to 50 times each second (20 to 50 Hz). Each individual measurement begins with a pulse of laser excitation light being launched into one of two fiber optic cables that are strung through the drill/push rod string. As the rod is advanced into the subsurface, the very fast pulses of laser light (10 nanoseconds in duration) are directed out the sapphire window and onto the soil surface that is pressed very firmly against the outside of the window. The pulses of green light strike whatever is present just outside the surface of the window. Most of the laser light is simply reflected by the soil matrix. However, if oil-like material (OLM) or tar-like material (TLM) associated with former MGP processes is present, the PAHs that exist in these NAPLs absorb some of the light and are driven into an electronically excited state. When these PAHs eventually return to the ground state (this typically takes less than 10 ns), a portion of the PAHs emit red-shifted light (longer wavelength light than the excitation laser). Some of this fluorescence, along with a small portion of the reflected excitation laser light, are collected by a mirror and focused into the second collection fiber optic for return to the TarGOST instrument for detection.

The return light is directed into a spectrometer located inside the TarGOST system. A grating in the spectrometer disperses this light into a "rainbow" across the back plane of spectrometer. Four optical fibers are located in this backplane. One of the fibers collects a small portion of the relatively intense laser light (more about this laser scatter channel later) while the other three fibers capture bands of the fluorescence (~10nm wide) emitted by any PAHs present in the NAPL. The four fibers are different lengths so that each fiber delivers its 'packet' of fluorescence photons to the photomultiplier tube (PMT) at delayed time intervals. The result is a "train" of time delayed photon packets all arriving at the same PMT over a period of 300 nano-seconds (ns). The PMT is a device that converts photons into a current pulse. This current pulse

is wired into a fast digital storage oscilloscope where it is converted into a transient voltage signal, is digitized, and recorded. This digitized transient is called a waveform. The laser light that is being reflected from the soil matrix is monitored in the first channel (left-most) and the three fluorescence bands are observed in the three right-most channels.

Figure 1 illustrates waveforms that are typical of those generated with TarGOST. If the soil is clean of NAPL, the laser scatter channel (leftmost) is far more intense than the three fluorescence channels. The Clean Sand waveform in Figure 1 illustrates what clean (or very low NAPL) soil typically looks like on the TarGOST system. If NAPL is present, the fluorescence channels begin to grow in comparison to the laser channel. The 1000 ppm waveform in Figure 1 illustrates such a condition. The more coal tar present, the lower the scatter channel gets and the higher the three fluorescence channels get. Finally, with pure NAPL on the window, the greatest increase in the fluorescence channels is observed, along with maximum loss of signal in the laser reflectance channel – due to absorbance by the PAH-laden NAPL. The NAPL waveform in Figure 1 illustrates the waveform resulting from such a condition.

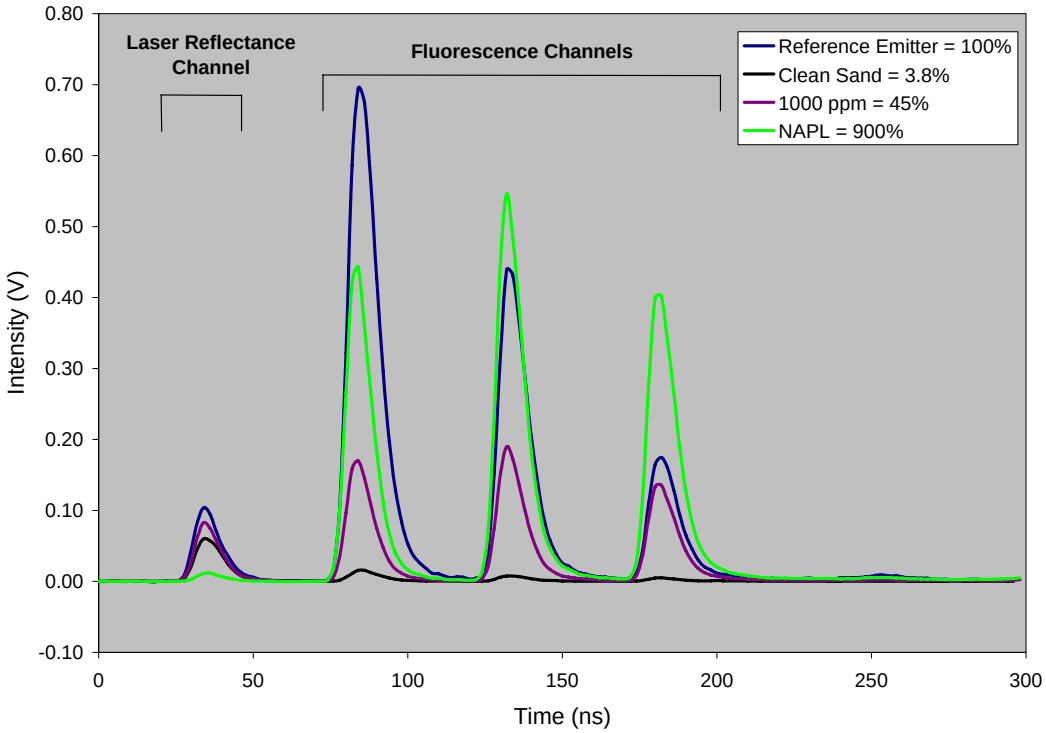


Figure 1. Example TarGOST waveforms.

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Calibration/Normalization

The waveform shapes (the relative amount of signal in each channel and the decay time on the right side of each peak) tell us quite a bit about the qualitative nature of what's happening outside the window. But what interests people most is the **amount** of NAPL that is present vs. depth. We do this by portraying the fluorescence vs. depth (FVD) in a continuous log format. To accomplish this we must reduce the 2-D waveform to a single quantitative number. We also need to normalize for any energy drift of the laser and optical alignment changes, so it is necessary to calibrate the system prior to each sounding and plot the downhole data relative to a known fluorescence emitting reference (RE) material. The RE is a stable and known material that can be applied to the window and measured just prior to each sounding. The fluorescence of the downhole data, relative to this RE, is then plotted as a function of depth.

Figure 2 graphically illustrates the calibration procedure. The RE both reflects some of the laser light and fluoresces at levels that are in the same general range as soils that are moderately to heavily contaminated with MGP NAPL. The Reference Emitter waveform shown in Figure 1 is an actual RE waveform taken with the TarGOST. Notice that the RE fluoresces in the same general intensity range as the pure NAPL, but it also (by design) reflects a high degree of scatter due to its buff gray color and lack of photon absorbing PAHs. The RE is designed to do this so that both the system's fluorescence and scatter components can be properly gauged and recorded on the same scaling of the oscilloscope. Once the RE is measured, all subsequent downhole (or laboratory) measurements can be normalized by this RE waveform, providing an apples-to-apples presentation of the data regardless of laser energy drift or other changes that would cause a difference in raw signal amplitude over time. It is useful to think of the RE waveform as the equivalent of the single-point 100ppm isobutylene calibration used for hand-held photo-ionization detectors.

To calculate the %RE, the area under the three fluorescence channels of the waveform is determined. The fluorescence area is then divided by the area under the laser scatter channel. This is called scatter correction. This is necessary because at very high concentrations the fluorescence does not continue to scale with concentration. This is due to complicated processes such as energy transfer, photon cycling, and other phenomenon that "quench" the fluorescence in high NAPL concentration soils. The uncorrected TLM curve in Figure 3 illustrates the problem. The addition of more and more NAPL to a soil sample should result in increasing fluorescence, but for some reason it only increase up to a certain point, at which the fluorescence response flattens out, or even worse, begins to fall. This poor type of response is called non-monotonic behavior and is obviously undesirable behavior for a screening tool. The laser scatter correction system is designed to prevent this "roll-over" affect. The scatter correction keeps this from occurring at the high end of concentrations (where soil is heavily contaminated or even saturated with NAPL). The scatter-corrected curves in Figure 3 illustrate the desired effect of scatter correction.

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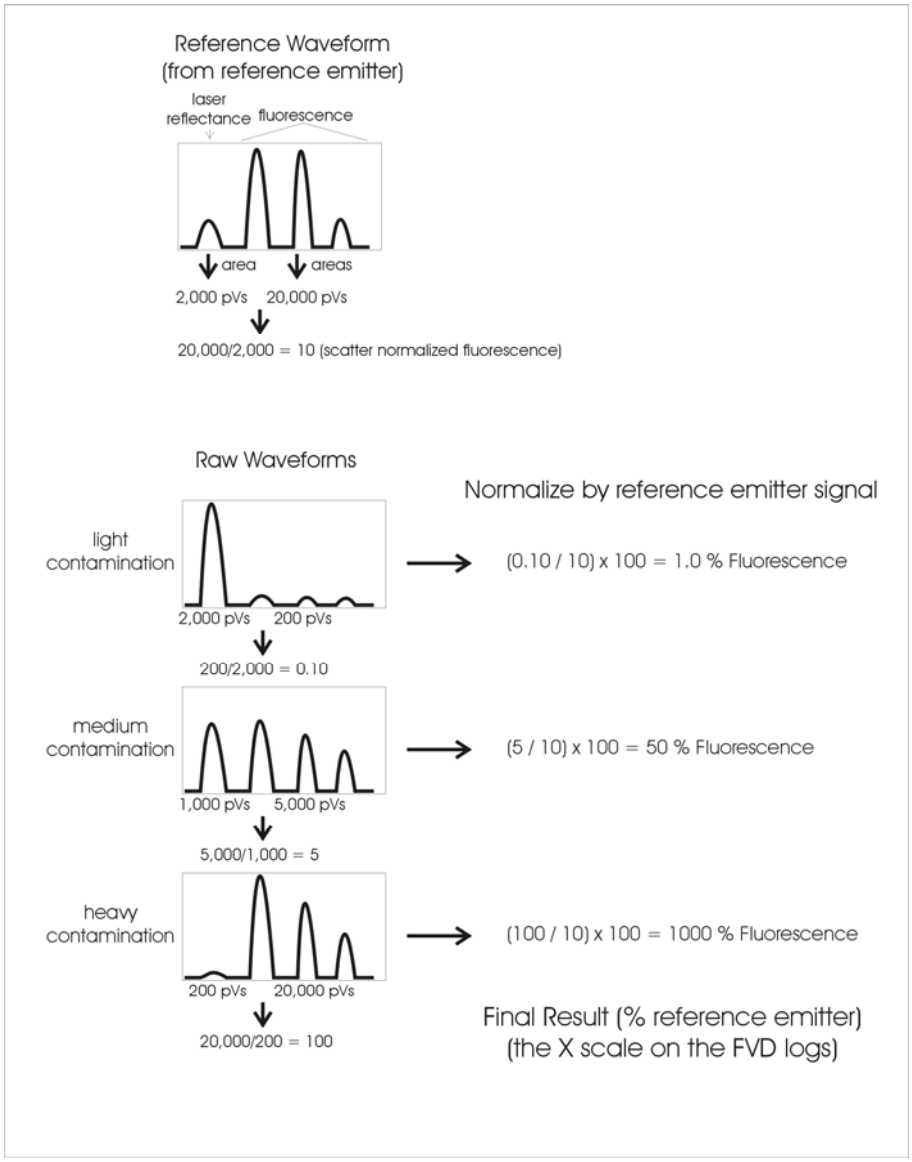

Figure 2. Single point RE calibration made prior to each TarGOST log.

The laser scatter intensity is relatively unaffected until NAPL concentrations reach the tens or hundreds of thousands PPM level, where the quenching (non-linearity of fluorescence response) is most pronounced. Laser scatter correction generally doesn't "kick in" until high concentrations are being measured, where fluorescence response flattens out or rolls over. In this way, the scatter corrected fluorescence readings scale relatively well across a wide range of concentrations, from the typical limit of detection (LOD) of 250-500 ppm, to the almost neat NAPL encountered in soil saturated with free product. Remember that TarGOST is designed to respond only to the NAPL impacted soils, not the PAHs attached in "dry" form to soot or dissolved phase PAHs. This makes it ideal for delineating source term areas of mobile MGP NAPL.

The scatter correction works well, but it isn't perfect. The TarGOST system is not an analytical instrument like a laboratory GC that sits in a clean, stable environment and only gets fed ultra-

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clean matrix-isolated analytes. Instead, it is asked to respond faithfully to an analyte that exists in a thousand different forms in an endless number of different environments. Variation in optical

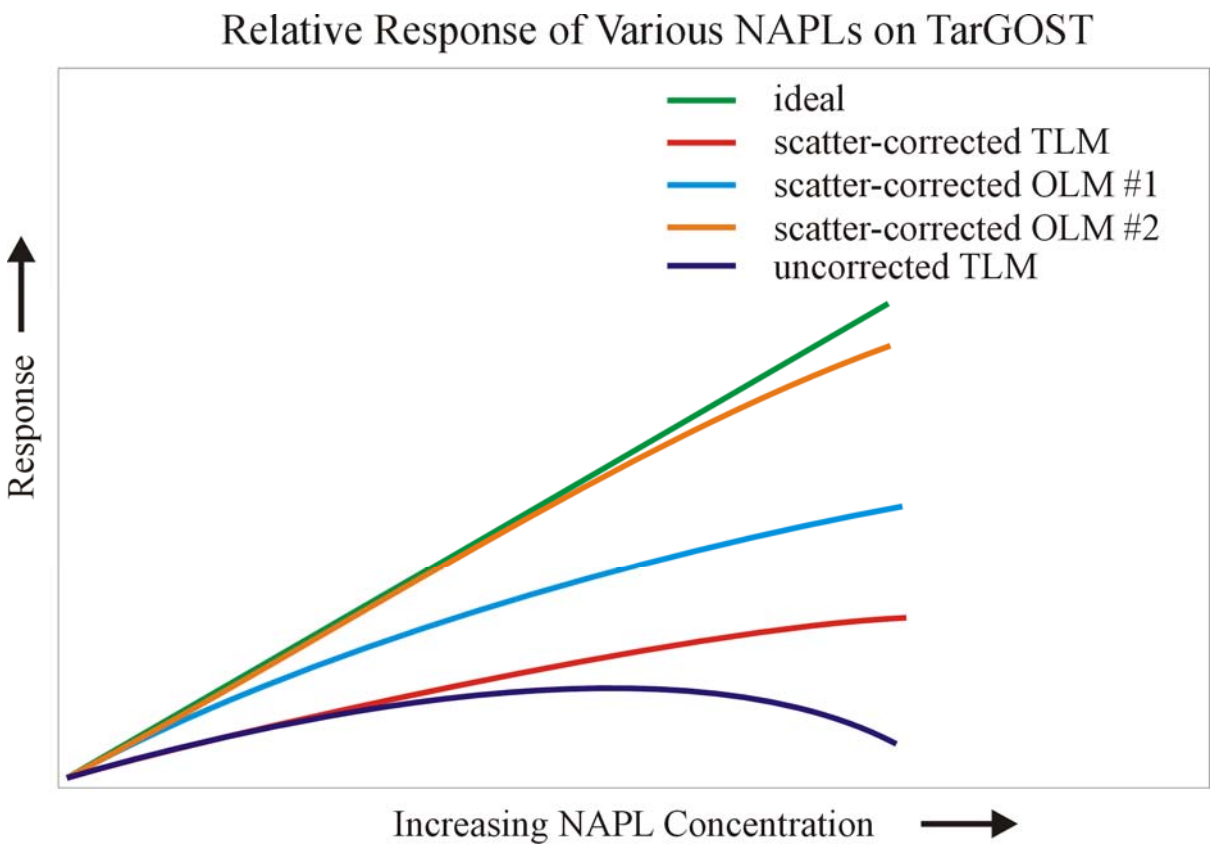

Figure 3. Variability of TarGOST response to NAPL products.

design (CPT vs. Geoprobe), mirror angle, and spectrometer settings can vary the amount of scatter present, especially at very high NAPL concentrations when the scatter is getting weak and difficult to measure relative to the much more intense fluorescence.

At high NAPL concentrations, even small variations in the laser scatter greatly influences the %RE number, especially when the laser scatter gets close to zero. For instance, let's imagine that with neat NAPL in front of the window, the fluorescence channels are averaging around 10,000 pico-Volt seconds (pVs) in area with each pulse of the laser. The laser scatter may be dancing around 400 and 800 pVs, because the scattered light is dim from being absorbed so highly by the PAHs. Now, even if the fluorescence stays almost exactly at 10,000 pVs every measurement, the relatively large variation in the tiny laser scatter that occurs will create a two or three-fold increase/decrease in %RE, even with the same NAPL sitting dead still on the window. That's why very high readings (500-1500%) often look unstable and jagged – because the laser scatter signal is so weak it "jitters" a lot compared to the fluorescence, causing large variations in %RE, even though the fluorescence portion of the waveform is relatively stable. For this reason, any wide swings in signals over 500% should "be taken with a grain of salt".

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The TarGOST operators do their best to adjust the amount of launched laser light, the spectrometer position, and mirror angle in the probe to achieve a consistent waveform for the RE at each job site and strives to maintain the same optical arrangement and a consistent RE signal for the entire project. Even though there are small differences in the setup from location to location, the variations in NAPL viscosity, soil matrix, and signal magnitude can swing the signal up or down by a factor of two or three, which dwarfs the calibration differences.

The limitations in the current calibration technique can lead to the case of significant differences in the maximum signal generated by the same NAPL from one platform to another. For instance, even if the technician adjusts the system to achieve the exact same signal with RE on both a CPT and a Geoprobe platform, the same NAPL may yield 500% on one of the platforms and 1000% on the other. This is not typical but it can and does happen for reasons that aren't fully understood. Our goal is to stay consistent at a particular site so that the entire data set from that site can be viewed consistently. TarGOST data is relatively consistent and semi-quantitative across all the data generated **at one site** and **for a particular NAPL product,** but significant cross-platform or lab-to-field variations can and have taken place. While this may alarm users, and we're not happy with it, it's not as serious as it seems. As an example, let us imagine a site that is contaminated with a single origin homogeneous NAPL product. With TarGOST, 100% response does indeed represent approximately twice as much NAPL as a 50% response at that site. Even if the laser energy or optics alignments change, the RE will do a reasonable job of normalizing the log-to-log data variation for that site. Dakota is currently working on an improved system that will better normalize across all systems/platforms regardless of design or conditions.

Lab studies with MGP NAPL on moist Fisher® sea sand consistently demonstrate that TarGOST is capable of linear response vs. NAPL concentration, but some NAPLS are better behaved than others. Figure 4 is one example of the TarGOST response vs. MGP NAPL concentration on sand.

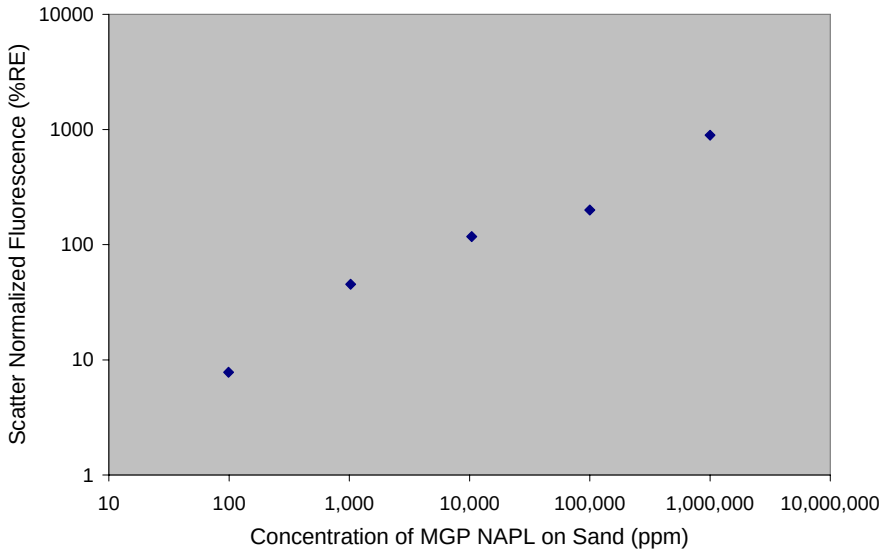

Figure 4. Calibration curve for MGP NAPL on Fisher Sea Sand

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NAPLs do vary in their ability to fluoresce, even NAPLs found at the same site. Figure 3 illustrates conceptually that TarGOST often responds with varying sensitivity (ΔTarGOST Signal/ΔNAPL Concentration) toward different NAPLs, depending on their origin and/or variances in the conditions under which they've been exposed in the decades they've spent in the subsurface. For instance, a more ashaltine TLM will typically fluoresce much less intensely than a runny, less viscous OLM. This may well be due to the relative abundance of solvent in one matrix vs. the other. The more solvent available (i.e. the less viscous the NAPL), the higher the likelihood of the PAHs being able to emit photons (fluoresce) before a non-radiative mechanism allows the PAH to come back down to the ground state without emitting a photon (quenching).

The preferential sensitivity of TarGOST toward the runnier (more mobile) OLMs is welcomed by most users, since TarGOST seems to accentuate the presence of the more mobile NAPLs. It is these more mobile NAPLs that are of the highest regulatory/compliance concern. There is an abundance of anecdotal evidence that suggests that some NAPLs may fractionate in the subsurface into OLM and TLM or even DNAPL and LNAPL. Dakota has participated in a number of investigations where a single NAPL body seems to have 'split' into two distinct NAPLS, with both NAPLs having similar but distinct waveform shapes as we moved away from the suspected release point and they appear to form two separate horizons (a "high" and "low" layer). Although there has been plenty of speculation, the exact mechanism for this phenomenon (if it actually occurs) is not known.

As previously described, TarGOST uses a green laser to excite the larger (4 -5 rings and higher) PAHs that exist almost exclusively in NAPL form, as opposed to smaller (2-3 ring) PAHs that can more readily partition into the groundwater due to their much higher solubilities in water. UVOST on the other hand employs ultra-violet (UV) light which can and does excite the smaller 2-3 ring aqueous phase PAHs and therefore detects dissolved phase PAHs such as naphthalenes in the groundwater. When this behavior is combined with UVOST's non-monotonic response for many NAPLs, extremely complicated logs are generated that need to be computer analyzed to separate the NAPL fluorescence contribution from that of the dissolved phase. The dissolved phase signals can even surpass NAPL signals, making confident NAPL delineation almost impossible at many sites. This is especially true for those sites with sand/gravel, where pockets of NAPL are perched in or amongst slow-moving or stagnant groundwater.

It should also be mentioned that TarGOST was designed to exclusively detect heavy PAH NAPLs. It has, by design, a very limited, if any, response to lighter POLs. For instance, fresh diesel applied to the window will not elicit even a small response from the TarGOST. However, if the diesel has co-mingled with coal tar, the mixture will fluoresce brightly and TarGOST will respond well.

To better appreciate the qualitative information that TarGOST provides, the FVD logs are color-coded by "filling in" the FVD's x-axis (%RE) with colors generated from the waveform at each and every depth. The color is determined by "mixing" the amount of red, green, and blue (RGB) channels and applying the resulting color to the area under the curve on the FVD. This makes the interpretation of the logs easier to see "at-a-glance" as opposed to relying solely on the few selected waveforms to understand the qualitative nature of the data vs. depth. Color-coding alerts the observer to shifts in NAPL types and can also help identify weak interfering

compounds like calcium rich (crushed limestone) soils and rotting wood/vegetation, both of which can sometimes (rarely) be mistaken for MGP waste.

Figure 5 shows the resulting colors for differing amounts of signal in each channel of the waveforms. Clean soil shows up blue (nearly 100% laser scatter), low-to-medium contamination often shows up orange or maroon (mostly red with some blue and green), and highly contaminated soils or neat NAPL typically shows up yellow (nearly all red and green with very little blue makes yellow). The color is simply another way of representing the information contained in the associated waveforms (shown in sub-panels at right in the figure). Just think of the color-coding as mixing paints in amounts equal to that contained under each associated red, green, and blue channel of the waveform. The standard for TarGOST is to use blue, red, and green in channels 1, 2, and 3 - leaving the fourth channel unused. The fourth channel was chosen to be the non-contributor to the color scheme because it varies the least in intensity across differing classes of NAPL.

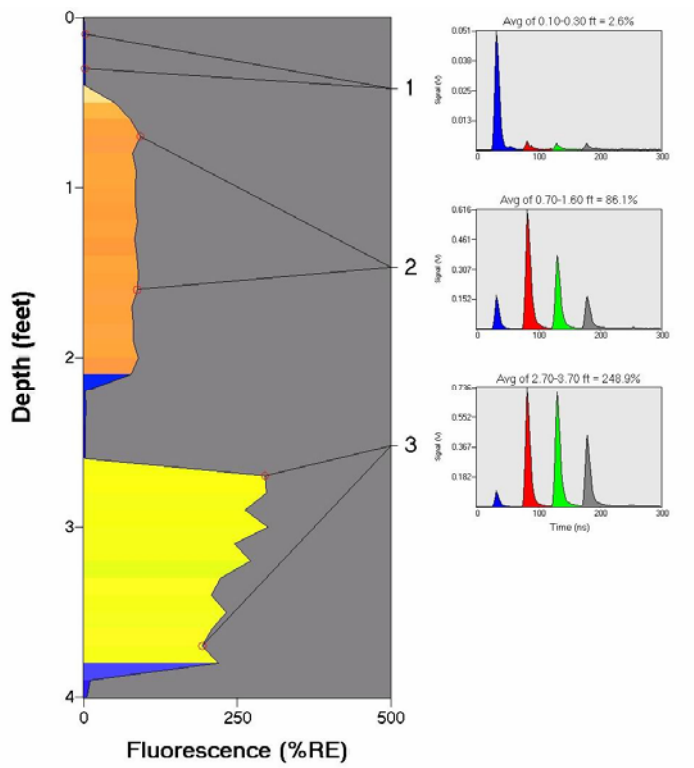

Figure 5. Example waveforms showing colors generated from RGB channel ratios.

The list below summarizes some of what we've learned in this section.

- TarGOST specifically targets the PAHs found in former MGP and creosote NAPLs
- TarGOST does detect staining and residual levels of NAPL as well as free phase
- TarGOST is "blind" to aqueous phase PAHs
- TarGOST is not able to reliably detect "dry" PAHs that are sorbed to soot, wood chips, and ash. They can generate a signal but it is often weak and not easily teased out of the background. Many times we're left wondering whether a small signal is caused by very

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high concentrations of "dry" PAHs on purifier chips or ash/soot or very low (100s of ppm) residual NAPL levels.

- TarGOST's typical lab-determined LOD for NAPL on site soil (or Fisher sea sand) is 250-500 ppm (weight of NAPL/weight of soil matrix). Note that this is not the same as weight of Total PAHs /weight of soil matrix, since not all of a NPAL is PAHs
- TarGOST has, on rare occasions, responded to mineral or plant interference enough to be a nuisance. One incident involved crushed limestone gravel fill while another involved buried rotting wood/brush debris (the result of major flooding on a gravelly river)
- TarGOST has not been observed to significantly respond to peat material (but this does not guarantee it won't on some future occasion)
- TarGOST does not respond to typical lighter end fuels like gasoline, kerosene, or diesel – unless they contain MGP waste or creosote that they are co-mingled with
- TarGOST is single-point calibrated with a reference emitter (RE) immediately prior to each sounding and the results are always plotted relative to RE in percent
- TarGOST calibration/setup isn't perfect and the response for an identical NAPL can vary with optical platform (CPT vs. Geoprobe) and from lab to field. However, once set up on site, the response remains stable over time and from log-to-log.
- NAPLs can vary greatly in their fluorescence response – even those found on the same site.
- Thinner, less viscous NPALS typically fluoresce much more than the more viscous TLMs. Asphalt-like TLMS which are solid/plastic fluoresce very poorly.
- Scatter-correction is applied to TarGOST data to reduce/eliminate "response rollover" at high concentrations
- Color-coding is deduced from the first 3 waveform channel areas and provides "at-a-glance" recognition of waveform consistency or changes
- The waveforms contain both quantitative and qualitative information

On-site TarGOST Fundamentals

So now that we understand the fundamentals of how TarGOST works, let's examine the logging procedure at the site. When the system first arrives on site, it is powered up and tested for proper function. If it is in Dakota's Geoprobe, the TarGOST is simply powered up and we're ready to begin probing after proper warm-up. If CPT deployment is involved, the TarGOST system is integrated into the CPT truck and proper data flow connections are made (about a 2 hour procedure). Once the system is warmed up and tested for proper function, the actual logging can begin.

The delivery platform (CPT, Geoprobe truck, or track-rig) is positioned over the flag/mark as directed by the controlling geologist/consultant. Clients typically start out in an area where NAPL is known to (or strongly believed to) exist. Pushing in "the heart" of the source term at the start gives everyone involved a feel for how well the NAPL is going to respond to TarGOST delineation. From there, the effort often moves out and away from the "hot zone" toward the edges, with hopes of bounding the extent of the NAPL source term.

TarGOST productivity can range anywhere from 200 to over 500 ft/day. If the pushes are fairly deep (>30 ft), and the obstructions or rubble are minimal, then the average is on the higher end

because we spend a lot more time actually probing, not moving around from location to location and/or trying multiple times to get holes started through rubble. On jobs with lots of shallow holes and/or numerous subsurface obstructions, like brick/rubble from previous demolitions, the production obviously slows down. This is due to spending lots of time making attempts to "get a straight hole going" or from break-offs and the subsequent repair they entail. We typically can achieve between 10 and 20 locations a day, again depending on the site conditions.

Buried utility clearance is often an overlooked issue, until the first day of the project when everyone realizes we can't probe without it. Weeks or months of planning are often stalled the first day due to improper preparations with regard to utility clearance. The TarGOST crew has been instructed NOT TO PROCEED if there is even a remote chance that the proper precautions have not been made to clear the location for underground utilities.

Once the location has been cleared for utilities, the RE material is put on the cleaned window, any necessary tweaks are made to the TarGOST, and an RE waveform is acquired. The probe is then positioned in the push platform for advancement into the soil. In the case of percussion or "jack-hammering" delivery such as Dakota's Geoprobe, the window is approximately 8 inches above the tip of the probe. In the case of cone-penetrometer test (CPT) delivery, the window is approximately 16 inches above the tip of the probe. When using Geoprobe delivery, the log is initiated when the window is at the ground surface. In CPT delivery, the log is initialized when the CPT tip is in contact with the ground. In both cases, the software automatically corrects for the window position and all logs are depth correct.

A unique name for the current log location is entered into the control computer and logging is started (probe advance begins). As the probe is pushed into the ground (at ~2cm/sec) the laser fires continuously, generating waveform after waveform on the detection system oscilloscope as the probe advances. We don't store every waveform that the oscilloscope records. We instead average the waveforms over every 1-2 inches, depending on the probe speed and laser repetition rate. The averaged waveforms are downloaded from the oscilloscope every second or two by the control software. These waveforms are immediately 'tagged' with the current depth, which is constantly being sent to the TarGOST system by depth monitoring systems built into the Geoprobe or CPT truck. All the averaged waveforms from the logging event are stored to the hard-drive for later viewing and presentation if necessary or desired. The scatter and fluorescence areas are calculated and these are normalized to the RE waveform's areas. The fluorescence response is plotted vs. depth in real time as the probe is advanced. Logging continues until "refusal" is met due to bedrock or very tight sands/gravels, or the client wishes to terminate.

The technician then uses the TarGOST software to highlight the waveforms at "depths of interest" for display in the print out. The waveforms are located in panel plots at the right of the FVD log to guide the viewer's interpretation of the log. These waveforms contain the qualitative information and are often chosen from depths with peak signal, signal changes, or other zones of interest along the log's Y depth axis. The technician immediately prints a hard copy, which is usually printed out before the probe is completely retrieved from the subsurface. The technician also saves an electronic image of the printed log in JPG format. At the end of the project the

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technician typically writes all the data and image logs to a CD, which is given to the lead geologist before departure.

Once the rods are all up and out of the hole, the hole is grouted (if necessary) and the probe tip and sapphire window is wiped clean in preparation for the next RE calibration. Time and money can often be saved by hiring a second crew/rig to grout the holes, instead of relying on the more expensive TarGOST system to do an otherwise routine task such as grouting. The next location is chosen and the procedure is repeated. The site investigation is often started with a grid or transect in mind, but it is common for the controlling geologist to modify the initially proposed investigation plan due to unforeseen "dirty" or "clean" zones encountered during the project. It is actually rare for the original transect or grid pattern to remain unchanged during the entire investigation, since the TarGOST regularly reveals previously unknown conditions at the site, including NAPL-free areas where significant NAPL was expected.

We recommend that the client conduct validation/confirmation sampling to bolster confidence in the body of evidence generated with TarGOST. Validation sampling of 10% of the TarGOST locations seems to be the most common co-sampling effort. Once the client gets familiar with TarGOST and becomes more comfortable with interpreting the results, they typically only sample where results are confusing or fly in the face of previous site understanding/information.

It is recommended that the client also conduct a few side-by-side tests of TarGOST for site heterogeneity assessment. Some sites yield nearly identical TarGOST logs when they are conducted a few feet apart because the NAPL is lying in well-behaved, homogeneously distributed layers. Other sites have extremely complex and heterogeneous NAPL distribution and yield side-by-side TarGOST logs with significant differences. In these conditions it is certainly unfair to conduct co-sampling efforts for TarGOST validation and expect TarGOST to "match" the traditional sampling results. In this case, even though the NAPL is scattered here and there, the validation hole is considered to be "right" and the TarGOST log, if not matching, is considered "wrong". In such heterogeneous environments even two side-by-side traditional sampling efforts might not come close to matching each other. So which one of the two traditional sampling locations is "right" and which one is "wrong" in this instance? Clearly neither is right or wrong, the site NAPL is simply heterogeneously distributed. Please keep this in mind when validation sampling against TarGOST as well.

The list below summarizes key aspects of deploying TarGOST at a former MGP or creosote site.

- TarGOST production averages between 10 and 20 locations/day and 200-500 ft/day, depending to large degree on subsurface conditions and difficulty in positioning the push platform over the desired location
- Proper utility clearance is the most important step in assuring a timely start and to prevent delays
- Start pushing in the "heart" of the source term to get a feel for the responsiveness of the TarGOST to your particular site's NAPL, then work your way out to find the edges and bound the source term NAPL
- Be prepared to adapt your transect and grid to ever-changing site model as TarGOST logs are reviewed

- On large-scale projects, consider hiring a second crew to pre-probe and/or grout with a small Geoprobe or drill rig if regulations/conditions warrant. While we don't mind doing the pre-probing or grouting ourselves, we want to spend the majority of our time doing what it is we're getting paid to do – delineate the site's NAPL
- Can TarGOST tell the difference between residual and free phase NAPL? The answer is clearly "No". There is no exact concentration where all NAPLs make a magical transition from "heavy residual" to "saturated or free-phase". Likewise, there is no set %RE that we can cite as being representative of saturated or free phase NAPL, since the response is continuous with concentration. With that said, it is certainly possible to determine a certain cutoff or signal range that is representative of the residual to free-phase transition for your site. For instance, let's say that after examining all the TarGOST logs and comparing them to previous efforts and the validation sampling, the geologist notes that free phase existed at depths/locations where the TarGOST logs exceeded 50%. It's certainly reasonable then to make the assertion that the 50% RE level is a general cutoff for the absence/presence of free-phase. Just remember that the entire body of evidence for any particular site should be used to come up with your %RE number

If you have any questions regarding your past or future project, feel free to call or write to your TarGOST operator or Randy St. Germain at stgermain@dakotatechnologies.com.

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UVOST™ USER'S GUIDE

Note: Dakota Technologies' ultra-violet wavelength laser-induced fluorescence tool is now named Ultra-Violet Optical Screening Tool (**UVOST™**). UVOST detects typical bulk petroleum, fuels, and light oils while TarGOST® is specifically designed to respond to coal tars and creosotes.

LASER-INDUCED FLUORESCENCE (LIF)

Fluorescence spectroscopy is one of the most widely applied spectroscopic techniques in use today. It is, by nature, a fast, sensitive and typically reversible process that makes it ideal for incorporation into a continuous screening technique that uses an optically transparent window as the conduit between the sensor and the analyte. Luminescence is the emission of light from any substance that returns to the ground state after being excited into an electronically excited state. If the bulk of the molecules emit their photons in less than a microsecond the emission is referred to as fluorescence. Emissions that take longer than this are called phosphorescence.

Fluorescence is typically observed in molecules that have an aromatic structure. One class of aromatics is the PAH found in quantity in typical petroleum products. The PAHs found in coal tars, creosotes and even sediments are also fluorescent, but they fluoresce much less efficiently than PAHs dissolved in more solvent-rich environments, such as the aliphatic body that makes up the bulk of fuels/petroleums. Dakota Technologies (Dakota) has observed that the less solvent available, the less efficiently the PAHs fluoresce. The PAHs continue to absorb the excitation light, but there is a much higher likelihood of the PAHs finding a non-radiative mechanism with which to shed the additional energy they picked up during the absorption of the excitation photon(s). In spite of this, the PAHs in sediments can still be coaxed into fluorescing well enough to allow in-situ laser-induced fluorescence screening via a sapphire-windowed probe.

A plot of the relative distribution of the different colors (or energies) of the photons being emitted by an excited sample of PAH is called the spectrum (or spectra when referring to more than one). Figure 1 illustrates the concept of PAH absorbance and fluorescence spectra. The spectra of individual PAH species (such as naphthalene and anthracene) can contain enough structure (peaks and valleys) to be identified in simple mixtures in the lab. The fluorescence of PAHs in sediments however, is originating from such a wide variety and concentrations of PAHs and differing local environments (dissolved phase, sorbed to particles, microcrystals, etc.) that the resulting spectra are very broad and contain very little "structure" that one might use to determine which individual PAHs are responsible for the fluorescence. The spectra do shift enough to recognize that the distribution of species or environments are changing, but individual speciation is impossible.

Another property of fluorescence that can be measured is the varying amount of time it takes for the molecules to emit the photons after exposure to a pulsed excitation source, such as a laser is illustrated in Figure 2. If we use a time sensitive detector to observe the number of photons being emitted over time, we can derive more information about the nature of the fluorophores and their environment. The different PAHs and the differing environments that exist in

sediments all combine to change the decay times observed. This information is readily obtained when using a pulsed source such as the laser we used in this application. UVOST allows us to investigate not only what colors are being emitted, but also how long it takes for the excited population of PAHs to emit the fluorescence photons. We use a patented method of combining the photons from four regions of the emission spectrum optically collected over 20 nm wide sections of the emission spectra at 340, 390, 440, and 490 nm.

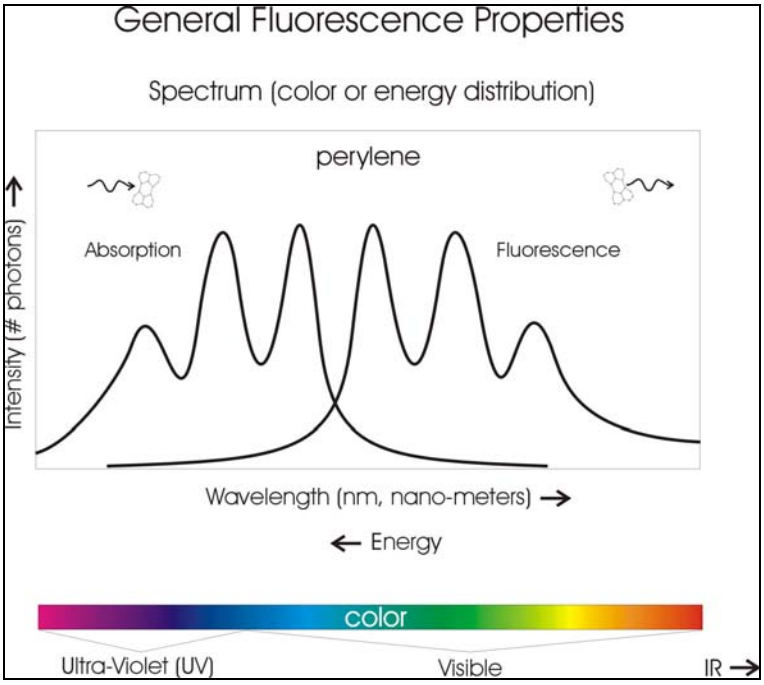

Figure 1. Spectral property of fluorescence

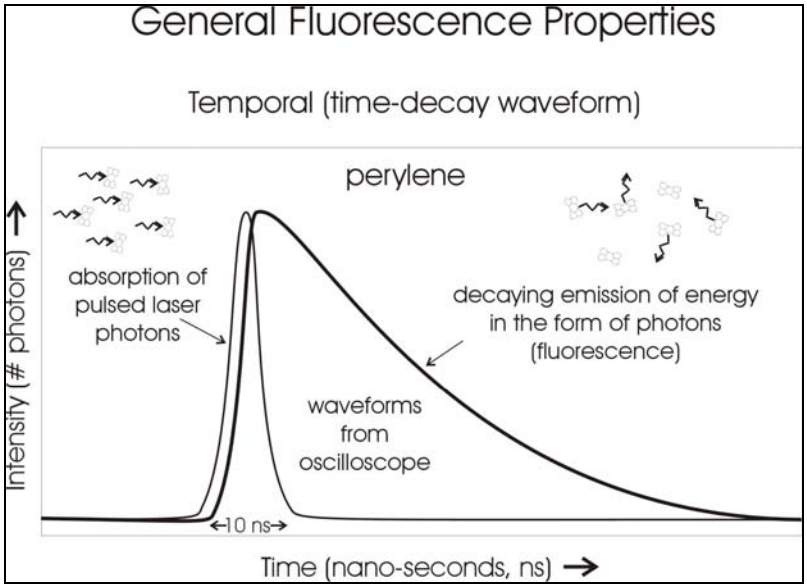

Figure2. Temporal property of fluorescence

These four "channels" are delayed in time through successively longer fiber optic delay lines and eventually arrive at the detector (photomultiplier tube or PMT). The resulting waveform is a unique measurement of both the spectral and temporal components of the fluorescence. This allows us to simultaneously observe the spectral and temporal qualities of the fluorescence. This technique is described in detail later in this report. It is these multi-wavelength waveforms, measured continuously and stored vs. depth, that ultimately serve as our indicator of PAH concentration vs. depth in the sediment.

Interferences

Nature has co-deposited a myriad of additional fluorescent materials in sediments that will also absorb the laser light and fluoresce intensely enough to complicate the measurement of the PAH fluorescence. Example materials include minerals such as calcites and a variety of biological materials. Both living organisms and their associated breakdown products (humic and fulvic acids) fluoresce well enough to interfere with the observation of the fluorescence of the target PAHs. This fluorescence, along with scattered excitation laser light and Raman light generated throughout the optical train (fiber optics) will ultimately make it back to the detector, mixed in with true PAH fluorescence, and must be accounted for in some fashion. Throughout this document we will refer to all these sources of non-PAH emitted photons as "background" fluorescence, even though the true source might well be non-fluorescent (scatter) in nature.

UNDERSTANDING UVOST FLUORESCENCE WAVEFORMS

Spectroscopic techniques involve probing the target matrix with light and learning about the contents of that matrix by analyzing the light that is emitted or absorbed by the target matrix. For screening tools it is crucial to glean as much information from this light as one can in as little time as possible. UVOST accomplishes this task in a novel fashion. The fluorescence data from UVOST is deceptively simple. There is a lot more going on in a UVOST waveform than one would imagine at first glance. It is actually a two-dimensional data set that contains three-dimensional fluorescence information. To complicate this, some of the information is overlapping. A full description of the multi-wavelength waveform data follows in order to give the reader an understanding of the data acquired during this study.

PAH time decay waveforms

Each type of PAH molecule (such as phenanthrene, naphthalene, or anthracene) emits fluorescence over a unique time period after being excited by a pulsed excitation source such as the laser used in UVOST. The emission starts out at maximum intensity, and then decays away at a rate unique to each type of PAH. The number of rings, the bonding between them, the amount of substitution on the rings, and other structural features of the molecule determine, to a great extent, the decay rate exhibited by a particular PAH. One class of molecule, the PCBs, have a structure that would seem to fluoresce well, but the chlorine substitution on the rings causes what is referred to as the heavy-atom effect, resulting in non-radiative relaxation from the excited state and a dramatic reduction in fluorescence. In fact the reduction is so significant that PCBs are essentially non-fluorescent molecules.

The environment in which the PAH exists also has a substantial influence on the decay rate. Quenching, which refers to any process that causes a decrease in the decay time (as well as the

intensity) of the fluorescence, is dependent on conditions like oxygen levels, solvent availability, solvent viscosity, and a myriad of other matrix dependent conditions. An example of this can be found with the fluorescence of PAHs in fuels (gasoline, diesel, or kerosene) vs. coal tar oil. The coal tar oil can often contain more PAHs than the fuels, but the fluorescence lifetime is much shorter and the total fluorescence of fuels is often 2 to 3 orders of magnitude more intense. If one were to dissolve coal tar in a solvent such as hexane, its fluorescence intensity would rival that of fuels because the solvent matrix is simply more suited to allow fluorescence to occur.

Figure 3 illustrates the differing decay times one might observe for 4 different PAHs, along with the time profile of the laser pulse that excited them. Now remember, these are large populations of PAHs being excited and while some begin emitting immediately, other individual PAH molecules "wait" many nanoseconds before emitting a photon. What is plotted here is a picture of the distribution of times that the PAHs are remaining in the excited state before emitting photons. Now in our case (sediments) we have many different PAHs of differing ring number and substitution levels. The bold curve in Figure 3 illustrates the fluorescence decay profile that would result if we observed the fluorescence of all four PAHs simultaneously. This is the fluorescence waveform that would result if all 4 different PAHs fluoresced with equal intensity (normalized to keep it on scale). This same concept is happening in the sediments. We are observing the sum of all the decay profiles for all the different PAHs that are absorbing and emitting photons with each pulse of the excitation laser. It should be noted that there is no predictable trend between decay rate and structure like the trend that exists between spectrum and structure as described below.

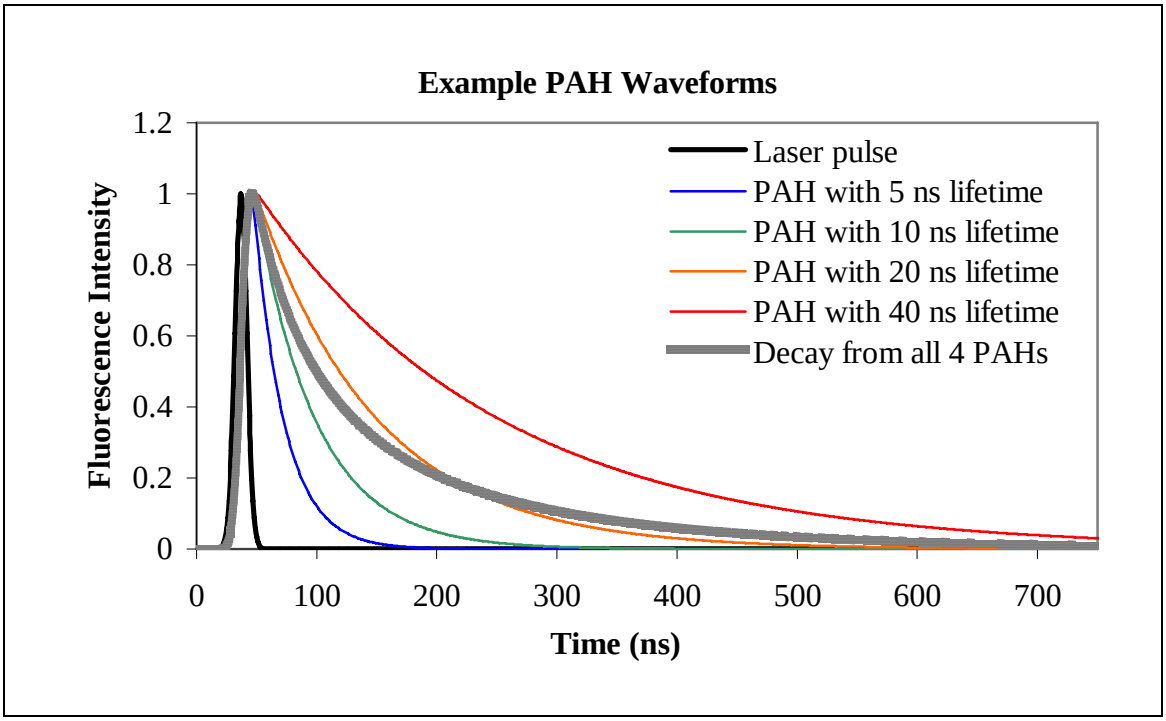

Figure 3. Temporal fluorescence examples

Of course the fluorescence decay profile observed in sediments is not made up of equal amounts of fluorescence from the various PAHs found in them. The wavelengths of light being emitted

by (spectra) and the relative fluorescence yields of the different PAHs are all quite different, but the concept is still valid. The decay profile of the PAHs observed in the sediment results from the decay profiles of a mixture of different PAHs, along with fluorescence from other materials in the matrix.

PAH spectra

Let's take a look at the other property of the fluorescence emission of the same 4 example PAHs we showed at in Figure 3. This time we'll examine not the time over which they fluoresce, but instead the distribution of energies found in the photons they emit. Remember that the fluorescence emission spectrum of a pure PAH is simply a graphical representation of the energy distribution of photons that are emitted from a large population of the PAHs as they release energy that was absorbed from the excitation beam of light (in our case, a laser). Spectra of pure PAHs are typically acquired by dissolving a sample of the pure PAH in a pure solvent that does not fluoresce.

Figure 4 depicts the fluorescence emission spectra of the same 4 PAHs used in the temporal example in Figure 3. The laser wavelength is also shown in Figure 4, demonstrating the principle that fluorescence occurs at longer wavelength (lower energy) than the excitation wavelength (also known as Stokes' shift). The basic trend is toward longer wavelength emission as more rings are added or substitution increases. Naphthalene emits at around 340 nm and the spectra "red-shift" as the number of rings increase. Another general property of fluorescence is that for a pure PAH the emission spectrum remains the same irrespective of what wavelength of light is used to excite them (Kasha's rule). This is not true for mixtures however, because changing the excitation wavelength might well change which PAH are being excited and to what degree. The bold spectrum in Figure 4 is the combined spectra of all 4 PAHs. This is a simplified illustration of what generally happens if we observe the total fluorescence of a mixture of different PAHs. Any change in the relative amounts of the differing PAHs or changes in the matrix in which they exist will cause a change in the spectrum of light actually emitted.

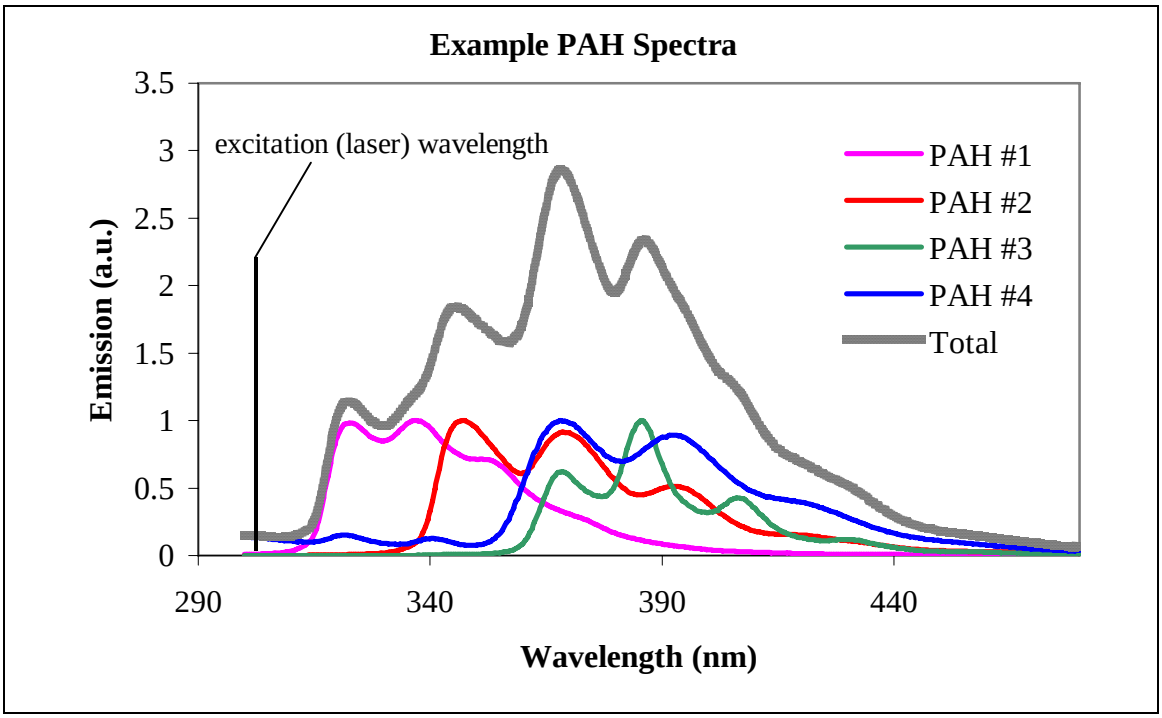

Figure 4. Spectral fluorescence examples

The fairly well defined structure (multiple peaks, valleys, and their various positions) of the spectra in Figure 4 suggests that perhaps one could use algorithms to extract information about the relative concentrations of the individual PAHs. While this is possible for very simple mixtures (2 to 3 PAHs) under controlled conditions, the algorithms quickly fail when many PAHs are present and interference fluorescence from humics, fulvics, and minerals is introduced. At best, one is able to use the overall shape of the total fluorescence spectrum to predict the *type* of mixture (diesel, coal tar, crude oil, etc.) and, in fact, this is routinely accomplished in environmental fluorescence forensics.

PAH multi-wavelength waveform (MWW)

The fluorescence of PAHs has both a spectral and temporal component. Real-world environmental samples typically contain at least several (if not dozens) of different PAHs along with other fluorophores, and the PAH fluorescence spectra overlap to form broad and fairly featureless spectral and temporal emission (compared to pure PAH spectra). If we were to record the temporal decay waveforms across the entire spectrum we would record what is called a wavelength-time matrix (WTM) that would describe the fluorescence emission completely. To create this we scan the emission selection monochromator from wavelength to wavelength, monitoring the pulsed emission vs. time at each wavelength with an oscilloscope.

Figure 5 contains the WTMs of diesel, jet, creosote, and gasoline on sand at several thousand ppm. The difference between the contaminants is clear and identification is straightforward. Dakota once employed these matrix style data sets to completely analyze the fluorescence of petroleum, oil, and lubricant (POL) contaminated soils. WTMs were (and still are) excellent for identifying/classifying the PAH fluorescence of environmental samples because of the unique information that both dimensions of PAH fluorescence exhibit when acquired in unison. While

WTMs make different contaminants readily discernable from one another, they are 3-dimensional and large. Also, the screening tool must be held still while the measurement is being made. All of these qualities make WTMs unwieldy for environmental screening tools that are designed to continuously log (typically 1 Hz) the presence of PAHs vs. time or depth.

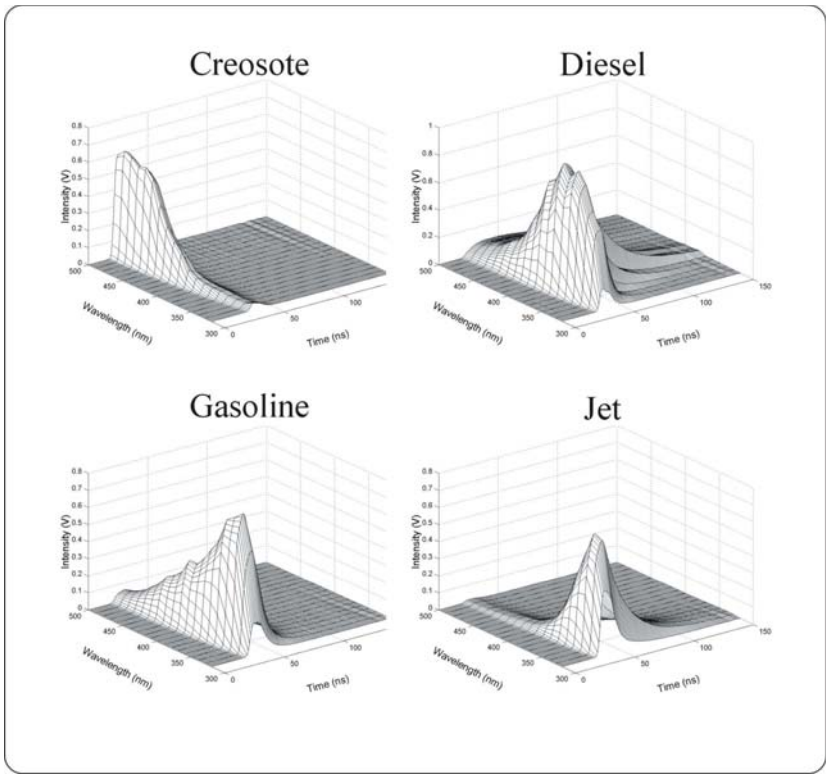

Figure 5. Example WTMs of common contaminants on sand

Because WTMs are so difficult to implement in screening mode, Dakota developed (and patented) a multiple-wavelength waveform (MWW) technique that allows multi-dimensional PAH fluorescence measurements to be acquired "on the fly". Figure 6 illustrates the concept. Select regions of the spectrum are monitored for their temporal response. The responses are optically delayed and recombined, and the resulting responses converge to form one two-dimensional waveform. There is sometimes overlap between the "channels" with long decay times, and the spectral regions being monitored are fewer and farther between than WTMs, but the resulting waveform still retains a unique combination of spectral and temporal fluorescence information that makes speciation and identification of PAH mixtures possible. Figure 7 illustrates the unique waveform produced by a variety of common PAH-containing environmental contaminants.

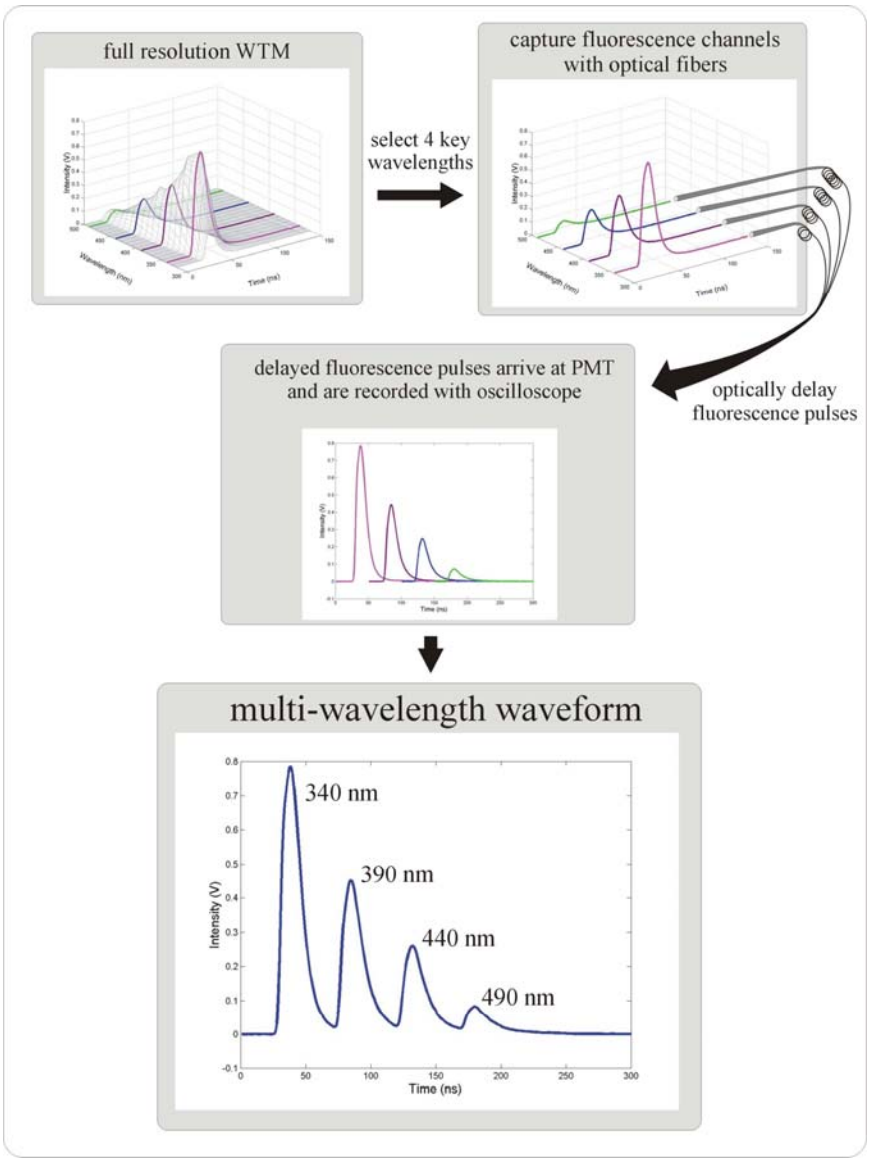

Figure 6. Multi-wavelength waveform concept

The UVOST system acquires waveforms at ~1 Hz and logs them to the hard drive continuously. As described below (see Calibration and normalization) the waveforms are integrated to achieve a quantitative result that is plotted vs. depth. The shape of the waveform yields information on the nature of the fluorescing material. With experience the analyst learns to look for changes or similarities in the waveform and is able to assess changes in the analyte concentration or the matrix. For instance, are the decay times for the various channels changing due to changes in the PAHs or perhaps changes in oxygen levels that affect quenching? Is the emission shifting to shorter or longer wavelengths due to changes in the amount of degradation via biological activity, weathering, or volatilization? Is the first channel (closest to the laser) getting more or less contribution from laser scatter due to improper mirror alignment? These and a myriad of other questions and answers can be gleaned from the shape of this simple, yet informative, data format.

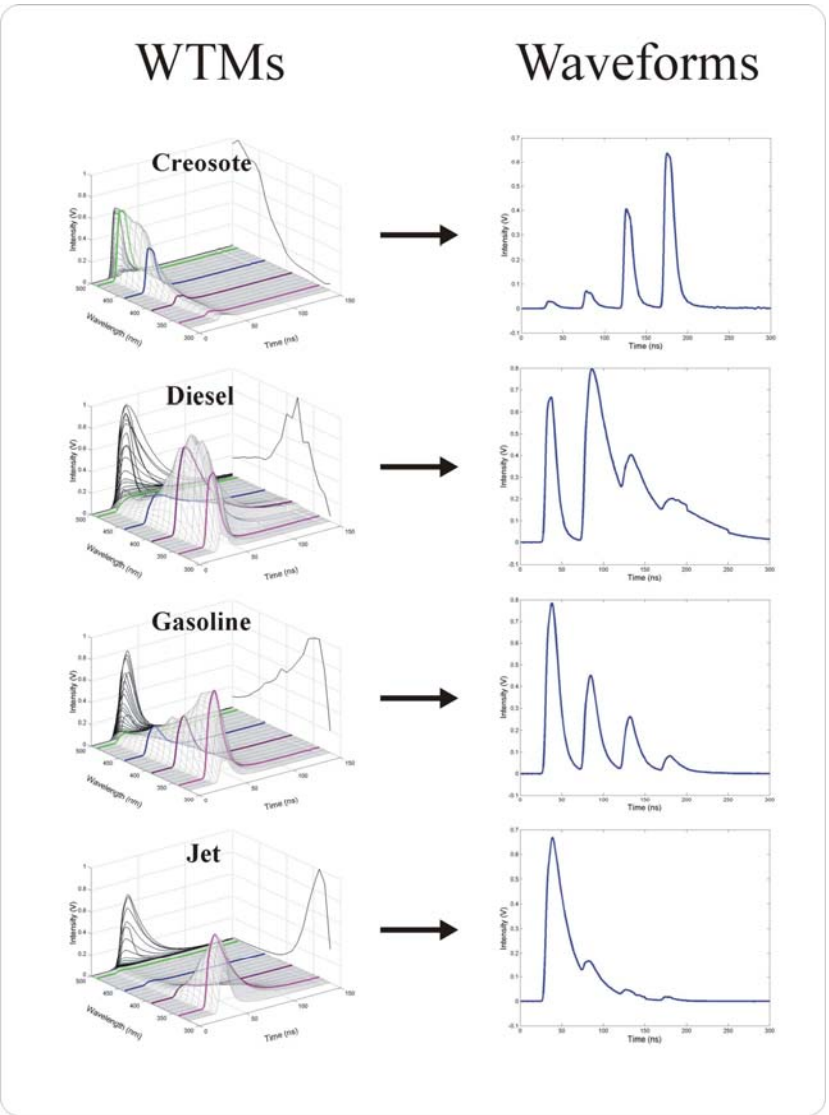

Figure 7. Waveforms of common contaminants

FVD colorization

The waveforms that are continuously logged vs. depth with UVOST contain a wealth of information, but to make this information easily interpretable in fluorescence vs. depth (FVD) log format, we need to further reduce the data to a one-dimensional data set that we can plot vs. depth. As discussed, the quantitative information is contained within the area under the waveform (total fluorescence) but how do we convert a waveform's shape into a singular entity? To accomplish this, Dakota has developed and implemented a novel technique that effectively converts the shape of the waveforms into colors. These colors are then used to fill in the area under the FVD that represents the total fluorescence measured at each point in the FVD. Figure 8, derived from data from a coal tar delineation project, illustrates the technique of colorizing the FVD according to the shape of the waveforms.

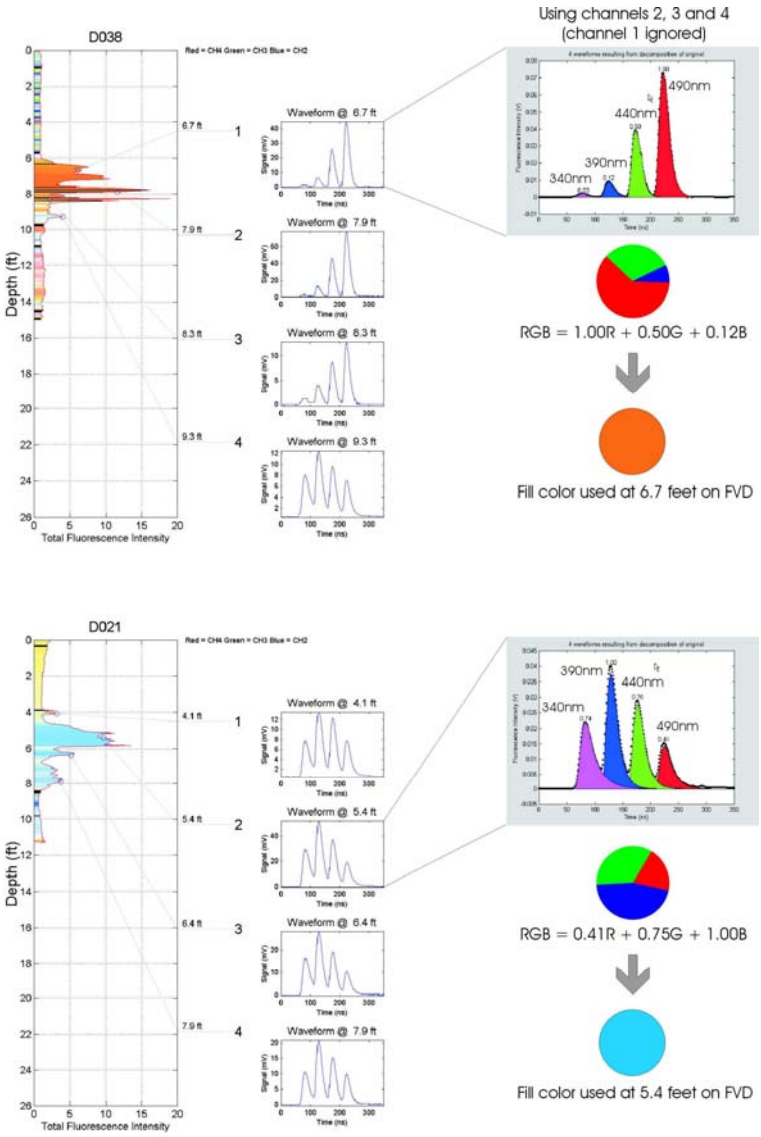

Figure 8. How color-coding is calculated

The result is a data presentation technique that allows the user to assess similarities or changes in the waveform shapes vs. depth by simply observing the colors that represent the shape of each and every waveform in the data set. This technique was used on the sediment measurements made in this project, both in the lab and in the field. It should be noted that the color black indicates that the algorithm that calculates the color failed to deconvolve the waveform successfully.

The colorization technique is limited to using three of the channels as a result of the red, green, and blue (RGB) color definition which computer colorization systems typically implement. A cyan, yellow, magenta, and black colorization system (CYMK) might allow the use of all four channels and is currently being considered as a replacement for RGB. The first three channels (340, 390, and 440 nm) were used to colorize the data in this study. The 490 nm channel was

used in a quantitative sense, but was ignored for the colorization. It should be noted that a strictly temporal change (where only the decay times change, not the spectrum) would not necessarily result in a color change, since the ratios of the 3 channels used might remain constant even though the area under the waveform itself will increase or decrease.

An added benefit of this technique is that it provides insight in situations where non-linear response behavior is encountered. Many contaminants such as coal tars, heavy crudes, and creosotes do not fluoresce with concentration in a linear fashion. For instance, a 10 fold increase in PAH concentration might produce very little or no increase in total fluorescence intensity. However, a spectral or temporal shift often does continue to occur with changes in concentration due to energy transfer, photon cycling, and other phenomenon. The color of the FVD fill continues to darken or shift in color, acting as an indicator of a change in the fluorescence of the sample, alerting the analyst to a possible increase in concentration. While this technique is less than analytical it does provide the analyst with additional insight into the distribution of PAHs in the soil vs. depth.

Calibration and normalization

The UVOST system response depends on a host of factors. These include laser energy, fiber termination quality, neutral density filter selection, parabolic mirror efficiency, and fiber length, just to name a few. To account for changes in these over time and location, a single point calibration and system check is performed. A reference emitter (coined M1) is placed on the sapphire window and the response is measured. The M1 solution is permanently stored in a quartz cuvette for convenience and the measurement takes place through the wall of the cuvette. This proprietary mix of hydrocarbons fluoresces efficiently across the entire system and serves as both an indicator of system function and as a data normalization benchmark.

The total fluorescence intensity (area under the waveform) of M1 serves to normalize the data from the push that immediately follows the reference emitter measurement. All the FVD logs are presented as a percentage of the signal achieved with M1. The area under every waveform in the data set is integrated, resulting in a pico-Volt-seconds unit (picoseconds * V or pVs). These values are divided by the pVs measured for M1, and the result is multiplied by 100. The result is a log with x-axis units of percent of M1. This creates a normalized data set that takes into account the entire system performance, from end to end (laser to oscilloscope). The shape of the M1 waveform acts to guide the operator in assessing proper alignment of the detection system. The relative contribution for each channel and the shape of M1 waveform is monitored for consistency to insure that the waveforms remain consistent from day to day.

APPENDIX I

GUIDANCE FOR DESCRIBING TAR

Author: T. Gilles Q2R & Approval By: C. Barry Q3R & Approval By: M. Kelley

STANDARD DESCRIPTORS – VISUAL OBSERVATIONS OF NAPL

Descriptive Term	Definition
No Visible Evidence	No visible evidence of oil on soil or sediment sample
Sheen	Any visible sheen in the water on soil or sediment particles or the core
Staining	Visible brown or black staining in soil or sediment; can be visible as mottling or in bands; typically associated with fine-grained soil or sediment
Coating	Visible brown or black oil coating soil or sediment particles; typically associated with coarse-grained soil or sediment such as coarse sand, gravels, and cobbles.
Oil Wetted	Visible brown or black oil wetting the soil or sediment sample; oil appears as a liquid and is not held by soil or sediment grains

APPENDIX J

ON-SITE FOIA INFORMATION

PARCEL J FOIA INFORMATION

Facility ID	Facility Status	Facility Name	Address	City	County	Zip	Facility Type	Green Tag Decal	Green Tag Issue Date	Green Tag Expiration Date	Owner ID	Owner Name	Owner Address	Owner City	Owner State	Owner Zip	Tank ID	Tank Status	Tank Capacity	Product	Date Installed	Last Used Date	Removed Date	OSFM First Notify Date	Fee Due	Pending NOV
2023985	Active	R & L Carriers	4359 W. 36th Street	Chicago	Cook	60632	Trucking Company	N005492	3/27/2012	12/31/2014	U0027882	R & L Carriers, Inc.	600 Gillam Road PO Box 271	Wilmington	OH	45177	1	Removed	10000	Diesel Fuel		1/7/1992	1/13/1992	3/26/1986	$0.00	N
2023985	Active	R & L Carriers	4359 W. 36th Street	Chicago	Cook	60632	Trucking Company	N005492	3/27/2012	12/31/2014	U0027882	R & L Carriers, Inc.	600 Gillam Road PO Box 271	Wilmington	OH	45177	2	Removed	10000	Diesel Fuel		1/7/1992	1/13/1992	3/26/1986	$0.00	N
2023985	Active	R & L Carriers	4359 W. 36th Street	Chicago	Cook	60632	Trucking Company	N005492	3/27/2012	12/31/2014	U0027882	R & L Carriers, Inc.	600 Gillam Road PO Box 271	Wilmington	OH	45177	3	Removed	20000	Diesel Fuel	1/1/1992	3/30/2007	7/10/2007	2/27/1992	$0.00	N
2023985	Active	R & L Carriers	4359 W. 36th Street	Chicago	Cook	60632	Trucking Company	N005492	3/27/2012	12/31/2014	U0027882	R & L Carriers, Inc.	600 Gillam Road PO Box 271	Wilmington	OH	45177	4	Removed	5000	Dyed Diesel	1/1/1992	3/30/2007	7/10/2007	2/27/1992	$0.00	N
2023985	Active	R & L Carriers	4359 W. 36th Street	Chicago	Cook	60632	Trucking Company	N005492	3/27/2012	12/31/2014	U0027882	R & L Carriers, Inc.	600 Gillam Road PO Box 271	Wilmington	OH	45177	5	Currently in use	20000	Diesel Fuel	2/13/2007			6/4/2007	$0.00	N
2023985	Active	R & L Carriers	4359 W. 36th Street	Chicago	Cook	60632	Trucking Company	N005492	3/27/2012	12/31/2014	U0027882	R & L Carriers, Inc.	600 Gillam Road PO Box 271	Wilmington	OH	45177	6	Currently in use	20000	Diesel Fuel	2/13/2007			6/4/2007	$0.00	N
2023985	Active	R & L Carriers	4359 W. 36th Street	Chicago	Cook	60632	Trucking Company	N005492	3/27/2012	12/31/2014	U0027882	R & L Carriers, Inc.	600 Gillam Road PO Box 271	Wilmington	OH	45177	7	Currently in use	5000	Dyed Diesel	2/13/2007			6/4/2007	$0.00	N

PARCEL N FOIA INFORMATION

Facility ID	Facility Status	Facility Name	Address	City	County	Zip	Facility Type	Owner ID	Owner Name	Owner Address	Owner City	Owner State	Owner Zip	Tank ID	Tank Status	Tank Capacity	Product	Last Used Date	Removed Date	OSFM First Notify Date	Fee Due	Pending NOV
2018091	Closed	Coca-Cola Usa Div Of Coca-Cola	4301 W 36Th St	Chicago	Cook	60632	None	U0003157	Coca Cola Usa Div Of Coca Cola	4301 W 36Th St	Chicago	IL	60632	1	Removed	10000	Diesel Fuel	10/1/1987	3/1/1988	3/26/1986	$0.00	N
2018091	Closed	Coca-Cola Usa Div Of Coca-Cola	4301 W 36Th St	Chicago	Cook	60632	None	U0003157	Coca Cola Usa Div Of Coca Cola	4301 W 36Th St	Chicago	IL	60632	2	Removed	20000	Diesel Fuel	10/1/1987	3/1/1988	3/26/1986	$0.00	N
2018091	Closed	Coca-Cola Usa Div Of Coca-Cola	4301 W 36Th St	Chicago	Cook	60632	None	U0003157	Coca Cola Usa Div Of Coca Cola	4301 W 36Th St	Chicago	IL	60632	3	Removed	10000	Diesel Fuel	10/1/1987	3/1/1988	3/26/1986	$0.00	N
2018091	Closed	Coca-Cola Usa Div Of Coca-Cola	4301 W 36Th St	Chicago	Cook	60632	None	U0003157	Coca Cola Usa Div Of Coca Cola	4301 W 36Th St	Chicago	IL	60632	4	Removed	10000	Diesel Fuel	10/1/1987	3/1/1988	3/26/1986	$0.00	N
2018091	Closed	Coca-Cola Usa Div Of Coca-Cola	4301 W 36Th St	Chicago	Cook	60632	None	U0003157	Coca Cola Usa Div Of Coca Cola	4301 W 36Th St	Chicago	IL	60632	5	Removed	10000	Diesel Fuel	10/1/1987	3/1/1988	3/26/1986	$0.00	N
2018091	Closed	Coca-Cola Usa Div Of Coca-Cola	4301 W 36Th St	Chicago	Cook	60632	None	U0003157	Coca Cola Usa Div Of Coca Cola	4301 W 36Th St	Chicago	IL	60632	6	Removed	1000	Lube Oil	10/1/1987	3/1/1988	3/26/1986	$0.00	N
2018091	Closed	Coca-Cola Usa Div Of Coca-Cola	4301 W 36Th St	Chicago	Cook	60632	None	U0003157	Coca Cola Usa Div Of Coca Cola	4301 W 36Th St	Chicago	IL	60632	7	Removed	1000	Used Oil	10/1/1987	3/1/1988	3/26/1986	$0.00	N

DLPC RECORDS UNIT
Microfilm Code Sheet

ID Number L031658001L

Name COCA COLA USA

File Division 27B

Permit or Federal ID Number

Cross-reference Information

IL 532 1577
ISD 1268 6/87

Printed on Recycled Paper

001126.001957

1999

Printed on Recycled P

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/785-8604
Fax: 217/524-1991

November 19, 1999

Certified # Z 416 149 242

The Coca-Cola Company
Attn: Mr. Gregory J. Koch
One Coca-Cola Plaza
Atlanta, GA 30313

Re: LPC # 0316580016 -- Cook County
Former Coca-Cola PTO, 4301 W. 36th Street/Chicago
SRP/Fiscal

Dear Mr. Koch:

Attached is an itemized statement and supporting documentation for costs incurred and paid by the State at the Former Coca-Cola PTO, 4301 W. 36th Street site in Chicago for the time period inception through September, 1999. This bill is pursuant to the signed Service Agreement dated April 8, 1999.

Also included in this bill is the No Further Remediation Assessment amount, which is due for the Former Coca-Cola PTO, 4301 W. 36th Street site in Chicago. This amount is pursuant to Title 17 of the Act (415 ILCS 5/58.10).

The total amount is due within 45 days of receipt of this request. Please follow the instructions below:

1. Checks should be made payable to:
   Treasurer - State of Illinois
   For Deposit into the Hazardous Waste Fund

2. Please identify your federal employer identification number (FEIN) or Social Security Number on your check.

3. Please write your LPC number on your check.

4. Mail your remittance, along with a copy of the bill to:
   Illinois Environmental Protection Agency
   Division of Administration, Fiscal Services Section
   1021 North Grand Avenue East - P.O. Box 19276
   Springfield, IL 62794-9276

SCREEN

If you have any questions concerning this, please contact the Project Manager identified on the attached bill.

Sincerely,

Mary Remmers

Mary Remmers, Manager
Financial Management Unit
Planning & Reporting Section
Bureau of Land

MR:GM:ah

Attachment

bc: Division File
Ginger Miller
Jay Gaydosh

INVOICE #
80-229-1

BILLING DATE: NOVEMBER 19, 1999

STATEMENT OF IEPA COSTS INCURRED & PAID

INCEPTION THROUGH SEPTEMBER 1999

FOR FORMER COCA-COLA PTO, 4301 WEST 36TH STREET/CHICAGO

LPC #0316580016

PERSONAL SERVICES, FRINGE BENEFITS, ALLOCATED AND INDIRECT		$634.04
TRAVEL		0
CONTRACTUAL	PROFESSIONAL SERVICES	0
	LABORATORY SERVICES	0
	OTHER	0
SUPPLIES		0
NFR ASSESSMENT		$634.04
SUBTOTAL		$1,268.08
PREPAYMENT		($500.00)
TOTAL PAYMENT DUE WITHIN 45 DAYS		$768.08

ANY QUESTIONS SHOULD BE DIRECTED TO:

JAY GAYDOSH, PROJECT MANAGER
LEAKING UNDERGROUND STORAGE TANK SECTION
DIVISION OF REMEDIATION MANAGEMENT
PHONE # 217/785-0231

IN ORDER TO RECEIVE PROPER CREDIT, PLEASE RETURN A COPY OF THIS PAGE WITH YOUR REMITTANCE.

COCA COLA USA/CHICAGO
LP 80 229

Assgn Div	Unit Code	Pay Prd	Employee	Total Hours	Amount Total	Allocated Program Costs	Indirect	Total Cost
LP	L	9915	GAYDOSH JAY F	10.00	319.15			
			Fiscal Year: 00		319.15	84.85	166.97	570.97
LP	W	9908	O'HARA ROBERT E	1.50	45.07			
			Fiscal Year: 99		45.07	1.03	16.97	63.07
			Assigned Division: LP		364.22	85.88	183.94	634.04
			Grand Total		364.22	85.88	183.94	634.04

00126.001960

00126.001961

80-229

Z 416 149 242

US Postal Service GM/MR

Receipt for Certified Mail

No Insurance Coverage Provided.

24

The Coca-Cola Company
Mr. Gregory J. Koch
One Coca-Cola Plaza
Atlanta, GA 30313

Postage	$
Certified Fee	1.40
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	1.25
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

SPRINGFIELD IL 62703 MPO USPS NOV 19 1999

PS Form 3800, April 1995

80-229

SENDER: GM/MR

- ☐ Complete items 1 and/or 2 for additional services. Complete items 3, 4a, and 4b.
- ☐ Print your name and address on the reverse of this form so that we can return this card to you.
- ☐ Attach this form to the front of the mailpiece, or on the back if space does not permit.
- ☐ Write "Return Receipt Requested" on the mailpiece below the article number.
- ☐ The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

24

3. Article Addressed to:

The Coca-Cola Company
Mr. Gregory J. Koch
One Coca-Cola Plaza
Atlanta, GA 30313

4a. Article Number Z 416 149 242

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery 11/22/99

5. Received By: (Print Name)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature

PS Form 38

Is your RETURN ADDRESS completed on the reverse side?

Thank you for ...ng Return Receipt Service.

UNITED STATES POSTAL SERVICE ST LOUIS MO PM

Postage & Fees Paid
USPS
Permit No. G-10

• Print your name, address, and ZIP Code in this box •

Illinois Environmental Protection Agency

P.O. Box 19276 Hall Code #

Springfield, Il 62794-9276

PS Form 3800, April 1993 (Reverse)

Stick postage stamps to article to cover First-Class postage, certified mail fee, and charges for any selected optional services (See front)

1. If you want this receipt postmarked, stick the gummed stub to the right of the return address leaving the receipt attached, and present the article at a post office service window or hand it to your rural carrier (no extra charge)

2. If you do not want this receipt postmarked, stick the gummed stub to the right of the return address of the article, date, detach and retain the receipt, and mail the article

3. If you want a return receipt write the certified mail number and your name and address on a return receipt card, Form 3811, and attach it to the front of the article by means of the gummed ends if space permits. Otherwise, affix to back of article. Endorse front of article RETURN RECEIPT REQUESTED adjacent to the number

4. If you want delivery restricted to the addressee, or to an authorized agent of the addressee, endorse RESTRICTED DELIVERY on the front of the article

5. Enter fees for the services requested in the appropriate spaces on the front of this receipt. If return receipt is requested, check the applicable blocks in item 1 of Form 3811

6. Save this receipt and present it if you make an inquiry.

b) The citation of the ordinance used as an institutional control in this Letter.

c) A description of the property being sent notice by adequate legal description or by reference to a plat showing the boundaries;

d) A statement that the ordinance restricting the groundwater use has been used by the Illinois EPA in reviewing a request for groundwater remediation objectives;

e) A statement as to the nature of the release and response action with the name, address, and Illinois EPA inventory identification number; and

f) A statement as to where more information may be obtained regarding the ordinance.

The following activities shall be grounds for voidance of the ordinance as an institutional control and this Letter:

a) Modification of the reference ordinance to allow potable uses of groundwater;

b) Approval of a site-specific request, such as a variance, to allow use of groundwater at the site;

c) Violation of the terms of an institutional control recorded.

As a part of its corrective action plan, the remediation site has relied upon Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, prohibiting potable uses of groundwater as defined therein. Proof of notification of affected parties, if any, shall be submitted in accordance with 35 Ill. Adm. Code 742.1015(b) and (c) within 45 days of the issuance of this NFR Letter.

6. Failure to establish, operate and maintain controls in full compliance with the Act, applicable regulations, and the above-referenced Report may result in voidance of this Letter.

OTHER TERMS

7. Any contaminated soil or groundwater that is removed, excavated, or disturbed from the above-referenced site must be handled in accordance with all applicable laws and regulations.

00126.001939

00126.001940

9931 :132

8. Where the Remediation Applicant is not the sole owner of the remediation site, the Remediation Applicant shall complete the attached "Property Owner Certification of NFR Letter Under the Site Remediation Program" form. This certification by original signature of each property owner, or the authorized agent of the owner(s), of the remediation site or any portion thereof who is not a Remediation Applicant shall be recorded along with this Letter.

9. Further information regarding this remediation site can be obtained through a written request under the Freedom of Information Act (5 ILCS 140) to:

   Illinois Environmental Protection Agency
   Attention: Freedom of Information Act Officer
   Bureau of Land -- #24
   1021 North Grand Avenue East
   Post Office Box 19276
   Springfield, IL 62794-9276

10. Pursuant to Section 58.10(f) of the Act (415 ILCS 5/58.10(f)), should the Illinois EPA seek to void this Letter, the Illinois EPA shall provide notice to the current title holder and to the Remediation Applicant at the last known address. The notice shall specify the cause for the voidance, explain the provisions for appeal, and describe the facts in support of this cause. Specific acts or omissions that may result in the voidance of this Letter under Sections 58.10(e)(1)-(7) of the Act (415 ILCS 5/58.10(e)(1)-(7)) include, but shall not be limited to:

    a) Any violation of institutional controls or the designated land use restrictions;

    b) The failure to operate and maintain preventive or engineering controls or to comply with any applicable groundwater monitoring plan;

    c) The disturbance or removal of contamination that has been left in place in accordance with the above-referenced Report. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected consistent with the above-referenced Report;

    d) The failure to comply with the recording requirements for this Letter;

    e) Obtaining the Letter by fraud or misrepresentation;

    f) Subsequent discovery of contaminants, not identified as part of the investigative or remedial activities upon which the issuance of the Letter was based, that pose a threat to human health or the environment;

    g) The failure to pay the No Further Remediation Assessment Fee within 45 days after receiving a request for payment from the Illinois EPA;

h) The failure to pay in full the applicable fees under the Review and Evaluation Services Agreement within 45 days after receiving a request for payment from the Illinois EPA.

11. Pursuant to Section 58.10(d) of the Act, this Letter shall apply in favor of the following persons:

a) The Coca-Cola Company;

b) The owner and operator of the remediation site;

c) Any parent corporation or subsidiary of the owner of the remediation site;

d) Any co-owner, either by joint-tenancy, right of survivorship, or any other party sharing a relationship with the owner of the remediation site;

e) Any holder of a beneficial interest of a land trust or inter vivos trust, whether revocable or irrevocable, involving the remediation site;

f) Any mortgagee or trustee of a deed of trust of the owner of the remediation site or any assignee, transferee, or any successor-in-interest of the owner of the remediation site;

g) Any successor-in-interest of the owner of the remediation site;

h) Any transferee of the owner of the remediation site whether the transfer was by sale, bankruptcy proceeding, partition, dissolution of marriage, settlement or adjudication of any civil action, charitable gift, or bequest;

i) Any heir or devisee of the owner of the remediation site;

j) Any financial institution, as that term is defined in Section 2 of the Illinois Banking Act and to include the Illinois Housing Development Authority, that has acquired the ownership, operation, management, or control of the remediation site through foreclosure or under the terms of a security interest held by the financial institution, under the terms of an extension of credit made by the financial institution, or any successor in interest thereto; or

k) In the case of a fiduciary (other than a land trustee), the estate, trust estate, or other interest in property held in a fiduciary capacity, and a trustee, executor, administrator, guardian, receiver, conservator, or other person who holds the remediated site in a fiduciary capacity, or a transferee of such party.

12. This Letter, including all attachments, must be recorded as a single instrument with the Office of the Recorder or Registrar of Titles of Cook County. For recording purposes, the SRP Environmental Notice attached to this Letter should be the first page of the instrument filed. In addition, the City of Chicago's Memorandum of Understanding must be filed as an

attachment of this Letter with the Office of the Recorder or Registrar of Titles of Cook County. This Letter shall not be effective until officially recorded by the Office of the Recorder or Registrar of Titles of Cook County in accordance with Illinois law so that it forms a permanent part of the chain of title for the Former Coca-Cola PTO property. Within 30 days of this Letter being recorded by the Office of the Recorder or Registrar of Titles of Cook County, a certified copy of this Letter and all attachments, as recorded, shall be obtained and submitted to the Illinois EPA as indicated below.

Mr. Robert O'Hara
Illinois Environmental Protection Agency
Bureau of Land/RPM Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

13. In accordance with Section 58.10(g) of the Act, a No Further Remediation Assessment Fee based on the costs incurred for the remediation site by the Illinois EPA for review and evaluation services will be applied in addition to the fees applicable under the Review and Evaluation Services Agreement. Request for payment of the No Further Remediation Assessment Fee will be included with the final billing statement.

If you have any questions regarding this correspondence, you may contact the Illinois EPA project manager, Jay F. Gaydosh, at 217/785-0231.

Sincerely,

Hernando A. Albarracin

Hernando A. Albarracin
Unit Manager
Leaking Underground Storage Tank Section
Division of Remediation Management
Bureau of Land

HAA:JFG:ct\991433.WPD

Enclosures: SRP Environmental Notice
Table A
Site Base Map
Property Owner Certification Form
Chicago Memorandum of Understanding

cc: Conestoga-Rovers & Associates

ity of Chicago
ichard M. Daley, Mayor

partment of Law
an S. Sher
rporation Counsel

ite 900
North LaSalle Street
icago, Illinois 60602
21 744-9010
21 744-6798 (FAX)

July 2, 1997

9931 2132

BY EXPRESS MAIL

RECEIVED
JUL 03 1997
I.E.P.A. / B.O.L.

Mr. Gary P. King
Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
1001 N. Grand Avenue, East
Springfield, IL 62702

Re: Memorandum of Understanding Between City of Chicago and IEPA

Dear Mr. King:

Enclosed please find two executed copies of the Memorandum of Understanding ("MOU") between the City of Chicago and the Illinois Environmental Protection Agency, pursuant to 35 Ill. Adm. Code 742.1015. As I discussed earlier with Mark Wight, the version of the MOU that is enclosed varies from the one you and he approved only in that there are two exhibits rather than three, since the new groundwater ordinance also includes a provision authorizing the City of Chicago's Commissioner of Environment to enter into this MOU, thus simultaneously satisfying the requirements of 35 Ill. Adm. Code 742.1015(i)(3) and 742.1015(i)(1), relating to required MOU attachments. As to the remaining attachment (identification of the legal boundaries within which the Potable Water Supply Well Ordinance is applicable), Mr. Wight said that a letter from a City official stating that the ordinance applied throughout the City would satisfy the requirements of 35 Ill. Adm. Code 742.1015(i)(2). A letter to that effect is attached as Exhibit B.

Please execute both documents and return the one marked "City Copy" to me for our files. If you have any questions, do not hesitate to contact me at 312-744-6904.

Sincerely,

Mort P. Ames

Mort P. Ames
Assistant Corporation Counsel

Encl.

cc w/o encl.: Henry L. Henderson
Jessica Rio
Jill Wineman

SCREENED
MM

WORKS

MEMORANDUM OF UNDERSTANDING BETWEEN THE CITY OF CHICAGO, ILLINOIS AND THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY REGARDING (A) THE USE OF A LOCAL POTABLE WATER SUPPLY WELL ORDINANCE AS AN ENVIRONMENTAL INSTITUTIONAL CONTROL AND (B) THE PROVISION OF INFORMATION RELATING TO "NO FURTHER REMEDIATION" DETERMINATIONS BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY TO THE CITY OF CHICAGO

I. PURPOSE AND INTENT

A. This Memorandum of Understanding ("MOU") is entered into between the City of Chicago, Illinois ("the City") and the Illinois Environmental Protection Agency ("Illinois EPA") for the purpose of (a) satisfying the requirements of 35 Ill. Adm. Code 742.1015 for the use of potable water supply well ordinances as environmental institutional controls and (b) ensuring that the City will be provided with copies of all "No Further Remediation" letters or determinations issued by the Illinois EPA pursuant to specific programs for sites located within the boundaries of Chicago, Illinois, in order to enable the City to maintain a complete and up-to-date registry of sites as required by 35 Ill. Adm. Code 742.1015(i)(5). The Illinois EPA has reviewed Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance"), attached as Attachment A, and has determined that the Municipal Code of Chicago prohibits the installation and use of new potable water supply wells by private entities but will allow the installation of potable water supply wells by the City and other units of local government pursuant to intergovernmental agreements with the City. In such cases, 35 Ill. Adm. Code 742.1015(a) provides that the City may enter into an MOU with the Illinois EPA to allow the use of the ordinance as an institutional control.

B. The intent of this Memorandum of Understanding is to (a) specify the responsibilities that must be assumed by the City to satisfy the requirements for MOUs as set forth at 35 Ill. Adm. Code 742.1015(i), and (b) require the Illinois EPA to provide the City with copies of all "No Further Remediation" letters or determinations that the Illinois EPA issues for sites located within the City of Chicago to enable the City to maintain a registry of sites pursuant to 35 Ill. Adm. Code 742.1015(i)(5).

II. DECLARATIONS AND ASSUMPTION OF RESPONSIBILITY

A. In order to ensure the long-term integrity of the Potable Water Supply Well Ordinance as an environmental institutional control and that risk to human health and the environment from contamination left in place in reliance on the Potable Water Supply Well Ordinance is effectively managed, the City hereby assumes the following responsibilities pursuant to 35 Ill. Adm. Code 742.1015(i):

1. The City will notify the Illinois EPA Bureau of Land of any changes to or requests for variance from the Potable Water Supply Well Ordinance at least 30 days prior to the date the local government is scheduled to take action on the proposed change or request (35 Ill. Adm. Code 742.1015(i)(4));

2. The City will maintain a registry of all sites within its corporate limits that have received "No Further Remediation" determinations from the Illinois EPA pursuant to specific programs (35 Ill. Adm. Code 742.1015(i)(5));

3. If the City determines to install a new potable water supply well(s), the City will review the registry of sites established under paragraph II.A.2. prior to siting such potable water supply well(s) within the area covered by the Potable Water Supply Well Ordinance, pursuant to 35 Ill. Adm. Code 742.1015(i)(6)(A);

4. If the City determines to install a new potable water supply well(s), the City will determine whether the potential source of potable water has been or may be affected by contamination left in place at the sites tracked and reviewed under paragraphs II.A.2. and 3. (35 Ill. Adm. Code 742.1015(i)(6)(B)); and

5. If the City determines to install a new potable water supply well(s), the City will take action as necessary to ensure that the potential source of potable water is protected from contamination or treated before it is used as a potable water supply (35 Ill. Adm. Code 742.1015(i)(6)(C));

6. If the City enters into intergovernmental agreements under Section 11-8-390 of the Municipal Code of Chicago to allow other units of local government to install new potable water supply well(s) within the corporate limits of the City, the City will require compliance with the procedures set forth in paragraphs II.A.3., 4., and 5. as a part of such agreements.

7. Notification under paragraph II.A.1. above, or other communications concerning this MOU directed to the Illinois EPA, shall be addressed to:

Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62794-9276

B. In order to ensure the long-term integrity of the Potable Water Supply Well Ordinance as an environmental institutional control and that risk to human health and the environment from contamination left in place in reliance on the Potable Water Supply Well Ordinance or other specific programs can be effectively managed, the Illinois EPA hereby assumes

the following responsibilities:

1. The Illinois EPA will provide the City with copies of all "No Further Remediation" letters or determinations that it issues pursuant to 35 Ill. Adm. Code 742, and other specific programs, for sites located within the boundaries of the City at the time said letters or determinations are provided to remediation applicants.

2. Copies of "No Further Remediation" letters or determinations provided to the City pursuant to paragraph II.B.1. above, or other communications concerning this MOU directed to the City, shall be addressed to:

Commissioner
Chicago Department of Environment
25th Floor
30 North LaSalle Street
Chicago, IL 60602-2575

III. SUPPORTING DOCUMENTATION

The following documentation is required by 35 Ill. Adm. Code 742.1015(i) and is attached to this MOU:

A. Attachment A: A copy of the Potable Water Supply Well Ordinance certified by the city clerk or other official as the current, controlling law (35 Ill. Adm. Code 742.1015(i)(3)) and a statement of the authority of the City to enter into the MOU (35 Ill. Adm. Code 742.1015(i)(1)).;

B. Attachment B: Identification of the legal boundaries within which the Potable Water Supply Well Ordinance is applicable (35 Ill. Adm. Code 742.1015(i)(2)); and

IN WITNESS WHEREOF, the lawful representatives of the parties have caused this MOU to be signed as follows:

FOR: The City of Chicago, Illinois

99812132

BY: _____ DATE: July 1, 1997
Commissioner
Department of Environment
City of Chicago

FOR: Illinois Environmental Protection Agency

BY: Gary P. King DATE: July 3, 1997
(Name and title of signatory)
Mgr, Division of Remediation Management
Bureau of Land

Version 6/27/97

00126.001947

JAMES J. LASKI, CITY CLERK
CITY CLERK'S OFFICE — CITY OF CHICAGO

Be It Ordained by the City Council of the City of Chicago:

SECTION 1. Chapter 11-8 of the Municipal Code of Chicago is hereby amended by adding a new Section 11-8-385 and by amending Section 11-8-390 by inserting the language in italics, as follows:

11-8-385 Potable Water Defined:

Potable water is any water used for human consumption, including, but not limited to water used for drinking, bathing, washing dishes, preparing foods and watering gardens in which produce intended for human consumption is grown.

11-8-390 Prohibited Use Of Secondary Water; *Prohibited Installation Of New Potable Water Supply Wells.*

No secondary water shall overflow into or be discharged into any surge tank, storage tank, or reservoir, or shall in any way be piped or conveyed into the water supply system of any building, structure, or premises to become a part of or be mixed with the fresh water supply from the mains of the Chicago Waterworks System either inside of the premises or in the water service pipe. Secondary water shall not be piped to or used in any plumbing fixture, or for cooling crushers, rollers, or mixers where foods, candies, liquids or materials are manufactured for human or animal consumption. No connection, tap, or opening shall be made in a water distribution system other than an approved water distribution system which will permit such water being used for drinking.

Wherever the fire-protective equipment in any building, structure or premises has service from the Chicago Waterworks System, no pipe or other conduit which conveys secondary water shall be cross-connected to the fire-protective equipment. All fire-protective equipment connected to the Chicago Waterworks System shall be constructed in such manner that

EXHIBIT
A

00125.001340

all tanks, pipes, pumps, surge tanks, and fire hydrants can be thoroughly drained, flushed and cleaned by the owners of such equipment and premises and there shall be no direct connections from the tanks, pipes and other equipment to any drainage pipes or sewers. *No groundwater well, cistern or other groundwater collection device installed after the effective date of this amendatory ordinance may be used to supply any potable water supply system, except at points of withdrawal by the City of Chicago or by units of local government pursuant to intergovernmental agreement with the City of Chicago.*

SECTION 2. Section 2-30-030 of the Municipal Code of Chicago is hereby amended by deleting the language in brackets and inserting the language in italics, as follows:

2-30-030 Commissioner -- Powers And Duties Designated.

The commissioner of the environment shall have the following powers and duties:

* * * * *

(21) To enter into grant agreements, cooperation agreements and other agreements or contracts with governmental entities, private business and civic and community groups necessary to implement the Green Streets Program and other urban forestry, beautification and environmental enhancement programs; *and agreements to implement the State of Illinois Site Remediation Program;*

SECTION 3. This ordinance shall be in full force and effect from and after its passage and approval.

STATE OF ILLINOIS,
County of Cook.

I, JAMES J. LASKI City Clerk of the City of Chicago in the County of Cook and State of Illinois, DO HEREBY CERTIFY that the annexed and foregoing is a true and correct copy of that certain ordinance now on file in my office An ordinance amending Title 11, Chapter 8 and Title 2, Chapter 30 of the Municipal Code of Chicago by establishment of definition of potable water, regulation of potable water supply system and empowerment of commissioner of environment for implementation of State of Illinois Site Remediation Program.

I DO FURTHER CERTIFY that the said ordinance was passed by the City Council of the said City of Chicago on the fourteenth (14th) day of May A. D. 1997 and deposited in my office on the fourteenth (14th) day of May A. D. 1997.

I DO FURTHER CERTIFY that the vote on the question of the passage of the said ordinance by the said City Council was taken by yeas and nays and recorded in the Journal of the Proceedings of the said City Council, and that the result of said vote so taken was as follows, to wit:

Yeas 47 Nays None

I DO FURTHER CERTIFY that the said ordinance was delivered to the Mayor of the said City of Chicago after the passage thereof by the said City Council, without delay, by the City Clerk of the said City of Chicago, and that the said Mayor failed to return the said ordinance to the said City Council with his written objections thereto at the next regular meeting of the said City Council occurring not less than five days after the passage of the said ordinance.

I DO FURTHER CERTIFY that the original, of which the foregoing is a true copy, is entrusted to my care for safe keeping, and that I am the lawful keeper of the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of the City of Chicago aforesaid, at the said City, in the County and State aforesaid, this twenty-seventh (27th) day of June A. D. 1997.

[L. S.]

JAMES J. LASKI, City Clerk.

ity of Chicago
ichard M. Daley, Mayor

epartment of Environment

nry L. Henderson
ommissioner

wenty-fifth Floor
) North LaSalle Street
hicago, Illinois 60602-2575
12) 744-7606 (Voice)
12) 744-6451 (FAX)
12) 744-3586 (TTY)

tp://www.ci.chi.il.us

July 1, 1997

99312132

Mr. Gary P. King
Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
1001 N. Grand Avenue, East
Springfield, IL 62702

RECEIVED
JUL 03 1997
I.E.P.A. / B.O.L.

Re: Chicago Ordinance No. 097990

Dear Mr. King:

Pursuant to 35 Ill. Adm. Code 742.1015(I)(2), Section 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, apply to all areas within the corporate limits of the City of Chicago.

Sincerely,

Henry L. Henderson
Commissioner

cc: Mort Ames
Asst. Corp. Counsel

Blue Bag Recycling
Please Recycle!

EXHIBIT
B

WORKS

00126.001951

99916673

8004/0068 50 001 Page 1 of 3
1999-09-28 15:39:45
Cook County Recorder 25.00

99916673

00126.001552

PREPARED BY:

Name: Former Coca-Cola PTO

Address: 4301 West 36th Street
Chicago, Illinois 60632

PIN Nos.: 16-34-400-006-0000
16-34-400-018-000

RECEIVED
OCT 1 8 1999
IEPA/BOL

RETURN TO:

Name: The Coca-Cola Company
Attn. Gregory J. Koch

Address: One Coca-Cola Plaza
Atlanta, GA 30313

THE ABOVE SPACE FOR RECORDER'S OFFICE

ADDENDUM TO
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
NO FURTHER REMEDIATION LETTER

Return to
Box 407
To: P. Sharkey

00126.001953

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

Division of Legal Counsel
217/782-5544
Telefax # 217/782-9807
TDD # 217/782-9143
E-mail: epa2868@epa.state.il.us

September 27, 1999

Patricia F. Sharkey
Mayer, Brown & Platt
190 South LaSalle Street
Chicago, Illinois 60603-3441

Re: Former Coca-Cola PTO
LPC #0316580016 – Cook County
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Pat:

I am writing to follow up on a question you have raised on behalf of the owner of the above referenced property, The Coca-Cola Company, as to the scope of the No Further Remediation ("NFR") letter (dated September 24, 1999) issued by the Illinois Environmental Protection Agency ("Illinois EPA"). First, your client notes that the site description in the NFR letter defines the entire parcel of property upon which the site remediation was performed, and not just the specific area of concern addressed in the approved underlying Site Investigation Plan and Remedial Action Completion Report (dated April 4, 1999, Log No. 99-701). Second, your client notes that the list of contaminants of concern as found in Table A of the NFR letter is more comprehensive than those which were the primary focus of the remediation and the approved underlying reports (i.e., Benzene, Toluene, Ethylbenzene, Xylene).

In response to your question, the Illinois EPA Division of Legal Counsel and Bureau of Land have reviewed the September 24, 1999 NFR letter and the above referenced underlying reports. By this letter, I am confirming the Illinois EPA's conclusion that the September 24, 1999 letter is valid (and shall become effective upon proper and timely recording) and may be relied upon by The Coca-Cola Company and its successors and assigns. I am further confirming that the scope of this NFR letter, like any other NFR letter, is limited by the scope of the approved underlying reports. Those reports more clearly identify the area of remediation surrounding the former underground storage tank excavation and that the contaminants of primary concern addressed by the NFR letter are benzene, toluene, ethylbenzene and xylene.

00126.001954

I direct your attention to Section 58.10(a) of the Illinois Environmental Protection Act ("Act") (415 ILCS 5/58.10(a)), which provides that issuance of the NFR letter signifies a release from further responsibilities under the Act in performing the approved remedial action, and shall be considered prima facie evidence that the site does not constitute a threat to human health and the environment and does not require further remediation under the Act. Further, Section 58.10(b) of the Act states that the NFR letter shall be limited to, inter alia, an acknowledgment that the requirements of the Remedial Action Plan and Remedial Action Completion Report were satisfied, and a description of the location of the affected property by adequate legal description or by reference to a plat showing its boundaries.

Thus, the Illinois EPA can only issue NFR letters in response to approved plans and completion reports, in this case, the Site Investigation Report and Remedial Action Completion Report (dated April 4, 1999, Log No. 99-701). Those reports more completely define the nature of the remediation performed at the site which led to the issuance of the September 24, 1999 NFR letter. Any specific questions on the content of the NFR letter may be answered by referring to information within those reports. Those reports collectively set forth the extent of remediation, the specific areas of the site upon which remediation was performed, and the contaminants which were the subject of the remediation. In short, the scope of the NFR letter for this site is no more or less than as was defined in those reports.

Please let me know if you have any further questions or comments.

Sincerely,

John J. Kim
Assistant Counsel

0316580016 — Cook
Former Coca-Cola PTO
SRP Tech

CONESTOGA-ROVERS & ASSOCIATES
3615 W. Bryn Mawr Avenue
Chicago, Illinois 60631

TELEPHONE: (773) 380-9933
FACSIMILE: (773) 380-6421

FACSIMILE

RECEIVED SEP 24 1999

DATE:	September 24, 1999	REFERENCE NO.:	13230
TO:	Hernando Albaracian	FACSIMILE NO.:	(217) 524-4193
FROM:	Steven Warner		

Total Pages (Including Cover Page) 2

☒ Facsimile is Receiver's Original

Original Will Follow By:

☐ Mail
☐ Overnight Courier
☐ Hand Delivery

MESSAGE

Attached is a memo from Pat Sharkey of Mayer Brown & Platt with the correct PIN for the former Coca-Cola PTO site in Chicago, Illinois (LPC #0316580016, project code LP80-229). As we discussed, the original NFR letter issued on August 11, 1999 contains the incorrect property ID numbers. We understand that this can be cleared up today through the issuance of a revised NFR letter. Please fax a copy of the revised NFR to Pat Sharkey at (312) 701-7711 and me at (773) 380-6421.

Your assistance with this matter is greatly appreciated.

THIS FAX TRANSMISSION IS INTENDED ONLY FOR THE ADDRESSEE(S) SHOWN ON THIS FORM AND MAY CONTAIN CONFIDENTIAL OR PRIVILEGED INFORMATION FROM CONESTOGA-ROVERS & ASSOCIATES (CRA). ANY DISCLOSURE, COPYING, DISTRIBUTION OR USE OF THE CONTENTS OF THIS FAX, WITHOUT THE CONSENT OF CRA, IS PROHIBITED. IF YOU HAVE RECEIVED THIS TRANSMISSION IN ERROR, PLEASE NOTIFY US IMMEDIATELY BY TELEPHONE (COLLECT).

MED

SCREEN MED

(217)524-4193

13230
Corresp

MEMORANDUM

~~PRIVILEGED AND CONFIDENTIAL~~

September 17, 1999

TO: Steve Wanner

FROM: Patricia F. Sharkey

RE: Tax Index No. for NFR Letter

The PIN for the 4301 W. 36th Street, Chicago, IL property is:

16-34-400-006-0000

I would appreciate it if you would forward this information to the Illinois EPA SRP application reviewer, Jay Gaydosh, so that the error in the PIN can be corrected in the NFR letter (page 2). I called John Kim, the IEPA attorney, and he agreed that asking Jay to send a replacement page is an appropriate way to get this error corrected.

Please note that we need to record this document with the Cook County Recorder of Deeds as soon as possible.

00125.001965

0316580016 -- Cook
Former Coca-Cola PTO
SRP Tech

CONESTOGA-ROVERS & ASSOCIATES
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631

TELEPHONE: (773) 380-9933
FACSIMILE: (773) 380-6421

FACSIMILE

DATE: September 24, 1999
REFERENCE NO.: 13230
TO: Hernando Albaracian
FACSIMILE NO.: (217) 524-4193

FROM: Steven Wanner/04

Total Pages (Including Cover Page) 1

☒ Facsimile is Receiver's Original

Original Will Follow By:
☐ Mail
☐ Overnight Courier
☐ Hand Delivery

MESSAGE

Hernando:

Here are the correct property index numbers for the former Coca-Cola PTO site in Chicago, Illinois (LPC #0316580016, project code LP80-229):

16-34-400-006-0000
16-34-400-018-0000

We understand that this can be cleared up today through the issuance of a revised NFR letter. Please fax a copy of the revised NFR to Pat Sharkey at (312) 701-7711 and me at (773) 380-6421.

Your assistance with this matter is greatly appreciated.

RECEIVED
SEP 24 [illegible]

SCREEN MED

THIS FAX TRANSMISSION IS INTENDED ONLY FOR THE ADDRESSEE(S) SHOWN ON THIS FORM AND MAY CONTAIN CONFIDENTIAL OR PRIVILEGED INFORMATION FROM CONESTOGA-ROVERS & ASSOCIATES (CRA). ANY DISCLOSURE, COPYING, DISTRIBUTION, OR USE OF THE CONTENTS OF THIS FAX, WITHOUT THE CONSENT OF CRA, IS PROHIBITED. IF YOU HAVE RECEIVED THIS TRANSMISSION IN ERROR, PLEASE NOTIFY US IMMEDIATELY BY TELEPHONE (COLLECT).

MRP

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/782-6762

CERTIFIED MAIL
2414155813

SEP 24 1999

The Coca-Cola Company
Attention: Gregory J. Koch
One Coca-Cola Plaza
Atlanta, Georgia 30313

Re: LPC #0316580016 -- Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Mr. Koch:

The Site Investigation Report and the Remedial Action Completion Report ("Report") (dated April 4, 1999, Log No. 99-701), as prepared by Conestoga-Rovers & Associates for the former Coca-Cola PTO property, has been reviewed by the Illinois Environmental Protection Agency ("Illinois EPA"). The Report demonstrates that the remedial action was successfully completed. Note: This NFR letter is being reissued to correct the Parcel Index Number listed on the Environmental Notice.

The remediation site, consisting of 6.7 acres, is legally described in the attached Environmental Notice and is commonly known as 4301 West 36th Street, Chicago, Illinois. Pursuant to Section 58.10 of the Environmental Protection Act ("Act") (415 ILCS 5/58.10), your request for a "No Further Remediation Determination" is granted under the conditions and terms specified in this No Further Remediation Letter ("Letter").

Issuance of this focused Letter signifies a release from further responsibilities under the Act in performing the approved remedial action. The Letter shall be considered prima facie evidence that the remediation site described in the attached Site Remediation Program ("SRP") Environmental Notice and shown in the attached Site Base Map does not constitute a threat to human health and the environment for the specified recognized environmental conditions so long as the site is utilized in accordance with the terms of this Letter.

RELEASABLE
Reviewer MD Date 01-10-00

00126-001368

CONDITIONS AND TERMS OF APPROVAL

LEVEL OF REMEDIATION AND LAND USE LIMITATIONS

1. The recognized environmental conditions, as characterized in the above-referenced Report, are identified in Table A.

2. The remediation objectives for the above-referenced site described in the SRP Environmental Notice of this Letter were established in accordance with the requirements of the Tiered Approach to Corrective Action Objectives (TACO, 35 Illinois Administrative Code Part 742) rules.

3. In accordance with Section 58.8(c) and 58.10(b)(3)of the Act (415 ILCS 5/58.8(c), 415 ILCS 5/58.10(b)(3)), the remediation site described in the attached SRP Environmental Notice and shown on the attached Site Base Map of this Letter is limited to residential or industrial/ commercial uses.

4. The land use specified in this Letter may be revised if:

   a) Further investigation or remedial action has been conducted that documents the attainment of objectives appropriate for the new land use; and

   b) A new Letter is obtained and recorded in accordance with Title XVII of the Act and regulations adopted thereunder.

PREVENTIVE, ENGINEERING, AND INSTITUTIONAL CONTROLS

5. Preventive: None.

   Engineering: None.

   Institutional: Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") effectively prohibits the installation of potable water supply wells (and the use of such wells) and is an acceptable institutional control under the following conditions:

   Each affected property owner and the City of Chicago must receive written notification from the Remediation Applicant desiring to use the ordinance as an institutional control that groundwater remediation objectives have been approved by the Illinois EPA. Written proof of this notification shall be submitted to the Illinois EPA within 45 days from the date of this Letter. The notification shall include:

   a) The name and address of the local unit of government;

b) The citation of the ordinance used as an institutional control in this Letter.

c) A description of the property being sent notice by adequate legal description or by reference to a plat showing the boundaries;

d) A statement that the ordinance restricting the groundwater use has been used by the Illinois EPA in reviewing a request for groundwater remediation objectives;

e) A statement as to the nature of the release and response action with the name, address, and Illinois EPA inventory identification number; and

f) A statement as to where more information may be obtained regarding the ordinance.

The following activities shall be grounds for voidance of the ordinance as an institutional control and this Letter:

a) Modification of the reference ordinance to allow potable uses of groundwater;

b) Approval of a site-specific request, such as a variance, to allow use of groundwater at the site;

c) Violation of the terms of an institutional control recorded.

As a part of its corrective action plan, the remediation site has relied upon Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, prohibiting potable uses of groundwater as defined therein. Proof of notification of affected parties, if any, shall be submitted in accordance with 35 Ill. Adm. Code 742.1015(b) and (c) within 45 days of the issuance of this NFR Letter.

6. Failure to establish, operate and maintain controls in full compliance with the Act, applicable regulations, and the above-referenced Report may result in voidance of this Letter.

OTHER TERMS

7. Any contaminated soil or groundwater that is removed, excavated, or disturbed from the above-referenced site must be handled in accordance with all applicable laws and regulations.

00125.00[illegible]

8. Where the Remediation Applicant is not the sole owner of the remediation site, the Remediation Applicant shall complete the attached "Property Owner Certification of NFR Letter Under the Site Remediation Program" form. This certification by original signature of each property owner, or the authorized agent of the owner(s), of the remediation site or any portion thereof who is not a Remediation Applicant shall be recorded along with this Letter.

9. Further information regarding this remediation site can be obtained through a written request under the Freedom of Information Act (5 ILCS 140) to:

   Illinois Environmental Protection Agency
   Attention: Freedom of Information Act Officer
   Bureau of Land -- #24
   1021 North Grand Avenue East
   Post Office Box 19276
   Springfield, IL 62794-9276

10. Pursuant to Section 58.10(f) of the Act (415 ILCS 5/58.10(f)), should the Illinois EPA seek to void this Letter, the Illinois EPA shall provide notice to the current title holder and to the Remediation Applicant at the last known address. The notice shall specify the cause for the voidance, explain the provisions for appeal, and describe the facts in support of this cause. Specific acts or omissions that may result in the voidance of this Letter under Sections 58.10(e)(1)-(7) of the Act (415 ILCS 5/58.10(e)(1)-(7)) include, but shall not be limited to:

    a) Any violation of institutional controls or the designated land use restrictions;

    b) The failure to operate and maintain preventive or engineering controls or to comply with any applicable groundwater monitoring plan;

    c) The disturbance or removal of contamination that has been left in place in accordance with the above-referenced Report. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected consistent with the above-referenced Report;

    d) The failure to comply with the recording requirements for this Letter;

    e) Obtaining the Letter by fraud or misrepresentation;

    f) Subsequent discovery of contaminants, not identified as part of the investigative or remedial activities upon which the issuance of the Letter was based, that pose a threat to human health or the environment;

    g) The failure to pay the No Further Remediation Assessment Fee within 45 days after receiving a request for payment from the Illinois EPA;

00126.001870

h) The failure to pay in full the applicable fees under the Review and Evaluation Services Agreement within 45 days after receiving a request for payment from the Illinois EPA.

11. Pursuant to Section 58.10(d) of the Act, this Letter shall apply in favor of the following persons:

a) The Coca-Cola Company;

b) The owner and operator of the remediation site;

c) Any parent corporation or subsidiary of the owner of the remediation site;

d) Any co-owner, either by joint-tenancy, right of survivorship, or any other party sharing a relationship with the owner of the remediation site;

e) Any holder of a beneficial interest of a land trust or inter vivos trust, whether revocable or irrevocable, involving the remediation site;

f) Any mortgagee or trustee of a deed of trust of the owner of the remediation site or any assignee, transferee, or any successor-in-interest of the owner of the remediation site;

g) Any successor-in-interest of the owner of the remediation site;

h) Any transferee of the owner of the remediation site whether the transfer was by sale, bankruptcy proceeding, partition, dissolution of marriage, settlement or adjudication of any civil action, charitable gift, or bequest;

i) Any heir or devisee of the owner of the remediation site;

j) Any financial institution, as that term is defined in Section 2 of the Illinois Banking Act and to include the Illinois Housing Development Authority, that has acquired the ownership, operation, management, or control of the remediation site through foreclosure or under the terms of a security interest held by the financial institution, under the terms of an extension of credit made by the financial institution, or any successor in interest thereto; or

k) In the case of a fiduciary (other than a land trustee), the estate, trust estate, or other interest in property held in a fiduciary capacity, and a trustee, executor, administrator, guardian, receiver, conservator, or other person who holds the remediated site in a fiduciary capacity, or a transferee of such party.

12. This Letter, including all attachments, must be recorded as a single instrument with the Office of the Recorder or Registrar of Titles of Cook County. For recording purposes, the SRP Environmental Notice attached to this Letter should be the first page of the instrument filed. In addition, the City of Chicago's Memorandum of Understanding must be filed as an

00136.001871

attachment of this Letter with the Office of the Recorder or Registrar of Titles of Cook County. This Letter shall not be effective until officially recorded by the Office of the Recorder or Registrar of Titles of Cook County in accordance with Illinois law so that it forms a permanent part of the chain of title for the Former Coca-Cola PTO property. Within 30 days of this Letter being recorded by the Office of the Recorder or Registrar of Titles of Cook County, a certified copy of this Letter and all attachments, as recorded, shall be obtained and submitted to the Illinois EPA as indicated below.

Mr. Robert O'Hara
Illinois Environmental Protection Agency
Bureau of Land/RPM Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

13. In accordance with Section 58.10(g) of the Act, a No Further Remediation Assessment Fee based on the costs incurred for the remediation site by the Illinois EPA for review and evaluation services will be applied in addition to the fees applicable under the Review and Evaluation Services Agreement. Request for payment of the No Further Remediation Assessment Fee will be included with the final billing statement.

If you have any questions regarding this correspondence, you may contact the Illinois EPA project manager, Jay F. Gaydosh, at 217/785-0231.

Sincerely,

Hernando A. Albarracin

Hernando A. Albarracin
Unit Manager
Leaking Underground Storage Tank Section
Division of Remediation Management
Bureau of Land

bcc: Hernando Albarracin
Division
Jay Gaydosh
Ginger Miller
Bob O'Hara

HAA:JFG:ct\991433.WPD

Enclosures: SRP Environmental Notice
Table A
Site Base Map
Property Owner Certification Form
Chicago Memorandum of Understanding

cc: Conestoga-Rovers & Associates

00126.001872

00126.001873

PREPARED BY:

Name: Former Coca-Cola PTO

Address: 4301 West 36th Street
Chicago, Illinois 60632

RETURN TO:

Name: The Coca-Cola Company
Attn: Gregory J. Koch

Address: One Coca-Cola Plaza
Atlanta, GA 30313

THE ABOVE SPACE FOR RECORDER'S OFFICE

THIS ENVIRONMENTAL NO FURTHER REMEDIATION LETTER MUST BE SUBMITTED BY THE REMEDIATION APPLICANT, WITHIN 45 DAYS OF ITS RECEIPT, TO THE OFFICE OF THE RECORDER OR REGISTRAR OF TITLES OF COOK COUNTY.

Illinois State EPA Number: 0316580016
The Coca-Cola Company, the Remediation Applicant, whose address is One Coca-Cola Plaza, Atlanta, GA, has performed investigative and/or remedial activities for the remediation site depicted on the attached Site Base Map and which remediation site can be identified by the following:

1. Legal description or Reference to a Plat Showing the Boundaries:

A parcel of land consisting of a part of Lots 1, 7, and 8, in County Clerks Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principle Meridian; said parcel of land being bounded and described as follows:

Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is 861.97 feet south from the North line of said Southeast quarter, and running thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet; thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 859.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago; thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southwest quarter of Section 34, and thence north along said parallel line, a distance of 719.01 feet to the point of beginning; containing 276,231 square feet of land, more or less.

00126.001874

2. Common Address: 4301 West 36th Street, Chicago, Illinois
3. Real Estate Tax Index/Parcel Index Numbers: 16-34-400-006-0000, 16-34-400-018-000
4. Remediation Site Owner: The Coca-Cola Company
5. Land Use Limitation: Residential or Industrial/Commercial
6. Site Investigation: Focused

See attached No Further Remediation Letter for other terms.

JG:ct\991433.WPD

00126.001875

Table A: Contaminants of Concern

Volatiles

CAS No.	Compound Name
71-43-2	Benzene
75-25-2	Bromoform
56-23-5	Carbon tetrachloride
108-90-7	Chlorobenzene
67-66-3	Chloroform
107-06-2	1,2-Dichloroethane
75-35-4	1,1-Dichloroethene
156-60-5	trans-1,2-Dichloroethene
78-87-5	1,2-Dichloropropane
542-75-6	1,3-Dichloropropene
10-41-4	Ethylbenzene
127-18-4	Tetrachloroethene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethene
75-01-4	Vinyl chloride
1330-210-7	Xylenes (total)

Polynuclear Aromatics

CAS No.	Compound Name
83-32-9	Acenaphthene
120-12-7	Anthracene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene
206-44-0	Fluoranthene
86-73-7	Fluorene
193-39-5	Indeno(1,2,3-c,d)pyrene
91-20-3	Naphthalene
129-00-0	Pyrene
208-96-8	Acenaphthalene
191-24-2	Benzo(g,h,i)perylene
85-01-8	Phenanthrene

JG:ct\991433.FRM

PROPERTY OWNER CERTIFICATION OF NFR LETTER UNDER THE SITE REMEDIATION PROGRAM

If the Remediation Applicant is not the sole owner of the remediation site, include the full legal name, title, the company, the street address, the city, the state, the ZIP Code, and the telephone number of all other property owners. Include the site name, street address, city, ZIP code, county, Illinois Inventory I.D. number and real estate tax index/parcel index number. The property owner(s), or the duly authorized agent of the owner(s) must certify, by original signature, the statement appearing below.

A duly authorized agent means a person who is authorized by written consent or by law to act on behalf of a property owner including, but not limited to:

1. For corporations, a principal executive officer of at least the level of vice-president;
2. For a sole proprietorship or partnership, the proprietor or a general partner, respectively; and
3. For a municipality, state or other public Agency, the head of the Agency or ranking elected official.

For multiple property owners, attach additional sheets containing the information described above, along with a signed, dated certification for each. All property owner certifications must be recorded along with the attached No Further Remediation Letter.

Property Owner Information

Owner's Name: _____

Title: _____

Company: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____ Phone: _____

Site Information

Site Name: _____

Site Address: _____

City: _____ State: _____ Zip Code: _____ County: _____

Illinois Inventory ID Number: _____

Real Estate Tax Index/Parcel Index No. _____

I hereby certify that I have reviewed the attached No Further Remediation Letter, and that I accept the terms and conditions and any land use limitations set forth in the Letter.

Owner's Signature: _____ Date: _____

SUBSCRIBED AND SWORN TO BEFORE ME
this _____ day of _____, 19__

_____
Notary Public

The Illinois EPA is authorized to require this information under Sections 415 ILCS 5/58 - 58.12 of the Environmental Protection Act and regulations promulgated thereunder. If the Remediation Applicant is not also the sole owner of the remediation site, this form must be completed by all owners of the remediation site and recorded with the NFR Letter. Failure to do so may void the NFR Letter. This form has been approved by the Forms Management Center. All information submitted to the Site Remediation Program is available to the public except when specifically designated by the Remediation Applicant to be treated confidentially as a trade secret or secret process in accordance with the Illinois Compiled Statutes, Section 7(a) of the Environmental Protection Act, applicable Rules and Regulations of the Illinois Pollution Control Board and applicable Illinois EPA rules and guidelines.

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276
THOMAS V. SKINNER, DIRECTOR

RECORDING REQUIREMENTS FOR NO FURTHER REMEDIATION LETTERS

Introduction

The Illinois EPA's Bureau of Land (BOL) issues a No Further Remediation (NFR) Letter at the completion of site remediation activities under the LUST Program and the SRP. The letter signifies that 1) the person conducting remediation has satisfied the respective BOL laws and regulations, and 2) that no further remediation is necessary to protect human health and the environment for the property described in the letter, so long as the site is used in accordance with the terms of the NFR letter.

Significance

When properly recorded, the NFR Letter holds legal significance for all applicable parties outlined in the Illinois Environmental Protection Act for the program in question. (See 415 ILCS 5/57.10(d) and 58.10(d)). However, if not properly recorded, the NFR Letter *holds no legal significance for anyone*. Furthermore, if not properly recorded, the Illinois EPA *will* take steps to void the NFR letter in accordance with the regulations pertaining to the program under which the remediation was performed.

Duty to Record

The duty to record the NFR Letter is *mandatory*. You *must* submit the letter to the Office of the Recorder or the Registrar of Titles of the county where the site is located *within 45 days after receipt of the letter*. You must record both the NFR Letter and the Environmental Notice. The letter must be recorded in accordance with Illinois law so that it forms a permanent part of the chain of title to ensure current and future users of the property will be informed of the conditions of the institutional controls. A certified copy of the letter as recorded must be sent to the Illinois EPA. Failure to record the NFR Letter in accordance with the regulations will make the letter voidable.

For More Information

Please refer to Tiered Approach to Corrective Action Objectives (TACO) Fact Sheet 3 available from the Illinois EPA by calling 1-888-299-9533 or contact the project manager whom you have been working with in the BOL.

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Z 416 155 813

24

HA/KG

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail (See reverse)

The Coca-Cola Company
Attn: Gregory J. Koch
One Coca-Cola Plaza
Atlanta, Georgia 30313

Postage	$
Certified Fee	1.40
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	1.25
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	
Postmark or Date	

SPRINGFIELD IL 62703 USPS SEP 24 1995

PS Form 3800, April 1995

Stick postage stamps to article to cover First-Class postage, certified mail fee, and charges for any selected optional services *(See front)*

1. If you want this receipt postmarked, stick the gummed stub to the right of the return address, leaving the receipt attached, and present the article at a post office service window or hand it to your rural carrier *(no extra charge)*.

2. If you do not want this receipt postmarked, stick the gummed stub to the right of the return address of the article, date, detach, and retain the receipt, and mail the article.

3. If you want a return receipt, write the certified mail number and your name and address on a Return Receipt Card, Form 3811, and attach it to the front of the article by means of the gummed ends if space permits. Otherwise, affix to back of article. Endorse front of article **RETURN RECEIPT REQUESTED** adjacent to the number.

4. If you want delivery restricted to the addressee, or to an authorized agent of the addressee, endorse **RESTRICTED DELIVERY** on the front of the article.

5. Enter fees for the services requested in the appropriate spaces on the front of this receipt. If return receipt is requested, check the applicable blocks in item 1 of Form 3811.

6. Save this receipt and present it if you make an inquiry.

PS Form **3800**, April 1995 *(Reverse)*

0316580016
Coca-Cola USA
SR/tech

99-1983

MAYER, BROWN & PLATT

190 SOUTH LA SALLE STREET

CHICAGO, ILLINOIS 60603-3441

PATRICIA F. SHARKEY
DIRECT DIAL (312) 701-7952
DIRECT FAX (312) 706-9113
psharkey@mayerbrown.com

MAIN TELEPHONE
312-782-0600
MAIN FAX
312-701-7711

September 29, 1999

VIA CERTIFIED U.S. MAIL
Mr. Robert O'Hara
Illinois Environmental Protection Agency
Bureau of Land/RPM Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

RECEIVED
OCT 01 1999
IEPA/BOL

Re: NOTIFICATION OF RECORDING OF NO FURTHER REMEDIATION LETTER BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY FOR THE FORMER COCA-COLA PTO
LPC# 0316580016 - COOK COUNTY
4301 WEST 36TH STREET
PROJECT CODE LP80-229

Dear Mr. O'Hara:

Pursuant to 35 Ill. Admin. Code 740.620(b) and the terms of the No Further Remediation Letter ("NFR Letter") issued by the Illinois Environmental Protection Agency for the above-referenced site on September 24, 1999, I enclose copies of the recorded NFR Letter and Addendum thereto, which were recorded and numbered by the Cook County Recorder of Deeds on September 27 and 28, 1999, respectively.

On Behalf of
THE COCA-COLA COMPANY

Patricia F. Sharkey
One of Its Attorneys

PFS/meb
Enclosures

COPY

99912132

00126.001880

PREPARED BY:

Name: Former Coca-Cola PTO

Address: 4301 West 36th Street
Chicago, Illinois 60632

RETURN TO:

Name: The Coca-Cola Company
Attn: Gregory J. Koch

Address: One Coca-Cola Plaza
Atlanta, GA 30313

RECEIVED
OCT 0 1 1999
IEPA/BOL

THE ABOVE SPACE FOR RECORDER'S OFFICE

THIS ENVIRONMENTAL NO FURTHER REMEDIATION LETTER MUST BE SUBMITTED BY THE REMEDIATION APPLICANT, WITHIN 45 DAYS OF ITS RECEIPT, TO THE OFFICE OF THE RECORDER OR REGISTRAR OF TITLES OF COOK COUNTY.

Illinois State EPA Number: 0316580016
The Coca-Cola Company, the Remediation Applicant, whose address is One Coca-Cola Plaza, Atlanta, GA, has performed investigative and/or remedial activities for the remediation site depicted on the attached Site Base Map and which remediation site can be identified by the following:

1. Legal description or Reference to a Plat Showing the Boundaries:

A parcel of land consisting of a part of Lots 1, 7, and 8, in County Clerks Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principle Meridian; said parcel of land being bounded and described as follows:

Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is 861.97 feet south from the North line of said Southeast quarter, and running thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet; thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 859.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago; thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southwest quarter of Section 34, and thence north along said parallel line, a distance of 719.01 feet to the point of beginning; containing 276,231 square feet of land, more or less.

2. Common Address: 4301 West 36th Street, Chicago, Illinois
3. Real Estate Tax Index/Parcel Index Numbers: 16-34-400-006-0000, 16-34-400-018-000
4. Remediation Site Owner: The Coca-Cola Company
5. Land Use Limitation: Residential or Industrial/Commercial
6. Site Investigation: Focused

See attached No Further Remediation Letter for other terms.

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Table A: Contaminants of Concern

Volatiles

CAS No.	Compound Name
71-43-2	Benzene
75-25-2	Bromoform
56-23-5	Carbon tetrachloride
108-90-7	Chlorobenzene
67-66-3	Chloroform
107-06-2	1,2-Dichloroethane
75-35-4	1,1-Dichloroethene
156-60-5	trans-1,2-Dichloroethene
78-87-5	1,2-Dichloropropane
542-75-6	1,3-Dichloropropene
10-41-4	Ethylbenzene
127-18-4	Tetrachloroethene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethene
75-01-4	Vinyl chloride
1330-210-7	Xylenes (total)

Polynuclear Aromatics

CAS No.	Compound Name
83-32-9	Acenaphthene
120-12-7	Anthracene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene
206-44-0	Fluoranthene
86-73-7	Fluorene
193-39-5	Indeno(1,2,3-c,d)pyrene
91-20-3	Naphthalene
129-00-0	Pyrene
208-96-8	Acenaphthalene
191-24-2	Benzo(g,h,i)perylene
85-01-8	Phenanthrene

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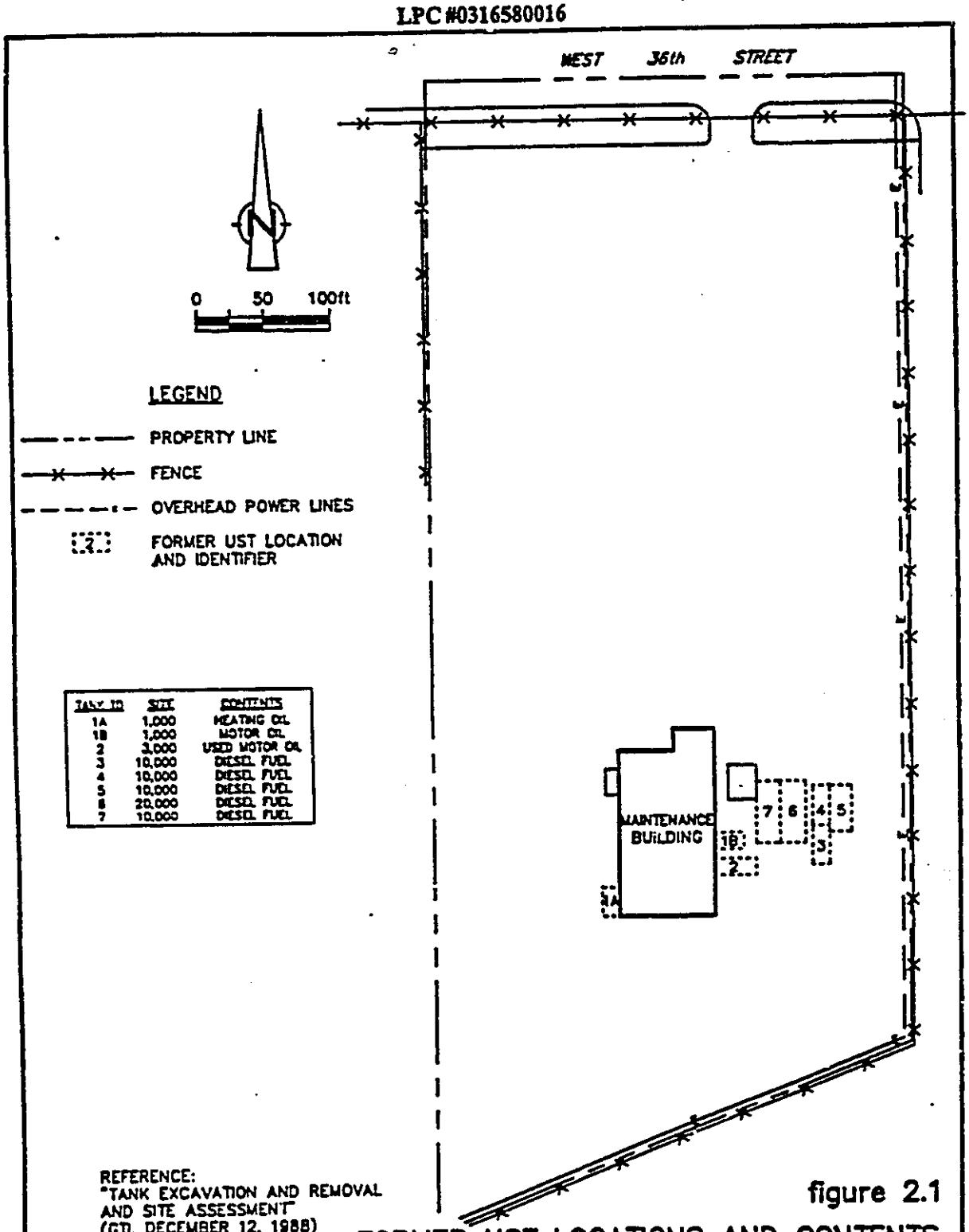
LPC #0316580016



TANK ID	SIZE	CONTENTS
1A	1,000	HEATING OIL
1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

REFERENCE:
"TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1988)

figure 2.1

FORMER UST LOCATIONS AND CONTENTS
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0002 APR 07/99

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/782-6762

CERTIFIED MAIL
2411155813

SEP 24 1999

The Coca-Cola Company
Attention: Gregory J. Koch
One Coca-Cola Plaza
Atlanta, Georgia 30313

Re: LPC #0316580016 – Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Mr. Koch:

The Site Investigation Report and the Remedial Action Completion Report ("Report") (dated April 4, 1999, Log No. 99-701), as prepared by Conestoga-Rovers & Associates for the former Coca-Cola PTO property, has been reviewed by the Illinois Environmental Protection Agency ("Illinois EPA"). The Report demonstrates that the remedial action was successfully completed. Note: This NFR letter is being reissued to correct the Parcel Index Number listed on the Environmental Notice.

The remediation site, consisting of 6.7 acres, is legally described in the attached Environmental Notice and is commonly known as 4301 West 36th Street, Chicago, Illinois. Pursuant to Section 58.10 of the Environmental Protection Act ("Act") (415 ILCS 5/58.10), your request for a "No Further Remediation Determination" is granted under the conditions and terms specified in this No Further Remediation Letter ("Letter").

Issuance of this focused Letter signifies a release from further responsibilities under the Act in performing the approved remedial action. The Letter shall be considered prima facie evidence that the remediation site described in the attached Site Remediation Program ("SRP") Environmental Notice and shown in the attached Site Base Map does not constitute a threat to human health and the environment for the specified recognized environmental conditions so long as the site is utilized in accordance with the terms of this Letter.

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CONDITIONS AND TERMS OF APPROVAL

LEVEL OF REMEDIATION AND LAND USE LIMITATIONS

1. The recognized environmental conditions, as characterized in the above-referenced Report, are identified in Table A.

2. The remediation objectives for the above-referenced site described in the SRP Environmental Notice of this Letter were established in accordance with the requirements of the Tiered Approach to Corrective Action Objectives (TACO, 35 Illinois Administrative Code Part 742) rules.

3. In accordance with Section 58.8(c) and 58.10(b)(3)of the Act (415 ILCS 5/58.8(c), 415 ILCS 5/58.10(b)(3)), the remediation site described in the attached SRP Environmental Notice and shown on the attached Site Base Map of this Letter is limited to residential or industrial/ commercial uses.

4. The land use specified in this Letter may be revised if:

   a) Further investigation or remedial action has been conducted that documents the attainment of objectives appropriate for the new land use; and

   b) A new Letter is obtained and recorded in accordance with Title XVII of the Act and regulations adopted thereunder.

PREVENTIVE, ENGINEERING, AND INSTITUTIONAL CONTROLS

5. Preventive: None.

   Engineering: None.

   Institutional: Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") effectively prohibits the installation of potable water supply wells (and the use of such wells) and is an acceptable institutional control under the following conditions:

   Each affected property owner and the City of Chicago must receive written notification from the Remediation Applicant desiring to use the ordinance as an institutional control that groundwater remediation objectives have been approved by the Illinois EPA. Written proof of this notification shall be submitted to the Illinois EPA within 45 days from the date of this Letter. The notification shall include:

   a) The name and address of the local unit of government;

b) The citation of the ordinance used as an institutional control in this Letter.

c) A description of the property being sent notice by adequate legal description or by reference to a plat showing the boundaries;

d) A statement that the ordinance restricting the groundwater use has been used by the Illinois EPA in reviewing a request for groundwater remediation objectives;

e) A statement as to the nature of the release and response action with the name, address, and Illinois EPA inventory identification number; and

f) A statement as to where more information may be obtained regarding the ordinance.

The following activities shall be grounds for voidance of the ordinance as an institutional control and this Letter:

a) Modification of the reference ordinance to allow potable uses of groundwater;

b) Approval of a site-specific request, such as a variance, to allow use of groundwater at the site;

c) Violation of the terms of an institutional control recorded.

As a part of its corrective action plan, the remediation site has relied upon Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, prohibiting potable uses of groundwater as defined therein. Proof of notification of affected parties, if any, shall be submitted in accordance with 35 Ill. Adm. Code 742.1015(b) and (c) within 45 days of the issuance of this NFR Letter.

6. Failure to establish, operate and maintain controls in full compliance with the Act, applicable regulations, and the above-referenced Report may result in voidance of this Letter.

OTHER TERMS

7. Any contaminated soil or groundwater that is removed, excavated, or disturbed from the above-referenced site must be handled in accordance with all applicable laws and regulations.

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8. Where the Remediation Applicant is not the sole owner of the remediation site, the Remediation Applicant shall complete the attached "Property Owner Certification of NFR Letter Under the Site Remediation Program" form. This certification by original signature of each property owner, or the authorized agent of the owner(s), of the remediation site or any portion thereof who is not a Remediation Applicant shall be recorded along with this Letter.

9. Further information regarding this remediation site can be obtained through a written request under the Freedom of Information Act (5 ILCS 140) to:

   Illinois Environmental Protection Agency
   Attention: Freedom of Information Act Officer
   Bureau of Land – #24
   1021 North Grand Avenue East
   Post Office Box 19276
   Springfield, IL 62794-9276

10. Pursuant to Section 58.10(f) of the Act (415 ILCS 5/58.10(f)), should the Illinois EPA seek to void this Letter, the Illinois EPA shall provide notice to the current title holder and to the Remediation Applicant at the last known address. The notice shall specify the cause for the voidance, explain the provisions for appeal, and describe the facts in support of this cause. Specific acts or omissions that may result in the voidance of this Letter under Sections 58.10(e)(1)-(7) of the Act (415 ILCS 5/58.10(e)(1)-(7)) include, but shall not be limited to:

    a) Any violation of institutional controls or the designated land use restrictions;

    b) The failure to operate and maintain preventive or engineering controls or to comply with any applicable groundwater monitoring plan;

    c) The disturbance or removal of contamination that has been left in place in accordance with the above-referenced Report. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected consistent with the above-referenced Report;

    d) The failure to comply with the recording requirements for this Letter;

    e) Obtaining the Letter by fraud or misrepresentation;

    f) Subsequent discovery of contaminants, not identified as part of the investigative or remedial activities upon which the issuance of the Letter was based, that pose a threat to human health or the environment;

    g) The failure to pay the No Further Remediation Assessment Fee within 45 days after receiving a request for payment from the Illinois EPA;

h) The failure to pay in full the applicable fees under the Review and Evaluation Services Agreement within 45 days after receiving a request for payment from the Illinois EPA.

11. Pursuant to Section 58.10(d) of the Act, this Letter shall apply in favor of the following persons:

a) The Coca-Cola Company;

b) The owner and operator of the remediation site;

c) Any parent corporation or subsidiary of the owner of the remediation site;

d) Any co-owner, either by joint-tenancy, right of survivorship, or any other party sharing a relationship with the owner of the remediation site;

e) Any holder of a beneficial interest of a land trust or inter vivos trust, whether revocable or irrevocable, involving the remediation site;

f) Any mortgagee or trustee of a deed of trust of the owner of the remediation site or any assignee, transferee, or any successor-in-interest of the owner of the remediation site;

g) Any successor-in-interest of the owner of the remediation site;

h) Any transferee of the owner of the remediation site whether the transfer was by sale, bankruptcy proceeding, partition, dissolution of marriage, settlement or adjudication of any civil action, charitable gift, or bequest;

i) Any heir or devisee of the owner of the remediation site;

j) Any financial institution, as that term is defined in Section 2 of the Illinois Banking Act and to include the Illinois Housing Development Authority, that has acquired the ownership, operation, management, or control of the remediation site through foreclosure or under the terms of a security interest held by the financial institution, under the terms of an extension of credit made by the financial institution, or any successor in interest thereto; or

k) In the case of a fiduciary (other than a land trustee), the estate, trust estate, or other interest in property held in a fiduciary capacity, and a trustee, executor, administrator, guardian, receiver, conservator, or other person who holds the remediated site in a fiduciary capacity, or a transferee of such party.

12. This Letter, including all attachments, must be recorded as a single instrument with the Office of the Recorder or Registrar of Titles of Cook County. For recording purposes, the SRP Environmental Notice attached to this Letter should be the first page of the instrument filed. In addition, the City of Chicago's Memorandum of Understanding must be filed as an

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00126.001889

attachment of this Letter with the Office of the Recorder or Registrar of Titles of Cook County. This Letter shall not be effective until officially recorded by the Office of the Recorder or Registrar of Titles of Cook County in accordance with Illinois law so that it forms a permanent part of the chain of title for the Former Coca-Cola PTO property. Within 30 days of this Letter being recorded by the Office of the Recorder or Registrar of Titles of Cook County, a certified copy of this Letter and all attachments, as recorded, shall be obtained and submitted to the Illinois EPA as indicated below.

Mr. Robert O'Hara
Illinois Environmental Protection Agency
Bureau of Land/RPM Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

13. In accordance with Section 58.10(g) of the Act, a No Further Remediation Assessment Fee based on the costs incurred for the remediation site by the Illinois EPA for review and evaluation services will be applied in addition to the fees applicable under the Review and Evaluation Services Agreement. Request for payment of the No Further Remediation Assessment Fee will be included with the final billing statement.

If you have any questions regarding this correspondence, you may contact the Illinois EPA project manager, Jay F. Gaydosh, at 217/785-0231.

Sincerely,

Hernando A. Albarracin

Hernando A. Albarracin
Unit Manager
Leaking Underground Storage Tank Section
Division of Remediation Management
Bureau of Land

HAA:JFG:ct\991433.WPD

Enclosures: SRP Environmental Notice
Table A
Site Base Map
Property Owner Certification Form
Chicago Memorandum of Understanding

cc: Conestoga-Rovers & Associates

ity of Chicago
chard M. Daley, Mayor

partment of Law
an S. Sher
rporation Counsel

te 900
North LaSalle Street
cago, Illinois 60602
2) 744-9010
2) 744-6798 (FAX)

July 2, 1997

BY EXPRESS MAIL

RECEIVED
JUL 03 1997
I.E.P.A. / B.O.L.

Mr. Gary P. King
Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
1001 N. Grand Avenue, East
Springfield, IL 62702

Re: Memorandum of Understanding Between City of Chicago and IEPA

Dear Mr. King:

Enclosed please find two executed copies of the Memorandum of Understanding ("MOU") between the City of Chicago and the Illinois Environmental Protection Agency, pursuant to 35 Ill. Adm. Code 742.1015. As I discussed earlier with Mark Wight, the version of the MOU that is enclosed varies from the one you and he approved only in that there are two exhibits rather than three, since the new groundwater ordinance also includes a provision authorizing the City of Chicago's Commissioner of Environment to enter into this MOU, thus simultaneously satisfying the requirements of 35 Ill. Adm. Code 742.1015(i)(3) and 742.1015(i)(1), relating to required MOU attachments. As to the remaining attachment (identification of the legal boundaries within which the Potable Water Supply Well Ordinance is applicable), Mr. Wight said that a letter from a City official stating that the ordinance applied throughout the City would satisfy the requirements of 35 Ill. Adm. Code 742.1015(i)(2). A letter to that effect is attached as Exhibit B.

Please execute both documents and return the one marked "City Copy" to me for our files. If you have any questions, do not hesitate to contact me at 312-744-6904.

Sincerely,

Mort P. Ames

Mort P. Ames
Assistant Corporation Counsel

Encl.

cc w/o encl.: Henry L. Henderson
Jessica Rio
Jill Wineman

SCREENED
MM

WORKS

MEMORANDUM OF UNDERSTANDING BETWEEN THE CITY OF CHICAGO, ILLINOIS AND THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY REGARDING (A) THE USE OF A LOCAL POTABLE WATER SUPPLY WELL ORDINANCE AS AN ENVIRONMENTAL INSTITUTIONAL CONTROL AND (B) THE PROVISION OF INFORMATION RELATING TO "NO FURTHER REMEDIATION" DETERMINATIONS BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY TO THE CITY OF CHICAGO

I. PURPOSE AND INTENT

A. This Memorandum of Understanding ("MOU") is entered into between the City of Chicago, Illinois ("the City") and the Illinois Environmental Protection Agency ("Illinois EPA") for the purpose of (a) satisfying the requirements of 35 Ill. Adm. Code 742.1015 for the use of potable water supply well ordinances as environmental institutional controls and (b) ensuring that the City will be provided with copies of all "No Further Remediation" letters or determinations issued by the Illinois EPA pursuant to specific programs for sites located within the boundaries of Chicago, Illinois, in order to enable the City to maintain a complete and up-to-date registry of sites as required by 35 Ill. Adm. Code 742.1015(i)(5). The Illinois EPA has reviewed Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance"), attached as Attachment A, and has determined that the Municipal Code of Chicago prohibits the installation and use of new potable water supply wells by private entities but will allow the installation of potable water supply wells by the City and other units of local government pursuant to intergovernmental agreements with the City. In such cases, 35 Ill. Adm. Code 742.1015(a) provides that the City may enter into an MOU with the Illinois EPA to allow the use of the ordinance as an institutional control.

B. The intent of this Memorandum of Understanding is to (a) specify the responsibilities that must be assumed by the City to satisfy the requirements for MOUs as set forth at 35 Ill. Adm. Code 742.1015(i), and (b) require the Illinois EPA to provide the City with copies of all "No Further Remediation" letters or determinations that the Illinois EPA issues for sites located within the City of Chicago to enable the City to maintain a registry of sites pursuant to 35 Ill. Adm. Code 742.1015(i)(5).

II. DECLARATIONS AND ASSUMPTION OF RESPONSIBILITY

A. In order to ensure the long-term integrity of the Potable Water Supply Well Ordinance as an environmental institutional control and that risk to human health and the environment from contamination left in place in reliance on the Potable Water Supply Well Ordinance is effectively managed, the City hereby assumes the following responsibilities pursuant to 35 Ill. Adm. Code 742.1015(i):

1. The City will notify the Illinois EPA Bureau of Land of any changes to or requests for variance from the Potable Water Supply Well Ordinance at least 30 days prior to the date the local government is scheduled to take action on the proposed change or request (35 Ill. Adm. Code 742.1015(i)(4));

2. The City will maintain a registry of all sites within its corporate limits that have received "No Further Remediation" determinations from the Illinois EPA pursuant to specific programs (35 Ill. Adm. Code 742.1015(i)(5));

3. If the City determines to install a new potable water supply well(s), the City will review the registry of sites established under paragraph II.A.2. prior to siting such potable water supply well(s) within the area covered by the Potable Water Supply Well Ordinance, pursuant to 35 Ill. Adm. Code 742.1015(i)(6)(A);

4. If the City determines to install a new potable water supply well(s), the City will determine whether the potential source of potable water has been or may be affected by contamination left in place at the sites tracked and reviewed under paragraphs II.A.2. and 3. (35 Ill. Adm. Code 742.1015(i)(6)(B)); and

5. If the City determines to install a new potable water supply well(s), the City will take action as necessary to ensure that the potential source of potable water is protected from contamination or treated before it is used as a potable water supply (35 Ill. Adm. Code 742.1015(i)(6)(C));

6. If the City enters into intergovernmental agreements under Section 11-8-390 of the Municipal Code of Chicago to allow other units of local government to install new potable water supply well(s) within the corporate limits of the City, the City will require compliance with the procedures set forth in paragraphs II.A.3., 4., and 5. as a part of such agreements.

7. Notification under paragraph II.A.1. above, or other communications concerning this MOU directed to the Illinois EPA, shall be addressed to:

Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62794-9276

B. In order to ensure the long-term integrity of the Potable Water Supply Well Ordinance as an environmental institutional control and that risk to human health and the environment from contamination left in place in reliance on the Potable Water Supply Well Ordinance or other specific programs can be effectively managed, the Illinois EPA hereby assumes

the following responsibilities:

1. The Illinois EPA will provide the City with copies of all "No Further Remediation" letters or determinations that it issues pursuant to 35 Ill. Adm. Code 742, and other specific programs, for sites located within the boundaries of the City at the time said letters or determinations are provided to remediation applicants.

2. Copies of "No Further Remediation" letters or determinations provided to the City pursuant to paragraph II.B.1. above, or other communications concerning this MOU directed to the City, shall be addressed to:

Commissioner
Chicago Department of Environment
25th Floor
30 North LaSalle Street
Chicago, IL 60602-2575

III. SUPPORTING DOCUMENTATION

The following documentation is required by 35 Ill. Adm. Code 742.1015(i) and is attached to this MOU:

A. Attachment A: A copy of the Potable Water Supply Well Ordinance certified by the city clerk or other official as the current, controlling law (35 Ill. Adm. Code 742.1015(i)(3)) and a statement of the authority of the City to enter into the MOU (35 Ill. Adm. Code 742.1015(i)(1)).;

B. Attachment B: Identification of the legal boundaries within which the Potable Water Supply Well Ordinance is applicable (35 Ill. Adm. Code 742.1015(i)(2)); and

IN WITNESS WHEREOF, the lawful representatives of the parties have caused this MOU to be signed as follows:

FOR: The City of Chicago, Illinois

BY: _____ DATE: July 1, 1997
Commissioner
Department of Environment
City of Chicago

FOR: Illinois Environmental Protection Agency

BY: Gary P. King DATE: July 3, 1997
(Name and title of signatory)
Mgr, Division of Remediation Management
Bureau of Land

Version 6/27/97

FORM C.C. 434 3M 4-86

Be It Ordained by the City Council of the City of Chicago:

SECTION 1. Chapter 11-8 of the Municipal Code of Chicago is hereby amended by adding a new Section 11-8-385 and by amending Section 11-8-390 by inserting the language in italics, as follows:

11-8-385 Potable Water Defined.

Potable water is any water used for human consumption, including, but not limited to water used for drinking, bathing, washing dishes, preparing foods and watering gardens in which produce intended for human consumption is grown.

11-8-390 Prohibited Use Of Secondary Water; *Prohibited Installation Of New Potable Water Supply Wells.*

No secondary water shall overflow into or be discharged into any surge tank, storage tank, or reservoir, or shall in any way be piped or conveyed into the water supply system of any building, structure, or premises to become a part of or be mixed with the fresh water supply from the mains of the Chicago Waterworks System either inside of the premises or in the water service pipe. Secondary water shall not be piped to or used in any plumbing fixture, or for cooling crushers, rollers, or mixers where foods, candies, liquids or materials are manufactured for human or animal consumption. No connection, tap, or opening shall be made in a water distribution system other than an approved water distribution system which will permit such water being used for drinking.

Wherever the fire-protective equipment in any building, structure or premises has service from the Chicago Waterworks System, no pipe or other conduit which conveys secondary water shall be cross-connected to the fire-protective equipment. All fire-protective equipment connected to the Chicago Waterworks System shall be constructed in such manner that

EXHIBIT
A

all tanks, pipes, pumps, surge tanks, and fire hydrants can be thoroughly drained, flushed and cleaned by the owners of such equipment and premises and there shall be no direct connections from the tanks, pipes and other equipment to any drainage pipes or sewers. *No groundwater well, cistern or other groundwater collection device installed after the effective date of this amendatory ordinance may be used to supply any potable water supply system, except at points of withdrawal by the City of Chicago or by units of local government pursuant to intergovernmental agreement with the City of Chicago.*

SECTION 2. Section 2-30-030 of the Municipal Code of Chicago is hereby amended by deleting the language in brackets and inserting the language in italics, as follows:

2-30-030 Commissioner -- Powers And Duties Designated.

The commissioner of the environment shall have the following powers and duties:

* * * * *

(21) To enter into grant agreements, cooperation agreements and other agreements or contracts with governmental entities, private business and civic and community groups necessary to implement the Green Streets Program and other urban forestry, beautification and environmental enhancement programs; *and agreements to implement the State of Illinois Site Remediation Program;*

SECTION 3. This ordinance shall be in full force and effect from and after its passage and approval.

STATE OF ILLINOIS,
County of Cook } ss.

I, JAMES J. LASKI City Clerk of the City of Chicago in the County of Cook and State of Illinois, DO HEREBY CERTIFY that the annexed and foregoing is a true and correct copy of that certain ordinance now on file in my office an ordinance amending Title 11, Chapter 8 and Title 2, Chapter 30 of the Municipal Code of Chicago by establishment of definition of potable water, regulation of potable water supply system and empowerment of commissioner of environment for implementation of State of Illinois Site Remediation Program

I DO FURTHER CERTIFY that the said ordinance was passed by the City Council of the said City of Chicago on the fourteenth (14th) day of May A. D. 1997 and deposited in my office on the fourteenth (14th) day of May A. D. 1997

I DO FURTHER CERTIFY that the vote on the question of the passage of the said ordinance by the said City Council was taken by yeas and nays and recorded in the Journal of the Proceedings of the said City Council, and that the result of said vote so taken was as follows, to wit:

Yeas 47 Nays None

I DO FURTHER CERTIFY that the said ordinance was delivered to the Mayor of the said City of Chicago after the passage thereof by the said City Council, without delay, by the City Clerk of the said City of Chicago, and that the said Mayor failed to return the said ordinance to the said City Council with his written objections thereto at the next regular meeting of the said City Council occurring not less than five days after the passage of the said ordinance.

I DO FURTHER CERTIFY that the original, of which the foregoing is a true copy, is entrusted to my care for safe keeping, and that I am the lawful keeper of the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of the City of Chicago aforesaid, at the said City, in the County and State aforesaid, this twenty-seventh (27th) day of June A. D. 1997

[L. S.]

James J. Laski

JAMES J. LASKI, City Clerk

City of Chicago
Richard M. Daley, Mayor

Department of Environment

Henry L. Henderson
Commissioner

Twenty-fifth Floor
30 North LaSalle Street
Chicago, Illinois 60602-2575
(312) 744-7606 (Voice)
(312) 744-6451 (FAX)
(312) 744-3586 (TTY)
http://www.cc.chi.il.us

July 1, 1997

Mr. Gary P. King
Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
1001 N. Grand Avenue, East
Springfield, IL 62702

RECEIVED
JUL 03 1997
I.E.P.A. / B.O.L.

Re: Chicago Ordinance No. 097990

Dear Mr. King:

Pursuant to 35 Ill. Adm. Code 742.1015(l)(2), Section 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, apply to all areas within the corporate limits of the City of Chicago.

Sincerely,

Henry L. Henderson
Commissioner

cc: Mort Ames
Asst. Corp. Counsel

Chicago Blue Bag Recycling
Please Recycle

EXHIBIT
B

00126.001852

COPY

00126.00155

PREPARED BY:

Name: **Former Coca-Cola PTO**

Address: **4301 West 36th Street**
Chicago, Illinois 60632

PIN Nos.: **16-34-400-006-0000**
16-34-400-018-000

RETURN TO:

Name: **The Coca-Cola Company**
Attn. Gregory J. Koch

Address: **One Coca-Cola Plaza**
Atlanta, GA 30313

THE ABOVE SPACE FOR RECORDER'S OFFICE

ADDENDUM TO
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
NO FURTHER REMEDIATION LETTER

RECEIVED
OCT 0 1 1999
IEPA/BOL

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

Division of Legal Counsel
217/782-5544
Telefax # 217/782-9807
TDD # 217/782-9143
E-mail: epa8868@epa.state.il.us

September 27, 1999

Patricia F. Sharkey
Mayer, Brown & Platt
190 South LaSalle Street
Chicago, Illinois 60603-3441

Re: Former Coca-Cola PTO
LPC #0316580016 – Cook County
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Pat:

I am writing to follow up on a question you have raised on behalf of the owner of the above referenced property, The Coca-Cola Company, as to the scope of the No Further Remediation ("NFR") letter (dated September 24, 1999) issued by the Illinois Environmental Protection Agency ("Illinois EPA"). First, your client notes that the site description in the NFR letter defines the entire parcel of property upon which the site remediation was performed, and not just the specific area of concern addressed in the approved underlying Site Investigation Plan and Remedial Action Completion Report (dated April 4, 1999, Log No. 99-701). Second, your client notes that the list of contaminants of concern as found in Table A of the NFR letter is more comprehensive than those which were the primary focus of the remediation and the approved underlying reports (i.e., Benzene, Toluene, Ethylbenzene, Xylene).

In response to your question, the Illinois EPA Division of Legal Counsel and Bureau of Land have reviewed the September 24, 1999 NFR letter and the above referenced underlying reports. By this letter, I am confirming the Illinois EPA's conclusion that the September 24, 1999 letter is valid (and shall become effective upon proper and timely recording) and may be relied upon by The Coca-Cola Company and its successors and assigns. I am further confirming that the scope of this NFR letter, like any other NFR letter, is limited by the scope of the approved underlying reports. Those reports more clearly identify the area of remediation surrounding the former underground storage tank excavation and that the contaminants of primary concern addressed by the NFR letter are benzene, toluene, ethylbenzene and xylene.

I direct your attention to Section 58.10(a) of the Illinois Environmental Protection Act ("Act") (415 ILCS 5/58.10(a)), which provides that issuance of the NFR letter signifies a release from further responsibilities under the Act in performing the approved remedial action, and shall be considered prima facie evidence that the site does not constitute a threat to human health and the environment and does not require further remediation under the Act. Further, Section 58.10(b) of the Act states that the NFR letter shall be limited to, inter alia, an acknowledgment that the requirements of the Remedial Action Plan and Remedial Action Completion Report were satisfied, and a description of the location of the affected property by adequate legal description or by reference to a plat showing its boundaries.

Thus, the Illinois EPA can only issue NFR letters in response to approved plans and completion reports, in this case, the Site Investigation Report and Remedial Action Completion Report (dated April 4, 1999, Log No. 99-701). Those reports more completely define the nature of the remediation performed at the site which led to the issuance of the September 24, 1999 NFR letter. Any specific questions on the content of the NFR letter may be answered by referring to information within those reports. Those reports collectively set forth the extent of remediation, the specific areas of the site upon which remediation was performed, and the contaminants which were the subject of the remediation. In short, the scope of the NFR letter for this site is no more or less than as was defined in those reports.

Please let me know if you have any further questions or comments.

Sincerely,

John J. Kim
Assistant Counsel

00125.001501

MAYER, BROWN & PLATT
190 SOUTH LA SALLE STREET
CHICAGO, ILLINOIS 60603-3441

MAIN TELEPHONE
312-782-0600
MAIN FAX
312-701-7711

00126.001902

September 28, 1999

RECEIVED
OCT 0 1 1999
IEPA/BOL

VIA U.S. CERTIFIED MAIL

Commissioner William Abolt
Chicago Department of the Environment
25th Floor
30 North LaSalle Street
Chicago, Illinois 60602-2575

Re: NOTIFICATION OF ISSUANCE OF
NO FURTHER REMEDIATION LETTER
BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
FOR THE FORMER COCA-COLA PTO
LPC# 0316580016 - COOK COUNTY
4301 WEST 36TH STREET
PROJECT CODE LP80-229

TO WHOM IT MAY CONCERN:

This notification is provided pursuant to 35 Ill. Admin. Code 742.1015 and the terms of the attached No Further Remediation Letter ("NFR Letter").

Please be advised that the attached NFR Letter was issued by the Illinois Environmental Protection Agency on September 24, 1999 for a remediation site currently owned by The Coca-Cola Company which is located at 4301 West 36th Street in Chicago, Illinois. The remediation site, the nature of the release and the response actions taken are described in the attached NFR letter and an attached addendum thereto issued by the Illinois Environmental Protection Agency on September 27, 1999. Section 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") restricting groundwater use has been used by the Illinois Environmental Protection Agency in reviewing the request for a groundwater remediation objective applicable to this remediation site.

Further information pertaining to this remediation site may be obtained from:

Illinois Environmental Protection Agency
Attention: Freedom of Information Act Officer
Bureau of Land --#24
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

Submitted on behalf of:
THE COCA-COLA COMPANY

By One Of Its Attorneys

Patricia F. Sharkey
Mayer, Brown & Platt
190 South La Salle Street
Chicago, Illinois 60603-3441
(312) 782-0600

cc: Robert O'Hara, IEPA

00126.001903

99916673 Page 1 of 1

COPY

00126-001904

PREPARED BY:

Name: **Former Coca-Cola PTO**

Address: **4301 West 36th Street**
Chicago, Illinois 60632

PIN Nos.: **16-34-400-006-0000**
16-34-400-018-000

RETURN TO:

Name: **The Coca-Cola Company**
Attn. Gregory J. Koch

Address: **One Coca-Cola Plaza**
Atlanta, GA 30313

THE ABOVE SPACE FOR RECORDER'S OFFICE

ADDENDUM TO
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
NO FURTHER REMEDIATION LETTER

00126.001905

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

Division of Legal Counsel
217/782-5544
Telefax # 217/782-5207
TDD # 217/782-9143
E-mail: epa1868@epa.state.il.us

September 27, 1999

Patricia F. Sharkey
Mayer, Brown & Platt
190 South LaSalle Street
Chicago, Illinois 60603-3441

Re: Former Coca-Cola PTO
LPC #0316580016 – Cook County
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Pat:

I am writing to follow up on a question you have raised on behalf of the owner of the above referenced property, The Coca-Cola Company, as to the scope of the No Further Remediation ("NFR") letter (dated September 24, 1999) issued by the Illinois Environmental Protection Agency ("Illinois EPA"). First, your client notes that the site description in the NFR letter defines the entire parcel of property upon which the site remediation was performed, and not just the specific area of concern addressed in the approved underlying Site Investigation Plan and Remedial Action Completion Report (dated April 4, 1999, Log No. 99-701). Second, your client notes that the list of contaminants of concern as found in Table A of the NFR letter is more comprehensive than those which were the primary focus of the remediation and the approved underlying reports (i.e., Benzene, Toluene, Ethylbenzene, Xylene).

In response to your question, the Illinois EPA Division of Legal Counsel and Bureau of Land have reviewed the September 24, 1999 NFR letter and the above referenced underlying reports. By this letter, I am confirming the Illinois EPA's conclusion that the September 24, 1999 letter is valid (and shall become effective upon proper and timely recording) and may be relied upon by The Coca-Cola Company and its successors and assigns. I am further confirming that the scope of this NFR letter, like any other NFR letter, is limited by the scope of the approved underlying reports. Those reports more clearly identify the area of remediation surrounding the former underground storage tank excavation and that the contaminants of primary concern addressed by the NFR letter are benzene, toluene, ethylbenzene and xylene.

I direct your attention to Section 58.10(a) of the Illinois Environmental Protection Act ("Act") (415 ILCS 5/58.10(a)), which provides that issuance of the NFR letter signifies a release from further responsibilities under the Act in performing the approved remedial action, and shall be considered prima facie evidence that the site does not constitute a threat to human health and the environment and does not require further remediation under the Act. Further, Section 58.10(b) of the Act states that the NFR letter shall be limited to, inter alia, an acknowledgment that the requirements of the Remedial Action Plan and Remedial Action Completion Report were satisfied, and a description of the location of the affected property by adequate legal description or by reference to a plat showing its boundaries.

Thus, the Illinois EPA can only issue NFR letters in response to approved plans and completion reports, in this case, the Site Investigation Report and Remedial Action Completion Report (dated April 4, 1999, Log No. 99-701). Those reports more completely define the nature of the remediation performed at the site which led to the issuance of the September 24, 1999 NFR letter. Any specific questions on the content of the NFR letter may be answered by referring to information within those reports. Those reports collectively set forth the extent of remediation, the specific areas of the site upon which remediation was performed, and the contaminants which were the subject of the remediation. In short, the scope of the NFR letter for this site is no more or less than as was defined in those reports.

Please let me know if you have any further questions or comments.

Sincerely,

John J. Kim
Assistant Counsel

00126.001906

COPY

99912132

00126.001007

PREPARED BY:

Name: Former Coca-Cola PTO

Address: 4301 West 36th Street
Chicago, Illinois 60632

RECEIVED
OCT 0 1 1999
IEPA/BOL

RETURN TO:

Name: The Coca-Cola Company
Attn: Gregory J. Koch

Address: One Coca-Cola Plaza
Atlanta, GA 30313

THE ABOVE SPACE FOR RECORDER'S OFFICE

THIS ENVIRONMENTAL NO FURTHER REMEDIATION LETTER MUST BE SUBMITTED BY THE REMEDIATION APPLICANT, WITHIN 45 DAYS OF ITS RECEIPT, TO THE OFFICE OF THE RECORDER OR REGISTRAR OF TITLES OF COOK COUNTY.

Illinois State EPA Number: 0316580016
The Coca-Cola Company, the Remediation Applicant, whose address is One Coca-Cola Plaza, Atlanta, GA, has performed investigative and/or remedial activities for the remediation site depicted on the attached Site Base Map and which remediation site can be identified by the following:

1. Legal description or Reference to a Plat Showing the Boundaries:

A parcel of land consisting of a part of Lots 1, 7, and 8, in County Clerks Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principle Meridian; said parcel of land being bounded and described as follows:

Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is 861.97 feet south from the North line of said Southeast quarter, and running thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet; thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 859.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago; thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southwest quarter of Section 34, and thence north along said parallel line, a distance of 719.01 feet to the point of beginning; containing 276,231 square feet of land, more or less.

2. Common Address: 4301 West 36th Street, Chicago, Illinois
3. Real Estate Tax Index/Parcel Index Numbers: 16-34-400-006-0000, 16-34-400-018-000
4. Remediation Site Owner: The Coca-Cola Company
5. Land Use Limitation: Residential or Industrial/Commercial
6. Site Investigation: Focused

See attached No Further Remediation Letter for other terms.

JG:ct\991433.WPD

00126.001908

Table A: Contaminants of Concern

Volatiles

CAS No.	Compound Name
71-43-2	Benzene
75-25-2	Bromoform
56-23-5	Carbon tetrachloride
108-90-7	Chlorobenzene
67-66-3	Chloroform
107-06-2	1,2-Dichloroethane
75-35-4	1,1-Dichloroethene
156-60-5	trans-1,2-Dichloroethene
78-87-5	1,2-Dichloropropane
542-75-6	1,3-Dichloropropene
10-41-4	Ethylbenzene
127-18-4	Tetrachloroethene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethene
75-01-4	Vinyl chloride
1330-210-7	Xylenes (total)

Polynuclear Aromatics

CAS No.	Compound Name
83-32-9	Acenaphthene
120-12-7	Anthracene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene
206-44-0	Fluoranthene
86-73-7	Fluorene
193-39-5	Indeno(1,2,3-c,d)pyrene
91-20-3	Naphthalene
129-00-0	Pyrene
208-96-8	Acenaphthalene
191-24-2	Benzo(g,h,i)perylene
85-01-8	Phenanthrene

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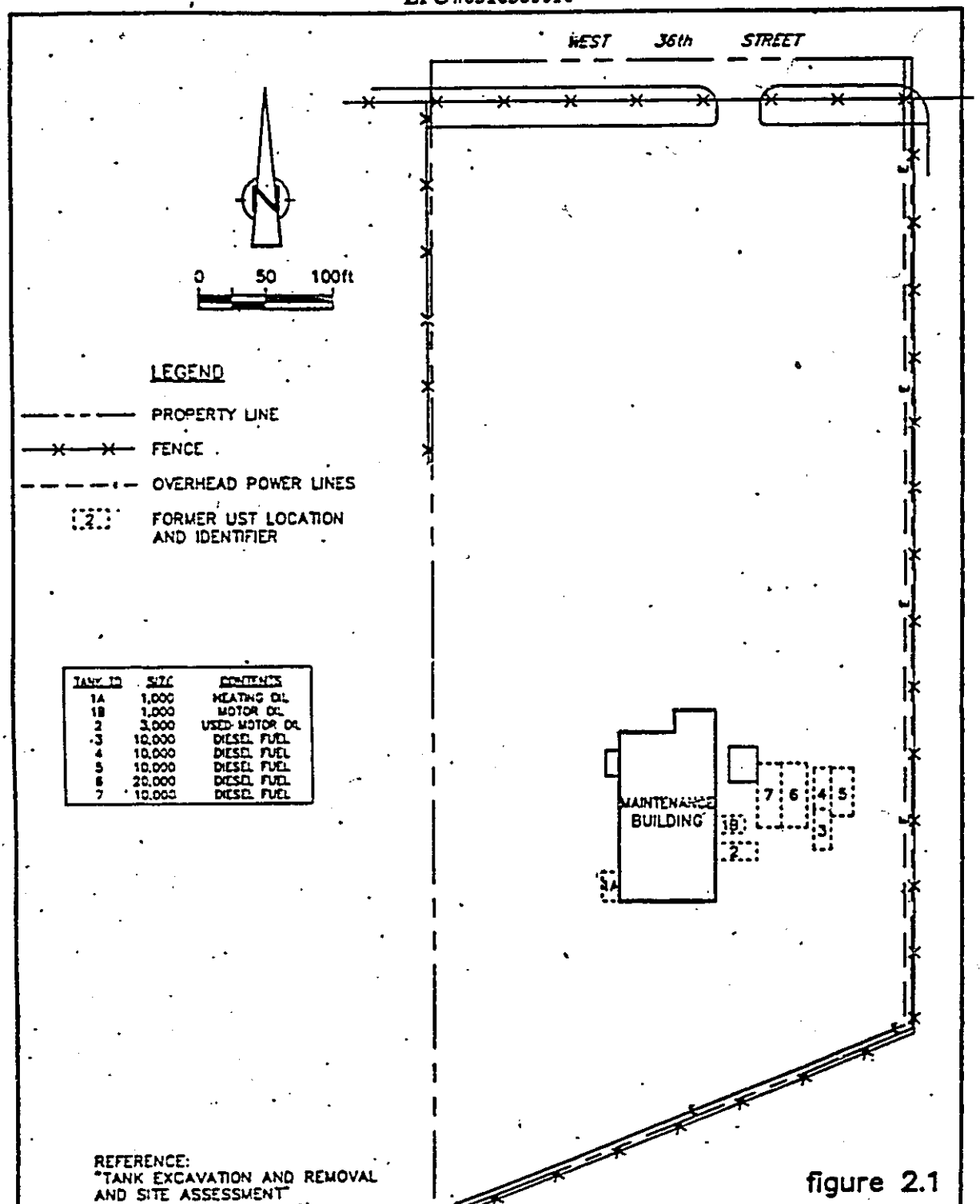
LPC #0316580016



TANK ID	SIZE	CONTENTS
1A	1,000	HEATING OIL
1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

REFERENCE:
"TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1988)

figure 2.1

FORMER UST LOCATIONS AND CONTENTS
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0002 APR 07/99

00126.001910

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/782-5762

CERTIFIED MAIL
2414155813

SEP 24 1999

The Coca-Cola Company
Attention: Gregory J. Koch
One Coca-Cola Plaza
Atlanta, Georgia 30313

Re: LPC #0316580016 – Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Mr. Koch:

The Site Investigation Report and the Remedial Action Completion Report ("Report") (dated April 4, 1999, Log No. 99-701), as prepared by Conestoga-Rovers & Associates for the former Coca-Cola PTO property, has been reviewed by the Illinois Environmental Protection Agency ("Illinois EPA"). The Report demonstrates that the remedial action was successfully completed. Note: This NFR letter is being reissued to correct the Parcel Index Number listed on the Environmental Notice.

The remediation site, consisting of 6.7 acres, is legally described in the attached Environmental Notice and is commonly known as 4301 West 36th Street, Chicago, Illinois. Pursuant to Section 58.10 of the Environmental Protection Act ("Act") (415 ILCS 5/58.10), your request for a "No Further Remediation Determination" is granted under the conditions and terms specified in this No Further Remediation Letter ("Letter").

Issuance of this focused Letter signifies a release from further responsibilities under the Act in performing the approved remedial action. The Letter shall be considered prima facie evidence that the remediation site described in the attached Site Remediation Program ("SRP") Environmental Notice and shown in the attached Site Base Map does not constitute a threat to human health and the environment for the specified recognized environmental conditions so long as the site is utilized in accordance with the terms of this Letter.

CONDITIONS AND TERMS OF APPROVAL

LEVEL OF REMEDIATION AND LAND USE LIMITATIONS

1. The recognized environmental conditions, as characterized in the above-referenced Report, are identified in Table A.

2. The remediation objectives for the above-referenced site described in the SRP Environmental Notice of this Letter were established in accordance with the requirements of the Tiered Approach to Corrective Action Objectives (TACO, 35 Illinois Administrative Code Part 742) rules.

3. In accordance with Section 58.8(c) and 58.10(b)(3)of the Act (415 ILCS 5/58.8(c), 415 ILCS 5/58.10(b)(3)), the remediation site described in the attached SRP Environmental Notice and shown on the attached Site Base Map of this Letter is limited to residential or industrial/ commercial uses.

4. The land use specified in this Letter may be revised if:

   a) Further investigation or remedial action has been conducted that documents the attainment of objectives appropriate for the new land use; and

   b) A new Letter is obtained and recorded in accordance with Title XVII of the Act and regulations adopted thereunder.

PREVENTIVE, ENGINEERING, AND INSTITUTIONAL CONTROLS

5. Preventive: None.

   Engineering: None.

   Institutional: Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") effectively prohibits the installation of potable water supply wells (and the use of such wells) and is an acceptable institutional control under the following conditions:

   Each affected property owner and the City of Chicago must receive written notification from the Remediation Applicant desiring to use the ordinance as an institutional control that groundwater remediation objectives have been approved by the Illinois EPA. Written proof of this notification shall be submitted to the Illinois EPA within 45 days from the date of this Letter. The notification shall include:

   a) The name and address of the local unit of government;

b) The citation of the ordinance used as an institutional control in this Letter.

c) A description of the property being sent notice by adequate legal description or by reference to a plat showing the boundaries;

d) A statement that the ordinance restricting the groundwater use has been used by the Illinois EPA in reviewing a request for groundwater remediation objectives;

e) A statement as to the nature of the release and response action with the name, address, and Illinois EPA inventory identification number; and

f) A statement as to where more information may be obtained regarding the ordinance.

The following activities shall be grounds for voidance of the ordinance as an institutional control and this Letter:

a) Modification of the reference ordinance to allow potable uses of groundwater;

b) Approval of a site-specific request, such as a variance, to allow use of groundwater at the site;

c) Violation of the terms of an institutional control recorded.

As a part of its corrective action plan, the remediation site has relied upon Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, prohibiting potable uses of groundwater as defined therein. Proof of notification of affected parties, if any, shall be submitted in accordance with 35 Ill. Adm. Code 742.1015(b) and (c) within 45 days of the issuance of this NFR Letter.

6. Failure to establish, operate and maintain controls in full compliance with the Act, applicable regulations, and the above-referenced Report may result in voidance of this Letter.

OTHER TERMS

7. Any contaminated soil or groundwater that is removed, excavated, or disturbed from the above-referenced site must be handled in accordance with all applicable laws and regulations.

00126.001911

8. Where the Remediation Applicant is not the sole owner of the remediation site, the Remediation Applicant shall complete the attached "Property Owner Certification of NFR Letter Under the Site Remediation Program" form. This certification by original signature of each property owner, or the authorized agent of the owner(s), of the remediation site or any portion thereof who is not a Remediation Applicant shall be recorded along with this Letter.

9. Further information regarding this remediation site can be obtained through a written request under the Freedom of Information Act (5 ILCS 140) to:

   Illinois Environmental Protection Agency
   Attention: Freedom of Information Act Officer
   Bureau of Land – #24
   1021 North Grand Avenue East
   Post Office Box 19276
   Springfield, IL 62794-9276

10. Pursuant to Section 58.10(f) of the Act (415 ILCS 5/58.10(f)), should the Illinois EPA seek to void this Letter, the Illinois EPA shall provide notice to the current title holder and to the Remediation Applicant at the last known address. The notice shall specify the cause for the voidance, explain the provisions for appeal, and describe the facts in support of this cause. Specific acts or omissions that may result in the voidance of this Letter under Sections 58.10(e)(1)-(7) of the Act (415 ILCS 5/58.10(e)(1)-(7)) include, but shall not be limited to:

    a) Any violation of institutional controls or the designated land use restrictions;

    b) The failure to operate and maintain preventive or engineering controls or to comply with any applicable groundwater monitoring plan;

    c) The disturbance or removal of contamination that has been left in place in accordance with the above-referenced Report. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected consistent with the above-referenced Report;

    d) The failure to comply with the recording requirements for this Letter;

    e) Obtaining the Letter by fraud or misrepresentation;

    f) Subsequent discovery of contaminants, not identified as part of the investigative or remedial activities upon which the issuance of the Letter was based, that pose a threat to human health or the environment;

    g) The failure to pay the No Further Remediation Assessment Fee within 45 days after receiving a request for payment from the Illinois EPA;

h) The failure to pay in full the applicable fees under the Review and Evaluation Services Agreement within 45 days after receiving a request for payment from the Illinois EPA.

11. Pursuant to Section 58.10(d) of the Act, this Letter shall apply in favor of the following persons:

a) The Coca-Cola Company;

b) The owner and operator of the remediation site;

c) Any parent corporation or subsidiary of the owner of the remediation site;

d) Any co-owner, either by joint-tenancy, right of survivorship, or any other party sharing a relationship with the owner of the remediation site;

e) Any holder of a beneficial interest of a land trust or inter vivos trust, whether revocable or irrevocable, involving the remediation site;

f) Any mortgagee or trustee of a deed of trust of the owner of the remediation site or any assignee, transferee, or any successor-in-interest of the owner of the remediation site;

g) Any successor-in-interest of the owner of the remediation site;

h) Any transferee of the owner of the remediation site whether the transfer was by sale, bankruptcy proceeding, partition, dissolution of marriage, settlement or adjudication of any civil action, charitable gift, or bequest;

i) Any heir or devisee of the owner of the remediation site;

j) Any financial institution, as that term is defined in Section 2 of the Illinois Banking Act and to include the Illinois Housing Development Authority, that has acquired the ownership, operation, management, or control of the remediation site through foreclosure or under the terms of a security interest held by the financial institution, under the terms of an extension of credit made by the financial institution, or any successor in interest thereto; or

k) In the case of a fiduciary (other than a land trustee), the estate, trust estate, or other interest in property held in a fiduciary capacity, and a trustee, executor, administrator, guardian, receiver, conservator, or other person who holds the remediated site in a fiduciary capacity, or a transferee of such party.

12. This Letter, including all attachments, must be recorded as a single instrument with the Office of the Recorder or Registrar of Titles of Cook County. For recording purposes, the SRP Environmental Notice attached to this Letter should be the first page of the instrument filed. In addition, the City of Chicago's Memorandum of Understanding must be filed as an

attachment of this Letter with the Office of the Recorder or Registrar of Titles of Cook County. This Letter shall not be effective until officially recorded by the Office of the Recorder or Registrar of Titles of Cook County in accordance with Illinois law so that it forms a permanent part of the chain of title for the Former Coca-Cola PTO property. Within 30 days of this Letter being recorded by the Office of the Recorder or Registrar of Titles of Cook County, a certified copy of this Letter and all attachments, as recorded, shall be obtained and submitted to the Illinois EPA as indicated below.

Mr. Robert O'Hara
Illinois Environmental Protection Agency
Bureau of Land/RPM Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

13. In accordance with Section 58.10(g) of the Act, a No Further Remediation Assessment Fee based on the costs incurred for the remediation site by the Illinois EPA for review and evaluation services will be applied in addition to the fees applicable under the Review and Evaluation Services Agreement. Request for payment of the No Further Remediation Assessment Fee will be included with the final billing statement.

If you have any questions regarding this correspondence, you may contact the Illinois EPA project manager, Jay F. Gaydosh, at 217/785-0231.

Sincerely,

Hernando A. Albarracin

Hernando A. Albarracin
Unit Manager
Leaking Underground Storage Tank Section
Division of Remediation Management
Bureau of Land

HAA:JFG:et991433.WPD

Enclosures: SRP Environmental Notice
Table A
Site Base Map
Property Owner Certification Form
Chicago Memorandum of Understanding

cc: Conestoga-Rovers & Associates

00126.001916

ity of Chicago
ichard M. Daley, Mayor

partment of Law
ran S. Sher
rporation Counsel

ne 900
North LaSalle Street
icago, Illinois 60602
21 744-9010
21 744-6798 (FAX)

July 2, 1997

BY EXPRESS MAIL

RECEIVED
JUL 03 1997
I.E.P.A. / B.O.L.

Mr. Gary P. King
Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
1001 N. Grand Avenue, East
Springfield, IL 62702

Re: Memorandum of Understanding Between City of Chicago and IEPA

Dear Mr. King:

Enclosed please find two executed copies of the Memorandum of Understanding ("MOU") between the City of Chicago and the Illinois Environmental Protection Agency, pursuant to 35 Ill. Adm. Code 742.1015. As I discussed earlier with Mark Wight, the version of the MOU that is enclosed varies from the one you and he approved only in that there are two exhibits rather than three, since the new groundwater ordinance also includes a provision authorizing the City of Chicago's Commissioner of Environment to enter into this MOU, thus simultaneously satisfying the requirements of 35 Ill. Adm. Code 742.1015(i)(3) and 742.1015(i)(1), relating to required MOU attachments. As to the remaining attachment (identification of the legal boundaries within which the Potable Water Supply Well Ordinance is applicable), Mr. Wight said that a letter from a City official stating that the ordinance applied throughout the City would satisfy the requirements of 35 Ill. Adm. Code 742.1015(i)(2). A letter to that effect is attached as Exhibit B.

Please execute both documents and return the one marked "City Copy" to me for our files. If you have any questions, do not hesitate to contact me at 312-744-6904.

Sincerely,

Mort P. Ames

Mort P. Ames
Assistant Corporation Counsel

Encl.

cc w/o encl.: Henry L. Henderson
Jessica Rio
Jill Wineman

SCREENED
MM

WORKS

MEMORANDUM OF UNDERSTANDING BETWEEN THE CITY OF CHICAGO, ILLINOIS AND THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY REGARDING (A) THE USE OF A LOCAL POTABLE WATER SUPPLY WELL ORDINANCE AS AN ENVIRONMENTAL INSTITUTIONAL CONTROL AND (B) THE PROVISION OF INFORMATION RELATING TO "NO FURTHER REMEDIATION" DETERMINATIONS BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY TO THE CITY OF CHICAGO

I. PURPOSE AND INTENT

A. This Memorandum of Understanding ("MOU") is entered into between the City of Chicago, Illinois ("the City") and the Illinois Environmental Protection Agency ("Illinois EPA") for the purpose of (a) satisfying the requirements of 35 Ill. Adm. Code 742.1015 for the use of potable water supply well ordinances as environmental institutional controls and (b) ensuring that the City will be provided with copies of all "No Further Remediation" letters or determinations issued by the Illinois EPA pursuant to specific programs for sites located within the boundaries of Chicago, Illinois, in order to enable the City to maintain a complete and up-to-date registry of sites as required by 35 Ill. Adm. Code 742.1015(i)(5). The Illinois EPA has reviewed Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance"), attached as Attachment A, and has determined that the Municipal Code of Chicago prohibits the installation and use of new potable water supply wells by private entities but will allow the installation of potable water supply wells by the City and other units of local government pursuant to intergovernmental agreements with the City. In such cases, 35 Ill. Adm. Code 742.1015(a) provides that the City may enter into an MOU with the Illinois EPA to allow the use of the ordinance as an institutional control.

B. The intent of this Memorandum of Understanding is to (a) specify the responsibilities that must be assumed by the City to satisfy the requirements for MOUs as set forth at 35 Ill. Adm. Code 742.1015(i), and (b) require the Illinois EPA to provide the City with copies of all "No Further Remediation" letters or determinations that the Illinois EPA issues for sites located within the City of Chicago to enable the City to maintain a registry of sites pursuant to 35 Ill. Adm. Code 742.1015(i)(5).

II. DECLARATIONS AND ASSUMPTION OF RESPONSIBILITY

A. In order to ensure the long-term integrity of the Potable Water Supply Well Ordinance as an environmental institutional control and that risk to human health and the environment from contamination left in place in reliance on the Potable Water Supply Well Ordinance is effectively managed, the City hereby assumes the following responsibilities pursuant to 35 Ill. Adm. Code 742.1015(i):

1. The City will notify the Illinois EPA Bureau of Land of any changes to or requests for variance from the Potable Water Supply Well Ordinance at least 30 days prior to the date the local government is scheduled to take action on the proposed change or request (35 Ill. Adm. Code 742.1015(i)(4));

2. The City will maintain a registry of all sites within its corporate limits that have received "No Further Remediation" determinations from the Illinois EPA pursuant to specific programs (35 Ill. Adm. Code 742.1015(i)(5));

3. If the City determines to install a new potable water supply well(s), the City will review the registry of sites established under paragraph II.A.2. prior to siting such potable water supply well(s) within the area covered by the Potable Water Supply Well Ordinance, pursuant to 35 Ill. Adm. Code 742.1015(i)(6)(A);

4. If the City determines to install a new potable water supply well(s), the City will determine whether the potential source of potable water has been or may be affected by contamination left in place at the sites tracked and reviewed under paragraphs II.A.2. and 3. (35 Ill. Adm. Code 742.1015(i)(6)(B)); and

5. If the City determines to install a new potable water supply well(s), the City will take action as necessary to ensure that the potential source of potable water is protected from contamination or treated before it is used as a potable water supply (35 Ill. Adm. Code 742.1015(i)(6)(C));

6. If the City enters into intergovernmental agreements under Section 11-8-390 of the Municipal Code of Chicago to allow other units of local government to install new potable water supply well(s) within the corporate limits of the City, the City will require compliance with the procedures set forth in paragraphs II.A.3., 4., and 5. as a part of such agreements.

7. Notification under paragraph II.A.1. above, or other communications concerning this MOU directed to the Illinois EPA, shall be addressed to:

Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62794-9276

B. In order to ensure the long-term integrity of the Potable Water Supply Well Ordinance as an environmental institutional control and that risk to human health and the environment from contamination left in place in reliance on the Potable Water Supply Well Ordinance or other specific programs can be effectively managed, the Illinois EPA hereby assumes

the following responsibilities:

1. The Illinois EPA will provide the City with copies of all "No Further Remediation" letters or determinations that it issues pursuant to 35 Ill. Adm. Code 742, and other specific programs, for sites located within the boundaries of the City at the time said letters or determinations are provided to remediation applicants.

2. Copies of "No Further Remediation" letters or determinations provided to the City pursuant to paragraph II.B.1. above, or other communications concerning this MOU directed to the City, shall be addressed to:

Commissioner
Chicago Department of Environment
25th Floor
30 North LaSalle Street
Chicago, IL 60602-2575

III. SUPPORTING DOCUMENTATION

The following documentation is required by 35 Ill. Adm. Code 742.1015(i) and is attached to this MOU:

A. Attachment A: A copy of the Potable Water Supply Well Ordinance certified by the city clerk or other official as the current, controlling law (35 Ill. Adm. Code 742.1015(i)(3)) and a statement of the authority of the City to enter into the MOU (35 Ill. Adm. Code 742.1015(i)(1)).;

B. Attachment B: Identification of the legal boundaries within which the Potable Water Supply Well Ordinance is applicable (35 Ill. Adm. Code 742.1015(i)(2)); and

IN WITNESS WHEREOF, the lawful representatives of the parties have caused this MOU to be signed as follows:

FOR: The City of Chicago, Illinois

BY: _____ DATE: July 1, 1997

Commissioner
Department of Environment
City of Chicago

FOR: Illinois Environmental Protection Agency

BY: Gary P. King DATE: July 3, 1997

(Name and title of signatory)
Mgr, Division of Remediation Management
Bureau of Land

Version 6/27/97

Be It Ordained by the City Council of the City of Chicago:

SECTION 1. Chapter 11-8 of the Municipal Code of Chicago is hereby amended by adding a new Section 11-8-385 and by amending Section 11-8-390 by inserting the language in italics, as follows:

11-8-385 Potable Water Defined.

Potable water is any water used for human consumption, including, but not limited to water used for drinking, bathing, washing dishes, preparing foods and watering gardens in which produce intended for human consumption is grown.

11-8-390 Prohibited Use Of Secondary Water; *Prohibited Installation Of New Potable Water Supply Wells.*

No secondary water shall overflow into or be discharged into any surge tank, storage tank, or reservoir, or shall in any way be piped or conveyed into the water supply system of any building, structure, or premises to become a part of or be mixed with the fresh water supply from the mains of the Chicago Waterworks System either inside of the premises or in the water service pipe. Secondary water shall not be piped to or used in any plumbing fixture, or for cooling crushers, rollers, or mixers where foods, candies, liquids or materials are manufactured for human or animal consumption. No connection, tap, or opening shall be made in a water distribution system other than an approved water distribution system which will permit such water being used for drinking.

Wherever the fire-protective equipment in any building, structure or premises has service from the Chicago Waterworks System, no pipe or other conduit which conveys secondary water shall be cross-connected to the fire-protective equipment. All fire-protective equipment connected to the Chicago Waterworks System shall be constructed in such manner that

EXHIBIT
A

all tanks, pipes, pumps, surge tanks, and fire hydrants can be thoroughly drained, flushed and cleaned by the owners of such equipment and premises and there shall be no direct connections from the tanks, pipes and other equipment to any drainage pipes or sewers. *No groundwater well, cistern or other groundwater collection device installed after the effective date of this amendatory ordinance may be used to supply any potable water supply system, except at points of withdrawal by the City of Chicago or by units of local government pursuant to intergovernmental agreement with the City of Chicago.*

SECTION 2. Section 2-30-030 of the Municipal Code of Chicago is hereby amended by deleting the language in brackets and inserting the language in italics, as follows:

2-30-030 Commissioner -- Powers And Duties Designated.

The commissioner of the environment shall have the following powers and duties:

* * * * *

(21) To enter into grant agreements, cooperation agreements and other agreements or contracts with governmental entities, private business and civic and community groups necessary to implement the Green Streets Program and other urban forestry, beautification and environmental enhancement programs; *and agreements to implement the State of Illinois Site Remediation Program;*

SECTION 3. This ordinance shall be in full force and effect from and after its passage and approval.

STATE OF ILLINOIS,
County of Cook.

I, JAMES J. LASKI City Clerk of the City of Chicago in the County of Cook and State of Illinois, DO HEREBY CERTIFY that the annexed and foregoing is a true and correct copy of that certain ordinance now on file in my office, an ordinance amending Title 11, Chapter 8 and Title 7, Chapter 30 of the Municipal Code of Chicago by establishment of definition of potable water, regulation of potable water supply system and enforcement of compliance of environment for implementation of State of Illinois Site Remediation Program.

I DO FURTHER CERTIFY that the said ordinance was passed by the City Council of the said City of Chicago on the fourteenth (14th) day of May A. D. 1997 and deposited in my office on the fourteenth (14th) day of May A. D. 1997.

I DO FURTHER CERTIFY that the vote on the question of the passage of the said ordinance by the said City Council was taken by yeas and nays and recorded in the Journal of the Proceedings of the said City Council, and that the result of said vote so taken was as follows, to wit:

Yeas 47 Nays None

I DO FURTHER CERTIFY that the said ordinance was delivered to the Mayor of the said City of Chicago after the passage thereof by the said City Council, without delay, by the City Clerk of the said City of Chicago, and that the said Mayor failed to return the said ordinance to the said City Council with his written objections thereto at the next regular meeting of the said City Council occurring not less than five days after the passage of the said ordinance.

I DO FURTHER CERTIFY that the original, of which the foregoing is a true copy, is entrusted to my care for safe keeping, and that I am the lawful keeper of the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of the City of Chicago aforesaid, at the said City, in the County and State aforesaid, this twenty-seventh (27th) day of June A. D. 1997.

[L. S.]

James J. Laski

JAMES J. LASKI, City Clerk.

ity of Chicago
ichard M. Daley, Mayor

epartment of Environment

enry L. Henderson
ommissioner

wenty-fifth Floor
) North LaSalle Street
hicago, Illinois 60602-2575
12) 744-7606 (Voice)
12) 744-6451 (FAX)
12) 744-3586 (TTY)

tp://www.ci.chi.il.us

July 1, 1997

Mr. Gary P. King
Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
1001 N. Grand Avenue, East
Springfield, IL 62702

RECEIVED
JUL 0 3 1997
I.E.P.A. / B.O.L.

Re: Chicago Ordinance No. 097990

Dear Mr. King:

Pursuant to 35 Ill. Adm. Code 742.1015(I)(2), Section 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, apply to all areas within the corporate limits of the City of Chicago.

Sincerely,

Henry L. Henderson
Commissioner

cc: Mort Ames
Asst. Corp. Counsel

Blue Bag Recycling
Please Recycle

EXHIBIT
B

00126.001925

CRA

Yaa; I tracked this in the comments field. Mab

8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631
(773) 380-9933 Office (773) 380-6421 Fax

0316580016 -- Cook
Former Coca-Cola PTO -
SRP Technical

October 7, 1999

Reference No. 13230

Mr. David Rohbock
Cook County Department of Public Health
1010 Lake Street
Suite 300
Oak Park, Illinois 60301

RECEIVED
OCT 1 2 1999
IEPA/BOL

Dear Mr. Rohbock:

Re: Monitoring Well Abandonment
Former Coca- Cola PTO Facility
Chicago, Illinois

Enclosed, please find Water Well Sealing Forms for five monitoring wells, which were abandoned at the above noted facility on September 21, 1999. Abandonment of these monitoring wells was performed since these wells are no longer needed after receiving a No Further Remediation letter from the Illinois Environmental Protection Agency (IEPA) for the facility.

Please feel free to contact me with any questions or comments you may have regarding the submittal of these forms.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Walter J. Pochron, P.G.

WJP/lo/1
Encl.

c.c.: H. Albaracian - IEPA
G. Koch – The Coca-Cola Company
B. Pyle - CRA

SCREEN MED

1/95

WATER WELL SEALING FORM

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 WEST JEFFERSON STREET
SPRINGFIELD, ILLINOIS 62761

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code.

1. Ownership (Name of Controlling Party) THE COCA-COLA COMPANY

2. Well Location: 4301 WEST 36TH STREET (Address - Lot Number) CHICAGO (City) COOK (County)

General Description: Township 39 (N)(S) Range 13 (E)(W) Section 34

SW Quarter of the _____ Quarter of the _____ Quarter

3. Year Drilled 1988

4. Drilling Permit Number (and date, if known) NA

5. Type of Well: Bored _____ Drilled _____ Other MONITORING WELL MW-1

6. Total Depth 15.83 Diameter(inches) 2.0

7. Formation clear of obstruction X Yes _____ No

8. DETAILS OF PLUGGING

Filled with BENTONITE (cement or other materials) from 15.83 to 0.5 ft.

Kind of plug ASPHALT from 0.5 to 0.0 ft.

Filled with _____ from _____ to _____ ft.

Kind of plug _____ from _____ to _____ ft.

Filled with _____ from _____ to _____ ft.

Kind of plug _____ from _____ to _____ ft.

9. CASING RECORD: Upper 3 feet of casing removed _____ Yes _____ No

10. Date well was sealed: Month 9 Day 21 Year 99

11. Licensed water well driller or other person approved by the Department performing well sealing.

BOART LONGYEAR COMPANY (Name) NA (Complete License Number)

101 ALDERSON STREET (Address) SCHOFIELD (City) WI 54476 (State/Zip)

This State Agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center.

IL 482-0631

1/95

WATER WELL SEALING FORM

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 WEST JEFFERSON STREET
SPRINGFIELD, ILLINOIS 62761

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code.

1. Ownership (Name of Controlling Party) THE COCA-COLA COMPANY

2. Well Location: 4301 WEST 36TH STREET (Address - Lot Number) CHICAGO (City) COOK (County)

General Description: Township 39 (N)(S) Range 13 (E)(W) Section 34

SW Quarter of the ____ Quarter of the ____ Quarter

3. Year Drilled 1986

4. Drilling Permit Number (and date, if known) NA

5. Type of Well: Bored ____ Drilled ____ Other MONITORING WELL MW-2

6. Total Depth 15.30 Diameter(inches) 2.0

7. Formation clear of obstruction X Yes ____ No

8. DETAILS OF PLUGGING

Filled with BENTONITE (cement or other materials) from 15.30 to 0.5 ft.

Kind of plug ASPHALT from 0.5 to 0.0 ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

9. CASING RECORD: Upper 3 feet of casing removed X Yes ____ No

10. Date well was sealed: Month 9 Day 21 Year 99

11. Licensed water well driller or other person approved by the Department performing well sealing.

BOART LONGYEAR COMPANY (Name) NA (Complete License Number)

101 ALDERSON STREET (Address) SCHOFIELD (City) WI 54476 (State/Zip)

This State Agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center.

IL 482-0631

1/95

WATER WELL SEALING FORM

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 WEST JEFFERSON STREET
SPRINGFIELD, ILLINOIS 62761

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

1. Ownership (Name of Controlling Party) THE COCA-COLA COMPANY

2. Well Location: 4301 WEST 36TH STREET (Address - Lot Number) CHICAGO (City) COOK (County)

General Description: Township 39 (N)(S) Range 13 (E)(W) Section 34

SW Quarter of the _____ Quarter of the _____ Quarter

3. Year Drilled 1988

4. Drilling Permit Number (and date, if known) NA

5. Type of Well: Bored _____ Drilled _____ Other MONITORING WELL MW-3

6. Total Depth 15.10 Diameter(inches) 2.0

7. Formation clear of obstruction X Yes _____ No

8. DETAILS OF PLUGGING

Filled with BENTONITE (cement or other materials) from 15.10 to 0.5 ft.

Kind of plug ASPHALT from 0.5 to 0.0 ft.

Filled with _____ from _____ to _____ ft.

Kind of plug _____ from _____ to _____ ft.

Filled with _____ from _____ to _____ ft.

Kind of plug _____ from _____ to _____ ft.

9. CASING RECORD: Upper 3 feet of casing removed X Yes _____ No

10. Date well was sealed: Month 9 Day 21 Year 99.

11. Licensed water well driller or other person approved by the Department performing well sealing.

BOART LONGYEAR COMPANY (Name) NA (Complete License Number)

101 ALDERSON STREET (Address) SCHOFIELD (City) WI 54476 (State/Zip)

This State Agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center.

IL 482-0431

1/95

WATER WELL SEALING FORM

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 WEST JEFFERSON STREET
SPRINGFIELD, ILLINOIS 62761

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

[redacted]

1. Ownership (Name of Controlling Party) THE COCA-COLA COMPANY

2. Well Location: 4301 WEST 36TH STREET (Address - Lot Number) CHICAGO (City) COOK (County)

General Description: Township 39 (N)(S) Range 13 (E)(W) Section 34

SW Quarter of the _____ Quarter of the _____ Quarter

3. Year Drilled 1988

4. Drilling Permit Number (and date, if known) NA

5. Type of Well: Bored _____ Drilled _____ Other MONITORING WELL MW-4

6. Total Depth 12.65 Diameter(inches) 2.0

7. Formation clear of obstruction X Yes _____ No

8. DETAILS OF PLUGGING

Filled with BENTONITE (cement or other materials) from 12.65 to 0.5 ft.

Kind of plug ASPHALT from 0.5 to 0.0 ft.

Filled with _____ from _____ to _____ ft.

Kind of plug _____ from _____ to _____ ft.

Filled with _____ from _____ to _____ ft.

Kind of plug _____ from _____ to _____ ft.

9. CASING RECORD: Upper 3 feet of casing removed X Yes _____ No

10. Date well was sealed: Month 9 Day 21 Year 99

11. Licensed water well driller or other person approved by the Department performing well sealing.

BOART LONGYEAR COMPANY (Name) NA (Complete License Number)

101 ALDERSON STREET (Address) SCHOFIELD (City) WI 54476 (State/Zip)

This State Agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center.

IL 492-0631

1/95

WATER WELL SEALING FORM

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 WEST JEFFERSON STREET
SPRINGFIELD, ILLINOIS 62761

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

[redacted]

1. Ownership (Name of Controlling Party) THE COCA-COLA COMPANY

2. Well Location: 4301 WEST 36TH STREET (Address - Lot Number) CHICAGO (City) COOK (County)

General Description: Township 39 (N)(S) Range 13 (E)(W) Section 34

SW Quarter of the _____ Quarter of the _____ Quarter

3. Year Drilled 1988

4. Drilling Permit Number (and date, if known) NA

5. Type of Well: Bored _____ Drilled _____ Other MONITORING WELL MW-5

6. Total Depth 15.55 Diameter(inches) 2.0

7. Formation clear of obstruction X Yes _____ No

8. DETAILS OF PLUGGING

Filled with BENTONITE (cement or other materials) from 15.55 to 0.5 ft.

Kind of plug ASPHALT from 0.5 to 0.0 ft.

Filled with _____ from _____ to _____ ft.

Kind of plug _____ from _____ to _____ ft.

Filled with _____ from _____ to _____ ft.

Kind of plug _____ from _____ to _____ ft.

9. CASING RECORD: Upper 3 feet of casing removed X Yes _____ No

10. Date well was sealed: Month 9 Day 21 Year 99

11. Licensed water well driller or other person approved by the Department performing well sealing.

BOART LONGYEAR COMPANY (Name) NA (Complete License Number)

101 ALDERSON STREET (Address) SCHOFIELD (City) WI 54476 (State/Zip)

This State Agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center.

IL 482-0631

99-2113

0316580016
Coca Cola U.S.A
SR/tech

MAYER, BROWN & PLATT

190 SOUTH LA SALLE STREET

CHICAGO, ILLINOIS 60603-3441

PATRICIA F. SHARKEY
DIRECT DIAL (312) 701-7952
DIRECT FAX (312) 706-9113
psharkey@mayerbrown.com

MAIN TELEPHONE
312-782-0600
MAIN FAX
312-701-7711

October 13, 1999

VIA CERTIFIED MAIL
Mr. Robert O'Hara
Illinois Environmental Protection Agency
Bureau of Land/RPM Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

Re: NOTIFICATION OF RECORDING OF
NO FURTHER REMEDIATION LETTER
BY THE ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY
FOR THE FORMER COCA-COLA PTO
LPC# 0316580016 - COOK COUNTY
4301 WEST 36TH STREET
PROJECT CODE LP80-229

RECEIVED
OCT 18 1999
IEPA/BOL

Dear Mr. O'Hara:

I enclose for your files a copy of the No Further Remediation Letter and supplement thereto for this matter as stamped by the Cook County Recorder of Deeds. This copy reflects the Recorder's numbering and the date on which these documents were recorded.

Please note that these are the same documents which we provided to you on September 29, 1999. The only difference is in the Recorder's stamp.

Please contact me if you have any questions regarding the recording of these documents.

Sincerely,

Patricia F. Sharkey

PFS/meb
Enclosure
cc: Jeffrey Simmons, Esq.

SCREEN MED

99912132

7956/0156 49 001 Page 1 of 19

1999-09-27 15:21:59

Cook County Recorder 57.00

99912132

PREPARED BY:

Name: Former Coca-Cola PTO

Address: 4301 West 36th Street
Chicago, Illinois 60632

RECEIVED

OCT 18 1999

IEPA/BOL

RETURN TO:

Name: The Coca-Cola Company
Attn: Gregory J. Koch

Address: One Coca-Cola Plaza
Atlanta, GA 30313

THE ABOVE SPACE FOR RECORDER'S OFFICE

THIS ENVIRONMENTAL NO FURTHER REMEDIATION LETTER MUST BE SUBMITTED BY THE REMEDIATION APPLICANT, WITHIN 45 DAYS OF ITS RECEIPT, TO THE OFFICE OF THE RECORDER OR REGISTRAR OF TITLES OF COOK COUNTY.

Illinois State EPA Number: 0316580016

The Coca-Cola Company, the Remediation Applicant, whose address is One Coca-Cola Plaza, Atlanta, GA, has performed investigative and/or remedial activities for the remediation site depicted on the attached Site Base Map and which remediation site can be identified by the following:

1. Legal description or Reference to a Plat Showing the Boundaries:

A parcel of land consisting of a part of Lots 1, 7, and 8, in County Clerks Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principle Meridian; said parcel of land being bounded and described as follows:

Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is 861.97 feet south from the North line of said Southeast quarter, and running thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet; thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 859.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago; thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southwest quarter of Section 34, and thence north along said parallel line, a distance of 719.01 feet to the point of beginning; containing 276,231 square feet of land, more or less.

Return to
Box 407.
To: P. Sharkey

ILLINOIS EPA SITE REMEDIATION PROGRAM ENVIRONMENTAL NOTICE

00125-001931

2. Common Address: 4301 West 36th Street, Chicago, Illinois
3. Real Estate Tax Index/Parcel Index Numbers: 16-34-400-006-0000, 16-34-400-018-000
4. Remediation Site Owner: The Coca-Cola Company
5. Land Use Limitation: Residential or Industrial/Commercial
6. Site Investigation: Focused

See attached No Further Remediation Letter for other terms.

JG:ct\991433.WPD

00126.001934

00126.001935

99312132

Table A: Contaminants of Concern

Volatiles

CAS No.	Compound Name
71-43-2	Benzene
75-25-2	Bromoform
56-23-5	Carbon tetrachloride
108-90-7	Chlorobenzene
67-66-3	Chloroform
107-06-2	1,2-Dichloroethane
75-35-4	1,1-Dichloroethene
156-60-5	trans-1,2-Dichloroethene
78-87-5	1,2-Dichloropropane
542-75-6	1,3-Dichloropropene
10-41-4	Ethylbenzene
127-18-4	Tetrachloroethene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethene
75-01-4	Vinyl chloride
1330-210-7	Xylenes (total)

Polynuclear Aromatics

CAS No.	Compound Name
83-32-9	Acenaphthene
120-12-7	Anthracene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene
206-44-0	Fluoranthene
86-73-7	Fluorene
193-39-5	Indeno(1,2,3-c,d)pyrene
91-20-3	Naphthalene
129-00-0	Pyrene
208-96-8	Acenaphthalene
191-24-2	Benzo(g,h,i)perylene
85-01-8	Phenanthrene

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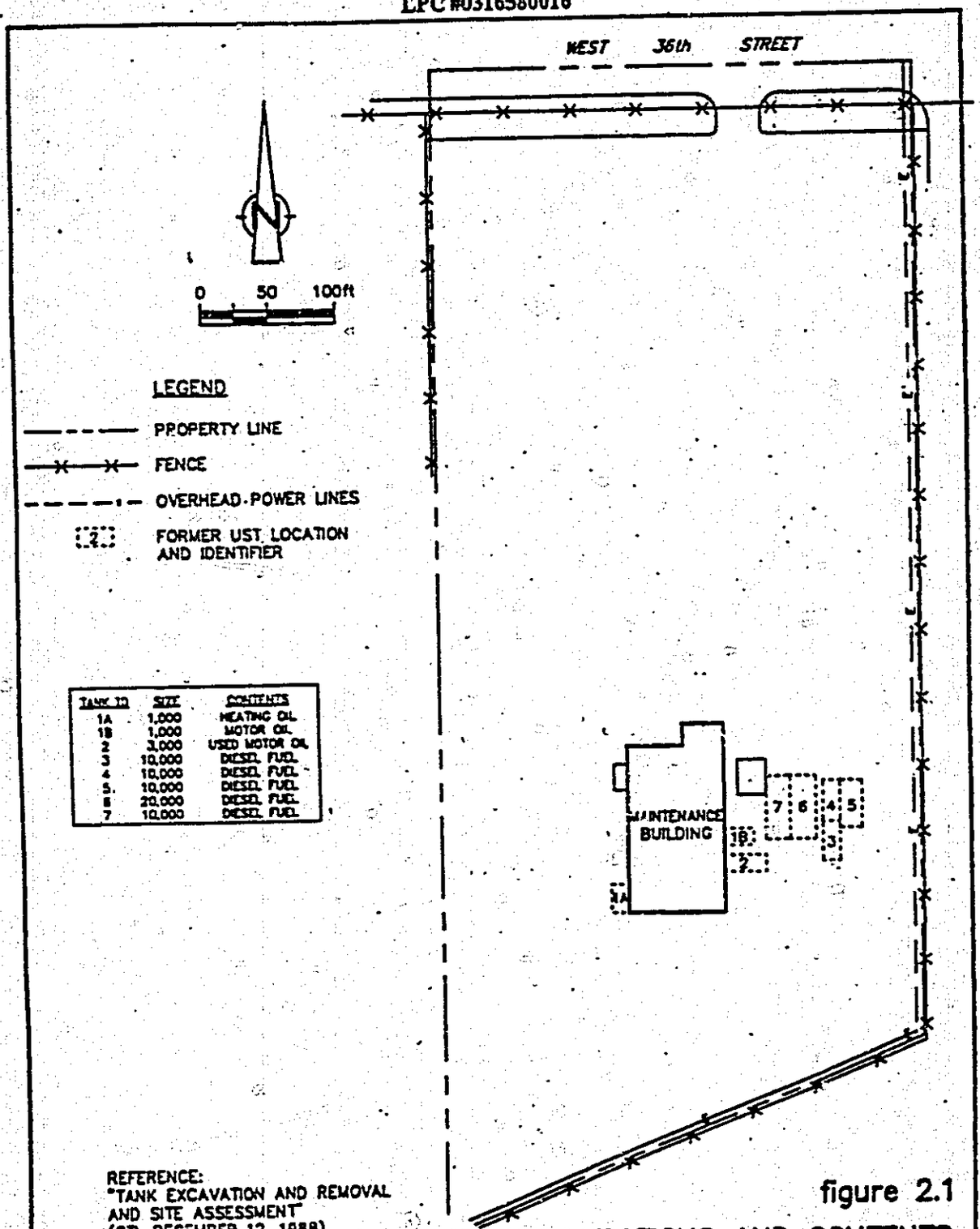
9931:132

00126.001936

LPC #0316580016



TANK ID	SIZE	CONTENTS
1A	1,000	HEATING OIL
1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

REFERENCE:
"TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1988)

figure 2.1

FORMER UST LOCATIONS AND CONTENTS
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-99(002)GN-G0002 APR 07/99

9931 2132

00126.001937

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276
THOMAS V. SKINNER, DIRECTOR

217/782-6762

CERTIFIED MAIL
2416155813

SEP 24 1999

The Coca-Cola Company
Attention: Gregory J. Koch
One Coca-Cola Plaza
Atlanta, Georgia 30313

Re: LPC #0316580016 – Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Mr. Koch:

The Site Investigation Report and the Remedial Action Completion Report ("Report") (dated April 4, 1999, Log No. 99-701), as prepared by Conestoga-Rovers & Associates for the former Coca-Cola PTO property, has been reviewed by the Illinois Environmental Protection Agency ("Illinois EPA"). The Report demonstrates that the remedial action was successfully completed. Note: This NFR letter is being reissued to correct the Parcel Index Number listed on the Environmental Notice.

The remediation site, consisting of 6.7 acres, is legally described in the attached Environmental Notice and is commonly known as 4301 West 36th Street, Chicago, Illinois. Pursuant to Section 58.10 of the Environmental Protection Act ("Act") (415 ILCS 5/58.10), your request for a "No Further Remediation Determination" is granted under the conditions and terms specified in this No Further Remediation Letter ("Letter").

Issuance of this focused Letter signifies a release from further responsibilities under the Act in performing the approved remedial action. The Letter shall be considered prima facie evidence that the remediation site described in the attached Site Remediation Program ("SRP") Environmental Notice and shown in the attached Site Base Map does not constitute a threat to human health and the environment for the specified recognized environmental conditions so long as the site is utilized in accordance with the terms of this Letter.

99312132

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CONDITIONS AND TERMS OF APPROVAL

LEVEL OF REMEDIATION AND LAND USE LIMITATIONS

1. The recognized environmental conditions, as characterized in the above-referenced Report, are identified in Table A.

2. The remediation objectives for the above-referenced site described in the SRP Environmental Notice of this Letter were established in accordance with the requirements of the Tiered Approach to Corrective Action Objectives (TACO, 35 Illinois Administrative Code Part 742) rules.

3. In accordance with Section 58.8(c) and 58.10(b)(3)of the Act (415 ILCS 5/58.8(c), 415 ILCS 5/58.10(b)(3)), the remediation site described in the attached SRP Environmental Notice and shown on the attached Site Base Map of this Letter is limited to residential or industrial/ commercial uses.

4. The land use specified in this Letter may be revised if:

   a) Further investigation or remedial action has been conducted that documents the attainment of objectives appropriate for the new land use; and

   b) A new Letter is obtained and recorded in accordance with Title XVII of the Act and regulations adopted thereunder.

PREVENTIVE, ENGINEERING, AND INSTITUTIONAL CONTROLS

5. Preventive: None.

   Engineering: None.

   Institutional: Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") effectively prohibits the installation of potable water supply wells (and the use of such wells) and is an acceptable institutional control under the following conditions:

   Each affected property owner and the City of Chicago must receive written notification from the Remediation Applicant desiring to use the ordinance as an institutional control that groundwater remediation objectives have been approved by the Illinois EPA. Written proof of this notification shall be submitted to the Illinois EPA within 45 days from the date of this Letter. The notification shall include:

   a) The name and address of the local unit of government;

00126.001789

APPENDIX B

NOVEMBER 9, 1990 IEPA LETTER

00126.001750

Illinois Environmental Protection Agency · P.O. Box 19276, Springfield, IL 62794-9276

217/782-6761

Refer to: LPC # 0310000000 – Cook County
Chicago/Coca-Cola USA
4301 W. 36th Street
Incident # None
LUST/Technical Reports

November 9, 1990

Mr. Louis M. Rundio, Jr.
McDermott, Will & Emery
227 West Monroe Street
Chicago, Illinois 60606-5096

Dear Mr. Rundio:

The Illinois EPA has reviewed the information submitted by Groundwater Technology, Inc. (GTI) dated August 17, 1990 and which was received by the Agency on August 20, 1990. This information consisted of an August 7, 1990 letter report to Mr. Andrew P. Maness of Coca-Cola USA.

The Agency requests that you take the following actions:

1. Notify ESDA of the leaking underground storage tank incident at your property as required by law. ESDA can be reached at 800/782-7860.

2. Collect soil samples taken from the soils adjacent to the UST excavation and submit for analysis of BETX to confirm that all contaminated soil has been removed. An acceptable minimum detection limit is 0.005 ppm.

Please submit two copies of the analytical results to the Agency at the address shown above. Include all "Refer to" information in any correspondence.

PRINTED ON RECYCLED PAPER

00126.001791

Mr. Louis M. Rundio, Jr.
McDermott, Will & Emery
November 9, 1990
Page two

Should you have any questions or require further assistance, please do not hesitate to contact Ms. Joanne B. Johnson, IEPA contract employee, at Environmental Science & Engineering, Inc. (312) 693-6030.

Sincerely,

Angela Aye Tin

Angela Aye Tin, Manager
State Sites Unit
Leaking Underground Storage Tank Section
Division of Land Pollution Control

cc: Division File
Maywood Region
Ken Burch, USEPA-Region V
Joanne Johnson, ESE

AAT:JBJ/mrc
90102210.JBJ

00126.001792

APPENDIX C

WORK PLAN

1.0 INTRODUCTION

The procedures presented herein detail the sampling and analytical protocols to be utilized during the site investigative activities at the Coca-Cola property ("Site") located in Chicago, Illinois.

00126.001794

2.0 GENERAL PROTOCOLS

2.1 EQUIPMENT CLEANING

2.1.1 INVESTIGATIVE EQUIPMENT

All equipment brought to the Site will be in good repair and free from dirt and debris. Before initiating drilling/sampling at each location, all downhole equipment will be decontaminated to prevent potential cross-contamination. Decontamination will be accomplished by flushing and wiping the components to remove all visible sediments followed by steam cleaning or high pressure washing with potable water (using a brush if necessary) to remove particulate matter and surface films.

2.1.2 SAMPLING EQUIPMENT

All sampling equipment will be decontaminated prior to field use and after each sample is collected to prevent potential cross-contamination between samples. Duplicate samples shall be collected concurrently with original samples therefore, sampling equipment will not be decontaminated before collection of the duplicate samples. Decontamination of equipment will be performed as follows:

i) wash with potable water and Alconox™ detergent using a brush, if necessary, to remove all visible foreign matter;

ii) rinse thoroughly with distilled water; and

iii) allow the equipment to air dry on a clean plastic sheet or aluminum foil as long as possible.

Following the final rinse, equipment will be visually inspected to verify that it is free of soil and other solid material that could contribute to possible cross-contamination.

2.2 FIELD SAMPLING

2.2.1 SAMPLE LABELING

Each sample will be labeled with a unique sample code that will facilitate tracking and cross-referencing of sample information. The sample identification code system is described below.

00126.001795

Example:	GW-060193-XX-001
GW	- designates types of sample (GW-groundwater, S-soil)
060193	- designates date of collection presented as month/day/year
XX	- sampler's initials
001	- sequential number starting with 01

Quality Control ("QC") samples also will be numbered with a unique sample site number, consistent with the numbering system described above.

2.2.2 FIELD LOG

A summary of all activities performed at the Site will be recorded in the field log book. The field log book will be a bound document with consecutively numbered pages. The entries for each day will commence on a new page, which will be dated. Corrections will be made by marking through the error with a single line, so as to remain legible, and initialing this action followed by the written correction. The field log books generated will be numbered consecutively and maintained at the office of the project engineer.

The following information will be recorded in the field log book for each sample collected:

i) facility location identification;

ii) nature of activities being performed at the Site;

iii) unique sample identification number;

iv) date and time of sample collection;

v) weather conditions;

vi) designation as to the type of sample (groundwater, soil, etc.);

vii) designation as to the means of collection (grab, bailer, etc.);

viii) name of sampling technician;

ix) analyses to be performed on sample; and

x) any other relevant comments such as odor, staining, texture, filtering, preservation, etc.

00126.001795

For the installation of investigative borings the following will be recorded in the field log book:

i) weather conditions;

ii) date of installation;

iii) type of equipment used;

iv) length of time to complete the investigative boring;

v) depth of boring;

vi) appearance of cuttings

vii) geologic log of the borehole; and

viii) any other relevant comments.

Alternatively, the stratigraphic log for each soil boring may be recorded on the appropriate CRA field form.

2.2.3 CHAIN-OF-CUSTODY FORMS

Chain-of-custody records will be used to track all samples from time of collection to the arrival of samples at the laboratory.

Each sample container being shipped to the laboratory will contain a chain-of-custody form. The chain-of-custody form consists of four copies that are distributed to the sampler, to the shipper, to the contract laboratory and to the office file of the project engineer. The sampler and shipper will maintain their copies while the other two copies are enclosed in a waterproof enclosure within the sample container. The laboratory, upon receiving the samples, will complete the remaining copies. The laboratory will maintain one copy for its records. The executed original will be returned to CRA with the data deliverables package.

2.2.4 SAMPLE CONTAINERS AND HANDLING

All samples will be placed in appropriate sample containers, labeled and properly sealed. The sample labels will include sample identification number, place of collection, date and time of collection and analyses to be performed. Samples will be cushioned within the shipping coolers

by the use of vermiculite, foam chips and/or bubble pack. Samples will be kept cool by the use of sealed plastic bags of ice. A trip blank will accompany each shipment of aqueous samples submitted for BTEX analysis.

Samples will be shipped to the project laboratory by commercial courier or delivered by hand. For samples collected on a Sunday or holiday, additional ice will be placed in the coolers, the coolers will be sealed and stored in a secure location then picked up by the courier or hand delivered on the next business day.

A chain-of-custody seal will be placed over the lid on the front and back of each shipping cooler. The seal will secure the lid and provide evidence that the samples have not been tampered with en-route to the laboratory. Clear tape will be placed over the seals to ensure that they are not accidentally broken during shipment.

Upon receipt of the cooler by the laboratory, the designated sample custodian will inspect the cooler. The sample custodian will note the condition of the cooler and seal on the chain-of-custody form. The sample custodian will then check the contents of the cooler against the information noted on the chain-of-custody form. If damage or discrepancies are observed, they will be duly recorded in the remark column of the chain-of-custody form, the form will then be signed and dated. Moreover, any observed damage or discrepancies will be reported immediately to the laboratory supervisor who will inform the laboratory manager and QC officer.

00126.001797

3.0 INVESTIGATIVE PROTOCOLS

3.1 SOIL SAMPLE COLLECTION

Approximately 14 soil borings will be advanced using either direct push ("DP") technology or hollow stem augers ("HSA"). Each boring will be advanced to a maximum depth interval of approximately 10 feet below ground surface ("bgs") or until the top of the water Table is encountered.

Soil samples will be collected continuously during the advancement of each soil boring for potential laboratory analysis, field screening and stratigraphic classification. The manner in which the soil will be handled depends on its ultimate intended purpose. Protocols for field screening and stratigraphic classification are detailed in the following sections. Sample volume that could potentially be selected for laboratory analysis will be handled in accordance with Section 4.1.

3.1.1 FIELD SCREENING

A representative aliquot of soil from each sample interval will be field-screened using a photoionization detector ("PID") and examined and classified in accordance with the Unified Soil Classification System ("USCS") to define subsurface stratigraphy.

Field screening will be conducted by placing a portion of the sample into a zip lock bag or glass jar covered with foil. The bag or jar will be sealed and agitated, if necessary, to break up clumps of soil. After approximately five minutes, a headspace reading will be obtained by inserting the tip of the PID into the zip lock bag or through the foil and recording the highest headspace reading. The PID reading will be recorded in the field log book or alternatively in the approved CRA stratigraphic form.

3.1.2 GEOTECHNICAL SAMPLING

A variety of geotechnical samples may be collected during the course of the investigation for use in determining Site characteristics. A complete listing of all geotechnical parameters and their associated analytical methods is provided in Table I.1.

3.2 SURVEYING

Horizontal control at the soil boring locations will be established by survey. The survey will locate horizontal coordinates to an accuracy of ±0.5 foot as referenced to an assumed Site-specific datum.

00125.00178

00126.001759

4.0 SAMPLING PROTOCOLS

4.1 SOIL SAMPLING PROTOCOLS

Soil samples will be collected from the boreholes for potential laboratory analysis using the procedures outlined below. These procedures will vary dependent on the type of equipment used to conduct the SOW:

Direct Push Sampler:

i) A new pair of disposable latex gloves will be used for each sample.

ii) Prior to use at each sampling location, all sampling equipment will be decontaminated in accordance with Section 2.1.2.

iii) The DP sampler will be advanced to the top of the target interval. The sampling device, containing four 6-inch long stainless steel sleeves, will then be released and the probe will be driven through the target depth.

iv) The soil sample will be retrieved by recovering the sampler from the borehole and opening the soil probe. One 6-inch long sleeve will be recovered and verified that zero headspace has been achieved. Any headspace that remains following sample recovery will be filled using an inert bentonite gel. The ends of the sleeve will be covered with inert Teflon tape and capped with polyvinyl chloride ("PVC") end caps. The sleeve with be labeled and placed in a cooler containing ice pending final sample selection.

v) One soil sample corresponding to the interval with the highest PID measurement from each soil boring will be retained for chemical analysis by the project laboratory.

vi) Alternatively, soil samples for BTEX analysis will be collected in accordance with U.S. EPA SW-846 Method 5035 using Encore™ sampler. Sample collection will remain identical to that stated previously with the exception that an Encore™ sampler will be used to collect the sample from each interval. This will eliminate the need for stainless steel sleeves inside the DP sampler.

Hollow Stem Augers:

i) A new pair of disposable latex gloves will be used for each sample.

ii) Prior to use at each sampling location, all sampling equipment will be decontaminated in accordance with Section 2.1.2.

00126.001300

iii) The HSA will be advanced to the top of the target interval. A spilt-spoon sampler containing four 6-inch long stainless steel sleeves will be driven through the target depth.

iv) The soil sample will be retrieved by recovering the split-spoon sampler from the borehole. One 6-inch long sleeve will be selected and verified that zero headspace is achieved. Any headspace that remains following sample recovery will be filled using an inert bentonite gel. The ends of the sleeve will be covered with inert Teflon tape and capped with polyvinyl chloride ("PVC") end caps. The sleeve with be labeled and placed in a cooler containing ice pending final sample selection.

v) One soil sample corresponding to the interval with the highest PID measurement and visual observations from each soil boring will be retained for chemical analysis by the project laboratory.

vi) Alternatively, soil samples for BTEX analysis will be collected in accordance with U.S. EPA SW-846 Method 5035 using Encore™ sampler. Sample collection will remain identical to that stated previously with the exception that an Encore™ sampler will be used to collect the sample from each interval. This will eliminate the need for stainless steel sleeves inside the DP sampler.

5.0 LABORATORY ANALYTICAL PROTOCOLS

Selected soil samples collected will be analyzed for BTEX, pursuant to U.S. EPA SW-846 Methods 8020, consistent with IEPA's Analytical Quality Assurance Plan ("AQAP") requirements. In addition, geotechnical parameters, namely total organic carbon, permeability, bulk density, moisture content, and soil particle density will be analyzed in up to three soil samples in order facilitate a Tier 2 evaluation pursuant to Illinois IAC '742 rules (TACO). Geotechnical samples will be representative of overall Site conditions. Physical parameters will be analyzed using the acceptable analytical protocols cited in 35 IAC '742 rules.

Following receipt of the analytical data, a data quality assessment and validation will be completed.

00126.001001

00126.001802

6.0 WASTE HANDLING PROTOCOLS

Wastes generated may include general refuse, used personal protective equipment ("PPE"), soil cuttings from soil borings, and decontamination fluids.

General refuse including plastic sheeting, buckets, paper bags, etc. will be removed from the Site. Daily refuse and PPE will be collected in plastic bags and disposed of at the end of each day.

Soil cuttings and decontamination fluids are expected to be minimal and will be staged in Department of Transportation ("DOT") approved 55-gallon drums pending characterization and disposal.

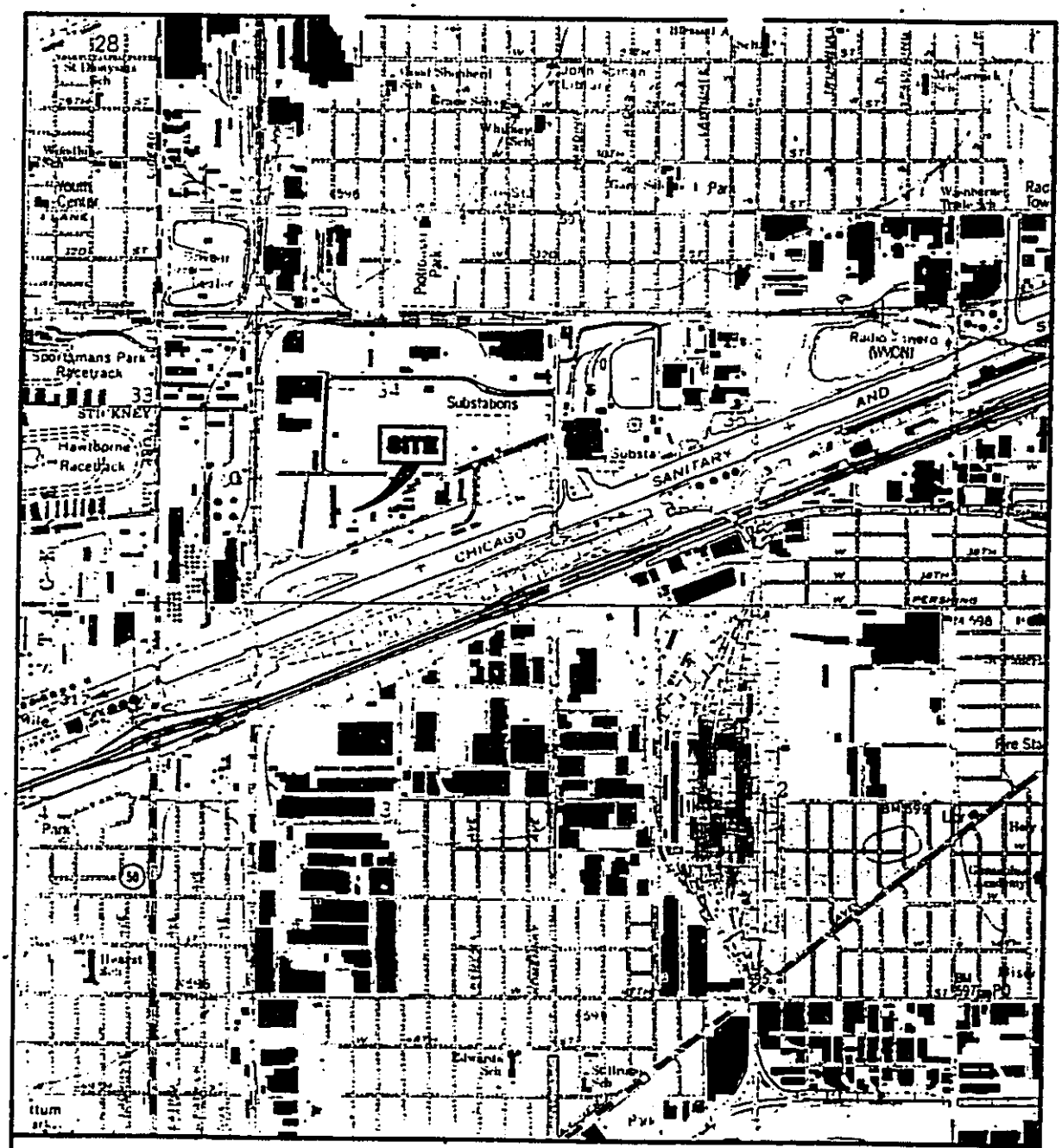
00126.001803

TABLE A.1

SUMMARY OF POTENTIAL ANALYTICAL METHODS
FORMER COCA-COLA USA SITE
CHICAGO, ILLINOIS

Parameter	*Sampling Location*	*Method*	*Notes*
Chemical Analyses			
BTEX[1]	Surface or Subsurface Surface or Subsurface	SW-846 8021 SW-846 5035	
Geotechnical Analyses			
Soil Bulk Density	Subsurface	ASTM - D 2937-94	drive cylinder method
Soil Particle Density	Surface or Subsurface	ASTM - D 854-92	specific gravity of soil
Moisture Content	Surface or Subsurface	ASTM - D 4959-89 ASTM - D 4643-93 ASTM - D 2216-92 ASTM - D 3017-88 Equivalent USEPA Method	reapproved 1994 microwave oven laboratory determination reapproved 1993 methods 3541 or 3550
Organic Carbon Content	Surface or Subsurface	Nelson and Sommers (1982) ASTM - D 2974-87 USEPA Method 9060 A	reapproved 1995 total organic content
Hydraulic Conductivity	Surface or Subsurface	ASTM - D 5084-90 pump test slug test	flexible wall permeameter

[1]BTEX - benzene, toluene, ethylbenzene and xylene



BASE SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE; ENGLEWOOD, IL 1993

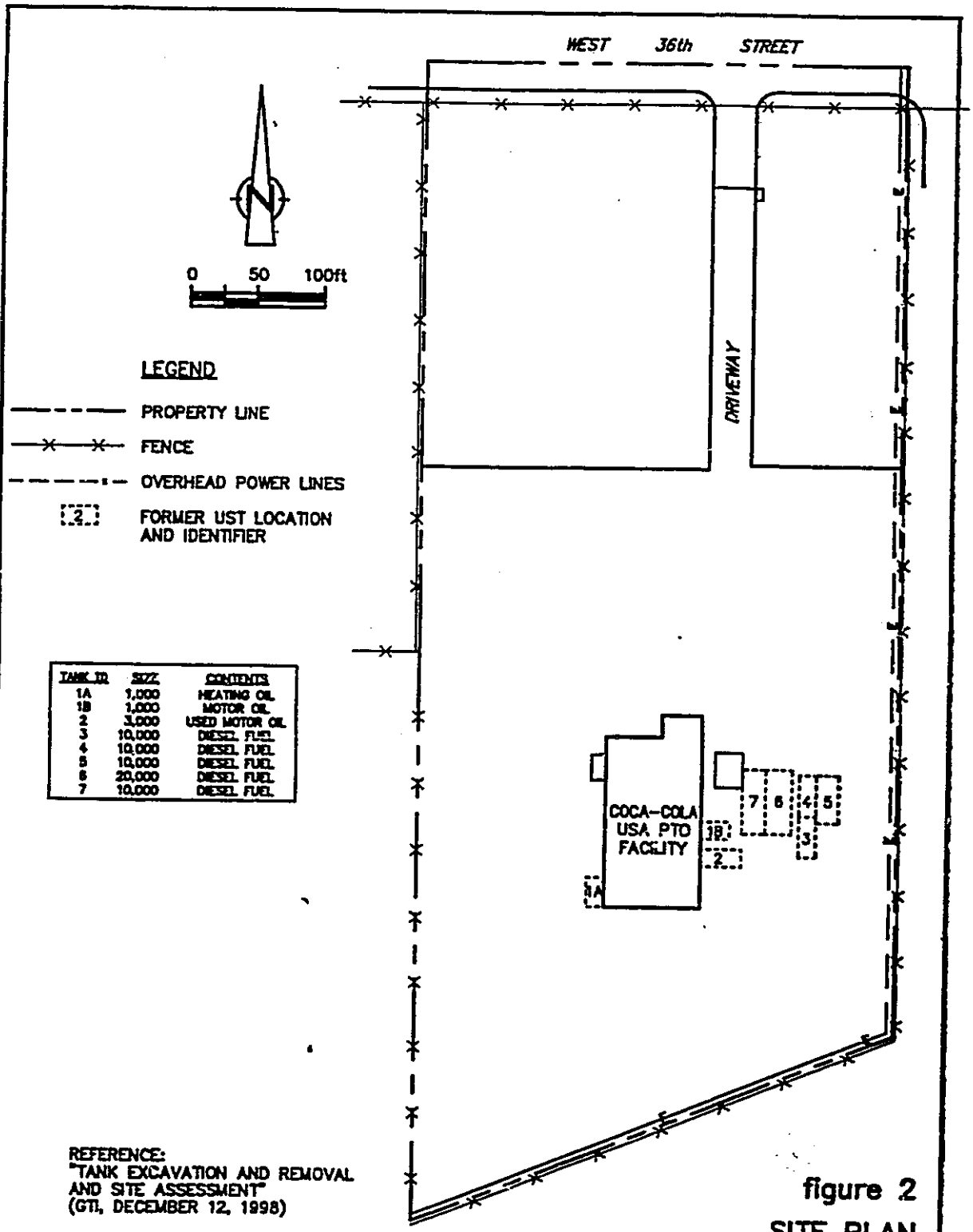
0 1/4 1/2 mile

CRA

figure 1

SITE LOCATION
COCA-COLA USA
Chicago, Illinois

13230-00(SIMM001)GN-C0001 JAN 27/99



TANK ID	SIZE	CONTENTS
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1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

REFERENCE:
"TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1998)

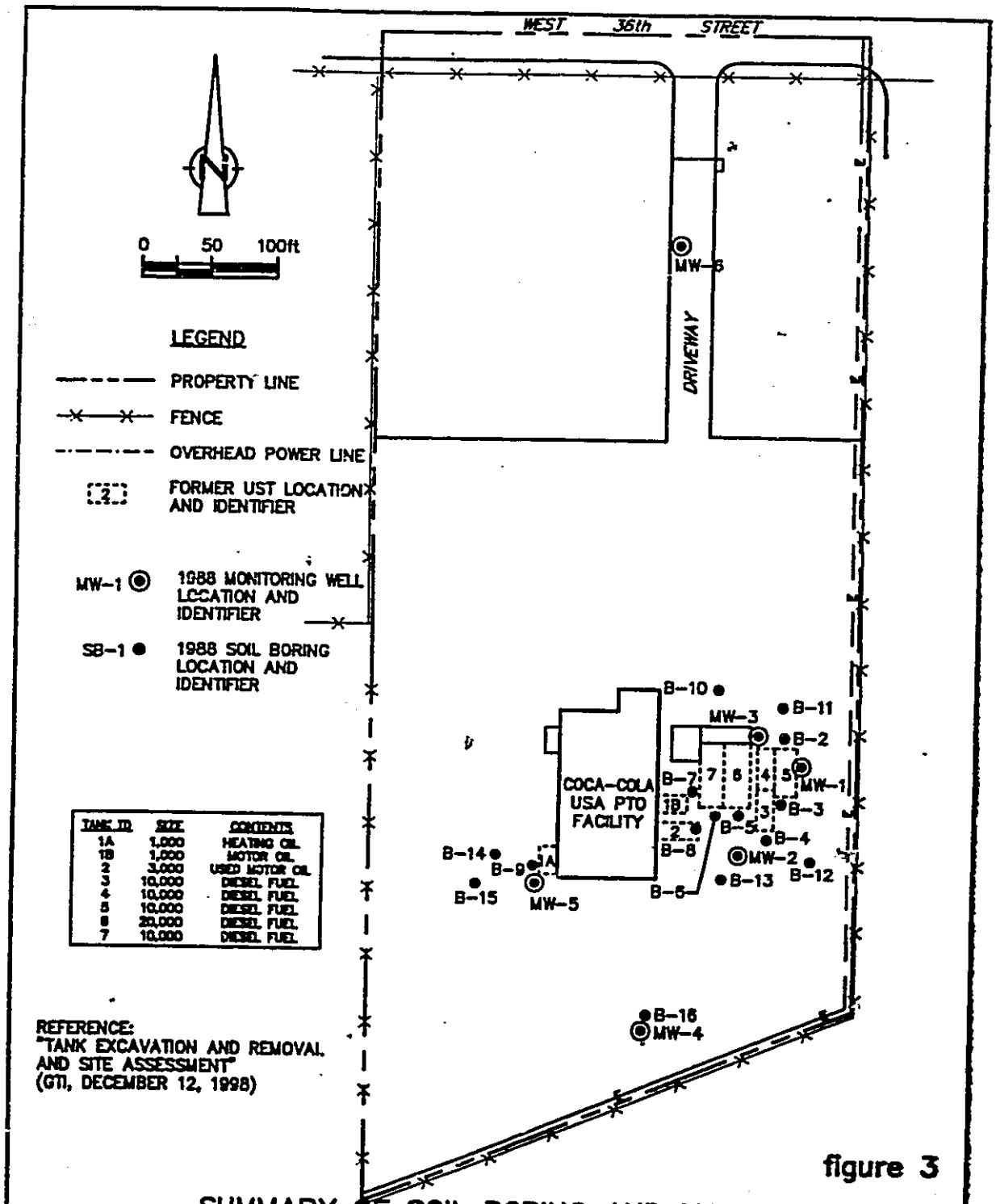
figure 2

SITE PLAN
FORMER COCA-COLA USA SITE
Chicago, Illinois

CRA

13230-00(SIMH001)GN-C0002 JAN 27/99

00126.001805



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2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

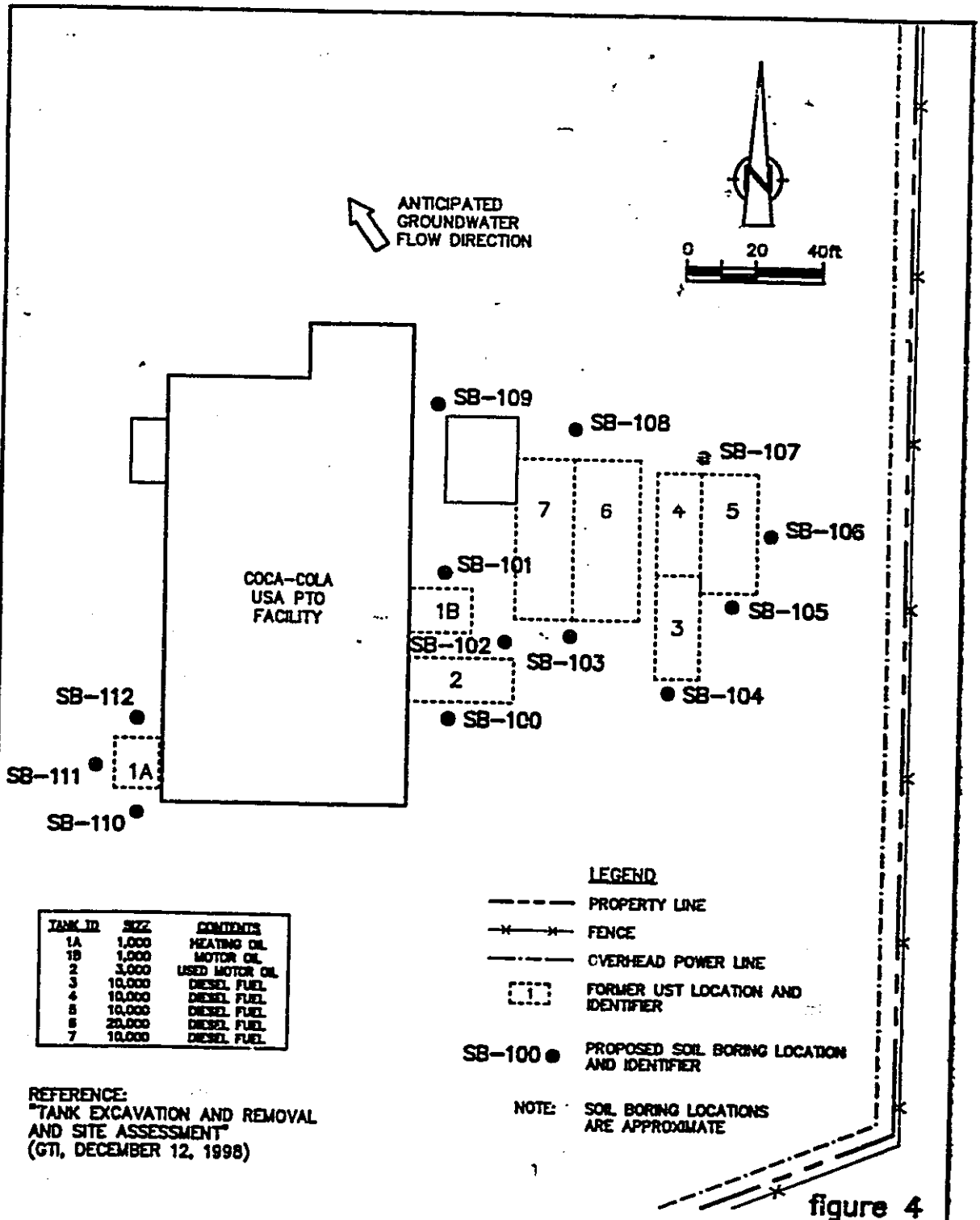
figure 3

SUMMARY OF SOIL BORING AND MONITORING WELL INSTALLATIONS COMPLETED DURING 1988 INVESTIGATIONS
FORMER COCA-COLA USA SITE
Chicago, Illinois

CRA

13230-00(SIMM001)GN-C0003 JAN 27/99

00126.001806



TANK ID	SIZE	CONTENTS
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2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

REFERENCE:
"TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1998)

figure 4

PROPOSED SOIL BORING LOCATIONS
FORMER COCA-COLA USA SITE
Chicago, Illinois

CRA

13230-00(SIMMS001)GN-C0004 JAN 27/99

00126.001807

00126.001808

APPENDIX D

SOIL BORING STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-01)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-100
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, some silt, little sand, trace of gravel, very stiff, dark brown, moist, (FILL)						
	– as above but stiff			1SS		27	1.0
2.5			BENTONITE CHIPS				
				2SS		10	NR
5.0							
			6" ø BOREHOLE	3SS		11	1.4
7.5	CL-CLAY, some silt, stiff, brown, wet						
	– clay becomes saturated		▽	4SS		12	0.6
	END OF HOLE @ 9.0ft BGS						
10.0							
12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-02)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-101
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, some silt, little sand, trace of gravel, stiff, dark brown, moist, trace of coal/fragments, (FILL)						
	- coal seam		BENTONITE CHIPS	1SS		12	2.8
-2.5							
			2" ø BOREHOLE	2SS		13	2.3
-5.0							
				3SS		18	14.0
	- as above saturated with little wood fragments, petroleum odor		3" ø BOREHOLE				
	END OF HOLE @ 7.0ft BGS						
-7.5							
-10.0							
-12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

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STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-03)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-102
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, some silt, little sand and gravel, hard, dark brown, moist, (FILL)						
2.5			BENTONITE CHIPS	1SS		43	NR
			8" Ø BOREHOLE	2SS		10	1.4
5.0							
				3SS		12	37.3
	- gravel content increases to some (may be coal or slag) strong petroleum odor, sheen on soil clay is saturated trace of wood fragments		3" Ø BOREHOLE				
7.5	END OF HOLE @ 7.0ft BGS						
	- NOTE:						
	- SOIL SAMPLE RETAINED FOR CHEMICAL ANALYSES WAS COLLECTED ABOVE THE SATURATED ZONE (5.0-6.0ft. BGS)						
10.0							
12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

00126.001611

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-04)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-103
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	Brick fragments						
	CL-CLAY, some silt, little sand, trace of gravel and brick fragments, very stiff, dark brown, moist, (FILL)		BENTONITE CHIPS	1SS		18	2.3
-2.5							
	- as above no brick fragments, trace of wood		8" ø BOREHOLE	2SS		17	1.3
-5.0							
	- clay becomes saturated, (groundwater)			3SS		20	2.7
			3" ø BOREHOLE				
	END OF HOLE @ 7.0ft BGS						
-7.5							
-10.0							
-12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-05)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-104
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, some silt, little sand and gravel, very stiff, dark brown, moist. (FILL)		BENTONITE CHIPS	1SS		20	L9
2.5			8" ø BOREHOLE	2SS		14	L0
5.0	GW-GRAVEL, (coal or slag), little sand, saturated, petroleum odor. (FILL)			3SS		21	-
			3" ø BOREHOLE				
7.5	END OF HOLE @ 7.0ft BGS						
10.0							
12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-C3)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-105
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, some silt, little sand, stiff, mottled brown to dark brown, moist, (FILL)						
	- fine sand seam		BENTONITE CHIPS	1SS		12	1.7
2.5							
			8" Ø BOREHOLE	2SS		11	1.0
5.0							
	GW-GRAVEL, little sand, (may be coal or slag) saturated			3SS		22	-
7.5			4" Ø BOREHOLE			-	-
	END OF HOLE @ 9.0ft BGS - collected shelby tube sample from 9.0-11.0ft. BGS						
10.0							
12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-07)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-106
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, some silt, little sand, trace of gravel, very stiff, dark brown, moist, (FILL)						
-2.5			BENTONITE CHIPS	1SS		16	1.9
	- trace of brick fragments		8" Ø BOREHOLE	2SS		20	3.7
-5.0	- clay becomes saturated						
	CL-CLAY, some silt, trace of gravel, very stiff, dark brown, trace of vegetation		3" Ø BOREHOLE	3SS		17	-
	END OF HOLE @ 7.0ft BGS						
-7.5							
-10.0							
-12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

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STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-08)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-107
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, some silt, little sand, trace of gravel, very stiff, dark brown, moist, (FILL)						
2.5			BENTONITE CHIPS	1SS		17	3.0
			6" Ø BOREHOLE	2SS		18	3.2
5.0	- fine grained, coal seam, wet/saturated, (may be coal or slag)						4
				3SS		35	2.9
	CL-CLAY, little silt, trace of gravel, very stiff, grayish brown, wet						
7.5	- clay becomes saturated		3" Ø BOREHOLE	4SS		18	10.9
	END OF HOLE @ 9.0ft BGS NOTE: - NO SOIL SAMPLE RETAINED FOR CHEMICAL ANALYSES						
10.0							
12.5							

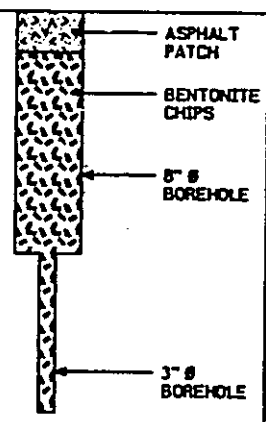
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-09)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-107A
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	FOR STRATIGRAPHIC DETAILS SEE LOG SB-107			ISS		17	3.5
2.5							
5.0	END OF HOLE @ 5.0ft BGS - NOTE: - SOIL BORING SB-107A WAS INSTALLED DIRECTLY ADJACENT TO SB-107						
7.5							
10.0							
12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

00126.001817

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-10)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-108
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, some silt, trace of sand and gravel, very stiff, dark brown, moist, trace of coal, (FILL)		BENTONITE CHIPS	1SS		18	1.5
-2.5			8" ø BOREHOLE	2SS		22	1.2
-5.0	SW-SAND, gravely, little clay, medium dense, dark brown/black fill saturated, petroleum odor, (FILL) (may be coal or slag)		3" ø BOREHOLE	3SS		19	60
	CL-CLAY, little silt, trace of gravel, very stiff, grayish brown, saturated						
-7.5	END OF HOLE @ 7.0ft BGS						
-10.0							
-12.5							

NOTE:
- SOIL SMAPLE RETAINED FOR CHEMICAL ANALYSES WAS COLLECTED ABOVE THE SATURATED ZONE (5.0-6.0ft. BGS INTERVAL)

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▽
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-11)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-109
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, some silt, little sand, trace of gravel, stiff, dark brown, moist. (FILL)		BENTONITE CHIPS	1SS		13	3.0
2.5			6" Ø BOREHOLE	2SS		11	NR
5.0	CL-CLAY, little silt and fine sand, very stiff, grayish brown, moist			3SS		19	4.1
7.5			4" Ø BOREHOLE	4ST		-	-
10.0	END OF HOLE @ 9.0ft BGS - NOTE: - COLLECTED SHELBY TUBE SAMPLE FROM THE 7-9ft. BGS INTERVAL						
12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-12)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-110
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, little silt, trace of sand and gravel, very stiff, grayish brown, moist, (FILL)		BENTONITE CHIPS	1SS		25	0.9
2.5			8" Ø BOREHOLE	2SS		14	3.8
5.0							
	CL-CLAY, organic rich, trace of gravel, dark gray, saturated, trace of vegetation and wood			3SS		30	3.8
7.5			4" Ø BOREHOLE	4ST		-	-
	END OF HOLE @ 9.0ft BGS NOTE: - COLLECTED SHELBY TUBE SAMPLE FROM THE 7-9ft. BGS INTERVAL						
10.0							
12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▽
CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-13)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-111
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: .W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, little silt, trace of sand and gravel, grayish brown, very stiff, moist - some sand, little gravel, dark brown, moist		BENTONITE CHIPS	1SS		19	1.0
2.5			8" ø BOREHOLE	2SS		18	7.8
5.0	- wet						
	- concrete			3SS		18	-
	CL-CLAY, little silt, trace of vegetation, organic rich, dark gray, saturated		3" ø BOREHOLE				
	END OF HOLE @ 7.0ft BGS						
7.5							
10.0							
12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(CL-14)
Page 1 of 1

PROJECT NAME: FORMER COCA-COLA SITE
PROJECT NUMBER: 13230
CLIENT: THE COCA-COLA COMPANY
LOCATION: CHICAGO, ILLINOIS
DRILLING CONTRACTOR: BOART LONGYEAR

HOLE DESIGNATION: SB-112
DATE COMPLETED: FEBRUARY 4, 1999
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. POCHRON
DRILLER: BRIAN LOVELAND

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt and Gravel		ASPHALT PATCH				
	CL-CLAY, little silt, trace of sand and gravel, very stiff, brown, moist						
	- little sand and gravel, dark, brown		BENTONITE CHIPS	1SS		25	0.8
-2.5							
	- mottled brown to dark brown		8" ø BOREHOLE	2SS		24	0.9
-5.0	- saturated						
	- concrete		3" ø BOREHOLE	3SS		38	-
	END OF HOLE @ 7.0ft BGS						
-7.5							
-10.0							
-12.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

00126.001627

APPENDIX E

LABORATORY ANALYTICAL REPORT

GREAT LAKES ANALYTICAL

1380 Busch Parkway
Buffalo Grove, Illinois 60089

Email: info@glalabs.com
(847) 808-7766 FAX (847) 808-7772

Date: February 12, 1999

Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Project: 13230, Former Coca-Cola Site

Enclosed are the results from 13 soil and 2 water samples received at Great Lakes Analytical on Feb 5, 1999. The requested analyses are listed below:

SAMPLE#	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
902009601	Soil, S-020499-WP-001	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009602	Soil, S-020499-WP-002	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009603	Soil, S-020499-WP-003	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009604	Soil, S-020499-WP-004	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009605	Soil, S-020499-WP-005	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009606	Soil, S-020499-WP-007	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009607	Soil, S-020499-WP-006	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009608	Water, GW-020499-WP-008	2/4/99	BTEX, EPA 5030/8021
902009609	Soil, S-020499-WP-009	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009610	Soil, S-020499-WP-010	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009611	Soil, S-020499-WP-011	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009612	Water, GW-020499-WP-012	2/4/99	BTEX, EPA 5030/8021
902009613	Soil, S-020499-WP-013	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5
902009614	Soil, S-020499-WP-014	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5

902009601.CRA <1>

902009615	Soil, S-020499-WP-015	2/4/99	BTEX, EPA 5035/8021 Percent Solids, EPA 7.3.3.1.5

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Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

GREAT LAKES ANALYTICAL

Jim Dowe

Kevin W. Keeley
Laboratory Director

GREAT LAKES ANALYTICAL

1380 Busch Parkway
Buffalo Grove, Illinois 60089

Email: info@glalabs.com
(847) 808-7766 FAX (847) 808-7772

Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Sample Descript: Soil
Analysis for: Percent Solids, EPA 7.3.3.1.5
First Sample #: 9020096-01

Sampled: Feb 4, 1999
Received: Feb 5, 1999

Analyzed: Feb 8-10, 1999
Reported: Feb 12, 1999

LABORATORY ANALYSIS FOR: Percent Solids, EPA 7.3.3.1.5

Sample Number	Sample Description	Detection Limit %	Sample Result %
9020096-01	S-020499-WP-001	0.10	74
9020096-02	S-020499-WP-002	0.10	90
9020096-03	S-020499-WP-003	0.10	87
9020096-04	S-020499-WP-004	0.10	85
9020096-05	S-020499-WP-005	0.10	74
9020096-06	S-020499-WP-007	0.10	83
9020096-07	S-020499-WP-006	0.10	82
9020096-09	S-020499-WP-009	0.10	86
9020096-10	S-020499-WP-010	0.10	90
9020096-11	S-020499-WP-011	0.10	86
9020096-13	S-020499-WP-013	0.10	85

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

GREAT LAKES ANALYTICAL

1380 Busch Parkway
Buffalo Grove, Illinois 60089

Email: info@glalabs.com
(847) 808-7766 FAX (847) 808-7772

Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Sample Descript: Soil
Analysis for: Percent Solids, EPA 7.3.3.1.5
First Sample #: 9020096-14

Sampled: Feb 4, 1999
Received: Feb 5, 1999
Analyzed: Feb 10, 1999
Reported: Feb 12, 1999

LABORATORY ANALYSIS FOR: Percent Solids, EPA 7.3.3.1.5

Sample Number	Sample Description	Detection Limit %	Sample Result %
9020096-14	S-020499-WP-014	0.10	92
9020096-15	S-020499-WP-015	0.10	84

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

Accreditations/Certifications: Illinois EPA-100261, New Jersey DEP-54001, New York DOH-11487, USACE, Wisconsin DNR-999917150

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Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Matrix Descript: Soil
Analysis Method: EPA 5035/8021
First Sample #: 9020096-01

Sampled: Feb 4, 1999
Received: Feb 5, 1999

Analyzed: Feb 12, 1999
Reported: Feb 12, 1999

BTEX ANALYSIS (EPA 8021)

Sample Number	Sample Description	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
9020096-01	S-020499-WP-001	N.D.	N.D.	N.D.	N.D.
9020096-02	S-020499-WP-002	0.095	0.081	0.063	0.16
9020096-03	S-020499-WP-003	N.D.	N.D.	N.D.	N.D.
9020096-04	S-020499-WP-004	0.025	0.097	N.D.	0.12
9020096-05	S-020499-WP-005	0.041	0.12	0.14	0.38
9020096-06	S-020499-WP-007	N.D.	N.D.	N.D.	0.025
9020096-07	S-020499-WP-006	0.22	0.036	0.068	0.13
9020096-09	S-020499-WP-009	0.031	0.057	0.033	0.13
9020096-10	S-020499-WP-010	0.067	0.050	0.036	0.11
Detection Limits:		**0.025**	**0.025**	**0.025**	**0.025**

Analytes reported as N.D. were not present above the stated limit of detection.

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

Accreditations/Certifications: Illinois EPA-100261, New Jersey DEP-54001, New York DOH-11487, USACE, Wisconsin DNR-999917160

902009301.CRA <3>

GREAT LAKES ANALYTICAL

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Buffalo Grove, Illinois 60089

Email: info@glalabs.com
(847) 808-7766 FAX (847) 808-7772

Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Matrix Descript: Soil
Analysis Method: EPA 5035/8021
First Sample #: 9020096-11

Sampled: Feb 4, 1999
Received: Feb 5, 1999

Analyzed: Feb 12, 1999
Reported: Feb 12, 1999

BTEX ANALYSIS (EPA 8021)

Sample Number	Sample Description	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
9020096-11	S-020499-WP-011	0.055	0.10	0.045	0.19
9020096-13	S-020499-WP-013	N.D.	0.028	0.027	0.081
9020096-14	S-020499-WP-014	0.23	0.36	0.28	0.78
9020096-15	S-020499-WP-015	0.059	0.12	0.094	0.47
Detection Limits:		**0.025**	**0.025**	**0.025**	**0.025**

Analytes reported as N.D. were not present above the stated limit of detection.

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

GREAT LAKES ANALYTICAL

1380 Busch Parkway
Buffalo Grove, Illinois 60089

Email: info@glalabs.com
(847) 808-7766 FAX (847) 808-7772

Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Matrix Descript: Water
Analysis Method: EPA 5030/8021
First Sample #: 9020096-08

Sampled: Feb 4, 1999
Received: Feb 5, 1999
Analyzed: Feb 11, 1999
Reported: Feb 12, 1999

BTEX ANALYSIS (EPA 8021)

Sample Number	Sample Description	Benzene mg/L (ppm)	Toluene mg/L (ppm)	Ethyl Benzene mg/L (ppm)	Xylenes mg/L (ppm)
9020096-08	GW-020499-WP-008	N.D.	N.D.	N.D.	N.D.
9020096-12	GW-020499-WP-012	N.D.	N.D.	N.D.	N.D.
Detection Limits:		0.00050	0.00050	0.00050	0.00050

Analytes reported as N.D. were not present above the stated limit of detection.

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

902009601.CRA <5>

GREAT LAKES ANALYTICAL
1380 Busch Parkway
Buffalo Grove, Illinois 60089
Email: info@glalabs.com
(847) 808-7766 FAX (847) 808-7772

Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Matrix: Soil
Method: BTEX
QC Sample Group: 902009601-07, 9-11, 13-15

Reported: Feb 12, 1999

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethylbenzene	Xylene
Method:	8021	8021	8021	8021
Analyst:	B. Buehrle	B. Buehrle	B. Buehrle	B. Buehrle
Concentration:	50	50	50	50
Units:	ng	ng	ng	ng
LAB. CONTROL SAMPLE DATA				
Date Analyzed:	Feb 12, 1999	Feb 12, 1999	Feb 12, 1999	Feb 12, 1999
Instrument I.D.#	GC-8	GC-8	GC-8	GC-8
LCS% Recovery:	99	87	92	96
Control Limits:	85-115	85-115	85-115	85-115
MATRIX SPIKE & DUP. DATA	9020059-01	9020059-01	9020059-01	9020059-01
Date Analyzed:	Feb 12, 1999	Feb 12, 1999	Feb 12, 1999	Feb 12, 1999
Instrument I.D.#	GC-8	GC-8	GC-8	GC-8
Matrix Spike % Recovery:	124	114	126	127
Matrix Spike Duplicate % Recovery:	118	102	127	103
Relative % Difference:	5.0	11	0.79	21
Control Limits:	50-130	50-130	50-130	50-130

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.})/2} \times 100$

902009601.CRA <7>

GREAT LAKES ANALYTICAL

1380 Busch Parkway
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Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Matrix: Water
Method: BTEX
QC Sample Group: 902009608, 12

Reported: Feb 12, 1999

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethylbenzene	Xylene
Method:	8021	8021	8021	8021
Analyst:	B. Buehrle	B. Buehrle	B. Buehrle	B. Buehrle
Concentration:	50	50	50	50
Units:	ng	ng	ng	ng
LAB. CONTROL SAMPLE DATA				
Date Analyzed:	Feb 11, 1999	Feb 11, 1999	Feb 11, 1999	Feb 11, 1999
Instrument I.D.#	GC-13	GC-13	GC-13	GC-13
LCS% Recovery:	90	105	108	109
Control Limits:	85-115	85-115	85-115	85-115
MATRIX SPIKE & DUP. DATA	9020145-01	9020145-01	9020145-01	9020145-01
Date Analyzed:	Feb 11, 1999	Feb 11, 1999	Feb 11, 1999	Feb 11, 1999
Instrument I.D.#	GC-13	GC-13	GC-13	GC-13
Matrix Spike % Recovery:	109	125	129	131
Matrix Spike Duplicate % Recovery:	91	102	108	111
Relative % Difference:	18.0	20	18	14
Control Limits:	80-120	80-120	80-120	80-120

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

% Recovery: $\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.})/2} \times 100$

902009601.CRA <8>

GREAT LAKES ANALYTICAL

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Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Matrix Descript: Soil
Analysis Method: EPA 5030/8021
First Sample #: Blank

Analyzed: Feb 12, 1999
Reported: Feb 12, 1999

BTEX ANALYSIS (EPA 8021)

Sample Number	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
Blank	N.D.	N.D.	N.D.	N.D.
Detection Limits:	0.025	0.025	0.025	0.025

Analytes reported as N.D. were not present above the stated limit of detection.

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

Accreditations Certifications: Illinois EPA-100261 New Jersey DEP-54001 New York DOH-11487
USACE Wisconsin DNR-999172150

GREAT LAKES ANALYTICAL

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Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Matrix Descript: Water
Analysis Method: EPA 5030/8021
First Sample #: Blank

Analyzed: Feb 11, 1999
Reported: Feb 12, 1999

BTEX ANALYSIS (EPA 8021)

Sample Number	Benzene mg/L (ppm)	Toluene mg/L (ppm)	Ethyl Benzene mg/L (ppm)	Xylenes mg/L (ppm)
Blank	N.D.	N.D.	N.D.	N.D.
Detection Limits:	**0.00050**	**0.00050**	**0.00050**	**0.00050**

Analytes reported as N.D. were not present above the stated limit of detection.

GREAT LAKES ANALYTICAL

Jim Dowe

Kevin W. Keeley
Laboratory Director

GREAT LAKES ANALYTICAL
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Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Method: EPA 8021
Matrix: Soil
QC Sample #: 9020096-01

Reported: Feb 12, 1999

QUALITY CONTROL DATA REPORT: SURROGATE RECOVERIES, EPA 8021

Surrogate	Percent Recovery, 9020096-01	Percent Recovery, 9020096-02	Percent Recovery, 9020096-03	Percent Recovery, 9020096-04	Percent Recovery, 9020096-05	Percent Recovery, 9020096-06	Percent Recovery, 9020096-07
Fluorobenzene	102	110	88	52	127	90	102

Surrogate	Percent Recovery, 9020096-09	Percent Recovery, 9020096-10	Percent Recovery, 9020096-11	Percent Recovery, 9020096-13	Percent Recovery, 9020096-14	Percent Recovery, 9020096-15	Percent Recovery, Blank
Fluorobenzene	99	124	109	96	95	117	113

Surrogate	Percent Recovery, LCS	Percent Recovery, Matrix Spike	Percent Recovery, Matrix Spike Dup	Control limits
Fluorobenzene	110	111	104	50-130

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

Accreditations/Certifications: Illinois EPA-100261, New Jersey DEP-54001, New York DOH-11487
USACE, Wisconsin DNR-999917160

GREAT LAKES ANALYTICAL
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Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631
Attention: Nancy Bergstrom

Client Project ID: 13230, Former Coca-Cola Site
Method: EPA 8021
Matrix: Water
QC Sample #: 9020096-08

Reported: Feb 12, 1999

QUALITY CONTROL DATA REPORT: SURROGATE RECOVERIES, EPA 8021

Surrogate	Percent Recovery, 9020096-08	Percent Recovery, 9020096-12	Percent Recovery, Blank	Percent Recovery, LCS	Percent Recovery, Matrix Spike	Percent Recovery, Matrix Spike Dup	Control Limits
Fluorobenzene	100	103	101	108	114	116	80-120

GREAT LAKES ANALYTICAL

Kevin W. Keeley
Laboratory Director

Accreditations/Certifications: Illinois EPA-100261, New Jersey DEP-54001, New York DOH-11487, USACE, Wisconsin DNR-999917160

CRA
CONESTOGA-ROVERS & ASSOCIATES
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631 (773)380-9933

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): Great Lakes

REFERENCE NUMBER: 13230

PROJECT NAME: Former Coca-Cola USA Site

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: Walter Parker

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE MATRIX	No. OF CONTAINERS	BTEX	% Solids	REMARKS
1	2/4/99	0955	S-020499-WP-001	Soil	2	X	X	90200960 1
2		1035	S-020499-WP-002		2	X	X	90200960 2
3		1105	S-020499-WP-003		2	X	X	90200960 3
4		1138	S-020499-WP-004		2	X	X	90200960 4
5		1300	S-020499-WP-005		2	X	X	90200960 5
6		1403	S-020499-WP-007		2	X	X	90200960 6
7		1414	S-020499-WP-006		2	X	X	90200960 7
8		1422	GW-020499-WP-008	Water	3	X		90200960 8
9		1455	S-020499-WP-009	Soil	2	X	X	90200960 9
10		1535	S-020499-WP-010	Soil	2	X	X	90200960 10
11		1600	S-020499-WP-011	Soil	2	X	X	90200960 11
12		1610	GW-020499-WP-012	Water	3	X		90200960 12
13		1652	S-020499-WP-013	Soil	2	X	X	90200960 13
14		1735	S-020499-WP-014	Soil	2	X	X	90200960 14
15		1755	S-020499-WP-015	Soil	2	X	X	90200960 15
			TOTAL NUMBER OF CONTAINERS		32			

RELINQUISHED BY: ① [signature]	DATE: 2/5/99 TIME:	RECEIVED BY: ② [signature]	DATE: 2-5 TIME:
RELINQUISHED BY: ② [signature]	DATE: 2-5-99 TIME: 1430	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: AIR BILL No.

White –Fully Executed Copy
Yellow –Receiving Laboratory Copy
Pink –Shipper Copy
Goldenrod –Sampler Copy

SAMPLE TEAM: W. Parker

RECEIVED FOR LABORATORY BY: K. Kell
DATE: 2/5/99 TIME: 1430

4088

APPENDIX F

DATA VALIDATION

CRA
CONESTOGA-ROVERS & ASSOCIATES
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631

CHICAGO FILE COPY
TELEPHONE: (773) 380-9933
FACSIMILE: (773) 380-6421

MEMORANDUM

TO: Steve Warner

REF. NO.: 13230

FROM: Nancy Bergstrom/lo/2 NMB

DATE: March 11, 1999

C.C.: Steve Day

RE: **Data Quality Assessment and Validation for the Samples Collected from the Former Coca-Cola PTO Site in Chicago, Illinois**

The following details a data quality assessment and validation for the samples collected from the Former Coca-Cola PTO Site in Chicago, Illinois. The samples, which are identified in Table 1, were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX)) by Great Lakes Analytical of Buffalo Grove, Illinois using Method 8021 from "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", EPA SW-846, 3rd Edition with promulgated Updates, November 1986. The quality control criteria used to assess the data were established by the method of analysis.[1]

Holding Time Period

The holding time period follows:

BTEX -14 days from sample collection to completion of analysis

The samples were prepared and analyzed within the required holding time period.

Method Blank Samples

Contamination of samples contributed by laboratory conditions or procedures was monitored by the data from concurrent preparation and analysis of method blank samples. Target analytes were not detected in the method blank samples.

Surrogate Compound Percent Recoveries

Individual sample performance for the organic analyses was monitored by assessing surrogate compound percent recovery data. The surrogate recovery acceptance criteria were met.

Laboratory Control Samples

Laboratory control sample (LCS) analysis serves to monitor the accuracy of the laboratory preparation and analysis methods. The LCS percent recoveries were acceptable.

[1] Application of quality assurance criteria was consistent with the relevant criteria in "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", EPA-540/R-94/012, February 1994.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

To assess the accuracy and precision of the analytical methods relative to the sample matrices, MS/MSD percent recoveries and relative percent differences (RPDs) were determined. The percent recoveries for several compounds violated the acceptance criteria for the MS/MSD samples. Qualification of the investigative data was not required since the samples chosen by the laboratory for MS/MSD analysis were not associated with the project. The percent recovery and RPD acceptance criteria were met for the remaining MS/MSD data.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision and are suitable for their intended use without qualification.

Attachments

TABLE 1

SAMPLE IDENTIFICATION NUMBERS
FORMER COCA-COLA PTO SITE
CHICAGO, ILLINOIS

S-020499-WP-001
S-020499-WP-002
S-020499-WP-003
S-020499-WP-004
S-020499-WP-005
S-020499-WP-006
S-020499-WP-007
GW-020499-WP-008
S-020499-WP-009
S-020499-WP-010
S-020499-WP-011
GW-020499-WP-012
S-020499-WP-013
S-020499-WP-014
S-020499-WP-015

APPENDIX G

LEGAL DESCRIPTION

No. [illegible]

QUIT CLAIM DEED—Statutory

(CORPORATION)

(Please Type and Type on Reverse Side Hereof)

Aug 20 '65 2-12 PM

20 936 445

*20936445

(The Above Space For Recorder's Use Only)

UNTC 5890578

THE GRANTOR Elizabeth Ann Cleary, a spinster

of the City of Chicago County of Cook State of Illinois for the consideration of ——TEN ($10.00)—— DOLLARS, and other good and valuable consideration in hand paid, CONVEYS and QUIT CLAIMS to THE COCA-COLA COMPANY

a corporation organized and existing under and by virtue of the laws of the State of Delaware having its principal office in the City of Atlanta County of and State of Georgia all interest in the following described Real Estate situated in the County of Cook and State of Illinois, to wit:

See attached Legal Description.

4.00

NO TAXABLE CONSIDERATION

Hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois.

DATED this 8th day of August 1969

Elizabeth Ann Cleary (Seal) (Seal)

(Seal) (Seal)

State of Illinois, County of Cook ss. I, the undersigned, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY that

Elizabeth Ann Cleary, a Spinster

personally known to me to be the same person whose name subscribed to the foregoing instrument appeared before me this day in person and acknowledged that she signed, sealed and delivered the said instrument as her free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and official seal, this 8th day of August 1969

Commission expires [illegible] 19[illegible]

ADDRESS OF PROPERTY:

THE ABOVE ADDRESS IS FOR STATISTICAL PURPOSES ONLY AND IS NOT A PART OF THIS DEED.

SEND SUBSEQUENT TAX BILLS TO:

MAIL TO: CHICAGO TITLE AND TRUST COMPANY
NAME 111 WEST WASHINGTON
ADDRESS CHICAGO, ILLINOIS 60602
CITY AND STATE P. BAKER

OR RECORDER'S OFFICE BOX NO. 222

20 936 445

Legal Description:

A parcel of land consisting of a part of each of Lots 1, 7 and 8, in County Clerk's Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principal Meridian; said parcel of land being bounded and described as follows:

Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is [illegible].97 feet south from the North line of said Southeast quarter, and running

thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet;

thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 839.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago;

thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of Section 34, and

thence north along said parallel line, a distance of 719.01 feet to the point of beginning;

containing 276,231 square feet of land, more or less.

20 936 445

END

Report Title: Focused Soil Investigation & Remedial Action Completion Report

Date of Report: 4/20/99

IL 532 1968
LPC 404 01/91

Printed on Recycled Paper

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/782-6762

APR 23 1999

CERTIFIED MAIL
P344296133

Coca Cola Company
Gregory J. Koch
One Coca Cola Plaza
Atlanta, GA 30313

Re: LPC #0316580016--Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th Street
Site Remediation Fiscal

Dear Mr. Koch:

Your application for enrollment for the above-referenced site in the Site Remediation Program and an advance partial payment in the amount of $500 for anticipated review and evaluation services was received by the Illinois Environmental Protection Agency ("Illinois EPA) on April 20, 1999. The application is complete and the site is enrolled as of that date.

This project has been assigned the billing code number of LP80 229 and the $500 advance partial payment has been credited to this account. The Illinois EPA project manager assigned to provide review and evaluation services for this project is Jay Gaydosh. Mr. Gaydosh is your primary Illinois EPA point of contact for this project and all routine correspondence and documents should be directed to him to ensure the quickest possible response.

If you have any questions or need further assistance, please contact Mr. Gaydosh at 217/785-0231.

Sincerely,

Hernando A. Albarracin

Hernando A. Albarracin
Unit Manager
Leaking Underground Storage Tank Section
Division of Remediation Management
Bureau of Land

cc: Steven J. Wanner

bcc: Division
Hernando Albarracin
Jay Gaydosh

SCREENED
M M

0316580016

P 344 296 133 24

US Postal Service

Receipt for Certified Mail

No Insurance Coverage Provided.

Do not use for International Mail (See reverse)

Coca Cola Company
Gregory J. Koch
One Coca Cola Plaza
Atlanta, GA 30313

Postage	$
Certified Fee	1.40
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	1.25
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form 3800, April 1995

Is your RETURN ADDRESS completed on the reverse side?

SENDER:

- Complete items 1 and/or 2 for additional services. 0316580016
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee): 24

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Coca Cola Company
Gregory J. Koch
One Coca Cola Plaza
Atlanta, GA 30313

4a. Article Number
P 344 296 133

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery

5. Received By: (Print Name)

6. Signature: (Addressee or Agent)
X

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, December 1994 102595-98-B-0229 Domestic Return Receipt

Thank you for using Return Receipt Service.

UNITED STATES POSTAL SERVICE

First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

• Print your name, address, and ZIP Code in this box •

Illinois Environmental Protection Agency

P.O. Box 19276 Mail Code #

Springfield, Il 62794-9276

62794-9276

PS Form 3800, April 1995 (Reverse)

Stick postage stamps to article to cover First-Class postage, certified mail fee, and charges for any selected optional services *(See front)*

1. If you want this receipt postmarked, stick the gummed stub to the right of the return address, leaving the receipt attached, and present the article at a post office service window or hand it to your rural carrier (no extra charge).

2. If you do not want this receipt postmarked, stick the gummed stub to the right of the return address of the article, date, detach, and retain the receipt, and mail the article.

3. If you want a return receipt, write the certified mail number and your name and address on a return receipt card, Form 3811, and attach it to the front of the article by means of the gummed ends if space permits. Otherwise, affix to back of article. Endorse front of article RETURN RECEIPT REQUESTED adjacent to the number.

4. If you want delivery restricted to the addressee, or to an authorized agent of the addressee, endorse RESTRICTED DELIVERY on the front of the article.

5. Enter fees for the services requested in the appropriate spaces on the front of this receipt. If return receipt is requested, check the applicable blocks in item 1 of Form 3811.

6. Save this receipt and present it if you make an inquiry.

Conestoga-Rovers & Associates
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631
(773) 380-9933 Office (773) 380-6421 Fax

August 9, 1999

Reference No. 13230

Mr. Rick Lucas
Manager - Voluntary Site Remediation Unit
Bureau of Land Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62794-9276

VIA TELEFACSIMILE AND OVERNIGHT COURIER

Dear Mr. Lucas:

Re: Former Coca-Cola PTO Property
4301 West 36th Street, Chicago, Illinois
LPC# 0316580016 -- Cook County

SRP

Enclosed please find the information clarifying the legal description of the property which was requested by the Agency in relation to the report entitled "Focused Site Investigation and Remedial Action Completion Report, Former Coca-Cola USA Facility, Chicago, Illinois" originally filed with the Agency on April 20, 1999.

Coca-Cola is re-submitting the above referenced report, which is incorporated by reference in its entirety, with this clarification. It is our understanding based upon conversations with Division of Legal Counsel that re-submission of this report may be deemed to technically restart the Agency's review period (which otherwise ended on July 19, 1999). Without agreeing or disagreeing with this interpretation of law, Coca-Cola has agreed to this characterization on the understanding that the Agency is prepared to issue a No Further Remediation letter for this site on or about August 16, 1999.

Due to the pendency of a real estate transaction pertaining to this property, prompt action by your office is requested. Please contact me if you have any further questions or anticipate any further delay on this matter.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Steven J. Wanner, L.P.G.

SJW/ko/2
Attachment

cc: John Kim
Hernando Albarracin
Jay Gaydosh
Patricia Sharkey
Jeffrey Simmons
Greg Koch

RECEIVED
AUG 13 1999
IEPA/BOL

13230

Client - Supplied

No. 821

QUIT CLAIM DEED—Statutory

(INDIVIDUAL TO CORPORATION)

Approved by [Chicago Title and Trust Co. / Chicago Real Estate Board]

COOK COUNTY, ILLINOIS
FILED FOR RECORD
AUG 20 '69 2 12 PM

20 936 445

*20936445

(The Above Space For Recorder's Use Only)

UNIT C 5890378

THE GRANTOR Elizabeth Ann Cleary, a spinster

of the City of Chicago County of Cook State of Illinois for the consideration of TEN ($10.00) DOLLARS, and other good and valuable consideration in hand paid, CONVEYS and QUIT CLAIMS to THE COCA-COLA COMPANY

a corporation organized and existing under and by virtue of the laws of the State of Delaware having its principal office in the City of Atlanta County of and State of Georgia all interest in the following described Real Estate situated in the County of Cook and State of Illinois, to wit:

See attached Legal Description.

4.00

hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois.

DATED this 8th day of August 1969

PLEASE PRINT OR TYPE NAME(S) BELOW SIGNATURE(S)

Elizabeth Ann Cleary (Seal) (Seal)

Elizabeth Ann Cleary

(Seal) (Seal)

State of Illinois, County of Cook ss. I, the undersigned, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY that

Elizabeth Ann Cleary, a Spinster

personally known to me to be the same person whose name subscribed to the foregoing instrument appeared before me this day in person, and acknowledged that she signed, sealed and delivered the said instrument as her free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

LILLIAN DANIS NOTARY PUBLIC COOK COUNTY, ILL.

Given under my hand and official seal, this 8th day of August 1969

Commission expires February 21 1972

Lillian Danis
NOTARY PUBLIC

ADDRESS OF PROPERTY:

THE ABOVE ADDRESS IS FOR STATISTICAL PURPOSES ONLY AND IS NOT A PART OF THIS DEED.

SEND SUBSEQUENT TAX BILLS TO:

(NAME)

(ADDRESS)

MAIL TO: CHICAGO TITLE AND TRUST COMPANY
NAME 111 WEST WASHINGTON
ADDRESS CHICAGO, ILLINOIS 60602
CITY AND STATE ATTN: P. BAKER

OR RECORDER'S OFFICE BOX NO. 533

AFFIX "RIDERS" OR REVENUE STAMPS HERE

NO TAXABLE CONSIDERATION

DOCUMENT NUMBER 20 936 445

Legal Description:

A parcel of land consisting of a part of each of Lots 1, 7 and 8, in County Clerk's Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principal Meridian; said parcel of land being bounded and described as follows:

Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is 861.97 feet south from the North line of said Southeast quarter, and running

thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet;

thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 859.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago;

thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of Section 34, and

thence north along said parallel line, a distance of 719.01 feet to the point of beginning;

containing 270,231 square feet of land, more or less.

20 936 445

END OF RECORDED DOCUMENT

LUST TECHNICAL REVIEW NOTES

Refer to: LPC# ~~03156580016~~ 0316580016 Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th St.
SRP No. 229
SRP Technical Files

Project Reviewer: Jay F. Gaydosh
Review Date: August 4, 1999

Document Reviewed: Site Investigative Report/Remedial Action Completion Report
Prepared by: Connestoga-Rovers & Associates
Dated: April 20, 1999 **Received:** April 20, 1999
Timeclock Date: July 19, 1999

Review Notes: 8 USTs and 150 cubic yards of soil removed in 1988. Findings of the site investigation indicate that concentrations of BETX in the soil surrounding the former USTs are below Tier I residential ingestion, inhalation, and construction worker inhalation and Ingestion objectives. The Chicago MOU is proposed to address groundwater contamination.

PE Cert. By Ronald Frehner.

Comments: None

Recommendations: Issue NFA Letter

Response: Submit filed copy of the NFR letter and Environmental Notice

Date Due: As prescribed in the NFR Letter.

SCREEN MED

00126.001851

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/782-6762

CERTIFIED MAIL

AUG 11 1999

P344297902

The Coca-Cola Company
Attention: Gregory J. Koch
One Coca-Cola Plaza
Atlanta, Georgia 30313

Re: LPC #0316580016 -- Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Mr. Koch:

The Site Investigation Report and the Remedial Action Completion Report ("Report") (dated April 4, 1999, Log No. 99-701), as prepared by Conestoga-Rovers & Associates for the former Coca-Cola PTO property, has been reviewed by the Illinois Environmental Protection Agency ("Illinois EPA"). The Report demonstrates that the remedial action was successfully completed.

The remediation site, consisting of 6.7 acres, is legally described in the attached Environmental Notice and is commonly known as 4301 West 36th Street, Chicago, Illinois. Pursuant to Section 58.10 of the Environmental Protection Act ("Act") (415 ILCS 5/58.10), your request for a "No Further Remediation Determination" is granted under the conditions and terms specified in this No Further Remediation Letter ("Letter").

Issuance of this focused Letter signifies a release from further responsibilities under the Act in performing the approved remedial action. The Letter shall be considered prima facie evidence that the remediation site described in the attached Site Remediation Program ("SRP") Environmental Notice and shown in the attached Site Base Map does not constitute a threat to human health and the environment for the specified recognized environmental conditions so long as the site is utilized in accordance with the terms of this Letter.

CONDITIONS AND TERMS OF APPROVAL

SCREEN ...

LEVEL OF REMEDIATION AND LAND USE LIMITATIONS

1. The recognized environmental conditions, as characterized in the above-referenced Report, are identified in Table A.

2. The remediation objectives for the above-referenced site described in the SRP Environmental Notice of this Letter were established in accordance with the requirements of the Tiered Approach to Corrective Action Objectives (TACO, 35 Illinois Administrative Code Part 742) rules.

3. In accordance with Section 58.8(c) and 58.10(b)(3) of the Act (415 ILCS 5/58.8(c), 415 ILCS 5/58.10(b)(3)), the remediation site described in the attached SRP Environmental Notice and shown on the attached Site Base Map of this Letter is limited to residential or industrial/ commercial uses.

4. The land use specified in this Letter may be revised if:

   a) Further investigation or remedial action has been conducted that documents the attainment of objectives appropriate for the new land use; and

   b) A new Letter is obtained and recorded in accordance with Title XVII of the Act and regulations adopted thereunder.

PREVENTIVE, ENGINEERING, AND INSTITUTIONAL CONTROLS

5. Preventive: None.

   Engineering: None.

   Institutional: Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") effectively prohibits the installation of potable water supply wells (and the use of such wells) and is an acceptable institutional control under the following conditions:

   Each affected property owner and the City of Chicago must receive written notification from the Remediation Applicant desiring to use the ordinance as an institutional control that groundwater remediation objectives have been approved by the Illinois EPA. Written proof of this notification shall be submitted to the Illinois EPA within 45 days from the date of this Letter. The notification shall include:

   a) The name and address of the local unit of government;

   b) The citation of the ordinance used as an institutional control in this Letter.

   c) A description of the property being sent notice by adequate legal description or by reference to a plat showing the boundaries;

00126.001653

d) A statement that the ordinance restricting the groundwater use has been used by the Illinois EPA in reviewing a request for groundwater remediation objectives;

e) A statement as to the nature of the release and response action with the name, address, and Illinois EPA inventory identification number; and

f) A statement as to where more information may be obtained regarding the ordinance.

The following activities shall be grounds for voidance of the ordinance as an institutional control and this Letter:

a) Modification of the reference ordinance to allow potable uses of groundwater;

b) Approval of a site-specific request, such as a variance, to allow use of groundwater at the site;

c) Violation of the terms of an institutional control recorded.

As a part of its corrective action plan, the remediation site has relied upon Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, prohibiting potable uses of groundwater as defined therein. Proof of notification of affected parties, if any, shall be submitted in accordance with 35 Ill. Adm. Code 742.1015(b) and (c) within 45 days of the issuance of this NFR Letter.

6. Failure to establish, operate and maintain controls in full compliance with the Act, applicable regulations, and the above-referenced Report may result in voidance of this Letter.

OTHER TERMS

7. Any contaminated soil or groundwater that is removed, excavated, or disturbed from the above-referenced site must be handled in accordance with all applicable laws and regulations.

8. Where the Remediation Applicant is not the sole owner of the remediation site, the Remediation Applicant shall complete the attached "Property Owner Certification of NFR Letter Under the Site Remediation Program" form. This certification by original signature of each property owner, or the authorized agent of the owner(s), of the remediation site or any portion thereof who is not a Remediation Applicant shall be recorded along with this Letter.

00125.001854

9. Further information regarding this remediation site can be obtained through a written request under the Freedom of Information Act (5 ILCS 140) to:

Illinois Environmental Protection Agency
Attention: Freedom of Information Act Officer
Bureau of Land -- #24
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

10. Pursuant to Section 58.10(f) of the Act (415 ILCS 5/58.10(f)), should the Illinois EPA seek to void this Letter, the Illinois EPA shall provide notice to the current title holder and to the Remediation Applicant at the last known address. The notice shall specify the cause for the voidance, explain the provisions for appeal, and describe the facts in support of this cause. Specific acts or omissions that may result in the voidance of this Letter under Sections 58.10(e)(1)-(7) of the Act (415 ILCS 5/58.10(e)(1)-(7)) include, but shall not be limited to:

a) Any violation of institutional controls or the designated land use restrictions;

b) The failure to operate and maintain preventive or engineering controls or to comply with any applicable groundwater monitoring plan;

c) The disturbance or removal of contamination that has been left in place in accordance with the above-referenced Report. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected consistent with the above-referenced Report;

d) The failure to comply with the recording requirements for this Letter;

e) Obtaining the Letter by fraud or misrepresentation;

f) Subsequent discovery of contaminants, not identified as part of the investigative or remedial activities upon which the issuance of the Letter was based, that pose a threat to human health or the environment;

g) The failure to pay the No Further Remediation Assessment Fee within 45 days after receiving a request for payment from the Illinois EPA;

h) The failure to pay in full the applicable fees under the Review and Evaluation Services Agreement within 45 days after receiving a request for payment from the Illinois EPA.

11. Pursuant to Section 58.10(d) of the Act, this Letter shall apply in favor of the following persons:

a) The Coca-Cola Company;

b) The owner and operator of the remediation site;

c) Any parent corporation or subsidiary of the owner of the remediation site;

d) Any co-owner, either by joint-tenancy, right of survivorship, or any other party sharing a relationship with the owner of the remediation site;

e) Any holder of a beneficial interest of a land trust or inter vivos trust, whether revocable or irrevocable, involving the remediation site;

f) Any mortgagee or trustee of a deed of trust of the owner of the remediation site or any assignee, transferee, or any successor-in-interest of the owner of the remediation site;

g) Any successor-in-interest of the owner of the remediation site;

h) Any transferee of the owner of the remediation site whether the transfer was by sale, bankruptcy proceeding, partition, dissolution of marriage, settlement or adjudication of any civil action, charitable gift, or bequest;

i) Any heir or devisee of the owner of the remediation site;

j) Any financial institution, as that term is defined in Section 2 of the Illinois Banking Act and to include the Illinois Housing Development Authority, that has acquired the ownership, operation, management, or control of the remediation site through foreclosure or under the terms of a security interest held by the financial institution, under the terms of an extension of credit made by the financial institution, or any successor in interest thereto; or

k) In the case of a fiduciary (other than a land trustee), the estate, trust estate, or other interest in property held in a fiduciary capacity, and a trustee, executor, administrator, guardian, receiver, conservator, or other person who holds the remediated site in a fiduciary capacity, or a transferee of such party.

12. This Letter, including all attachments, must be recorded as a single instrument with the Office of the Recorder or Registrar of Titles of Cook County. For recording purposes, the SRP Environmental Notice attached to this Letter should be the first page of the instrument filed. In addition, the City of Chicago's Memorandum of Understanding must be filed as an attachment of this Letter with the Office of the Recorder or Registrar of Titles of Cook County. This Letter shall not be effective until officially recorded by the Office of the Recorder or Registrar of Titles of Cook County in accordance with Illinois law so that it forms a permanent part of the chain of title for the Former Coca-Cola PTO property. Within 30 days of this Letter being recorded by the Office of the Recorder or Registrar of Titles of Cook County, a certified copy of this Letter and all attachments, as recorded, shall be obtained and submitted to the Illinois EPA as indicated below.

00126.001856

Mr. Robert O'Hara
Illinois Environmental Protection Agency
Bureau of Land/RPM Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

13. In accordance with Section 58.10(g) of the Act, a No Further Remediation Assessment Fee based on the costs incurred for the remediation site by the Illinois EPA for review and evaluation services will be applied in addition to the fees applicable under the Review and Evaluation Services Agreement. Request for payment of the No Further Remediation Assessment Fee will be included with the final billing statement.

If you have any questions regarding this correspondence, you may contact the Illinois EPA project manager, Jay F. Gaydosh, at 217/785-0231.

Sincerely,

Hernando A. Albarracin

Hernando A. Albarracin
Unit Manager
Leaking Underground Storage Tank Section
Division of Remediation Management
Bureau of Land

HAA:JFG:ct\991433.FRM

Enclosures: SRP Environmental Notice
Table A
Site Base Map
Property Owner Certification Form
Chicago Memorandum of Understanding

cc: Conestoga-Rovers & Associates

bcc: Division
Hernando Albarracin, w/o MOU
Jay Gaydosh, w/o MOU
Ginger Miller, w/o MOU
Bob O'Hara, w/o MOU

00126.001857

Table A: Contaminants of Concern

Volatiles

CAS No.	Compound Name
71-43-2	Benzene
75-25-2	Bromoform
56-23-5	Carbon tetrachloride
108-90-7	Chlorobenzene
67-66-3	Chloroform
107-06-2	1,2-Dichloroethane
75-35-4	1,1-Dichloroethene
156-60-5	trans-1,2-Dichloroethene
78-87-5	1,2-Dichloropropane
542-75-6	1,3-Dichloropropene
10-41-4	Ethylbenzene
127-18-4	Tetrachloroethene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethene
75-01-4	Vinyl chloride
1330-210-7	Xylenes (total)

Polynuclear Aromatics

CAS No.	Compound Name
83-32-9	Acenaphthene
120-12-7	Anthracene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene
206-44-0	Fluoranthene
86-73-7	Fluorene
193-39-5	Indeno(1,2,3-c,d)pyrene
91-20-3	Naphthalene
129-00-0	Pyrene
208-96-8	Acenaphthalene
191-24-2	Benzo(g,h,i)perylene
85-01-8	Phenanthrene

JG:ct\991433.FRM

00126.001058

PREPARED BY:

Name: Former Coca-Cola PTO

Address: 4301 West 36th Street
Chicago, Illinois 60632

RETURN TO:

Name: The Coca-Cola Company
Attn: Gregory J. Koch

Address: One Coca-Cola Plaza
Atlanta, GA 30313

THE ABOVE SPACE FOR RECORDER'S OFFICE

THIS ENVIRONMENTAL NO FURTHER REMEDIATION LETTER MUST BE SUBMITTED BY THE REMEDIATION APPLICANT, WITHIN 45 DAYS OF ITS RECEIPT, TO THE OFFICE OF THE RECORDER OR REGISTRAR OF TITLES OF COOK COUNTY.

Illinois State EPA Number: 0316580016
The Coca-Cola Company, the Remediation Applicant, whose address is One Coca-Cola Plaza, Atlanta, GA, has performed investigative and/or remedial activities for the remediation site depicted on the attached Site Base Map and which remediation site can be identified by the following:

1. Legal description or Reference to a Plat Showing the Boundaries:

   A parcel of land consisting of a part of Lots 1, 7, and 8; in County Clerks Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principle Meridian; said parcel of land being bounded and described as follows:

   Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is 861.97 feet south from the North line of said Southeast quarter, and running thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet; thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 859.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago; thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southwest quarter of Section 34, and thence north along said parallel line, a distance of 719.01 feet to the point of beginning; containing 276,231 square feet of land, more or less.

00126.001859

00126-001860

2. Common Address: 4301 West 36th Street, Chicago, Illinois

3. Real Estate Tax Index/Parcel Index Numbers:

   S-020499-WP-001
   S-020499-WP-002
   S-020499-WP-003
   S-020499-WP-004
   S-020499-WP-005
   S-020499-WP-006
   S-020499-WP-007
   GW-020499-WP-008
   S-020499-WP-009
   S-020499-WP-010
   S-020499-WP-011
   GW-020499-WP-012
   S-020499-WP-013
   S-020499-WP-014
   S-020499-WP-015

4. Remediation Site Owner: The Coca-Cola Company

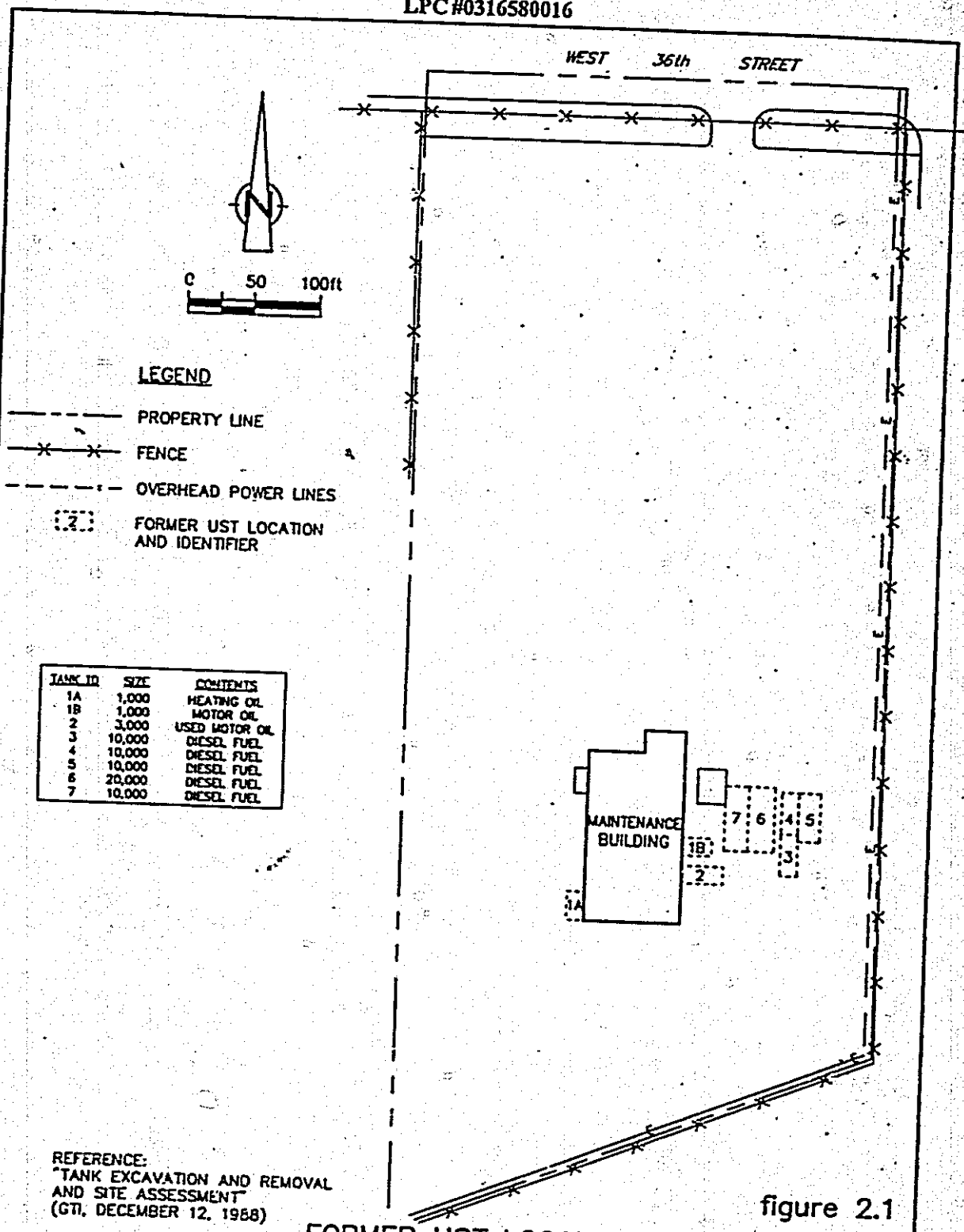
5. Land Use Limitation: Residential or Industrial/Commercial

6. Site Investigation: Focused

See attached No Further Remediation Letter for other terms.

JG:ct\991433.FRM

LPC#0316580016



TANK ID	SIZE	CONTENTS
1A	1,000	HEATING OIL
1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

REFERENCE:
"TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1988)

figure 2.1

FORMER UST LOCATIONS AND CONTENTS
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0002 APR 07/99

00126.001361

PROPERTY OWNER CERTIFICATION OF NFR LETTER UNDER THE SITE REMEDIATION PROGRAM

If the Remediation Applicant is not the sole owner of the remediation site, include the full legal name, title, the company, the street address, the city, the state, the ZIP Code, and the telephone number of all other property owners. Include the site name, street address, city, ZIP code, county, Illinois Inventory I.D. number and real estate tax index/parcel index number. The property owner(s), or the duly authorized agent of the owner(s) must certify, by original signature, the statement appearing below.

A duly authorized agent means a person who is authorized by written consent or by law to act on behalf of a property owner including, but not limited to:

1. For corporations, a principal executive officer of at least the level of vice-president;
2. For a sole proprietorship or partnership, the proprietor or a general partner, respectively; and
3. For a municipality, state or other public Agency, the head of the Agency or ranking elected official.

For multiple property owners, attach additional sheets containing the information described above, along with a signed, dated certification for each. All property owner certifications must be recorded along with the attached No Further Remediation Letter.

Property Owner Information

Owner's Name: _____

Title: _____

Company: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____ Phone: _____

Site Information

Site Name: _____

Site Address: _____

City: _____ State: _____ Zip Code: _____ County: _____

Illinois Inventory ID Number: _____

Real Estate Tax Index/Parcel Index No. _____

I hereby certify that I have reviewed the attached No Further Remediation Letter, and that I accept the terms and conditions and any land use limitations set forth in the Letter.

Owner's Signature: _____ Date: _____

SUBSCRIBED AND SWORN TO BEFORE ME
this _____ day of _____, 19__

_____
Notary Public

The Illinois EPA is authorized to require this information under Sections 415 ILCS 5/58 - 58.12 of the Environmental Protection Act and regulations promulgated thereunder. If the Remediation Applicant is not also the sole owner of the remediation site, this form must be completed by all owners of the remediation site and recorded with the NFR Letter. Failure to do so may void the NFR Letter. This form has been approved by the Forms Management Center. All information submitted to the Site Remediation Program is available to the public except when specifically designated by the Remediation Applicant to be treated confidentially as a trade secret or secret process in accordance with the Illinois Compiled Statutes, Section 7(a) of the Environmental Protection Act, applicable Rules and Regulations of the Illinois Pollution Control Board and applicable Illinois EPA rules and guidelines.

JG:ct\991433.FRM

00126.001863

P 344 297 902

US Postal Service SRP

Receipt for Certified Mail 24

No Insurance Coverage Provided

Do

Se

Str

Po

The Coca-Cola Company
Attn: Gregory J. Koch
One Coca Cola Plaza
Atlanta, GA 30313

Postage	$
Certified Fee	1.40
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	
Postmark or Date	

PS Form 3800, April 1995

SPRINGFIELD USPS AUG 17 1999

Is your RETURN ADDRESS completed on the reverse side?

SENDER:

- Complete items 1 and/or 2 for additional services. SRP
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee): 24

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3.

The Coca-Cola Company
Attn: Gregory J. Koch
One Coca Cola Plaza
Atlanta, GA 30313

MORRIS BROWN ATLANTA AUG 17 1998 30314

4a. Article Number P 344 297 902

4b. Service Type

☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery 8/19/99

5. Received By: (Print Name)

6. Signature: (Addressee or Agent)
X O Mason 8/17/99

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, December 1994 102595-98-B-0229 Domestic Return Receipt

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3. If you want a return receipt, write the certified mail number and your name and address on a return receipt card, Form 3811, and attach it to the front of the article by means of the gummed ends if space permits. Otherwise, affix to back of article. Endorse front of article RETURN RECEIPT REQUESTED adjacent to the number.

4. If you want delivery restricted to the addressee, or to an authorized agent of the addressee, endorse RESTRICTED DELIVERY on the front of the article.

5. Enter fees for the services requested in the appropriate spaces on the front of this receipt. If return receipt is requested, check the applicable blocks in Item 1 of Form 3811.

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PS Form 3800, April 1995 (Reverse)

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Microfilm Code Sheet

ID Number L03165800 16

Name COCA COLA USA

File Division 27 A

Permit or Federal ID Number

Cross-reference Information

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ISD 1268 6/87

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START

Report Title: Focused Site Investigation & Remedial Action Completion Report

Date of Report: 4/20/99

IL 532 1967
LPC 403 01/91

Printed on Recycled Paper

99-701 0316580016--Cook County
Chicago/Coca Cola USA/
Site Remediation/Tech. Reports

Conestoga-Rovers & Associates
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631
(773) 380-9933 Office (773) 380-6421 Fax

00126.001717

April 20, 1999

Reference No. 13230

HAND DELIVERED

Mr. Rick Lucas
Manager – Voluntary Site Remediation Unit
Bureau of Land
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62794-9276

Dear Mr. Lucas:

Re: Former Coca-Cola PTO Property
Chicago, Illinois

Enclosed, please find four copies of the document entitled *"Focused Site Investigation and Remedial Action Completion Report, Former Coca-Cola USA Facility, Chicago, Illinois"* prepared by Conestoga-Rovers & Associates (CRA) on behalf of The Coca-Cola Company. The enclosed report documents the scope of work, investigative protocols, and the results of a focused site investigation designed to identify any historical benzene, toluene, ethylbenzene, and xylenes (BTEX) in the area proximal to an area where eight underground storage tanks (USTs) were formerly located on the property. The eight tanks were closed by removal in 1988. The focused site investigation was completed in accordance with the requirements of 35 Ill. Adm. Code Part 740.430.

To meet the specific concerns raised in the context of the pending sale of the property, the site investigation completed by CRA was focused in two respects. First, the investigation was focused on the compounds of concern previously identified in correspondence from the Illinois Environmental Protection Agency (IEPA). Second, the investigation was focused on soil in the immediate vicinity of the USTs that were closed by removal in 1988. At this juncture, based upon the results of the focused site investigation, The Coca-Cola Company would like to enroll in the Site Remediation Program and obtain a focused No Further Remediation (NFR) letter from the IEPA. To facilitate this, attached hereto are a Site Remediation Program Application Services Agreement and Report Submittal forms (DRM-1 and DRM-2), an Election to Proceed under the Site Remediation Program form, and a $500 check payable to the Treasurer of the State of Illinois.

Please feel free to contact me should you have any questions or comments concerning this matter.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Steven J. Wanner

Steven J. Wanner

SJW//
Encl.
c.c.: G. Koch
P. Sharkey
R. Pyle

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TSOI TREASURER STATE OF ILLINOIS CHECK 45546

INVOICE NUMBER	DATE	GROSS	DISCOUNT	NET PAID
ENTRY FEE	07/04/99	500.00	0.00	500.00
	TOTALS:	500.00	0.00	500.00

CONESTOGA-ROVERS & ASSOCIATES, INC.

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
2055 Niagara Falls Boulevard, Suite 3
Niagara Falls, New York 14304

THE BANK OF NOVA SCOTIA
101 FEDERAL ST., BOSTON, MA. 02110

CHECK
45546
5-173/110

PAY **FIVE HUNDRED and 00/100 DOLLARS

TO THE ORDER OF

TREASURER STATE OF ILLINOIS

UNITED STATES DOLLAR ACCOUNT

DATE	U.S. DOLLARS
7 Apr 99	$ 500.00

CONESTOGA-ROVERS & ASSOCIATES, INC.

PER: AUTHORIZED SIGNING OFFICER

PER: AUTHORIZED SIGNING OFFICER

⑆011001739⑆ 00405 17⑈

Illinois Environmental Protection Agency
Bureau of Land
Remedial Project Management Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

FOR ILLINOIS EPA USE:
LOG NO. _____
☐ $500 Advance Partial Payment Included
☐ DRM-2 SRP Form Included
☐ DRM-3 Request for Assessment Included

00126.001719

Site Remediation Program Application and Services Agreement (DRM- 1)

I. Site Identification:

Site Name: FORMER COCA-COLA PTO
Street Address: 4301 WEST 36TH STREET
City: CHICAGO, ILLINOIS ZIP Code: 60632
County: COOK Approximate Size of Site (Acres): 6.7
Illinois Inventory I. D. Number: N/A U.S. EPA I.D. Number: N/A
Site Base Map Attached? Yes: X No: __ Illinois EPA Permit(s): N/A
LUST/IEMA Incident numbers (if applicable) NONE

II. Remediation Applicant:

Applicant's Name: Gregory J. Koch Title: Manager, Environmental Technologies
Company: The Coca-Cola Company
Street Address: One Coca-Cola Plaza
City: Atlanta State: GA ZIP Code: 30313
Phone: (404) 676-7698 FEIN or SSN: 58-0623465

I hereby certify that I am authorized to sign this application and services agreement. I certify that the proposed project meets the eligibility criteria set forth in Section 58.1(a)(2) of the Environmental Protection Act (415 ILCS 5/58.1(a)(2)) and regulations promulgated thereunder and that this submittal and all attachments were prepared at my direction. In consideration for the Illinois EPA's agreement to provide (subject to applicable law, available resources, and receipt of the advance partial payment) review and evaluation services for activities carried out pursuant to Title 17 of the Illinois Environmental Protection Act (415 ILCS 5/58-58.12), I agree to:

(1) Conform with the procedures of Title 17 of the Illinois Environmental Protection Act (415 ILCS 5/58 - 58.12) and implementing regulations;
(2) Allow for or otherwise arrange site visits or other site evaluation by the Illinois EPA when requested;
(3) Agree to pay any reasonable costs incurred and documented by the Illinois EPA in providing such services; and
(4) Make an advance partial payment to the Illinois EPA for such anticipated services provided in Section IV of this application.

As the Remediation Applicant, I understand that I may terminate this services agreement at any time, by notifying the Illinois EPA in writing that services previously requested under the services agreement are no longer wanted. Within 180 days after receipt of the notice, the Illinois EPA shall provide me with a final invoice for services provided until the date of receipt of such notification.

To the best of my knowledge and belief, this request and all attachments are true, accurate and complete. I hereby certify that I have the authority to enter into this agreement.

Remediation Applicant's Signature: Gregory J. Koch Date: April 8, 1999

IL 532-2546
LPC 565 May-97

III. Written Permission from the Property Owner (if not Remediation Applicant):

Owner's Name: N/A

Title: _____

Company: _____

Street Address: _____

City: _____ State: _____ ZIP Code: _____ Phone: _____

I hereby certify that the Remediation Applicant has my permission to enroll the site identified in Section I of this application into the Illinois EPA Site Remediation Program. I certify that the Remediation Applicant or designated representative has permission to enter upon the indicated premises for the purpose of conducting remedial investigations or remediation.

Owner's Signature: _____ Date: _____

For multiple property owners attach additional sheets containing all the information above along with a signed, dated certification for each.

IV. Advance Partial Payment:

The Remediation Applicant shall identify which advance partial payment plan is selected:

☒ Plan 1: A $500 advance partial payment is included with this application. Please make the check payable to: "Treasurer, State of Illinois". Please include "Hazardous Waste Fund" and the Remediation Applicant's FEIN or SSN on the check; or

☐ Plan 2: Request the Illinois EPA determine the appropriate partial payment (i.e., one-half of the total anticipated costs of the Illinois EPA or $5,000, whichever sum is less). Information on Form DRM-3 ("Request for Assessment of Advance Partial Payment for Anticipated Services") must accompany this application in order for the Illinois EPA to determine the appropriate advance partial payment specific to the services requested.

NOTE: Illinois EPA cannot refund payments without a legislative appropriation. Payment under Plan 1 accelerates the review process but increases the risk of forfeiting the payment if the applicant is ineligible. Payment under Plan 2 may result in a larger advance partial payment when a final determination is made on the application, but it reduces the risk of forfeiture.

V. Project Objectives:

If known, identify the recognized environmental conditions and related contaminants of concern and whether a comprehensive NFR Letter, a Focused NFR Letter, or a limited release under Section 4(y) of the Environmental Protection Act is being sought:

A Focused NFR Letter for BTEX analytes in former UST area. See attached report.

Identify any support services being sought from the Illinois EPA in addition to the review and evaluation services:

None, in additin to review and evaluation

Anticipated Schedule Attached? Yes: ____ No: x

Identify the current and post-remediation uses of the remediation site: Commercial/Industrial

☞ **If this application contains plans and reports for review and evaluation by the Illinois EPA, Form DRM-2 must also accompany this submittal.**

The Illinois EPA is authorized to require this information under Section 415 ILCS 5/58-58.12 of the Environmental Protection Act and regulations promulgated thereunder. Disclosure of this information is required as a condition of participation in the Site Remediation Program. Failure to do so may prevent this form from being processed and could result in your application being rejected. This form has been approved by the Forms Management Center. All information submitted as part of this Application is available to the public except when specifically designated by the Remediation Applicant to be treated confidentially as a trade secret or secret process in accordance with the Illinois Compiled Statutes, Section 7(a) of the Environmental Protection Act, applicable Rules and Regulations of the Illinois Pollution Control Board and applicable Illinois EPA rules and guidelines.

00126.001721

Illinois Environmental Protection Agency
Bureau of Land
Remedial Project Management Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

FOR ILLINOIS EPA USE:
LOG NO. _____

Site Remediation Program Form (DRM-2)
(To Be Submitted with all Plans and Reports)

I. Site Identification

Site Name: FORMER COCA-COLA PTO
Street Address: 4301 36TH STREET
City: CHICAGO, ILLINOIS Illinois Inventory I. D. Number: NONE
IEMA Incident Number: NONE

II. Remediation Applicant:

Applicant's Name: Gregory J. Koch Company: The Coca-Cola Company
Street Address: One Coca-Cola Plaza
City: Atlanta State: GA ZIP Code: 30313 Phone: (404) 676-7692

I hereby request that the Illinois EPA review and evaluate the attached project documents in accordance with the terms and conditions of the Environmental Protection Act (415 ILCS 5), implementing regulations, and the review and evaluation services agreement.

Remediation Applicant's Signature: Gregory J. Koch Date: April 8, 1999

III. Contact Person:

Contact's Name: STEVEN WANNER Company: CONESTOGA-ROVERS & ASSOCIATES
Street Address: 8615 WEST BRYN MAWR
City: CHICAGO State: IL ZIP Code: 60631 Phone: (773)380-9933

IV. Review & Evaluation Licensed Professional Engineer ("RELPE"), if applicable:

RELPE's Name: _____ Company: _____
Street Address: _____
City: _____ State: _____ ZIP Code: _____ Phone: _____

All information submitted is available to the public except when specifically designated by the Remediation Applicant to be treated confidentially as a trade secret or secret process in accordance with the Illinois Compiled Statutes, Section 7(a) of the Environmental Protection Act, applicable Rules and Regulations of the Illinois Pollution Control Board and applicable Illinois EPA rules and guidelines. The Illinois EPA is authorized to require this information under Sections 415 ILCS 5/58 - 58.12 of the Environmental Protection Act and regulations promulgated thereunder. Disclosure of this information is required as a condition of participation in the Site Remediation Program. Failure to do so may prevent this form from being processed and could result in your plan(s) or report(s) being rejected. This form has been approved by the Forms Management Center.

V. Project Documents Being Submitted:

Document Title: FOCUSED SITE INVESTIGATION AND REMEDIAL ACTION COMPLETION REPORT Date of Preparation of Plan or Report: MARCH 1999

Prepared by: CONESTOGA-ROVERS & ASSOCIATES

Prepared for: THE COCA-COLA COMPANY

Type of Document Submitted:

- ☐ Site Investigation Report - Comprehensive
- ☒ Site Investigation Report - Focused
- ☐ Remediation Objectives Report
- ☐ Remedial Action Plan
- ☒ Remedial Action Completion Report
- ☐ Sampling Plan
- ☐ Health and Safety Plan
- ☐ Community Relations Plan
- ☐ Risk Assessment
- ☐ Contaminant Fate & Transport Modeling
- ☐ Other:

Document Title: _____ Date of Preparation of Plan or Report: _____

Prepared by: _____

Prepared for: _____

Type of Document Submitted:

- ☐ Site Investigation Report - Comprehensive
- ☐ Site Investigation Report - Focused
- ☐ Remediation Objectives Report
- ☐ Remedial Action Plan
- ☐ Remedial Action Completion Report
- ☐ Sampling Plan
- ☐ Health and Safety Plan
- ☐ Community Relations Plan
- ☐ Risk Assessment
- ☐ Contaminant Fate & Transport Modeling
- ☐ Other:

Document Title: _____ Date of Preparation of Plan or Report: _____

Prepared by: _____

Prepared for: _____

Type of Document Submitted:

- ☐ Site Investigation Report - Comprehensive
- ☐ Site Investigation Report - Focused
- ☐ Remediation Objectives Report
- ☐ Remedial Action Plan
- ☐ Remedial Action Completion Report
- ☐ Sampling Plan
- ☐ Health and Safety Plan
- ☐ Community Relations Plan
- ☐ Risk Assessment
- ☐ Contaminant Fate & Transport Modeling
- ☐ Other:

VI. Professional Engineer's Seal or Stamp:

I attest that all site investigations or remedial activities that are the subject of this plan(s) or report(s) were performed under my direction, and this document and all attachments were prepared under my direction or reviewed by me, and to the best of my knowledge and belief, the work described in the plan and report has been designed or completed in accordance with the Illinois Environmental Protection Act (415 ILCS 5), 35 Ill. Adm. Code 740, and generally accepted engineering practices, and the information presented is complete.

Engineer Name: RONALD FREHNER

Company: CRA ENGINEERING, INC Phone: (651)639-0913

Registration Number: 0062-051867

Signature: _____

Professional Engineer's Seal or Stamp: RONALD FREHNER 062-051867 PROFESSIONAL ENGINEER OF ILLINOIS

License Expiration Date: 11/30/99

The Illinois EPA is authorized to require this information under Title XVII of the Environmental Protection Act (415 ILCS 5/58.1(a)(2)). Failure to disclose this information may prevent this form from being processed and could also prevent acceptance into the Site Remediation Program. This form has been approved by the Forms Management Center.

Illinois Environmental Protection Agency
Leaking Underground Storage Tank Program
Election to Proceed under the Site Remediation Program

(this form applies only to owners/operators electing to conduct remediation under SRP)

A. SITE IDENTIFICATION

IEMA #: N/A IEPA Inventory ID #: _____

Site Name: Former Coca-Cola PTO

Site Address (Not a P.O. Box): 4301 West 36TH Street

City: Chicago , Illinois County: Cook

B. CERTIFICATION

In accordance with Section 58.1(b) of the Environmental Protection Act ("Act") (415 ILCS 5/58.1(b)), the following statement of election is made:

As the Owner and/or Operator of this tank system, I/we am/are electing to proceed with remediation in accordance with Title XVII of the Act (415 ILCS 5/58 et seq.) and 35 Illinois Administrative Code ("35 IAC") Part 740. I/we am/are aware of the following:

- *Completion of the Site Remediation Program ("SRP") Application and Service Agreement Form (DRM-1) is required to enroll into the Program.*
- *I/we am/are subject to an advance partial payment for requested services in the amount of $500 or request that the Illinois Environmental Protection Agency ("Illinois EPA") estimate the total costs to provide the requested services and assess an advance partial payment not to exceed $5,000 or one-half of the total anticipated costs of the Illinois EPA, whichever is less. If the second option is selected, Form DRM-3 must be completed and attached to the application and service agreement.*
- *The advance partial payment is not refundable.*
- *I/we am/are subject to payments for costs incurred by the Illinois EPA for the performance of services under the SRP once the advance partial payment has been depleted. In addition, a No Further Remediation ("NFR") letter assessment fee is required based on Illinois EPA-incurred costs up to a maximum of $2,500.*
- *I/we am/are no longer eligible to seek reimbursement from the Underground Storage Tank Fund for costs incurred after the date the SRP Application and Service Agreement Form (DRM-1) is signed by the Remediation Applicant and accepted by the Illinois EPA.*
- *I/we am/are subject to the report requirements of 35 Ill. Adm. Code Part 740, which includes, but not limited to, submitting a Site Investigation Report, Remediation Objectives Report, Remedial Action Plan, and Remedial Action Completion Report.*

- *All plans and reports submitted for review and evaluation must be prepared by, or under the supervision of, an Illinois licensed professional engineer. Any plan or report submitted to the Illinois EPA for review and evaluation must be accompanied by Form DRM-2.*

- *That an NFR letter issued pursuant to Section 57.10 of the Act (LUST) signifies that all statutory and regulatory corrective action requirements applicable to the occurrence have been complied with; whereas, an NFR letter issued pursuant to Section 58.10 of the Act (SRP) signifies a release from further responsibilities under the Act in performing the approved remedial action and shall be considered prima facie evidence that the site does not constitute a threat to human health and the environment. The NFR letter issued pursuant to Section 58.10 of the Act may not address all recognized environmental conditions or contaminants of concern subject to LUST regulations. Therefore, the content of the NFR letter issued pursuant to Section 58.10 of the Act may reflect that fact.*

- *I/we am/are responsible for any environmental conditions or contaminants of concern associated with a LUST release not addressed in the NFR letter issued pursuant to Section 58.10 of the Act, including, but not limited to, off-site soil and/or groundwater contamination.*

- *If I/we am/are also the Remediation Applicant under the SRP, I/we further agree that any NFR letter issued pursuant to Section 58.10 of the Act is voidable by the Illinois EPA if I/we fail to address such conditions or contaminants as required by law.*

C. SIGNATURES

Owner:		**Operator:**	
Name:	The Coca-Cola Company	Name:	same as owner
Contact:	Gregory J. Koch	Contact:	
Address:	One Coca-Cola Plaza	Address:	
	Mail Code TEC 803		Atlanta, GA 30313
Signature:	[signature]	Signature:	
Date:	April 8, 1999	Date:	
Phone:	(404) 676-7698	Phone:	

Submit this form to:

Illinois Environmental Protection Agency
Bureau of Land – #24
LUST Section
1021 North Grand Avenue East
P.O Box 19276
Springfield, Illinois 62794-9276

Printed on Recycled Paper

FOCUSED SITE INVESTGATION AND REMEDIAL ACTION COMPLETION REPORT

FORMER COCA-COLA SITE
CHICAGO, ILLINOIS

ORIGINAL

APRIL 1999
REF. NO. 13230 (2)
This report is printed on recycled paper.

Prepared By:
Conestoga-Rovers & Associates
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631
(773) 380-9933 Office (773) 380-6421 Fax

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Worldwide Engineering, Environmental, and Construction Services

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EXECUTIVE SUMMARY

On behalf of The Coca-Cola Company (Coca-Cola), Conestoga-Rovers & Associates (CRA) completed a focused Site investigation at the former Coca-Cola property located at 4301 West 36th Street in Chicago, Illinois (the "Property"). This investigation was focused in two respects. First, the purpose of the investigation was to verify that no BTEX contamination in excess of applicable standards remain in soil in an area of the Property from which eight underground storage tanks and approximately 150 cubic yards of soil were removed in 1988. Second, although previous investigations covered a broader area of the Property, this site investigation was limited to soil in the area surrounding the UST excavation. The scope of work completed was designed to meet the requirements of a focused Site investigation pursuant to the 35 Ill Adm. Code (IAC) Part 740.430 and complete an evaluation of Site conditions pursuant to the regulations at 35 IAC Part 742.

The analytical data obtained during the focused Site investigation were compared to the applicable Tier 1 corrective action objectives in the Part 742 regulations. The concentrations of Site-related compounds meet the default Tier 1 corrective action objectives for residential, industrial/commercial, and construction worker ingestion and inhalation exposure route scenarios. Therefore, The Coca-Cola Company wishes to enter the Site Remediation Program to obtain closure of this matter. This document was prepared to meet the requirements of a Focused Site Investigation Report as described at Section 740.430 and a Remedial Action Completion Report pursuant to Section 740.455 of the Illinois regulations.

1.0 INTRODUCTION

1.1 BACKGROUND

Conestoga-Rovers & Associates (CRA) was retained by The Coca-Cola Company (Coca-Cola) to design and implement a program to investigate soil in an area proximal to the former location of eight underground storage tanks (Site). This work was performed at the former Coca-Cola private trucking operation (PTO) located at 4301 West 36th Street in Chicago, Illinois (the "Property"). A Property location map is provided in Figure 1.1. The Property is approximately 6.7 acres in size and lies immediately south of West 36th Street. The Property contains one approximately 9,300 square foot building which houses offices, storage, garage bays, and a wash bay. The Property is completely paved with the exception of thin strips of grass along the east and south perimeter fence (see Figure 1.2). Historically, the Property has been used by The Coca-Cola Company to operate a maintenance and distribution facility for a fleet of trucks. Currently, the Property is leased to NationsWay Transport Service (NationsWay) of Commerce City, Colorado. NationsWay uses this property as a truck maintenance and trailer staging facility.

The Property is situated in a heavily industrialized section of southwest Chicago. A natural gas pipeline and a rail easement are located south of the Property. The Chicago Sanitary and Ship Canal is located approximately one-quarter mile south of the Property. The land parcel immediately west of the Property is also leased by NationsWay, which uses this adjacent parcel as a truck maintenance and trailer staging facility. The land to the north of 36th Street is occupied by numerous tractors and trailers and appears to be operated as a tractor-trailer staging yard. There were no permanent structures observed in this yard. The IGT Energy Development Center occupies land to the east of the Property. A parcel with an office building and various industrial structures is located northwest of the Property.

1.2 SCOPE OF WORK

The scope of work completed by CRA on behalf of The Coca-Cola Company included the following:

- evaluation of the existing Site data and documents;

- scoping of Site investigative activities and preparation of a work plan and Health & Safety Plan (HASP) for a focused Site investigation;
- implementation of field investigative activities;
- TACO evaluation of analytical data; and
- preparation of the Focused Site Investigation Report and Remedial Action Completion Report for submittal to the IEPA.

1.3 REPORT ORGANIZATION

This document was prepared to meet the requirements of a Focused Site Investigation Report as described at Section 740.430 and a Remedial Action Completion Report pursuant to Section 740.455 of the Illinois regulations. As such, this report is organized into the following sections:

1.0 Introduction
2.0 Site Background
3.0 Investigative Activities
4.0 Analytical Results
5.0 Summary and Conclusions
6.0 No Further Remediation
7.0 Professional Engineer Certification

2.0 SITE BACKGROUND

2.1 PREVIOUS WORK

As depicted in Figure 2.1 and summarized in Table 2.1, eight underground storage tanks (USTs) were formerly located on the Property. Seven USTs were formerly located east of the main building and an eighth UST was formerly located near the southwest corner of the main building. The seven USTs east of the main building were associated with routine servicing of trucks and the dispensing of fuel. The dispensing and handling of fuels and oils occurred predominantly to the east of the main building where several pumping islands and seven of the eight USTs were formerly located. The single UST west of the main building was formerly used to contain heating oil.

During March 1988, the eight USTs were closed by removal by R.W. Collins, Inc. under the supervision of Groundwater Technology, Inc. (GTI). UST removal activities and sampling results are documented in the GTI report entitled *"Tank Excavation and Removal and Site Assessment, Coca-Cola USA, 4301 West 36th Street, Chicago, Illinois"*, dated December 1988, which was previously submitted to the IEPA. As documented in the December 1988 GTI report, approximately 150 cubic yards of petroleum-impacted soil was excavated during closure of the USTs. During closure activities, GTI collected soil samples from the base of each of the USTs, and GTEL Environmental Laboratories, Inc. analyzed these samples for total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). The concentration of TPH in the soil samples collected from the base of the UST excavations ranged from not detected to 250 milligrams per kilogram (mg/kg). BTEX was not detected in any of the soil samples collected from the base of the UST excavations. The UST excavations were filled following the 1988 investigation and the former tank area is currently entirely paved.

Following closure of the USTs, GTI initiated an investigation of the soil and groundwater in the vicinity of the former tank locations. This investigation included advancement of soil borings with soil sample collection, the installation of groundwater monitoring wells near the former USTs, and the collection of groundwater samples for laboratory analysis. Specifically, 16 soil borings and six groundwater monitoring wells were installed by GTI in the vicinity of the former USTs. The approximate locations of soil borings and monitoring wells installed by GTI in 1988 to investigate the UST area are depicted in Figure 2.2. Soil samples were collected from selected intervals from each boring for TPH analysis. Groundwater samples were collected from the six monitoring wells in the vicinity of the former USTs for BTEX and TPH analysis.

A summary of the TPH data generated during the soil boring and monitoring well installations is provided in Table 2.2. Only low level detections of BTEX compounds were noted in groundwater samples collected from three of the six groundwater monitoring wells (MW-2, MW-3, and MW-6). The groundwater data is provided in Table 2.3. Each of the BTEX detections were below the Illinois Class I groundwater quality standards. No free phase petroleum product was detected by GTI in monitoring wells installed in the vicinity of the former USTs. The analytical data obtained by GTI during their 1988 investigations is reproduced in Appendix A. Additional soil and groundwater samples were collected by GTI in 1988 in the southwestern portion of the Property. These additional soil borings and groundwater monitoring wells were associated with an investigations related to a release from USTs located on the adjacent parcel. These soil and groundwater samples were not related to the investigation of the former USTs located on the former Coca-Cola Property.

2.2 SITE GEOLOGY AND HYDROGEOLOGY

The Property is located within the limits of the City of Chicago approximately one-quarter mile north of the Chicago Sanitary and Ship Canal. The geologic stack-unit map indicates that the Property is underlain by the Carmi Member of the Equality Formation (Figure 2.3). The Carmi Member is a glacial till unit that consists predominantly of clay and silt.[1] The Property is located in an area classified as D2 in the Berg Circular (see Figure 2.4).[2] Areas designated as D2 are described as uniform, relatively impermeable silty or clayey glacial till or other fine-grained materials at least 20 feet thick with no evidence of interbedded sand and gravel.[3] Areas designated as D in the Berg Circular represent geologic sequences with the lowest potential for contaminating aquifers. In addition, the Property is located within the limits of the City of Chicago, which has prohibited the use of groundwater for potable use. Through a Memorandum of Understanding (MOU) with the City of Chicago, the IEPA recognizes this code restriction as an institutional control for groundwater.

Previous investigations conducted on the Property and the adjacent land to the west and observations made during this investigation indicate the Property is underlain with four

1 *Handbook of Illinois Stratigraphy*, Illinois State Geological Survey, Bulletin 95, 1975, page 226.
2 *Potential for Contamination of Shallow Aquifers in Illinois*, Illinois State Geological Survey, Circular 532, 1984.
3 IBID., page 27.

to seven feet of unconsolidated fill, consisting mainly of silt and clay with coal and gravel seams. A native silty clay layer that contains occasional silt and/or sand lenses underlies the fill. The water table is encountered at depths of four to seven feet below ground surface. Previous investigations on the Property conducted during 1988 determined that groundwater flow is toward the northwest.

00126.001734

3.0 INVESTIGATIVE ACTIVITIES

3.1 INVESTIGATIVE OBJECTIVES

In a letter dated November 9, 1990, the IEPA requested that additional soil samples be collected from the perimeter of the UST excavation and that these soil samples be analyzed for BTEX. Previous investigations determined that BTEX was not present in soil at the base of the UST excavation and was present only in low levels (below the Illinois Class I groundwater quality standards) in groundwater samples collected from monitoring wells located in the vicinity of the former tank locations. Previous investigations also determined that only low levels of total petroleum hydrocarbons (TPH) were present in soil adjacent to the excavations. However, the previous investigations did not include sampling to confirm that BTEX in soil adjacent to the excavation met applicable standards. The IEPA's November 9, 1990 letter is provided in Appendix B.

The objective of the focused Site investigative activities described herein was to address IEPA's question in the November 1990 letter concerning BTEX analytes and to confirm that BTEX analytes in soil adjacent to the tank excavation meet the current standards. The work plan detailed the scope of work, field investigative procedures, and analytical protocols for a focused Site investigation. The work plan for the focused investigation is reproduced in Appendix C.

3.2 SITE-SPECIFIC SAMPLING PROGRAM

The investigative scope of work was designed to obtain the data required to complete a focused Site invesugation pursuant to the Part 740 regulations, an evaluation of Site conditions pursuant to the Illinois Part 742 regulations and the data requested by the IEPA. The scope of work consisted of the following general tasks:

- premobilization activities and utility clearance;
- a subsurface investigation proximal to the former USTs with collection and field screening of soil samples;
- collection of soil samples from selected intervals for laboratory analysis;
- survey the locations of the soil borings;
- evaluation of Site data consistent with the Illinois Part 742 regulations; and

- preparation of a focused Site investigation report with a request for a No Further Remediation letter or recommendations for additional activities, as appropriate.

The Site investigation was focused both in terms of the compounds of concern (BTEX) and the area of the property investigated (location of the former USTs).

3.3 FIELD ACTIVITIES

A total of 14 soil borings were advanced using hollow stem auger (HSA) drilling methods. Soil boring locations are illustrated on Figure 3.1. Field activities associated with the focused Site investigation were conducted on February 4 and 5, 1999. Detailed Site-specific protocols for sample collection, handling, documentation procedures, and laboratory protocols used during the investigation are detailed in the work plan reproduced in Appendix C.

Soil borings were positioned around the perimeter of the former UST locations and advanced to depths ranging from 5 to 11 feet. Soil samples were collected continuously during the advancement of each soil boring using a split-spoon sampler. A representative aliquot of soil from each interval was collected for potential laboratory analysis, labeled and placed into a cooler containing ice. A second aliquot of soil from each interval was used for field screening using a photoionization detector (PID).

Soil samples were selected for laboratory analysis based upon the results of field screening and visual observations. One soil sample was collected from each soil boring from the interval above the water table. In general, the soil sample corresponding to the interval with the highest PID measurement from each soil boring was retained for chemical analysis by the project laboratory. Soil samples submitted to the project laboratory were analyzed for BTEX consistent with the IEPA's Analytical Quality Assurance Plan (AQAP) requirements. Quality assurance/quality control (QA/QC) samples consisted of collecting rinsate and matrix spike/matrix spike duplicate samples.

Soil recovered from each boring was classified in accordance with the Unified Soil Classification System (USCS) to define subsurface stratigraphy. Additionally, during the field screening and classification of soil from each sample interval, the absence or presence of free phase petroleum product was noted. No free phase petroleum product was observed during the advancement of the soil borings installed during the focused Site investigation. Stratigraphic logs for the completed soil borings are presented in

Appendix D. The locations of the 14 soil borings were surveyed by an Illinois licensed professional surveyor.

00126.001757

4.0 ANALYTICAL RESULTS

4.1 GENERAL

Sample analyses were performed by Great Lakes Analytical of Buffalo Grove, Illinois (GLA). Soil sample analysis for BTEX was performed in accordance with U.S. Environmental Protection Agency (EPA) method 8021.[4] Analytical reports received from GLA are reproduced in Appendix E.

CRA's quality control officer conducted analytical data quality assessments and validation of the results obtained from GLA. The evaluation of the analytical data for accuracy and precision was based on quality assurance/quality control (QA/QC) information provided by the project laboratory. The QA/QC information included laboratory method blank data, matrix spike and surrogate spike compound recovery data, and laboratory check sample recovery data. Based upon the results of the data quality assessments and validations, the analytical data were determined to be valid and suitable for the intended use for this project. The analytical data quality assessments and validations are presented in Appendix F.

4.2 ANALYTICAL DATA SUMMARY

Table 4.1 and Figure 4.1 summarize the BTEX analytical data obtained during the focused Site investigation. In addition, Table 4.1 compares the BTEX concentrations in the soils to the Illinois Tier 1 corrective action objectives for residential and commercial/industrial properties in the Part 742 regulations. The concentrations of BTEX analytes in soil meet the default Tier 1 corrective action objectives for residential, industrial/commercial, and construction worker ingestion and inhalation exposure routes.

The concentration of benzene in eight soil samples (SB-102, SB-103, SB-104, SB-105, SB-107A, SB-108, SB-111, and SB-112 exceeded the Tier 1 soil component of the groundwater ingestion exposure route value. However, the Site is located within the limits of the City of Chicago, and the use of groundwater for potable use is not allowed due to a code restriction. Through a Memorandum of Understanding (MOU) with the City of Chicago, the IEPA recognizes this City code restriction as an institutional control for groundwater. Therefore, the corrective action objectives for the groundwater ingestion pathway are not applicable within the limits of the City of Chicago.

4 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, EPA SW-846, November 1986.

5.0 SUMMARY AND CONCLUSIONS

5.1 PROJECT SUMMARY

Eight underground storage tanks were previously closed by removal in 1988. Soil and groundwater samples collected during and shortly after closure of the USTs in 1988 indicated that only low-level concentrations of BTEX were present in soil and groundwater. BTEX detections in groundwater were below the Illinois Class I groundwater quality standards. Through its letter dated November 9, 1990, the IEPA requested that additional soil samples be collected around the perimeter of the UST excavation and that these soil samples be analyzed for BTEX to confirm that the corrective actions were completed.

To address IEPA's request for additional data, CRA prepared a work plan designed to obtain the additional data to complete a Focused Site Investigation pursuant to the Part 740 regulations and an evaluation of Site conditions pursuant to the Illinois Part 742 regulations was prepared. This work plan detailed a focused Site investigation designed to obtain the BTEX data requested by IEPA in its November 1990 letter. CRA completed investigative activities in accordance with the work plan in February 1999.

5.2 CONCLUSIONS

Based on the data obtained from this focused site investigation and data from the previous investigations, BTEX analytes are not present in the soils surrounding the former USTs at concentrations in excess of the applicable Tier 1 corrective action objectives for a residential property.

The data collected to date support the following conclusions:

1. The concentrations of BTEX in the soils surrounding the former USTs are below the Illinois Tier 1 residential ingestion and inhalation objectives and construction worker ingestion and inhalation exposure route objectives.

2. The Site is located within the City of Chicago, where an approved MOU prohibiting the use of groundwater is in existence. Therefore, the groundwater exposure route is not a pathway of concern in the City of Chicago.

3. Soil boring observations and analytical data obtained during this focused Site investigation indicate that free phase petroleum product is not present in the soils surrounding the former USTs. The hydraulic monitoring performed during previous Site investigations further supports this conclusion.

6.0 NO FURTHER REMEDIATION

As discussed herein, the data compiled to date indicate that closure of the USTs and corrective action activities have been successfully completed. Therefore, a focused No Further Remediation Letter is being sought from the IEPA for BTEX analytes in the former UST area.

The complete legal description for the former Coca-Cola property is presented in Appendix G.

00126.001741

00125.001742

6.0 NO FURTHER REMEDIATION

As discussed herein, the data compiled to date indicate that closure of the USTs and corrective action activities have been successfully completed. Therefore, a focused No Further Remediation Letter is being sought from the IEPA for BTEX analytes in the former UST area.

The complete legal description for the former Coca-Cola property is presented in Appendix G.

7.0. PROFESSIONAL ENGINEER CERTIFICATION

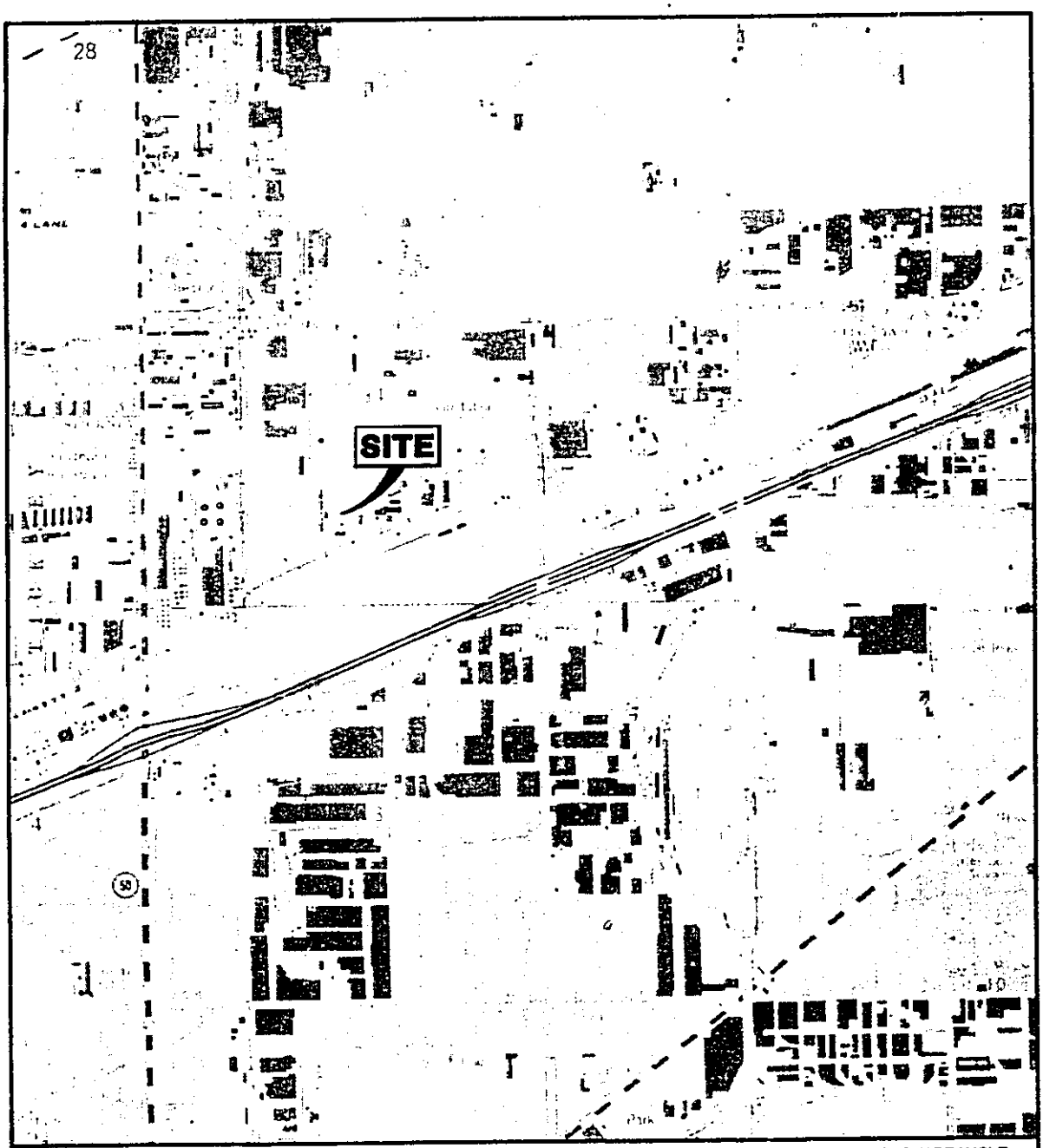
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

RONALD FREHNER
0062-051867
PROFESSIONAL
ENGINEER
OF
ILLINOIS

P.E. Seal

Ronald Frehner, P.E.
CRA Engineering, Inc.

Illinois Registration No.: 0062-051867
License Expiration Date: 11/30/99
Signature: Ronald Frehner
Date: 4/13/99



BASE SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE; ENGLEWOOD, IL 1993

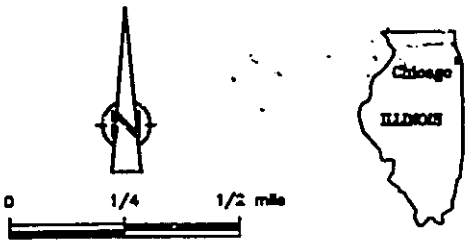


figure 1.1

PROPERTY LOCATION
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0001 APR 07/99

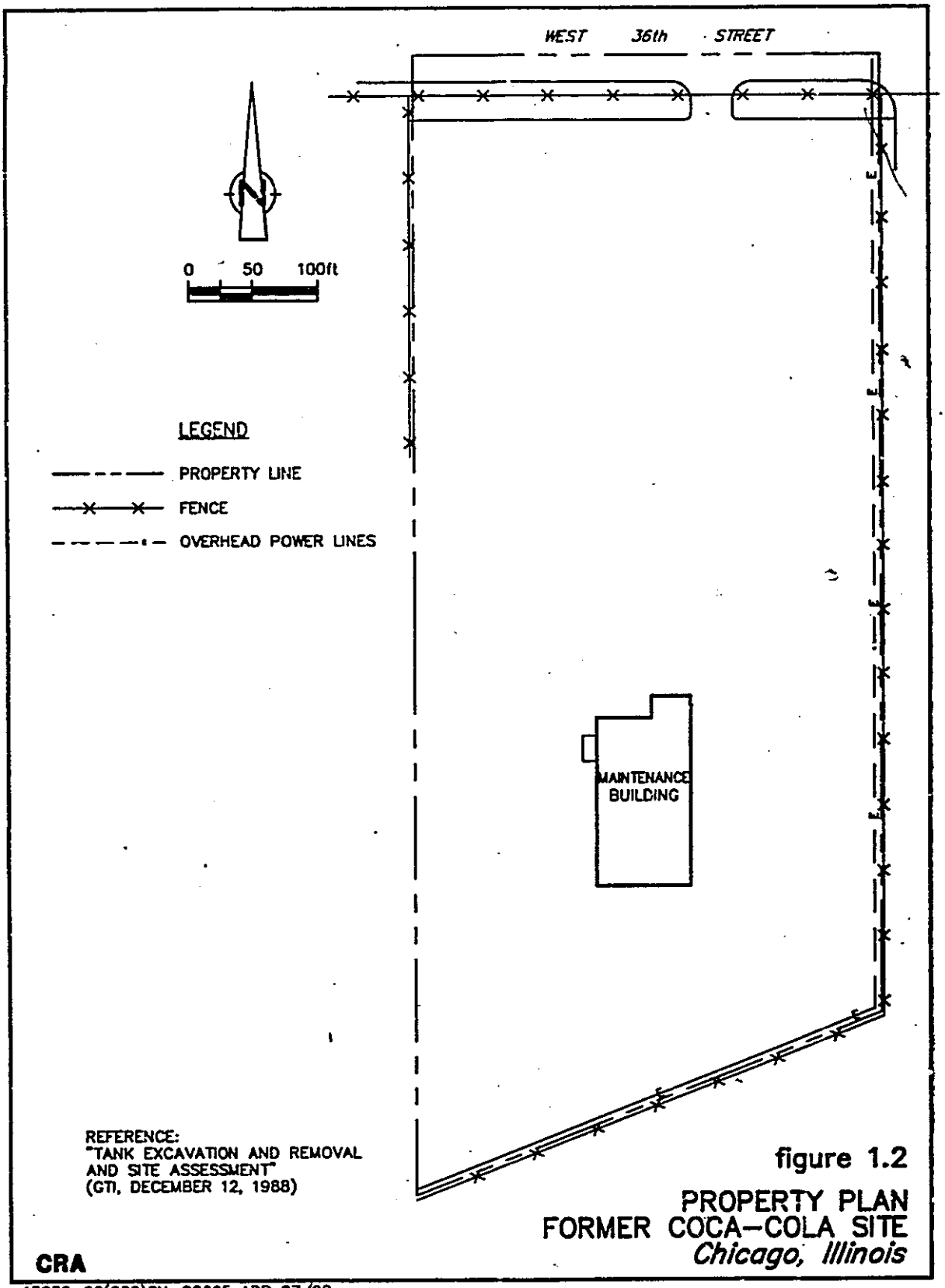
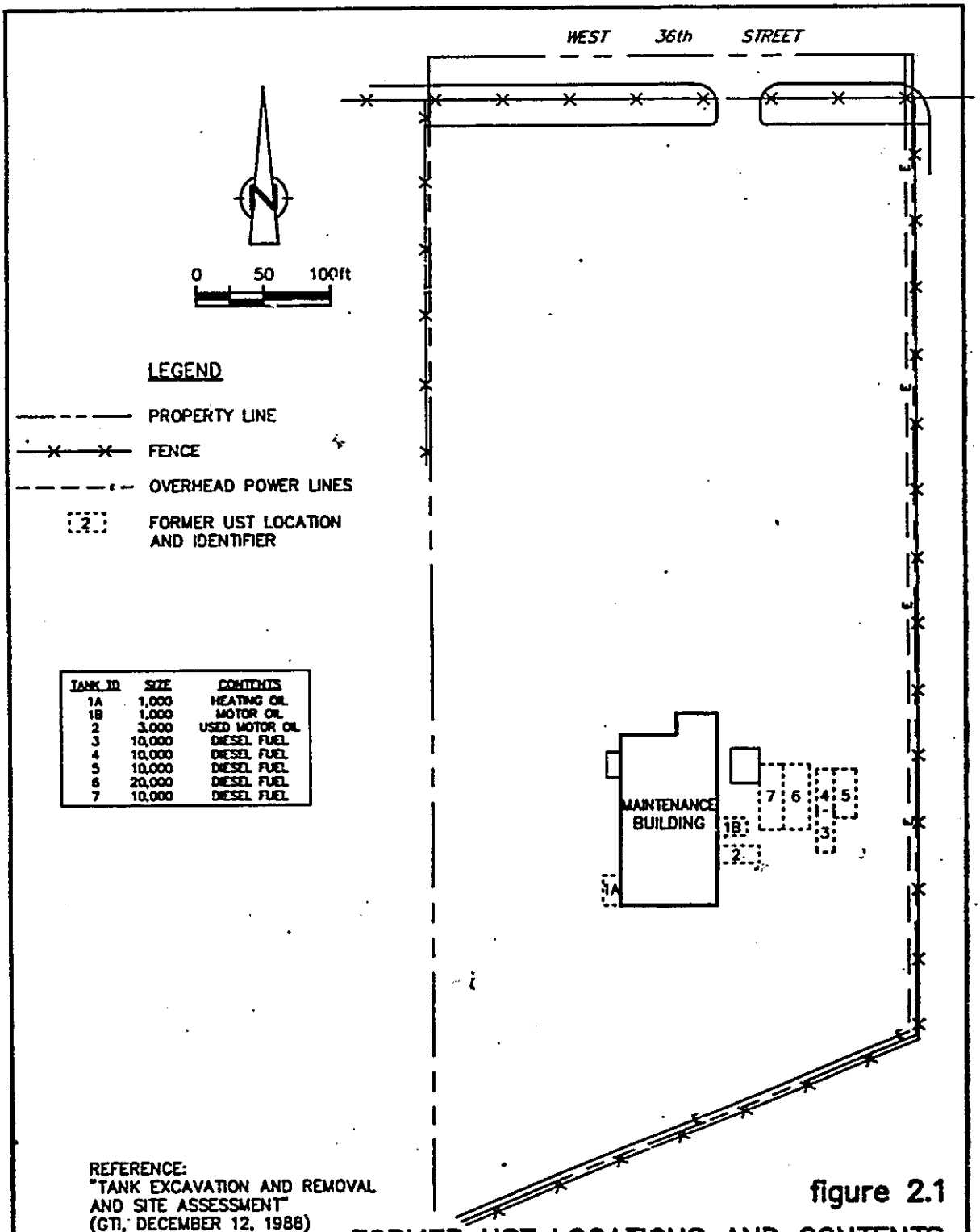


figure 1.2

PROPERTY PLAN
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0005 APR 07/99



TANK ID	SIZE	CONTENTS
1A	1,000	HEATING OIL
1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

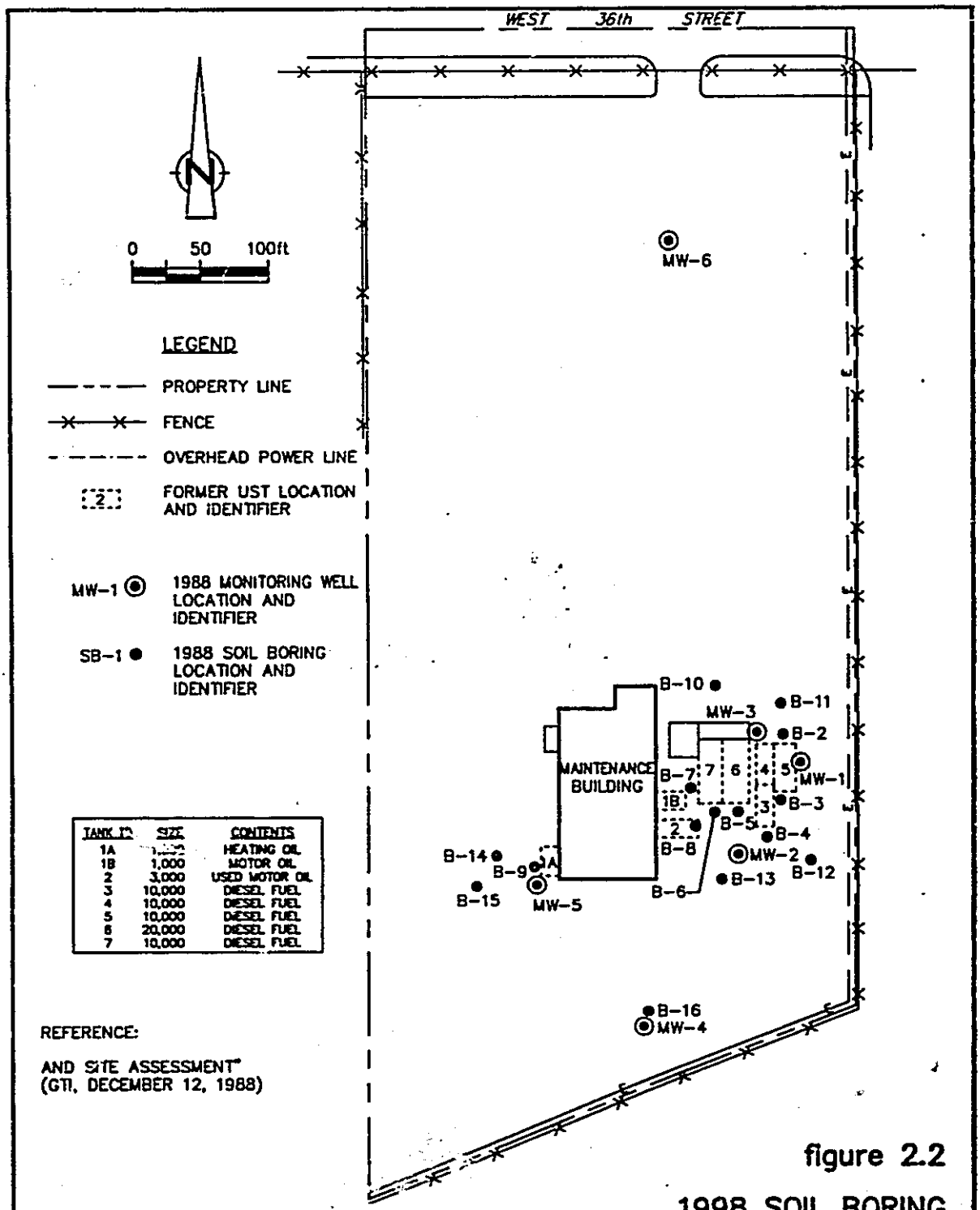
REFERENCE:
"TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1988)

figure 2.1

FORMER UST LOCATIONS AND CONTENTS
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0002 APR 07/99



TANK #	SIZE	CONTENTS
1A	[illegible]	HEATING OIL
1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

REFERENCE:

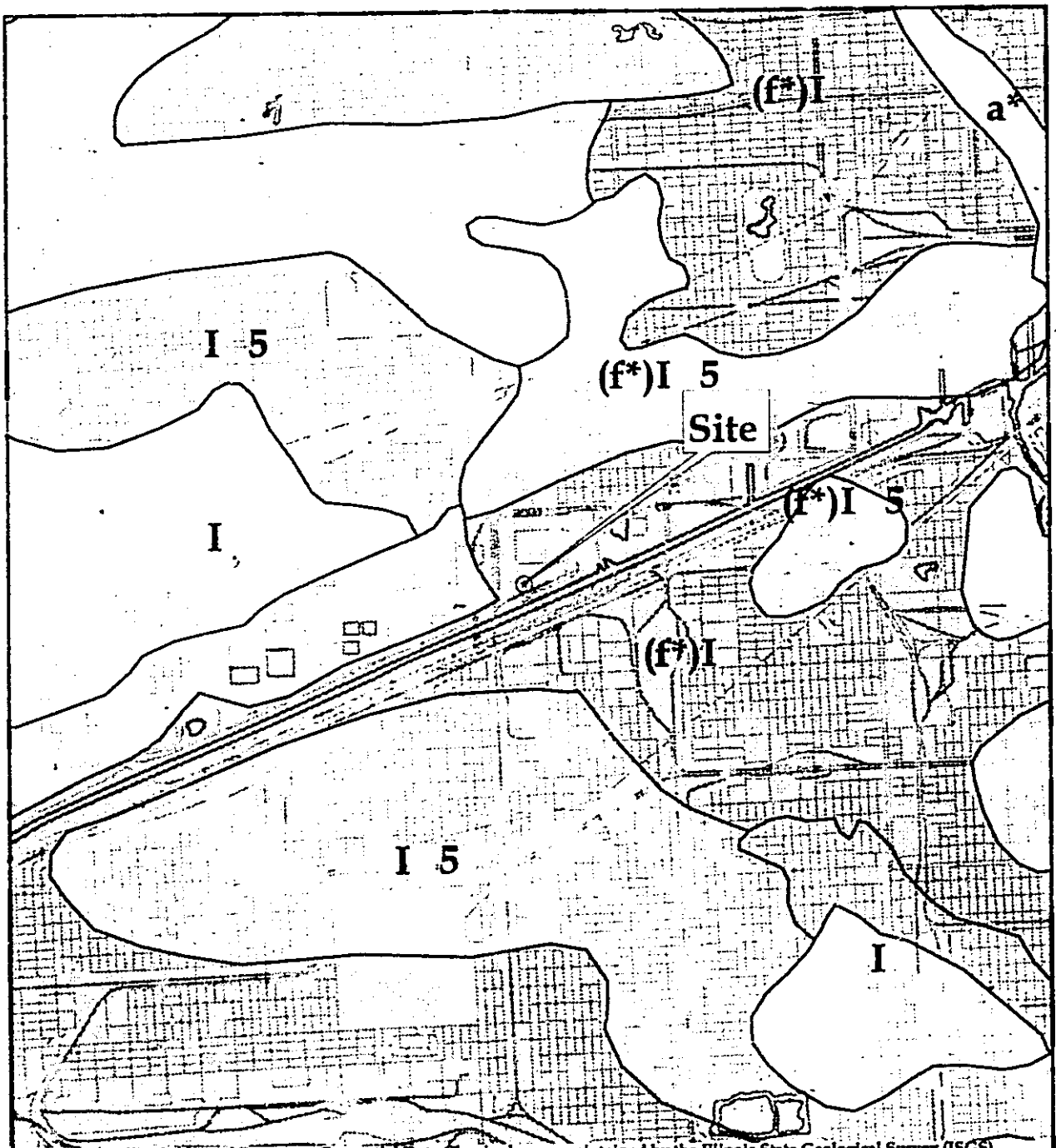
AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1988)

figure 2.2

1998 SOIL BORING
AND MONITORING WELL INSTALLATIONS
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0003 APR 07/99



Source: The Illinois Natural Resources Geospatial Data Clearinghouse, maintained by the Illinois State Geological Survey (ISGS).

1 0 1 2 Miles

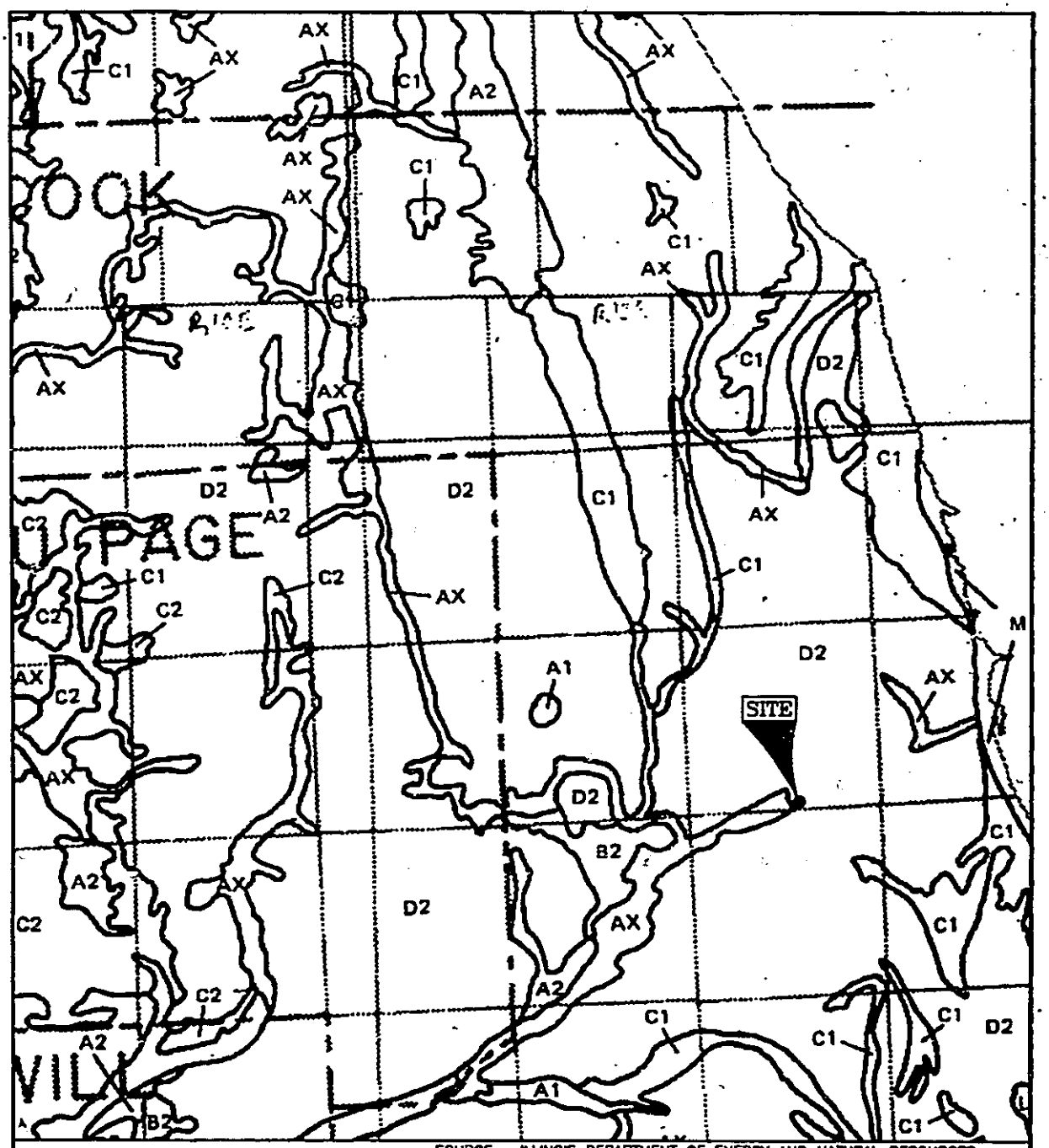
Capital letters indicate that the unit is greater than 6 meters in thickness.
Lowercase letters with an asterisk indicate that the unit is less than 6 meters in thickness
Parenthesis indicates that the formation is discontinuous
"a" indicates Cahokia Alluvium
"f" indicates the Equality Formation, Grand Member
"I" indicates Wedron Formation sandy and clayey diamictons
"5" indicates Silurian and some Devonian rocks, mainly dolomite

N

figure 2.3

GEOLOGIC STACK UNIT MAP
COCA-COLA USA
Chicago, Illinois

CRA CONESTOGA-ROVERS & ASSOCIATES
8615 West Bryn Mawr Avenue, Chicago, Illinois 60631
Tel. (773) 380-9533 Fax (773) 380-6421



SOURCE: ILLINOIS DEPARTMENT OF ENERGY AND NATURAL RESOURCES
STATE GEOLOGICAL SURVEY
POTENTIAL FOR CONTAMINATION OF SHALLOW AQUIFERS IN ILLINOIS
CIRCULAR 532, PLATE 1, 1984.

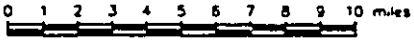
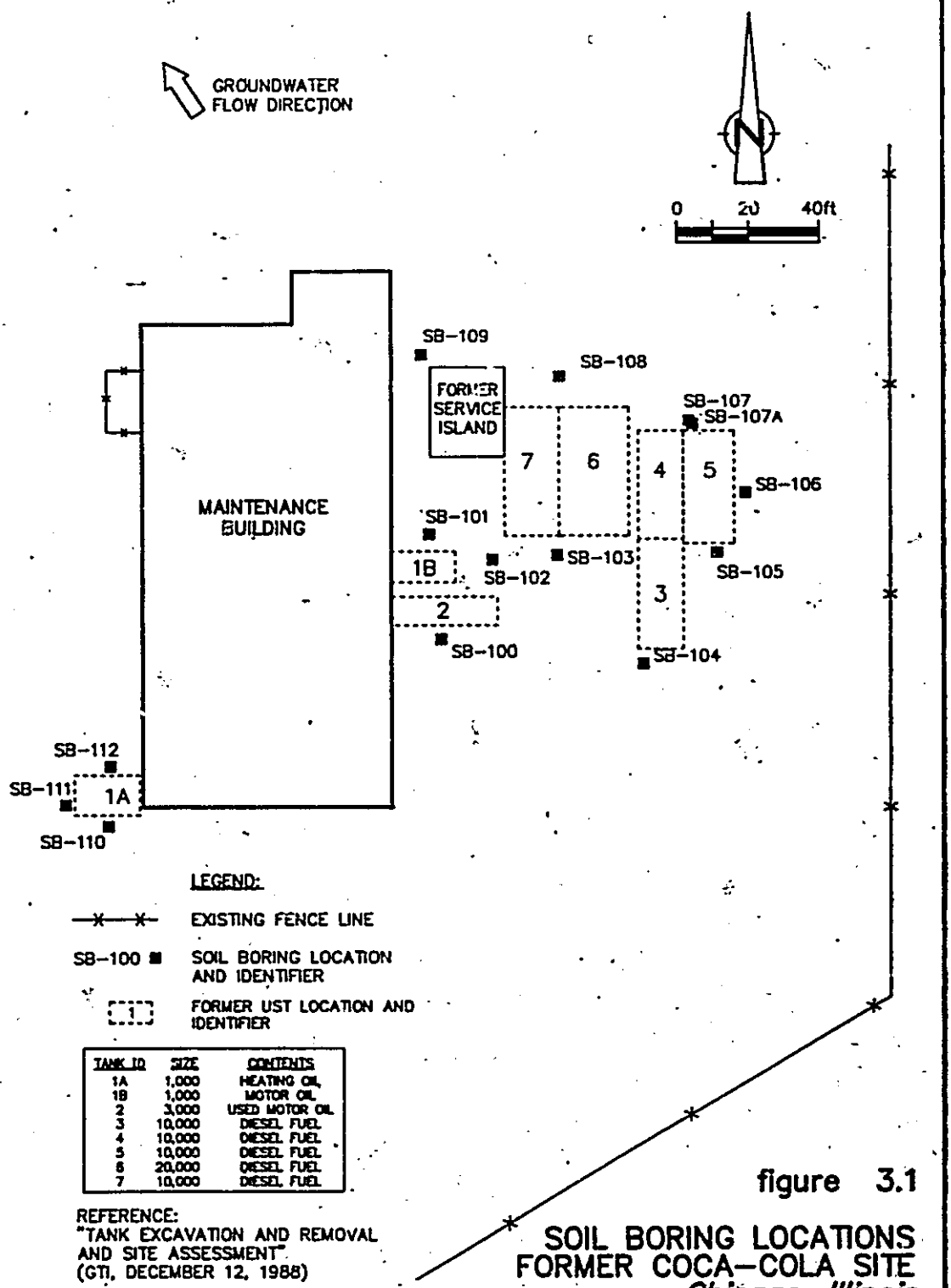


figure 2.4

BERG CIRCULAR
SITE CLASSIFICATION MAP
COCA-COLA USA
Chicago, Illinois

CRA

13230-00(002)GN-C0008 APR 06/99



LEGEND:

EXISTING FENCE LINE

SB-100 SOIL BORING LOCATION AND IDENTIFIER

1 FORMER UST LOCATION AND IDENTIFIER

TANK ID	SIZE	CONTENTS
1A	1,000	HEATING OIL
1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

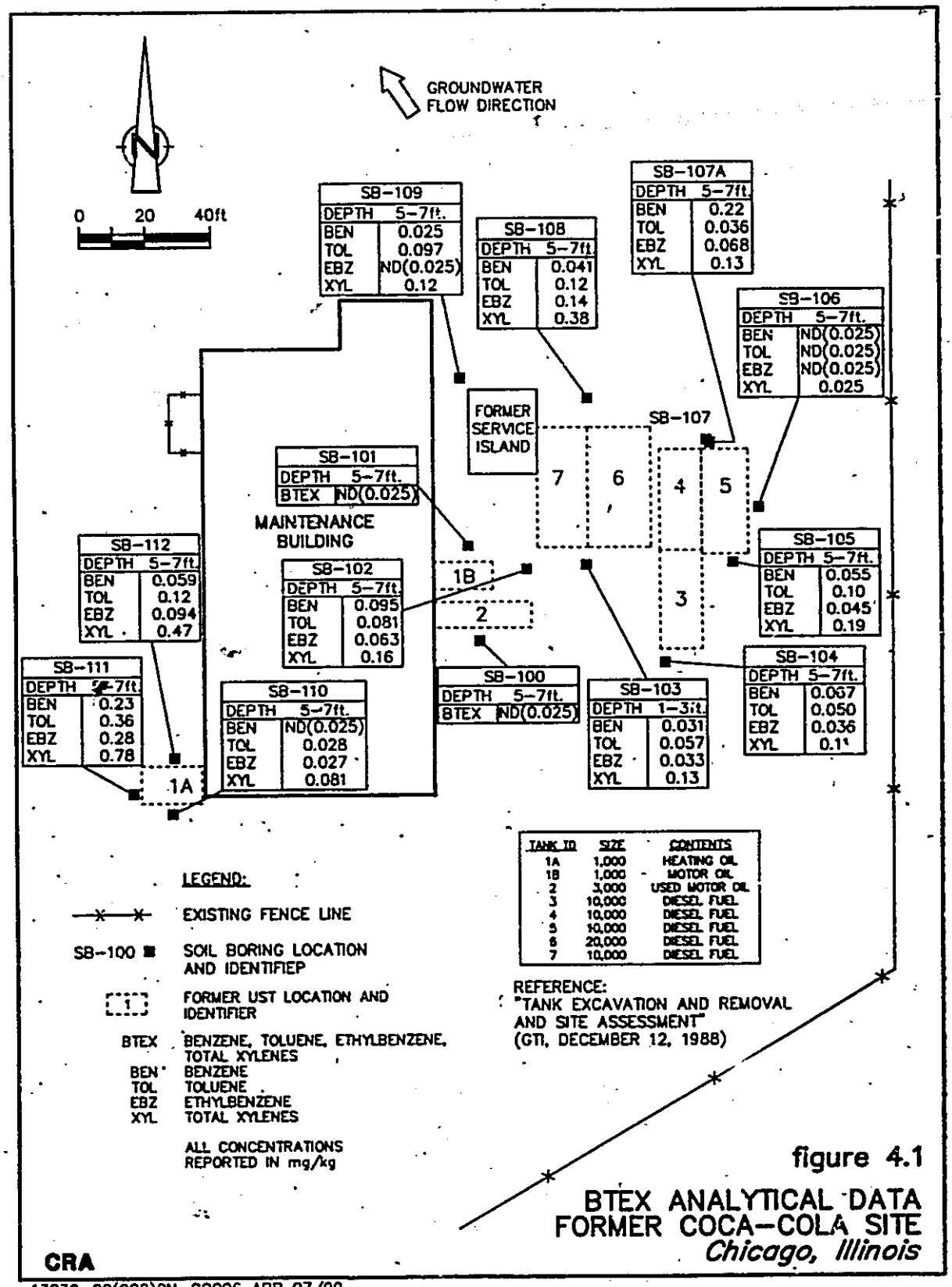
REFERENCE:
"TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1988)

figure 3.1

SOIL BORING LOCATIONS
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0007 APR 07/99



TANK ID	SIZE	CONTENTS
1A	1,000	HEATING OIL
1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

figure 4.1

BTEX ANALYTICAL DATA
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0006 APR 07/99

TABLE 2.1

SUMMARY OF FORMER USTs
FORMER COCA-COLA PTO SITE
CHICAGO, ILLINOIS

Tank ID	*APPROX. SIZE (gallons)*	*CONTENTS*
1A	1,000	Heating Oil
1B	1,000	Motor Oil
2	3,000	Used Motor Oil[1]
3	10,000	Diesel Fuel
4	10,000	Diesel Fuel
5	10,000	Diesel Fuel
6	20,000	Diesel Fuel
7	10,000	Diesel Fuel

[1] The term waste oil has been associated with UST #2 in previous investigative reports concerning this Site. However, this terminology does not accurately reflect the known use for this UST. According to Coca-Cola personnel, UST #2 was used only for the storage of used motor oil generated during routine vehicle maintenance.

TABLE 2.2

SUMMARY OF 1988 SOIL TPH ANALYTICAL DATA
FORMER COCA-COLA USA SITE
CHICAGO, ILLINOIS

		Total Petroleum Hydrocarbons in Soil		
Boring/Well ID	*Sample Date*	*1.0' x 2.5'*	*3.5' x 5.5'*	*8.5' x 10.0'*
MW-1	05/18/88	—[1]	1,000	ND[2]
MW-2	05/18/88	1,700	ND	ND
MW-3 (B-1)	05/18/88	—	—	1,300
MW-4	05/19/88	1,300	—	ND
MW-5	05/19/88	ND	—	—
MW-6	05/19/88	—	ND	—
B-2	05/18/88	—	9,400	ND
B-3	05/18/88	1,100	200	—
B-4	05/18/88	—	—	ND
B-5	05/18/88	—	ND	—
B-6	05/18/88	900	150	—
B-7	05/18/88	—	1,200	ND
B-8	05/18/88	5,600	440	ND
B-9	05/19/88	—	16,000	—
B-10	06/29/88	—	630	—
B-11	06/29/88	—	3,600	—
B-12	06/29/88	—	1,700	—
B-13	06/29/88	—	500	—
B-14	06/29/88	—	ND	—

[1] — = Sample Not Analyzed

[2] ND - None Detected

Reference: Table VII Tank Excavation and Removal and Site Assessment, Coca-Cola USA (GTI, December 5, 1998).

TABLE 2.3

SUMMARY OF 1988 GROUNDWATER BTEX ANALYTICAL DATA
FORMER COCA-COLA USA SITE
CHICAGO, ILLINOIS

Location:	*Date Sampled*	*Benzene*	*Toluene*	*Ethylbenzene*	*Total Xylenes*
MW-1	5/27/88	ND[1]	ND	ND	ND
MW-2	5/27/88	ND	ND	ND	ND
MW-3	5/27/88	0.0029	0.0009	0.0041	0.0052
MW-4	5/27/88	ND	ND	ND	ND
MW-5	5/27/88	ND	ND	ND	ND
MW-6	5/27/88	ND	0.0018	ND	ND

[1] ND - not detected
All results reported in milligrams per Liter
Reference: *Tank Excavation and Removal and Site Assessment, Coca-Cola USA* (GTI, December 5, 1988)

TABLE 4.1

SUMMARY OF BTEX IN SOIL
FORMER COCA-COLA PTO SITE
CHICAGO, ILLINOIS

Soil Boring Number	Sample Depth (ft bgs)[1]	CRA Sample Number	Detected Concentration (mg/kg)[2]	Exposure Route-Specific Values for Soils: Residential Ingestion (mg/kg)	Residential Inhalation (mg/kg)	Industrial-Commercial Ingestion (mg/kg)	Industrial-Commercial Inhalation (mg/kg)	Construction Worker Ingestion (mg/kg)	Construction Worker Inhalation (mg/kg)
SB-100	5-7	S-020499-WP-001							
		Benzene	ND(0.025)[3]	22	0.8	200	1.5	4,300	2.1
		Toluene	ND(0.025)	16,000	650	410,000	650	410,000	42
		Ethylbenzene	ND(0.025)	7,800	400	200,000	400	20,000	58
		Xylenes	ND(0.025)	160,000	410	1,000,000	410	410,000	410
SB-102	5-7	S-020499-WP-002							
		Benzene	0.095	22	0.8	200	1.5	4,300	2.1
		Toluene	0.081	16,000	650	410,000	650	410,000	42
		Ethylbenzene	0.063	7,800	400	200,000	400	20,000	58
		Xylenes	0.16	160,000	410	1,000,000	410	410,000	410
SB-101	5-7	S-020499-WP-003							
		Benzene	ND(0.025)	22	0.8	200	1.5	4,300	2.1
		Toluene	ND(0.025)	16,000	650	410,000	650	410,000	42
		Ethylbenzene	ND(0.025)	7,800	400	200,000	400	20,000	58
		Xylenes	ND(0.025)	160,000	410	1,000,000	410	410,000	410
SB-109	5-7	S-020499-WP-004							
		Benzene	0.025	22	0.8	200	1.5	4,300	2.1
		Toluene	0.097	16,000	650	410,000	650	410,000	42
		Ethylbenzene	ND(0.025)	7,800	400	200,000	400	20,000	58
		Xylenes	0.12	160,000	410	1,000,000	410	410,000	410
SB-108	5-7	S-020499-WP-005							
		Benzene	0.041	22	0.8	200	1.5	4,300	2.1
		Toluene	0.12	16,000	650	410,000	650	410,000	42
		Ethylbenzene	0.14	7,800	400	200,000	400	20,000	58
		Xylenes	0.38	160,000	410	1,000,000	410	410,000	410

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TABLE 4.1

SUMMARY OF BTEX IN SOIL
FORMER COCA-COLA PTO SITE
CHICAGO, ILLINOIS

Soil Boring Number	Sample Depth (ft bgs)[1]	CRA Sample Number	Detected Concentration (mg/kg)[2]	Exposure Route-Specific Values for Soils: Residential Ingestion (mg/kg)	Residential Inhalation (mg/kg)	Industrial-Commercial Ingestion (mg/kg)	Industrial-Commercial Inhalation (mg/kg)	Construction Worker Ingestion (mg/kg)	Construction Worker Inhalation (mg/kg)
SB-106	3-5	S-020499-WP-007							
		Benzene	ND(0.025)	22	0.8	200	1.5	4,300	2.1
		Toluene	ND(0.025)	16,000	650	410,000	650	410,000	42
		Ethylbenzene	ND(0.025)	7,800	400	200,000	400	20,000	58
		Xylenes	0.025	160,000	410	1,000,000	410	410,000	410
SB-107A	3-5	S-020499-WP-006							
		Benzene	0.22	22	0.8	200	1.5	4,300	1.5
		Toluene	0.036	16,000	650	410,000	650	410	650
		Ethylbenzene	0.068	7,800	400	200,000	400	200,000	400
		Xylenes	0.13	16,000	410	1,000,000	410	1,000,000	410.0
SB-103	1-3	S-020499-WP-009							
		Benzene	0.031	22	0.8	200	1.5	4,300	2.1
		Toluene	0.057	16,000	650	410,000	650	410,000	42
		Ethylbenzene	0.033	7,800	400	200,000	400	20,000	58
		Xylenes	0.13	160,000	410	1,000,000	410	410,000	410
SB-104	1-3	S-020499-WP-010							
		Benzene	0.067	22	0.8	200	1.5	4,300	2.1
		Toluene	0.050	16,000	650	410,000	650	410,000	42
		Ethylbenzene	0.036	7,800	400	200,000	400	20,000	58
		Xylenes	0.11	160,000	410	1,000,000	410	410,000	410
SB-105	3-5	S-020499-WP-011							
		Benzene	0.055	22	0.8	200	1.5	4,300	2.1
		Toluene	0.10	16,000	650	410,000	650	410,000	42
		Ethylbenzene	0.045	7,800	400	200,000	400	20,000	58
		Xylenes	0.19	160,000	410	1,000,000	410	410,000	410

00126 00175 9 SL 7 00 '92 TOO

TABLE 4.1

SUMMARY OF BTEX IN SOIL
FORMER COCA-COLA PTO SITE
CHICAGO, ILLINOIS

Soil Boring Number	Sample Depth (ft bgs)[1]	CRA Sample Number	Detected Concentration (mg/kg)[2]	Exposure Route-Specific Values for Soils: Residential Ingestion (mg/kg)	Residential Inhalation (mg/kg)	Industrial-Commercial Ingestion (mg/kg)	Industrial-Commercial Inhalation (mg/kg)	Construction Worker Ingestion (mg/kg)	Construction Worker Inhalation (mg/kg)
SB-110	3-5	S-020499-WP-013							
		Benzene	ND(0,025)	22	0.8	200	1.5	4,300	2.1
		Toluene	0.028	16,000	650	410,000	650	410,000	42
		Ethylbenzene	0.027	7,800	400	200,000	400	20,000	58
		Xylenes	0.081	160,000	410	1,000,000	410	410,000	410
SB-111	3-5	S-020499-WP-014							
		Benzene	0.23	22	0.8	200	1.5	4,300	2.1
		Toluene	0.36	16,000	650	410,000	650	410,000	42
		Ethylbenzene	0.28	7,800	400	200,000	400	20,000	58
		Xylenes	0.78	160,000	410	1,000,000	410	410,000	410
SB-112	3-5	S-020499-WP-015							
		Benzene	0.059	22	0.8	200	1.5	4,300	2.1
		Toluene	0.12	16,000	650	410,000	650	410,000	42
		Ethylbenzene	0.094	7,800	400	200,000	400	20,000	58
		Xylenes	0.47	160,000	410	1,000,000	410	410,000	410

[1] ft bgs - feet below ground surface
[2] mg/kg - milligrams per kilograms
[3] ND( ) - compound not detected at concentrations above the detection limit noted in parentheses
[4] [redacted] - detected concentration exceeds Exposure Route value

00126.001752

APPENDIX A

1988 ANALYTICAL DATA REPORTS

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-1

6/20/88
Submitted to: Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/6/88, is a reissue.

Sample Identification:

This report covers soil samples #71316-71334 taken by S.N. on 5/18/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Petroleum Hydrocarbons by Soxhlet extraction and infrared spectrophotometry, GTL Method Code 6020. Method reference: Methods 503D and 503E, Standard Methods for the Examination of Water and Wastes, 16th Edition, APHA, 1985. Petroleum Hydrocarbons is defined by this method as any material which is soluble in freon (1,1,2-trichloro-1,2,2,-trifluoroethane), does not volatilize at 48°C, and is not removed by silica gel treatment to remove biogenic material. The method is applicable to the measurement of most light petroleum fuels, except gasoline. Significant loss of gasoline present can be expected. Heavier residuals of petroleum which are not soluble in freon are not detected.

The data in this set conforms to the GTL Quality Assurance Program including the parameters of sample integrity. Samples were extracted 5/23/88-5/26/88 and analyzed on 5/27/88. Analyst: S.E.T.

Results:
Results are reported as mg/Kg Petroleum Hydrocarbons detected per kilogram of dry soil. For a 10 gram sample the detection limit is 50 mg/Kg.

The data in this report have been reviewed for accuracy and completeness.

Prepared by:
Bob Edwards
Bob Edwards
GC Lab Manager

Reissue Approval:
Michael Webb
Michael Webb
Quality Assurance

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Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-1

Petroleum Hydrocarbons in Soil
mg/kg

Sample No.	ID	Petroleum Hydrocarbons	Detection Limit
71316	B1, 8.5-10'	1300	53
71317	B2, 4-5.5'	9400	840
71318	B2, 8.5-10'	ND	58
71319	MW1, 4-5.5'	1000	310
71320	MW1, 8.5-10'	ND	83
71321	B3, 1-2.5'	1100	400
71322	B3, 4-5.5'	200	61
71323	B4, 8.5-10'	ND	52
71324	B5, 4-5.5'	ND	62
71325	B6, 1-2.5'	900	39
71326	B6, 4-5.5'	150	44
71327	B7, 4-5.5'	1200	68
71328	B7, 8.5-10'	ND	62
71329	MW2, 1-2.5'	1700	410
71330	MW2, 8.5-10'	ND	77
71331	MW2, 4-5.5'	ND	90
71332	B8, 1-2.5'	5600	370
71333	B8, 4-5.5'	440	48
71334	B8, 8.5-10'	ND	48

Notes:

ND = None Detected.

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LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
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(603) 673-8105 (FAX)

Report No.
401-144-8928-2

6/21/88
Submitted to:

Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/1/88, previously numbered 401-114-8827-77-1, is a reissue.

Sample Identification:

This report covers soil samples # 71390-71394 taken by J.S. on 5/19/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Petroleum Hydrocarbons by Soxhlet extraction and infrared spectrophotometry, GTL Method Code 6020. Method reference: Methods 503D and 503E, Standard Methods for the Examination of Water and Wastes, 16th Edition, APHA, 1985. Petroleum Hydrocarbons is defined by this method as any material which is soluble in freon (1,1,2-trichloro-1,2,2,-trifluoroethane), does not volatilize at 48°C, and is not removed by silica gel treatment to remove biogenic material. The method is applicable to the measurement of most light petroleum fuels, except gasoline. Significant loss of gasoline present can be expected. Heavier residuals of petroleum which are not soluble in freon are not detected.

The data in this set conforms to the GTL Quality Assurance Program including the parameters of sample integrity. Samples were extracted 5/26/88 and analyzed on 5/27/88. Analyst: S.E.T.

Results:
Results are reported as mg/Kg Petroleum Hydrocarbons detected per kilogram of dry soil. For a 10 gram sample the detection limit is 50 mg/Kg.

The data in this report have been reviewed for accuracy and completeness.

Prepared by:

Dave Reese
Extractable Organics Manager

Reissue Approval:

Michael Webb

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Meadowbrook Industrial Park
Milford, NH 03055
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Report No.
401-144-8928-2

Petroleum Hydrocarbons in Soil
mg/kg

Sample	ID	Petroleum Hydrocarbons	Detection Limit
71390	MW4, 1-2.5'	1300	76
71391	MW4, 8.5-10'	ND	77
71392	MW5, 1-2.5'	ND	49
71393	B9, 4-5.5'	16000	670
71394	MW6, 4-5.5'	ND	48

Notes:

ND = None Detected

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GTEL Report No.
401-144-8928-3

June 21, 1988

Mr. Steve Naleski
Groundwater Technology, Inc.
2113 Stonington Ave.
Hoffman Estates, IL 60195

Sampling Site: Chicago, IL
Date Sampled: 5/19/88
Sampler: Judith Supergan

The enclosed data reports the analysis of soil sample # 71720 for polychlorinated biphenyls (PCB's).

Samples are extracted in accordance with EPA Method 8080, and within the seven-day holding period. Samples are analyzed by gas chromatography with electron capture detection. Confirmation of samples testing positive is accomplished by analysis using a second gc column. Quality control procedures, including method blanks, matrix spikes and surrogate addition are used to demonstrate acceptable accuracy and precision.

For PCB's: An acid cleanup of a portion of the sample extract was performed to reduce matrix interferances.

Analyst: L. Schlickenrieder

Prepared by:

Dave Reese
Extractable Organics Manager

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GTEL Report No.
401-144-8828-3

June 21, 1988

Method 8080 PCB Analytical Results (ug/g)

Sampling Site: Chicago, IL
Sampling Date: 5/18/88
Sampler: Judith Supergan
Extraction Date: 5/26/88
Analysis Date: 5/28/88

Sample Lab #:	71720
Field ID:	B9-2-H

Aroclor	ug/g (ppm)
PCB-1221	<1.80
PCB-1232	<1.80
PCB-1016 (1242)	<0.80
PCB-1248	<0.85
PCB-1254	<0.85
PCB-1260	<0.85
PCB-1262	<0.85

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Report No.
401-144-8928-4

6/20/88
Submitted to:

Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/8/88, previously numbered 401-114-8927-77-3, is a reissue.

Sampling Date: 5/19/88
Site Location: Chicago, Illinois.

This reports the analysis of soil sample 71721 extracted in freon for a hydrocarbon fingerprint. This is a customized analysis which provides a comparison between the sample and representative fuel samples. It compares the molecular weight distribution of the sample and known fuels, and provides an identification on this basis.

Samples are analyzed by gas chromatography with flame ionization detection. Sample constituents are separated on a DB-1 capillary column, 30 meter x 0.53 mm, using Helium carrier gas at 6 cc/min. The column oven is temperature programmed as follows: 40 degrees C initial T, programmed at 5 degrees/min to a final T of 230 degrees C, which is held for 10 minutes.

The accompanying data provides simulated distillation information for each sample and known fuel products. This data is also graphically displayed as percentage composition vs simulated boiling point (g.c. retention time).

Prepared by:

Bob Edwards
GC Lab Manager

Analyst: A. Naber

Reissue Approval:

Michael Webb
Quality Assurance

SIMULATED DISTILLATION
401-144-8928-4
Coca Cola USA

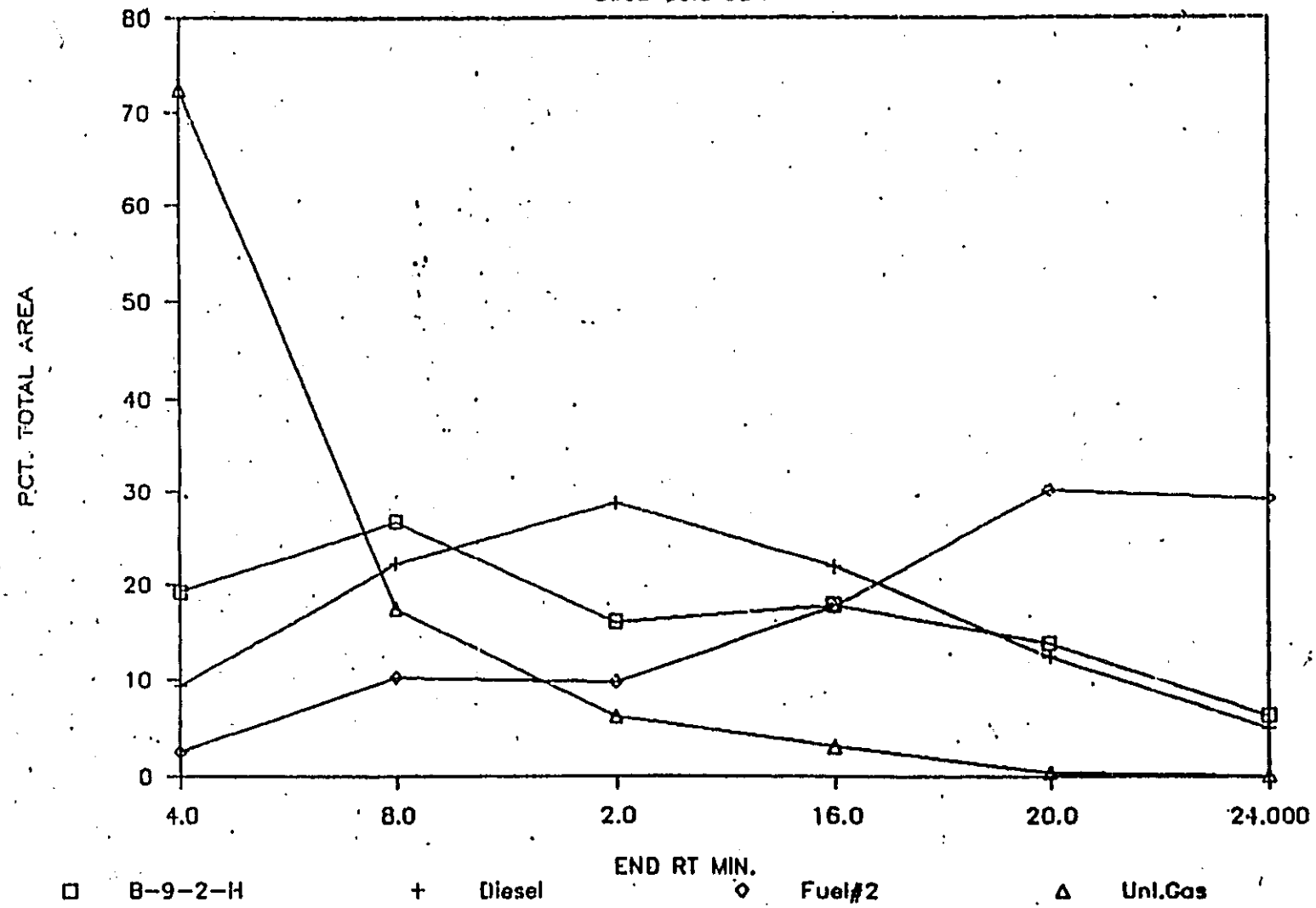
PERCENT OF TOTAL AREA USING
4 MIN INTERVALS

END RT.	71721	Diesel	Fuel #2	Unl. Gas
4	19.2	9.35	2.47	72.5
8	26.7	22.2	10.3	17.5
12	16.1	28.7	9.84	6.22
16	17.9	21.9	17.7	3.10
20	13.9	12.5	30.1	.319
24	6.37	5.03	29.2	.03
TOTAL %	100.2	99.7	99.6	99.7
I.B.P.	.349	.655	2.22	.528

LEGEND
Diesel = Diesel Fuel
Fuel #2 = Home Heating Fuel #2
Unl. Gas = Regular Unleaded Gasoline
I.B.P. = Initial Boiling Point in Minutes
RT. = Retention Time in Minutes
71721 = B-9-2-H

SIMULATED DISTILLATION

Coca Cola USA



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Milford, NH 03055
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Report No.
401-144-8928-7

11/14/88
Submitted to:

Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL 60195

This report previously dated 7/18/88, is a reissue.

Sample Identification:
This report covers soil samples # 74910-74912 taken by S.L.N., on 6/29/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Petroleum Hydrocarbons by Soxhlet extraction and infrared spectrophotometry, GTEL Method Code 6020. Method reference: Methods 503D and 503E, Standard Methods for the Examination of Water and Wastes, 16th Edition, APHA, 1985. Petroleum Hydrocarbons is defined by this method as any material which is soluble in freon (1,1,2-trichloro-1,2,2,-trifluoroethane), does not volatilize at 48°C, and is not removed by silica gel treatment to remove biogenic material. The method is applicable to the measurement of most light petroleum fuels, except gasoline. Significant loss of gasoline present can be expected. Heavier residuals of petroleum which are not soluble in freon are not detected.

The data in this set conforms to the GTEL Quality Assurance Program including the parameters of sample integrity. Samples were extracted 7/12/88 and analyzed on 7/12/88. Analyst: S.E.T.

Results:
Results are reported as mg/Kg Petroleum Hydrocarbons detected per kilogram of dry soil. For a 10 gram sample the detection limit is 50 mg/Kg.

The data in this report have been reviewed for accuracy and completeness.

Respectfully submitted,

Susan C. Uhler
Susan C. Uhler
Laboratory Director

Roseanna Dube
Roseanna Dube
Quality Assurance

Report No.
401-144-8928-7

Petroleum Hydrocarbons in Soil
mg/Kg

Sample	ID	Petroleum Hydrocarbons
74910	TB-5	ND
74911	TB-6	ND
74912	TB-7	1200

Notes:

ND = None Detected

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Report No.
401-144-8928-10

8/16/88
Submitted to:

Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

Sampling Date: 6/29/88
Site Location: Chicago, Illinois

This reports the analysis of product samples # 77399-77401 for a hydrocarbon fingerprint. This is a customized analysis which provides a comparison between the sample and represenative fuel samples. It compares the molecular weight distribution of the sample and known fuels, and provides an identification on this basis.

Samples are analyzed by gas chromatography with flame ionization detection. Sample constituents are separated on a DB-5 capillary column, 30 meter x 0.53 mm, using Helium carrier gas at 6 cc/min. The column oven is temperature programmed as follows: 40 degrees C initial T, programmed at 5 degrees/min to a final T of 300 degrees C, which is held for 15 minutes.

The accompanying data provides simulated distillation information for each sample and known fuel products. This data is also graphically displayed as percentage composition vs simulated boiling point (g.c. retention time).

Respectfully submitted,

Bob Edwards

Bob Edwards
Gas Chromatography Manager

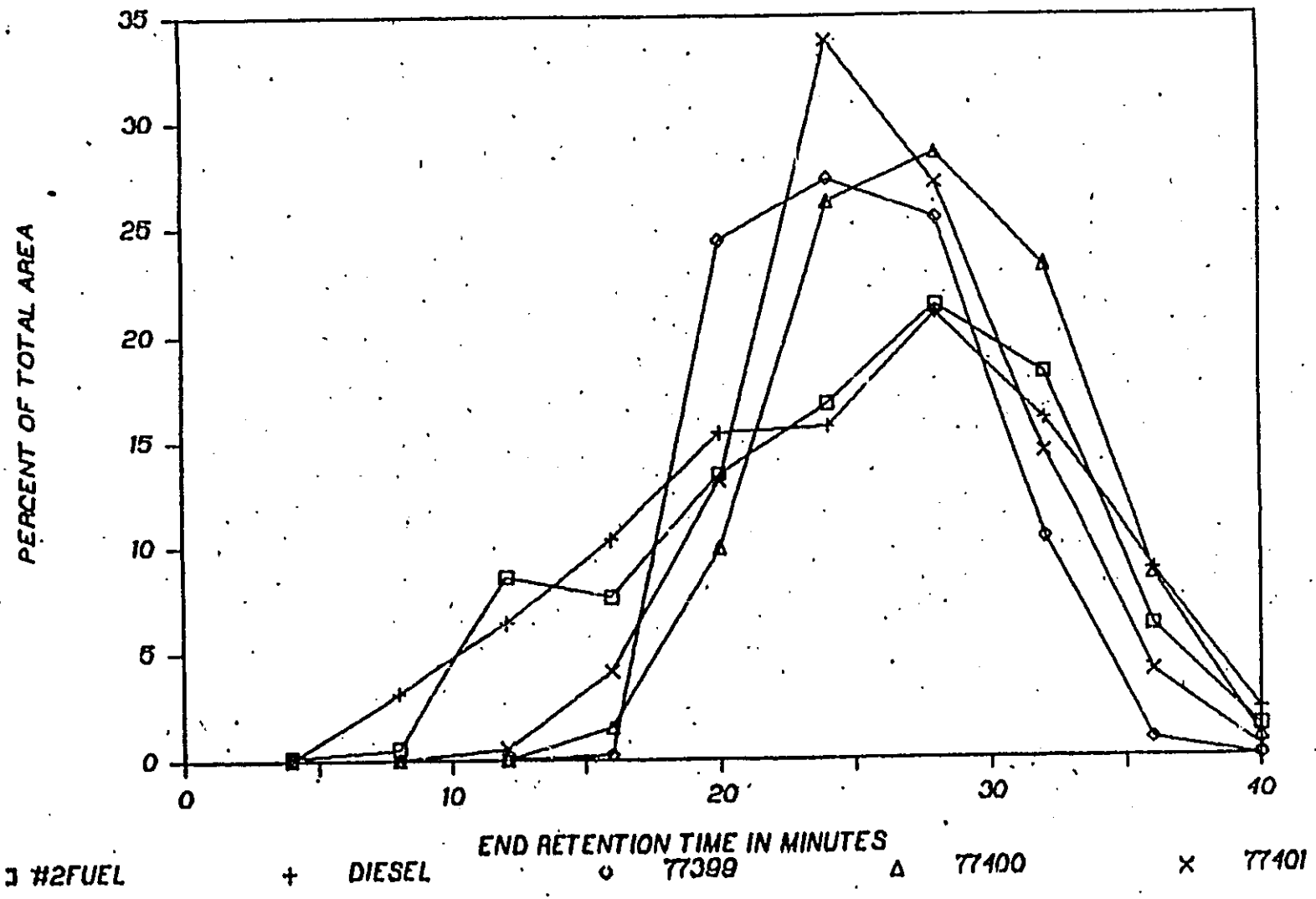
SIMULATED DISTILLATION ANALYSIS
COCA COLA USA
401-144-8928-10

ID	#2 HEATING FUEL	DIESEL FUEL	77399 B-13	77400 B-14	77401 B-10
END RETENTION TIME IN MINUTES	PERCENT OF TOTAL AREA USING 4 MIN. INTERVALS				
4.0	0.1	0.0	0.0	0.0	0.0
8.0	0.5	3.1	0.0	0.0	0.0
12.0	8.6	6.4	0.0	0.0	0.5
16.0	7.6	10.3	0.2	1.5	4.1
20.0	13.4	15.4	24.4	9.9	13.1
24.0	16.8	15.7	27.3	26.2	33.8
28.0	21.4	21.0	25.4	28.5	27.1
32.0	18.2	16.0	10.3	23.2	14.4
36.0	6.2	8.8	0.8	8.6	4.0
40.0	1.4	2.2	0.0	0.9	0.4
TOTAL %	92.8	96.7	88.4	97.9	97.0
I.B.P. MIN.	4.6	4.5	14.2	14.5	13.2

LEGEND
I.B.P. = INITIAL BOILING POINT

SIMULATED DISTILLATION ANALYSIS

COCA COLA USA



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Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-11

11/14/88
Submitted To:

Gary Robinson
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 10/25/88, is a reissue.

Sample Identification:
The attached report covers 5 soil samples # 82977-82981 taken by S.N., on 10/06/88 at site # 401-144-8928, Chicago, Illinois. Samples were extracted on 10/13/88 by N.P.B.

Method:
Analysis was performed for volatile organics by purge and trap gas chromatography, EPA Method 5030, with flame ionization detection and photoionization detection as per EPA Methods 8015 and 8020. Quantification was performed on a very polar column. This modification fractionates aliphatics (up to C12) away from the volatile aromatics. Chromatographic conditions are referenced in GTL Method Code 119. Hexane and orthoxylene are used as calibration standards for the aliphatic hydrocarbons and miscellaneous aromatics, respectively.

Sampling, sample handling, and preservation are specified by this laboratory to be as per EPA Method 5030. Any irregularities are referenced as notes to the analytical report.

E.A. was the performing analyst.

Results:
Results are reported in ppm (mg/kg) dry soil.

Respectfully submitted,

Bob Edwards
Bob Edwards
Gas Chromatography Manager

Reissue Approval:

Roseanna Dube
Roseanna Dube
Quality Assurance

Report No.
401-144-8928-11

Analytical Results
Hydrocarbons in Soil mg/kg (ppm)

Sample No.	ID	C4-C12 Aliphatic Hydrocarbons	C8-C10 Aromatic Hydrocarbons	Total
82977	MW-7 3.5-5'	ND	ND	ND
82978	MW-7 8.5-10'	ND	ND	ND
82979	MW-8 1-2.5'	ND	8.5	9.8
82980	MW-8 3.5-5'	ND	15	15
82981	MW-8 8.5-10'	ND	ND	ND
Detection Limits		8.1	5.4	

Notes:

ND = None Detected

GTEL ENVIRONMENTAL LABORATORIES, INC.

Report No.
401-144-8928-11

Analytical Results
Hydrocarbons in Soil mg/kg (ppm)

Sample	ID	Date Run	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Total BTEX
82977	MW-7 3.5-5'	10/18/88	ND	ND	ND	ND	ND
82978	MW-7 8.5-10'	10/18/88	ND	ND	ND	ND	ND
82979	MW-8 1-2.5'	10/18/88	1.3	ND	ND	ND	1.3
82980	MW-8 3.5-5'	10/18/88	0.18	0.27	ND	ND	0.45
82981	MW-8 8.5-10'	10/18/88	ND	ND	ND	ND	ND
Detection Limits			0.11	0.27	0.43	0.91	

Notes:

ND = None Detected

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NOV 14 1988

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Report No.
401-144-8928-12

11/08/88
Submitted to: Gary Robinson
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

Sample Identification:

This report covers soil samples # 82993-83010 taken by S.N. on 10/06/88 at site # 401-144-8928, Chicago, Illinois.

Method:

Petroleum Hydrocarbons by Soxhlet extraction and infrared spectrophotometry, GTL Method Code 6020. Method reference: Methods 503D and 503E, Standard Methods for the Examination of Water and Wastes, 16th Edition, APHA, 1985. Petroleum Hydrocarbons is defined by this method as any material which is soluble in freon (1,1,2-trichloro-1,2,2,-trifluoroethane), does not volatilize at 48°C. and is not removed by silica gel treatment to remove biogenic material.

The data in this set conforms to the GTL Quality Assurance Program including the parameters of sample integrity. Samples were extracted 11/03/88 & 11/04/88 and analyzed on 11/05/88. Analysts: M.H./J.B./B.C.

Results:

Results are reported as mg Petroleum Hydrocarbons detected per kilogram of dry soil. For a 10 gram sample the detection limit is 50 mg/Kg.

The data in this report have been reviewed for accuracy and completeness.

Respectfully Submitted,

Susan C. Uhler
Laboratory Director

Report No.
401-144-8928-12

Petroleum Hydrocarbons in Soil
mg/kg

Sample	ID	Petroleum Hydrocarbons	Detection Limit
82993	MW-7(1-2.5)	410	38
82994	MW-7(3.5-5)	600	50
82995	MW-7(8.5-10)	150	50
82996	B-19(1-2.5)	210	45
82997	B-19(3.5-5)	1600	50
82998	B-19(8.5-10)	130	50
82999	MW-8(1-2.5)	210	50
83000	MW-8(3.5-5)	390	46
83001	MW-8(8.5-10)	ND	50
83002	B-18(1-2.5)	1800	45
83003	B-18(3.5-5)	4800	50
83004	B-18(8.5-10)	ND	45
83005	B-20(1-2.5)	390	45
83006	B-20(3.5-10)	240	50
83007	B-20(8.5-10)	ND	56
83008	MW-9(1-2.5)	100	50
83009	MW-9(3.5-5)	380	50
83010	MW-9(8.5-10)	ND	51

Notes:

ND = None Detected

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GTEL Report No.
401-144-8928-13

11/14/88
Submitted to:

Gary Robinson
Groundwater Technology, Inc
2113 Stonington Ave.
Hoffman Estates, IL 60195

Sample Identification:
The attached report covers soil samples # 82987-82992 taken on 10/06/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Analysis was performed for polynuclear aromatic hydrocarbons by High Performance Liquid Chromatography as per EPA Method 8310. Analysis was performed using dual UV and Fluorescence detection. Quality Control procedures, including method blanks and matrix spikes were employed to demonstrate accuracy and precision.

Sampling and sample handling and preservation are specified by this laboratory to be as per EPA Method 8310.

Results:
Results are reported in ug/kg (ppb).

Prepared by:

for Dave Reese

Dave Reese
Extractable Organics Manager

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Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
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Report No.
401-144-8928-5

11/14/88
Submitted To:

Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/2/88, is a reissue.

Sample Identification:
The attached report covers water samples #72296-72300 taken by J.S., using 40 ml septum-capped glass vials at site # 401-144-8928, Chicago, Illinois.

Method:
Analysis was performed for purgeable aromatic priority pollutants and xylenes by purge and trap gas chromatography with photo-ionization and flame ionization detection, as per a modified EPA Method 602. FID quantitation was performed on a very polar column which fractionates aliphatics (up to C12) away from volatile aromatics. Chromatographic conditions are referenced in GTEL Method Code 2010. Hexane and orthoxylene are used as calibration standards for the aliphatic hydrocarbons and miscellaneous aromatics, respectively, if reported.

Samples diluted in order to maintain the calibration range are so indicated by a footnote giving the factor by which the MDL is raised.

Sampling, sample handling, and preservation are specified by this laboratory to be as per EPA Method 602. Any irregularities are referenced as notes to the analytical report.

Results:
Results are reported in ppb (ug/l).

Prepared By:

Bob Edwards
Gas Chromatography Manager

Analyst: D.A.R.

Roseanna Dube
Quality Assurance

Report No.
401-144-8928-5

Analytical Results
Hydrocarbons in Water ug/L (ppb)

Sample	ID	Date Sampled	Date Run	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Total BTEX
72296	MW-3	5/27/88	6/1/88	2.9	0.9	4.1	5.2	13
72297	MW-1	5/27/88	6/1/88	ND	ND	ND	ND	ND
72298	MW-2	5/27/88	6/1/88	ND	ND	ND	ND	ND
72299	MW-5	5/27/88	6/1/88	ND	ND	ND	ND	ND
72300	MW-6	5/27/88	6/1/88	ND	1.8	ND	ND	1.8
Detection Limits				0.2	0.5	0.8	1.7	

ND = None Detected

GTEL ENVIRONMENTAL LABORATORIES, INC.

Report No.
401-144-8928-5

Analytical Results
Hydrocarbons in Water ug/L (ppb)

Sample No.	ID	C4-C12 Aliphatic Hydrocarbons	C8-C10 Aromatic Hydrocarbons	Total
72296	MW-3	11	130	150
72297	MW-1	ND	ND	ND
72298	MW-2	ND	ND	ND
72299	MW-5	ND	ND	ND
72300	MW-6	ND	ND	1.8
Detection Limits		15	10	

ND = None Detected

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4825
(603) 673-8105 (FAX)

Report No.
401-144-8928-6

11/14/88
Submitted to:

Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/6/88, is a reissue.

Sample Identification:
The attached report covers water sample #72301 taken on 5/27/88 at site # 401-1 4-8928, Chicago, Illinois.

Method:
Analysis was performed for volatile organics by purge and trap GC/MS as per EPA Method 624. Detection limits are listed on the report. Samples are diluted in order to maintain the calibrated range of the instrument and so indicated by a footnote giving the factor by which the MDL is raised.

Sampling and sample handling and preservation are specified by this laboratory to be as per EPA Method 624.

Results:
Results are reported in ug/L (ppb.).

Prepared by:

Dave Reese
GC/MS Manager
DRR/ch

Roseanna Dube
Quality Assurance

Report No.
401-144-8928-6

Volatile Organics Analysis

Sample No.	72301
ID	MW-4
Date Sampled	5-27-88
Date Analyzed	6-01-88

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	ND	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	ND	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	ND	4.5
Total-Xylene	19	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1

Notes: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-6105 (FAX)

Report No.
401-144-8928-14

11/14/88
Submitted To:

Gary Robinson
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL 60195

This report previously dated 10/25/88, is a reissue.

Sample Identification:
The attached report covers water samples # 83483-83486 taken by S.N., on 10/12/88 using 40 ml septum-capped glass vials at site # 401-144-8928, Chicago, Illinois.

Method:
Analysis was performed for purgeable aromatic priority pollutants and xylenes by purge and trap gas chromatography with photoionization and flame ionization detection, as per a modified EPA Method 602. FID quantitation was performed on a very polar column which fractionates aliphatics (up to C12) away from volatile aromatics. Chromatographic conditions are referenced in GTEL Method Code 2010. Hexane and ortho-xylene are used as calibration standards for the aliphatic hydrocarbons and miscellaneous aromatics, respectively, if reported.

Samples diluted in order to maintain the calibration range are so indicated by a footnote giving the factor by which the MDL is raised.

Sampling, sample handling, and preservation are specified by this laboratory to be as per EPA Method 602. Any irregularities are referenced as notes to the analytical report.

E.A. was the performing analyst.

Results:
Results are reported in ppb (ug/l).

Respectfully submitted,

Bob Edwards
Gas Chromatography Manager

Roseanna Dube
Quality Assurance

Report No.
401-144-8928-14

Analytical Results
Hydrocarbons in Water ug/L (ppb)

Sample	ID	Date Run	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Total BTEX
83483	MW-8	10/19/88	44	5.4	67	61	180
83484	MW-9	10/19/88	24	1.9	3.3	4.5	34
83485	MW-5	10/19/88	ND	ND	ND	ND	ND
83486	MW-2	10/19/88	ND	1.0	ND	ND	1.0
Detection Limits			0.2	0.5	0.8	1.7	

Notes:

ND = None Detected

GTEL
ENVIRONMENTAL LABORATORIES, INC.

Report No.
401-144-8928-14

Analytical Results
Hydrocarbons in Water ug/L (ppb)

Sample No.	ID	C4-C12 Aliphatic Hydrocarbons	C8-C10 Aromatic Hydrocarbons	Total
83483	MW-8	1600	300	2100
83484	MW-9	300	150	480
83485	MW-5	ND	ND	ND
83486	MW-2	ND	ND	1.0
Detection Limits		15	10	

Notes:

ND = None Detected

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ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

GTEL Report No.
401-144-8928-15

11/14/88
Submitted to:

Gary Robinson
Groundwater Technology, Inc.
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 11/7/88, is a reissue.

Sample Identification:
The attached report covers water samples # 83778-83781 taken on 10/14/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Analysis was performed for polynuclear aromatic hydrocarbons by High Performance Liquid Chromatography as per EPA Method 8310. Analysis was performed using dual UV and Fluorescence detection. Quality Control procedures, including method blanks and matrix spikes were employed to demonstrate accuracy and precision. In case of samples requiring dilutions the footnote give the factor by which the MDL is raised.

Sampling and sample handling and preservation are specified by this laboratory to be as per EPA Method 8310.

Results:
Results are reported in ug/L (ppb).

Prepared by:

Susan L. White for
Dave Reese
Extractable Organics Manager

Roseanna Dube
Roseanna Dube
Quality Assurance

GTEL Report No.
401-144-8928-15

Polynuclear Aromatic Hydrocarbons Analysis

Sample No.	83780
Field ID	MW5
Date Sampled	10/14/88
Date Analyzed	10/28/88

Parameter	Concentration ug/L	Detection Limit ug/L
Naphthalene	ND	1.8
Acenathylene	ND	2.3
1-Methylnaphthalene	ND	1.8
2-Methylnaphthalene	ND	1.8
Acenaphthene	ND	1.8
Fluorene	ND	0.21
Phenanthrene	ND	0.64
Anthracene	ND	0.66
Fluoranthene	ND	0.21
Pyrene	ND	0.27
Benzo(a)anthracene	0.062	0.013
Chrysene	ND	0.15
Benzo(b)fluoranthene	0.058	0.018
Benzo(k)fluoranthene	0.027	0.017
Benzo(a)pyrene	0.061	0.023
Dibenz(ah)anthracene	ND	0.030
Benzo(ghi)perylene	ND	0.076
Indeno(1,2,3-cd)pyrene	0.066	0.043

ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES, INC.

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217)782-2829
PAT QUINN, GOVERNOR LISA BONNETT, DIRECTOR

NFR INSPECTION EVALUATION DOCUMENT

DATE: January 2, 2014

TO: BUREAU of LAND File

FROM: Neelu Lowder

SUBJECT: 0316580016 – Cook County
Chicago/Former Coca-Cola PTO
Site Remediation/Technical Reports

Date of NFR Letter: September 24, 1999

Inspection Date: January 2, 2014

	Consistent	Inconsistent	Further Determination	NA
Barrier:	[ ]	[ ]	[ ]	[X]
Land Use:	[ ]	[ ]	[ ]	[X]
Groundwater Use:	[X]	[ ]	[ ]	[ ]

Comments:
The No Further Remediation Letter identified the following institutional control: groundwater use restriction. The Chicago groundwater ordinance (11-8-390) is still valid for use as an institutional control. No further action is warranted at this time.

IEPA-DIVISION OF RECORDS MANAGEMENT
RECEIVED
JAN 30 2014
REVIEWER MED

LPC# 0316580016 / Cook County
Coca Cola USA / Chicago
Site Remediation Program/Technical Reports

Right-to-Know Evaluation

The Bureau of Land site identified above has been reviewed. A check mark next to any one of the following criteria indicates further evaluation of the site is necessary. NFR dated 9/24/1999

Criteria:

☐ Contaminated soil is measured off-site to exceed the appropriate Tier 1 remediation objectives based on the current use of the off-site property. For purposes of this procedure, soils beneath publicly owned roadways should not be considered off-site when making this determination; or

☐ Groundwater contamination is measured or modeled to exceed, within the setback zone or regulated recharge area of a potable Community Water Supply (CWS) well, or setback zone of a private well or non-CWS well, either TACO Tier 1 groundwater remediation objectives under Part 742, Appendix B, Table E or Class I groundwater standards under Part 620, whichever is applicable to the BOL program with lead responsibility for the site; or

☐ Groundwater contamination from a site for which a BOL program has lead responsibility is measured in a well used as a drinking water supply; or

☐ Evidence of a release of liquids or dumping of waste in either such quantities or with such toxic leaching potential that off site groundwater contamination is suspected; or

☐ Waste management sites (e.g. regulated landfills) with groundwater monitoring programs that are in corrective action; or

☐ Other site specific information regarding the release, such as site geology allowing excessive movement of contaminants or the presence of non-aqueous phase liquids (free product) in groundwater, that may increase the potential threat to humans; or

☐ BOL refers a matter to the Division of Legal Counsel for enforcement under Section 43(a) of the Act; or

☐ BOL refers a site to the Division of Legal Counsel for issuance of a seal order under Section 34(a) of the Act; or

☐ The Agency, U.S. EPA, or a third party under Agency or U.S. EPA oversight performs an immediate removal under federal CERCLA, as amended

RELEASABLE
MAY 04 2010
REVIEWER MD

Comments:

☐ At least one of the above criteria is met and the above-identified site must be further evaluated.

☐ Insufficient information submitted to make an adequate RTK decision.

☑ None of the above criteria are met and the above-identified site does not warrant any further evaluation.

The No Further Remediation letter issued for this site contains only a restriction on use of the groundwater. It can be concluded that no contaminants of concern are above the Taco Tier 1 ingestion objectives or (Tier 1 or 2) inhalation objectives. It is also concluded that no potable well setback area was affected or predicted to be affected since the No Further Remediation letter was issued in accordance with 742 rules. It is concluded that no contaminants of concern would trigger the right to know criteria listed above.

Date of Review: 5/04/2010 Signature: [signature]

NFR INSPECTION EVALUATION DOCUMENT
GIS

DATE: October 19, 2009

TO: BUREAU of LAND File

FROM: Rick Lucas SRP BOL

SUBJECT: LPC#0316580016 -Cook County
Chicago / Former Coca-Cola PTO
Site Remediation/ Technical Reports (31A)

NFR Letter: 9/24/1999 Recorded: 9/27/1999

A desktop evaluation was performed to determine the likelihood that institutional controls are not in place for the above referenced NFR letter. Publicly available aerial maps were used to observe whether the land use or barriers exist at the time of the photograph. The following maps were consulted on the date referenced above: Bing Maps.

	Consistent	Inconsistent	Further Determination	NA
Barrier:	[ ]	[ ]	[ ]	[ ]
Land Use:	[X]	[ ]	[ ]	[ ]
Groundwater Use:	[X]	[ ]	[ ]	[ ]
Proof of Recording:	[X]	[ ]	[ ]	[ ]

Institutional Controls:

Land Use: Residential or Industrial

Institutional Use Restriction: Groundwater use restriction

Description: Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") effectively prohibits the installation of potable water supply wells (and the use of such wells) and is an acceptable institutional control.

Barriers: None Required

RELEASABLE

NOV 19 2009

REVIEWER MD

Ordinance: 097990

Comments:

Groundwater Use was determined to be consistent based on the existence of the adopted Ordinance prohibiting the installation of potable wells.
Proof of Recording was determined to be consistent if the IEPA's database indicated the NFR was recorded.

Attachments: Photo Document
cc - RPMS - O'Hara

The appearance of some of the images

following this page is due to

Poor Quality Original Documents

and not the scanning or filming processes.

Com Microfilm Company
(217) 525-5860

J:\toolbox\poorDocs.doc

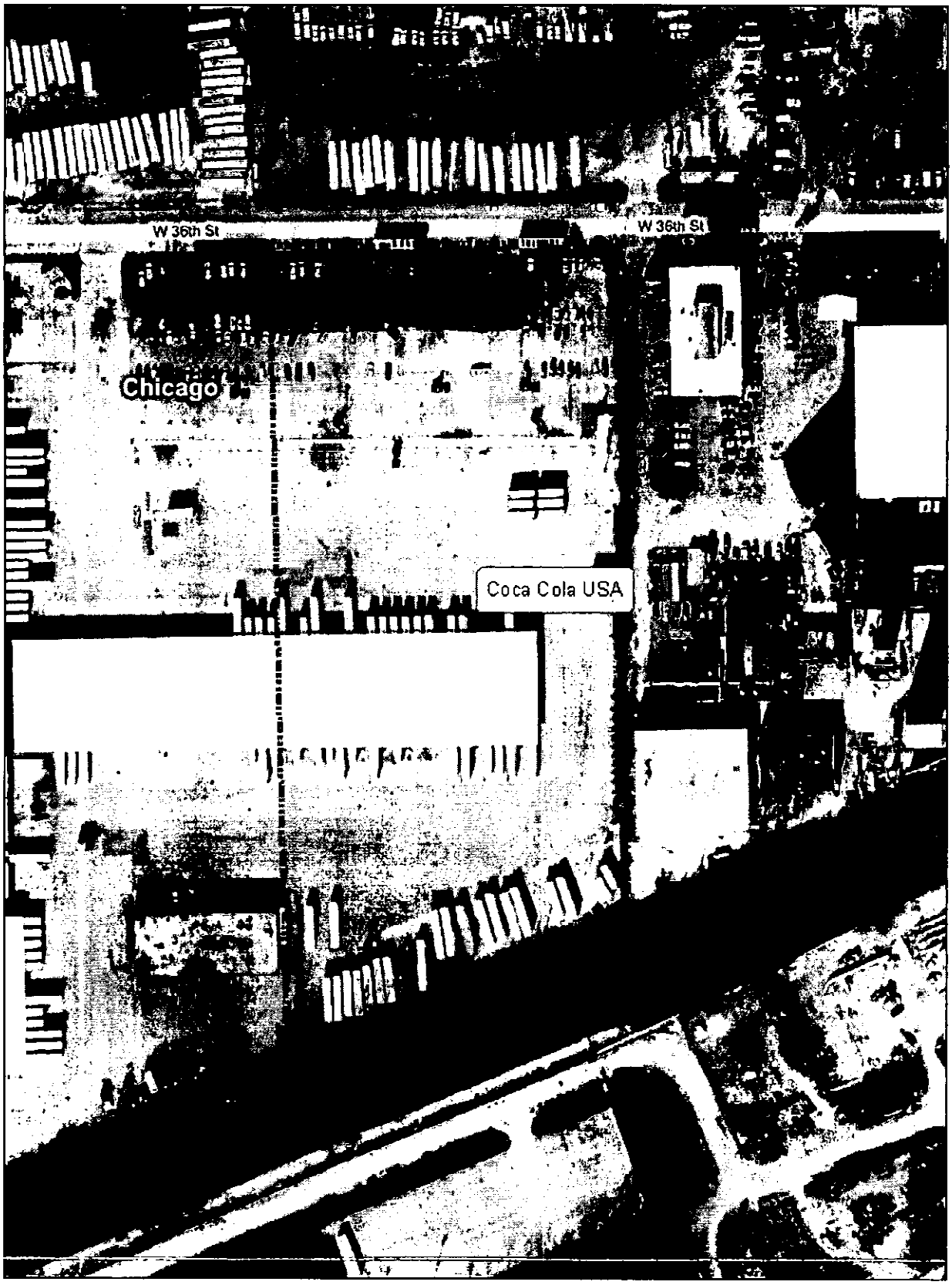
Institutional Control Review

NFR Dated: 9/24/1999

NAMEof SITE: Former Coca-Cola PTO

LPC#: 0316580016

Date of Review: 10/19/09



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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/782-6762

CERTIFIED MAIL
2414155813

SEP 24 1999

The Coca-Cola Company
Attention: Gregory J. Koch
One Coca-Cola Plaza
Atlanta, Georgia 30313

Re: LPC #0316580016 -- Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Mr. Koch:

The Site Investigation Report and the Remedial Action Completion Report ("Report") (dated April 4, 1999, Log No. 99-701), as prepared by Conestoga-Rovers & Associates for the former Coca-Cola PTO property, has been reviewed by the Illinois Environmental Protection Agency ("Illinois EPA"). The Report demonstrates that the remedial action was successfully completed. Note: This NFR letter is being reissued to correct the Parcel Index Number listed on the Environmental Notice.

The remediation site, consisting of 6.7 acres, is legally described in the attached Environmental Notice and is commonly known as 4301 West 36th Street, Chicago, Illinois. Pursuant to Section 58.10 of the Environmental Protection Act ("Act") (415 ILCS 5/58.10), your request for a "No Further Remediation Determination" is granted under the conditions and terms specified in this No Further Remediation Letter ("Letter").

Issuance of this focused Letter signifies a release from further responsibilities under the Act in performing the approved remedial action. The Letter shall be considered prima facie evidence that the remediation site described in the attached Site Remediation Program ("SRP") Environmental Notice and shown in the attached Site Base Map does not constitute a threat to human health and the environment for the specified recognized environmental conditions so long as the site is utilized in accordance with the terms of this Letter.

RELEASABLE
FEB 09 2006
REVIEWER MD

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CONDITIONS AND TERMS OF APPROVAL

LEVEL OF REMEDIATION AND LAND USE LIMITATIONS

1. The recognized environmental conditions, as characterized in the above-referenced Report, are identified in Table A.

2. The remediation objectives for the above-referenced site described in the SRP Environmental Notice of this Letter were established in accordance with the requirements of the Tiered Approach to Corrective Action Objectives (TACO, 35 Illinois Administrative Code Part 742) rules.

3. In accordance with Section 58.8(c) and 58.10(b)(3)of the Act (415 ILCS 5/58.8(c), 415 ILCS 5/58.10(b)(3)), the remediation site described in the attached SRP Environmental Notice and shown on the attached Site Base Map of this Letter is limited to residential or industrial/ commercial uses.

4. The land use specified in this Letter may be revised if:

   a) Further investigation or remedial action has been conducted that documents the attainment of objectives appropriate for the new land use; and

   b) A new Letter is obtained and recorded in accordance with Title XVII of the Act and regulations adopted thereunder.

PREVENTIVE, ENGINEERING, AND INSTITUTIONAL CONTROLS

5. Preventive: None.

   Engineering: None.

   Institutional: Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") effectively prohibits the installation of potable water supply wells (and the use of such wells) and is an acceptable institutional control under the following conditions:

   Each affected property owner and the City of Chicago must receive written notification from the Remediation Applicant desiring to use the ordinance as an institutional control that groundwater remediation objectives have been approved by the Illinois EPA. Written proof of this notification shall be submitted to the Illinois EPA within 45 days from the date of this Letter. The notification shall include:

   a) The name and address of the local unit of government;

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b) The citation of the ordinance used as an institutional control in this Letter.

c) A description of the property being sent notice by adequate legal description or by reference to a plat showing the boundaries;

d) A statement that the ordinance restricting the groundwater use has been used by the Illinois EPA in reviewing a request for groundwater remediation objectives;

e) A statement as to the nature of the release and response action with the name, address, and Illinois EPA inventory identification number; and

f) A statement as to where more information may be obtained regarding the ordinance.

The following activities shall be grounds for voidance of the ordinance as an institutional control and this Letter:

a) Modification of the reference ordinance to allow potable uses of groundwater;

b) Approval of a site-specific request, such as a variance, to allow use of groundwater at the site;

c) Violation of the terms of an institutional control recorded.

As a part of its corrective action plan, the remediation site has relied upon Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, prohibiting potable uses of groundwater as defined therein. Proof of notification of affected parties, if any, shall be submitted in accordance with 35 Ill. Adm. Code 742.1015(b) and (c) within 45 days of the issuance of this NFR Letter.

6. Failure to establish, operate and maintain controls in full compliance with the Act, applicable regulations, and the above-referenced Report may result in voidance of this Letter.

OTHER TERMS

7. Any contaminated soil or groundwater that is removed, excavated, or disturbed from the above-referenced site must be handled in accordance with all applicable laws and regulations.

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8. Where the Remediation Applicant is not the sole owner of the remediation site, the Remediation Applicant shall complete the attached "Property Owner Certification of NFR Letter Under the Site Remediation Program" form. This certification by original signature of each property owner, or the authorized agent of the owner(s), of the remediation site or any portion thereof who is not a Remediation Applicant shall be recorded along with this Letter.

9. Further information regarding this remediation site can be obtained through a written request under the Freedom of Information Act (5 ILCS 140) to:

   Illinois Environmental Protection Agency
   Attention: Freedom of Information Act Officer
   Bureau of Land -- #24
   1021 North Grand Avenue East
   Post Office Box 19276
   Springfield, IL 62794-9276

10. Pursuant to Section 58.10(f) of the Act (415 ILCS 5/58.10(f)), should the Illinois EPA seek to void this Letter, the Illinois EPA shall provide notice to the current title holder and to the Remediation Applicant at the last known address. The notice shall specify the cause for the voidance, explain the provisions for appeal, and describe the facts in support of this cause. Specific acts or omissions that may result in the voidance of this Letter under Sections 58.10(e)(1)-(7) of the Act (415 ILCS 5/58.10(e)(1)-(7)) include, but shall not be limited to:

    a) Any violation of institutional controls or the designated land use restrictions;

    b) The failure to operate and maintain preventive or engineering controls or to comply with any applicable groundwater monitoring plan;

    c) The disturbance or removal of contamination that has been left in place in accordance with the above-referenced Report. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected consistent with the above-referenced Report;

    d) The failure to comply with the recording requirements for this Letter;

    e) Obtaining the Letter by fraud or misrepresentation;

    f) Subsequent discovery of contaminants, not identified as part of the investigative or remedial activities upon which the issuance of the Letter was based, that pose a threat to human health or the environment;

    g) The failure to pay the No Further Remediation Assessment Fee within 45 days after receiving a request for payment from the Illinois EPA;

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h) The failure to pay in full the applicable fees under the Review and Evaluation Services Agreement within 45 days after receiving a request for payment from the Illinois EPA.

11. Pursuant to Section 58.10(d) of the Act, this Letter shall apply in favor of the following persons:

a) The Coca-Cola Company;

b) The owner and operator of the remediation site;

c) Any parent corporation or subsidiary of the owner of the remediation site;

d) Any co-owner, either by joint-tenancy, right of survivorship, or any other party sharing a relationship with the owner of the remediation site;

e) Any holder of a beneficial interest of a land trust or inter vivos trust, whether revocable or irrevocable, involving the remediation site;

f) Any mortgagee or trustee of a deed of trust of the owner of the remediation site or any assignee, transferee, or any successor-in-interest of the owner of the remediation site;

g) Any successor-in-interest of the owner of the remediation site;

h) Any transferee of the owner of the remediation site whether the transfer was by sale, bankruptcy proceeding, partition, dissolution of marriage, settlement or adjudication of any civil action, charitable gift, or bequest;

i) Any heir or devisee of the owner of the remediation site;

j) Any financial institution, as that term is defined in Section 2 of the Illinois Banking Act and to include the Illinois Housing Development Authority, that has acquired the ownership, operation, management, or control of the remediation site through foreclosure or under the terms of a security interest held by the financial institution, under the terms of an extension of credit made by the financial institution, or any successor in interest thereto; or

k) In the case of a fiduciary (other than a land trustee), the estate, trust estate, or other interest in property held in a fiduciary capacity, and a trustee, executor, administrator, guardian, receiver, conservator, or other person who holds the remediated site in a fiduciary capacity, or a transferee of such party.

12. This Letter, including all attachments, must be recorded as a single instrument with the Office of the Recorder or Registrar of Titles of Cook County. For recording purposes, the SRP Environmental Notice attached to this Letter should be the first page of the instrument filed. In addition, the City of Chicago's Memorandum of Understanding must be filed as an

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2. Common Address: 4301 West 36th Street, Chicago, Illinois

3. Real Estate Tax Index/Parcel Index Numbers: 16-34-400-006-0000, 16-34-400-018-000

4. Remediation Site Owner: The Coca-Cola Company

5. Land Use Limitation: Residential or Industrial/Commercial

6. Site Investigation: Focused

See attached No Further Remediation Letter for other terms.

JG:ct\991433.WPD

Table A: Contaminants of Concern

Volatiles

CAS No.	Compound Name
71-43-2	Benzene
75-25-2	Bromoform
56-23-5	Carbon tetrachloride
108-90-7	Chlorobenzene
67-66-3	Chloroform
107-06-2	1,2-Dichloroethane
75-35-4	1,1-Dichloroethene
156-60-5	trans-1,2-Dichloroethene
78-87-5	1,2-Dichloropropane
542-75-6	1,3-Dichloropropene
10-41-4	Ethylbenzene
127-18-4	Tetrachloroethene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethene
75-01-4	Vinyl chloride
1330-210-7	Xylenes (total)

Polynuclear Aromatics

CAS No.	Compound Name
83-32-9	Acenaphthene
120-12-7	Anthracene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene
206-44-0	Fluoranthene
86-73-7	Fluorene
193-39-5	Indeno(1,2,3-c,d)pyrene
91-20-3	Naphthalene
129-00-0	Pyrene
208-96-8	Acenaphthalene
191-24-2	Benzo(g,h,i)perylene
85-01-8	Phenanthrene

JG:ct\991433.FRM

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0316580016 / COOK
COCA-COLA U.S.A.
LUST/TECH REPORT

Illinois Environmental Protection Agency · P.O. Box 19276, Springfield, IL 62794-9276

217/782-6761

Refer to: LPC # 0310000000 -- Cook County
Chicago/Coca-Cola USA
4301 W. 36th Street
Incident # None
LUST/Technical Reports

January 25, 1991

Louis M. Rundio, Jr.
McDermott, Will & Emery
227 West Monroe Street
Chicago, Illinois 60606-5096

Dear Mr. Rundio:

The Illinois EPA has reviewed the information you submitted dated December 10, 1990 and which was received by the Agency on December 11, 1990. Regarding the Agency's requirement that you notify ESDA, the Agency maintains that notification is required by law (29 Ill. Adm. Code, Ch I, Part 430).

Regarding the soil samples you had previously collected, the Agency has assumed the detection limit to be 1.0 ppm. Please provide the original laboratory reports which show an acceptable detection limit of 0.005 ppm or resample in the vicinity of the former excavation. Note that the Agency has authority under 35 Illinois Adm. Code 731; Subpart F to require UST remediation work performed previous to the date of enactment (April 17, 1989) to meet present Agency requirements.

Please submit two copies of the sampling data to the Agency at the address shown above. Include all "Refer to" information in any correspondence.

Should you have any questions or require further assistance, please do not hesitate to contact Ms. Joanne B. Johnson, IEPA contract employee, at Environmental Science & Engineering, Inc. (312) 693-6030.

Sincerely,

Angela Aye Tin

Angela Aye Tin,
State Sites Unit
Leaking Underground Storage Tank Section
Division of Land Pollution Control

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pc: Division File
Maywood Region
Ken Burch, USEPA-Region V
Joanne Johnson, ESE

AAT:JBJ/mrc
90122103.JBJ

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0316580016/Cook
Coca-Cola USA
Lust/Tech Report

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213/277-4110

201 SOUTH BISCAYNE BOULEVARD
MIAMI, FLORIDA 33131
305/358-3500

227 WEST MONROE STREET
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714/851-0633

1211 AVENUE OF THE AMERICAS
NEW YORK, NEW YORK 10036
212/768-5400

1850 K STREET, N.W.
WASHINGTON, D.C. 20006
202/887-8000

LOUIS M. RUNDIO, JR.
312/984-7710

December 10, 1990

Ms. Angela Aye Tin
Manager, State Sites Unit
Leaking Underground Storage Tank Section
Division of Land Pollution Control
Illinois Environmental Protection Agency
Post Office Box 19276
Springfield, Illinois 62794-9276

Re: Coca-Cola USA
4301 W. 36th Street
Chicago, Illinois
Underground Storage Tank Removal

Dear Ms. Tin:

This letter responds to the two requests in your November 9, 1990 letter.

As to notifying ESDA of the tank removal, please note that the tanks were removed in March, 1988. In August, 1990 I talked to IEPA representatives in connection with this issue and believed the issue had been resolved at that time with a recognition by IEPA that reporting was not required. My position that reporting was not required is based on a review of the effective dates of current regulations and of regulations in effect in March, 1988. If upon reconsideration, IEPA has changed its position please let me know. Also, I would appreciate your supplying me with a basis for IEPA's position so I can determine whether our assessment is incorrect.

As to soil samples in the excavation, samples were collected and analyzed at the time of removal. The results of the analysis were included in the December, 1988 tank

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excavation and removal report prepared by Groundwater Technology, Inc. For your convenience, I am enclosing copies of the pages of the report dealing with the sampling and analysis of soil from the excavation.

I trust this information is fully responsive to your requests, however, if you need any further information or require any clarification, please do not hesitate to call me.

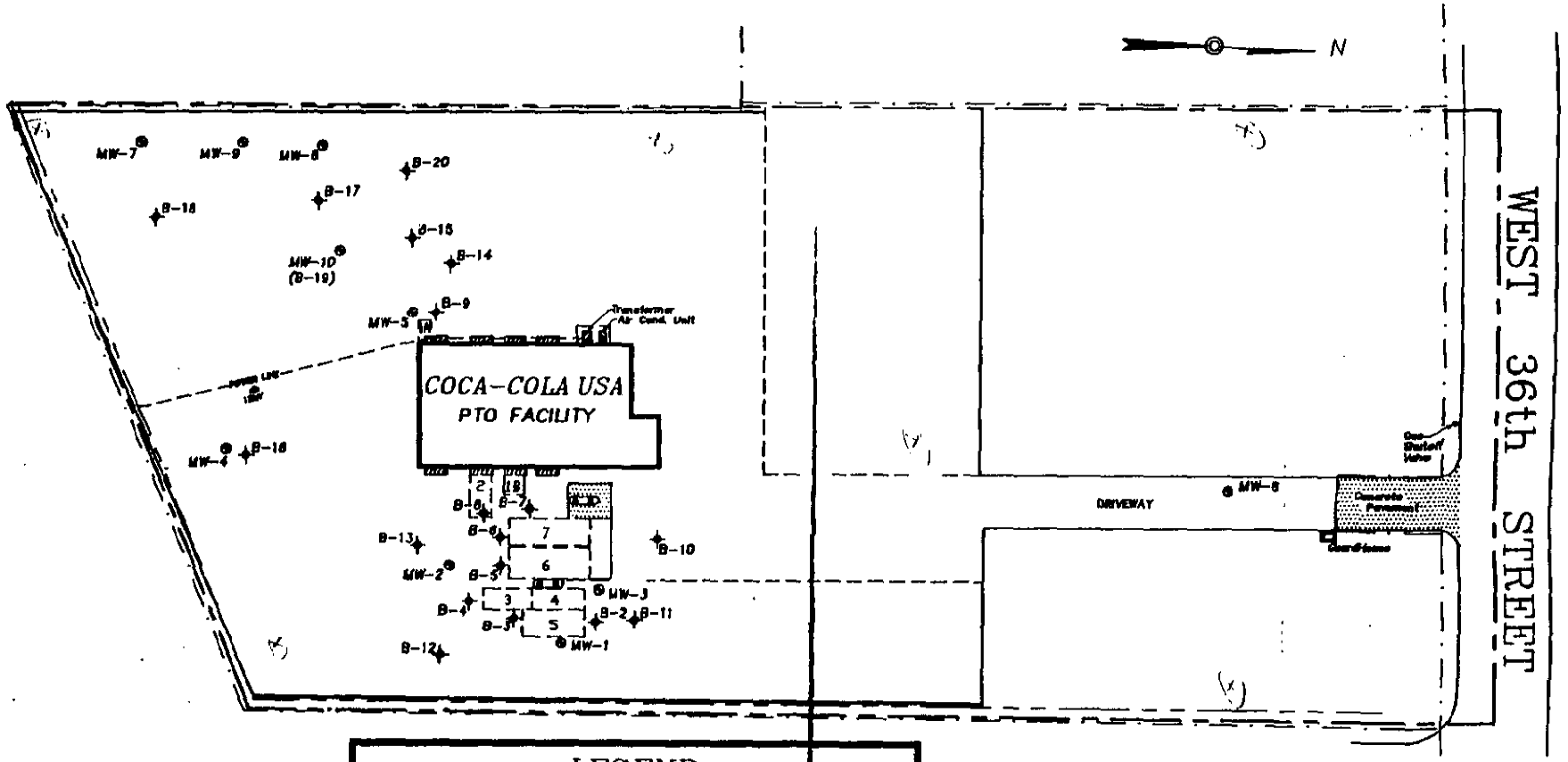
Very truly yours,

Louis M. Rundio, Jr.

Louis M. Rundio, Jr.

LMR/mog
Enclosure
1460g

cc: Ms. Joanne B. Johnson, ESE (w/encl.)



LEGEND

- SOIL BORING
- MONITORING WELL
- CONCRETE PAD
- PUMP ISLAND
- UNDERGROUND STORAGE TANK
- FENCELINE
- PROPERTY BOUNDRY
- OVERHEAD WIRE
- GUARD RAIL

0 64 128 192 256

SCALE IN FEET

FIGURE 2

GROUNDWATER TECHNOLOGY, INC.
2113 Stonington Avenue
Hoffman Estates, IL 60195

PROJECT No. 401-114-8927.77	DATE 04-22-88
DETAILED EAW	TITLE: SITE MAP
CHECKED GMR	
APPROVED	CLIENT: COCA-COLA USA
	LOCATION: 4301 W. 36th Street Chicago, Illinois
	892703A

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3.2 Results

3.2.1 Tank Removal and Visual Inspection

The eight tanks removed from the Coca-Cola USA trucking facility included: one-20,000 gallon; four-10,000 gallon; one-3,000 gallon; and two- 1,000 gallon underground storage tanks.

The visual inspection completed on tanks 1A, 1B, 2, 4, 6, and 7 (Table I and Figure 2) resulted in no visible signs of corrosion. The bottom half of tank #3 had corroded areas. A 1/2-inch hole was detected on the end of the tank. In addition, a seam at the same end was separated. Tank #5 had several holes located at its bottom. Refer to Appendix D for photographic documentation of the excavated tanks.

3.2.2 Soil Analysis

Soil samples collected from under the storage tanks and from the stockpiles were analyzed for VOCs (EPA Method 8020) and TPH (Standard Methods 503D & E). Samples collected from beneath the tanks and identified as T1A, T1B, T2, T3, T4, T5, T6, and T7 (Figure 2) contained non-detectable (ND) concentrations of BTEX. The samples collected from Stockpiles "N" and "A" had non-detectable concentrations of BTEX. The sample collected from Stockpile "S" had a BTEX concentration of 1.0 ppm. The sample collected from Stockpile "A" displayed a TPH value of 2,300 ppm. TPH concentrations for the soil samples collected are summarized in Table III and presented as Appendix E.

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Table III

Soil Sample Analytical Results

Sample Number	Location	TPH (ppm)	BTEX (ppm)
T1A		200	ND
T1B		150	ND
T2		25	ND
T3	North	ND	ND
T3	South	ND	ND
T4	North	18	ND
T4	South	ND	ND
T5	North	140	ND
T5	South	7	ND
T6	North	ND	ND
T6	South	250	ND
T7	North	ND	ND
T7	North	ND	ND
Stockpile A	Grab	2,300	ND
Stockpile N	Grab	1,400	ND
Stockpile S	Grab	2,500	1.0

Notes: BTEX = The sum of Benzene, Toluene, Ethylbenzene and Xylenes
TPH = Total Petroleum Hydrocarbons
ppm = Parts Per Million
ND = None Detected

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WASHINGTON, D.C. 20006
202/887-8000

LOUIS M. RUNDIO, JR.
312/984-7710

February 18, 1991

0316580016/Cook
Coca-Cola U.S.A.
Lust/Tech Report

Ms. Angela Aye Tin
State Sites Unit
Leaking Underground Storage Tank Section
Division of Land Pollution Control
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, Illinois 62794-9276

Re: LPC # 0310000000 -- Cook County
Chicago/Coca-Cola USA
4301 West 36th Street
Incident # None
LUST/Technical Reports

Dear Ms. Tin:

After reviewing the regulatory provisions cited in your letter of January 25, 1991, we have come to the conclusion that the law does not require notification to ESDA under the particular circumstances at the above location. Part 430 of 29 Ill. Admin. Code, ch. I, requires notification to ESDA whenever an incident or accident involving a hazardous material occurs which results in certain events (see § 430.40 of the regulations in effect at the time of the tank removal, and § 430.30 of the present regulations). None of those events occurred at the Coca-Cola facility. Nor were reportable amounts of any hazardous substance or extremely hazardous substance released.

In addition, the ESDA regulations specifically exempt from the notification requirements situations where any exposure is within the site on which the facility is located, which is the case here. We therefore believe that the company was not and is not required to notify ESDA, both because no events have occurred which would make the notification requirements applicable and because the situation at the Coca-Cola facility is specifically exempted from emergency release notification.

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Also, we note that although § 731.173 provides some leeway for requiring reclosure of an UST system closed before December 22, 1988, it does not apply at the Coca-Cola facility. Section 731.173 provides that the Fire Marshal, not IEPA, has the authority to direct a new assessment of the site and reclosure in accordance with Subpart F, but only if in the Fire Marshal's judgment a release may pose a current or potential threat to human health or the environment. In Coca-Cola's case, tests were performed according to the U.S. EPA methods that IEPA requires in its LUST manual for soil testing. Test results indicate a BETX of 1 ppm, with no detected benzene. Given that IEPA's published LUST soil cleanup objectives are 16.025 ppm for BETX, we believe it is unlikely that the Fire Marshal would find a BETX of 1 ppm poses a threat to human health or the environment.

We believe it will expedite completion of this matter if, as you suggest, we contact Ms. Joanne B. Johnson. We will therefore call her to schedule a meeting to discuss these questions.

Very truly yours,

Louis M. Rundio, Jr.

Louis M. Rundio, Jr.

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Illinois Environmental Protection Agency · P.O. Box 19276, Springfield, IL 62794-9276

217/782-6761

Refer to: LPC ~~#0310000000~~ 0316580016 – Cook County
Chicago/Coca-Cola USA
4301 W. 36th Street
Incident # None
LUST/Technical Reports

November 9, 1990

Mr. Louis M. Rundio, Jr.
McDermott, Will & Emery
227 West Monroe Street
Chicago, Illinois 60606-5096

Dear Mr. Rundio:

The Illinois EPA has reviewed the information submitted by Groundwater Technology, Inc. (GTI) dated August 17, 1990 and which was received by the Agency on August 20, 1990. This information consisted of an August 7, 1990 letter report to Mr. Andrew P. Maness of Coca-Cola USA.

The Agency requests that you take the following actions:

1. Notify ESDA of the leaking underground storage tank incident at your property as required by law. ESDA can be reached at 800/782-7860.

2. Collect soil samples taken from the soils adjacent to the UST excavation and submit for analysis of BETX to confirm that all contaminated soil has been removed. An acceptable minimum detection limit is 0.005 ppm.

Please submit two copies of the analytical results to the Agency at the address shown above. Include all "Refer to" information in any correspondence.

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Should you have any questions or require further assistance, please do not hesitate to contact Ms. Joanne B. Johnson, IEPA contract employee, at Environmental Science & Engineering, Inc. (312) 693-6030.

Sincerely,

Angela Aye Tin

Angela Aye Tin, Manager
State Sites Unit
Leaking Underground Storage Tank Section
Division of Land Pollution Control

cc: Division File
Maywood Region
Ken Burch, USEPA-Region V
Joanne Johnson, ESE

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0316580016 / Cook
COCA-COLA U.S.A.
LUST / TECH REPORT

Memo

Environmental Science & Engineering, Inc.

DATE: October 18, 1990

FROM: Joanne Johnson, ESE JBJ

TO: IEPA Springfield/Division File

RE: LPC # 0310000000 -- Cook County
Chicago/Coca-Cola USA
4301 West 36th Street
Incident # None
LUST/Technical Reports

RE: LPC # 0310000000 -- Cook County
Chicago/SSCI Joint Venture
4359 West 36th Street
Incident # None
LUST/Technical Reports

This memo documents the file review of the above-referenced sites. These two sites are adjacent to each other and are reviewed together because the petroleum contamination observed at both of the sites is alleged to be from the same source.

Background

SSCI. SSCI Joint Venture Group owns a trucking terminal at 4359 West 36th Street. Two 10,000-gallon diesel USTs are on the property. A waste oil UST was removed from the property sometime between 1986 and 1988. The location of the waste oil UST is not stated. The two diesel USTs were tightness-tested in 1988 and found to be tight. A pipe leading to the fuel dispensers from the USTs was found to be leaking. It was excavated and replaced. Location of leak, volume of material lost and date of repair is not stated.

In April, 1988, a subsurface exploration program was conducted by Professional Service Industries, Inc (PSI). PSI drilled seven borings and collected 27 soil samples from these borings. Locations are shown on Figure 1. PSI also collected groundwater samples from the four monitoring wells previously installed at the site (in 1987). All samples were analyzed for benzene, toluene and xylene (BTX). Results are shown in Table 1. B-1, B-4 and B-6 have soil concentrations in excess of IEPA Objectives. Groundwater in the vicinity of MW-2, MW-3 and MW-4 has concentrations in excess of IEPA Objectives.

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SSCI also submitted a proposal for a hydrogeologic investigation of their site prepared by Baker/TSA entitled "Preliminary Contamination Assessment - Arkansas Freightways Terminal" to the IEPA. This proposal included drilling three soil borings and installing three monitoring wells at the site. The Baker/TSA report entitled "Preliminary Contamination Assessment", dated August 1988, presents the results of this investigation. Twelve soil borings (B-1 to B-12) were installed on the site from June 20-24, 1988. Three of these (B-4, B-5 and B-9) were converted to monitoring wells (MW-5 to MW-7). See locations on Figure 2.

Forty-two soil samples were collected from the borings. Twenty-six of these samples were submitted for analysis of TPH, fifteen of these samples were analyzed for BTX and two of these samples were analyzed for total lead. The results are shown in Table 2. B-6, B-8 and MW-7 have soil concentrations in excess of IEPA Objectives.

Groundwater samples were collected from the three new monitoring wells on June 30, 1988 and analyzed for BETX. Results are shown in Table 3. MW-7 has concentrations in excess of IEPA Objectives. Groundwater flow direction was determined from two rounds of static water measurements in July, 1988. Flow is predominantly to the southwest, with a mound located approximately under the SSCI building on site (Figures 3 and 4).

Baker/TSA's conclusions are summarized as follows: ". . . the on-site diesel fuel tanks do not appear to be the primary source of current subsurface contamination. . . . the primary source of the soil and water contamination appears to be a gasoline source located somewhere off-site to the east of the property."

Baker/TSA's recommendations were to conduct a long-term groundwater level measurement program to confirm the groundwater flow direction; to inquire about the UST-related activities at the Coca-Cola property to the east; and to conduct additional borings to fully define the extent of contamination.

Coca-Cola USA. On November 14, 1988, Carmen Yung of the IEPA requested Coca-Cola to provide the basic information regarding a tank removal operation conducted at the Coca-Cola site. On December 5, 1988, Coca-Cola submitted a report prepared by Groundwater Technology, Inc. (GTI) entitled "Tank Excavation and Removal and Site Assessment."

Eight USTs were removed from the Coca-Cola site in March 1988:

- one 20,000-gallon diesel fuel UST (Tank 6);
- four 10,000-gallon diesel fuel USTs (Tanks 3, 4, 5 and 7);
- one 3,000-gallon waste oil UST (Tank 2);
- one 1,000-gallon motor oil UST (Tank 1B); and
- one 1,000-gallon heating oil UST (Tank 1A).

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The locations of the USTS are shown on Figure 5. Two of the 10,000-gallon USTs (Tank 3 and Tank 5) had signs of corrosion. The limits of excavation, laterally and vertically, were not stated in the report. A total of 220 cubic yards of soil were excavated as part of the removal.

Approximately 150 cubic yards had visually discolored soil and were placed in Stockpile A. The remaining soil had low HNu readings (2 to 10 ppm) and was placed in Stockpiles N and S. This soil was later used as backfill after the USTs had been removed. Soil samples were collected from each stockpile and the UST excavation on March 23-24, 1988. At least one soil sample was collected from the excavation under each of the tanks (exact depth unknown.) Two samples were collected from the 20,000 and 10,000 gallon USTs. Samples were analyzed for TPH and VOCs. Results are shown in Table 4. Note that the PQL of this round of sampling is noted stated in the lab report, but can be inferred to be 1 ppm, significantly higher than the allowable 0.005 ppm.

A site assessment program consisting of three separate drilling programs was performed at the site from May to October 1988. Fourteen borings were installed on May 18, 1988; six of these were converted to monitoring wells (MW-1 to MW-6). Eight additional borings were installed on June 29, 1988. Six additional monitoring wells were installed on October 6, 1988; four of these were converted to monitoring wells (MW-7 to MW-10). The locations are shown on Figure 5.

Fifty soil samples were obtained during drilling of the borings and monitoring wells. Table 5 lists the sample results. Free-phase product was found in boring B-17 at 3.5 to 5.5 feet below grade. Only six of these samples, from MW-7 and MW-8, were analyzed for BETX. Data are shown in Table 6. Only the MW-8 samples exceed the IEPA Objectives.

Groundwater samples were collected from the monitoring wells. Results are shown in Table 7. A thin film of free-phase product on the groundwater table was observed in MW-7. MW-3 and MW-8 had concentrations of benzene in excess of IEPA Objectives. Groundwater elevations were recorded on four occasions: May 27, June 14, October 12 and November 9, 1988. Flow was determined to be to the north/northwest.

GTI reached several conclusions, summarized here: the lateral extent of the contamination has not yet been determined; the highest contamination areas are near the USTs and in the southwest corner of the property; and "(t)here is no indication . . . that the contamination [found in the southwest corner] originated from the former on-site underground storage tanks . . ."

Joint Investigation. A joint investigation of the two properties was performed by GTI. Baker/TSA was present during drilling and sampling operations. The results of this investigation are summarized in the August 7, 1990 letter report prepared by GTI.

From November 20 through 28, 1990, ten soil borings were installed on the two properties. Eight of these borings were converted to monitoring wells (Figure 6.) The soil sample exhibiting the highest PID reading in each boring was submitted for analysis of VOCs, PNAs and TPH. Table 8 lists the results. The soil in the vicinity of MW-208 and MW-209 exceed the IEPA Objectives.

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On December 12 and 13, 1989, each of the 25 monitoring wells on both properties were sampled. The samples were analyzed for BETX and PNAs, including naphthalene. Tables 9 and 10 show the data. At the Coca-Cola property, only MW-8 exceeded the IEPA Objectives for benzene. MW-3, MW-7 and MW-8 showed detectable levels of PNAs, but these were non-carcinogenic PNAs, within the Objective of 1 ppm. At the SSCI property, MW-3, MW-208 and MW-209 exceeded the IEPA Objective for benzene. A number of samples had detectable concentrations of PNAs but only MW-2 and MW-3 contained any carcinogenic PNAs.

Recommendations

Contaminated soil and groundwater is present at both of these sites in the area of the USTs. In addition, the SSCI property has contamination at the northwest corner of the SSCI building. Figure 10 indicates the locations of analytical results that exceed IEPA Objectives for either soil or groundwater. The source of the contamination in the vicinity of MW-3, MW-8 and MW-208 has not clearly been identified by any of the reports. Based upon the groundwater flow at these two sites and the presence of "clean" soil and groundwater in the vicinity of MW-202, it seems clear that the eight USTs formerly on the Coca-Cola property could not have been the source of the contamination observed on the SSCI property.

The following actions should be taken by SSCI:

1. Report the LUST incident to ESDA, as required by law.

2. Prepare a workplan to remediate the soil and groundwater contamination found on the property. Submit this workplan to the Agency for approval.

The following actions should be taken by Coca-Cola:

1. Report the LUST incident to ESDA, as required by law.

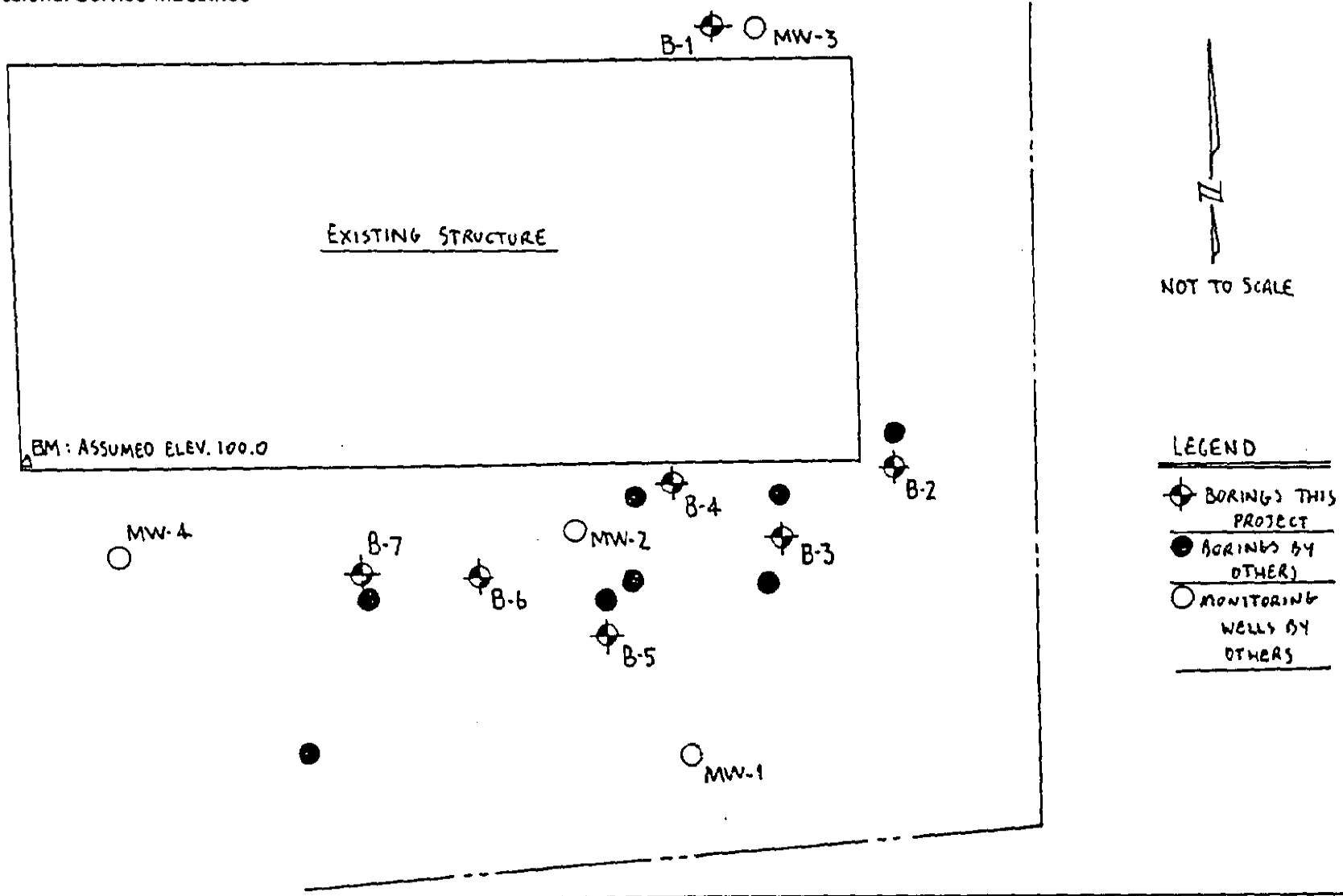
2. Collect soil samples taken from the soils adjacent to the UST excavation and submit for analysis of BETX to confirm that all contaminated soil has been removed. An acceptable PQL should be used for this analysis.

cc: Maywood File
Joanne Johnson, ESE

SSCICOKE.MEM

Figure 1

Professional Service Industries



PROJECT NAME		PROJECT NO.
Subsurface Sampling and Laboratory Testing	BORING LOCATION DIAGRAM	152-85057
		DATE April 27, 1988

PSI Soil boring and monitoring well locations. April, 1988.

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TABLE 1
SUMMARY OF SOIL/GROUNDWATER SAMPLING CONDUCTED BY PSI
AT SSCI PROPERTY APRIL 28, 1988

Location	Depth	Benzene	Toluene	Xylenes	Total BTX
Groundwater:					
MW-1	na	<.001	<.010	<.010	<.010
MW-2	na	**1.550**	<.010	0.140	1.690
MW-3	na	**12.825**	0.650	3.590	**17.065**
MW-4	na	<.001	<.010	20.580	**20.580**
Soil:					
B-1	1-2.5'	<.66	0.8	33.4	**34.2**
B-1	3.5-5'	**1.3**	12.0	33.0	**46.3**
B-1	6-7.5'	**1.7**	**	3.8	**
B-1	8.5-10'	<.66	**	<.66	**
B-2	1-2.5'	**	<.66	1.1	**
B-2	3.5-5'	<.66	**	2.3	**
B-2	6-7.5'	<.66	<.66	<.66	<.66
B-2	8.5-10'	<.66	**	24.0	**
B-3	1-2.5'	<.66	**	3.1	**
B-3	3.5-5'	<.66	**	**	**
B-3	6-7.5'	<.66	**	1.2	**
B-3	8.5-10'	<.66	**	<.66	**
B-4	1-2.5'	**9.5**	13.0	63.0	**85.5**
B-4	3.5-5'	**4.3**	**	2.5	**
B-4	6-7.5'	<.66	**	1.4	**
B-4	8.5-10'	<.66	**	0.87	**
B-5	1-2.5'	<.66	**	<.66	**
B-5	3.5-5'	**	<.66	**	**
B-5	6-7.5'	<.66	**	1.3	**
B-5	8.5-10'	<.66	**	<.66	**
B-6	1-2.5'	**1.4**	0.66	**	**
B-6	3.5-5'	<.66	**	**	**
B-6	6-7.5'	<.66	<.66	**	**
B-6	8.5-10'	<.66	**	**	**
B-7	3.5-5'	<.66	<.66	<.66	<.66
B-7	6-7.5'	<.66	**	<.66	**
B-7	8.5-10'	<.66	**	<.66	**

1. Results shown in ppm.
2. Violation of IEPA Objectives shown in **bold type**.
3. Note that the benzene samples have detection limits above the PQL of 0.005 ppm.
4. ** is not explained in the lab report, but probably means "not analyzed."

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Figure 2

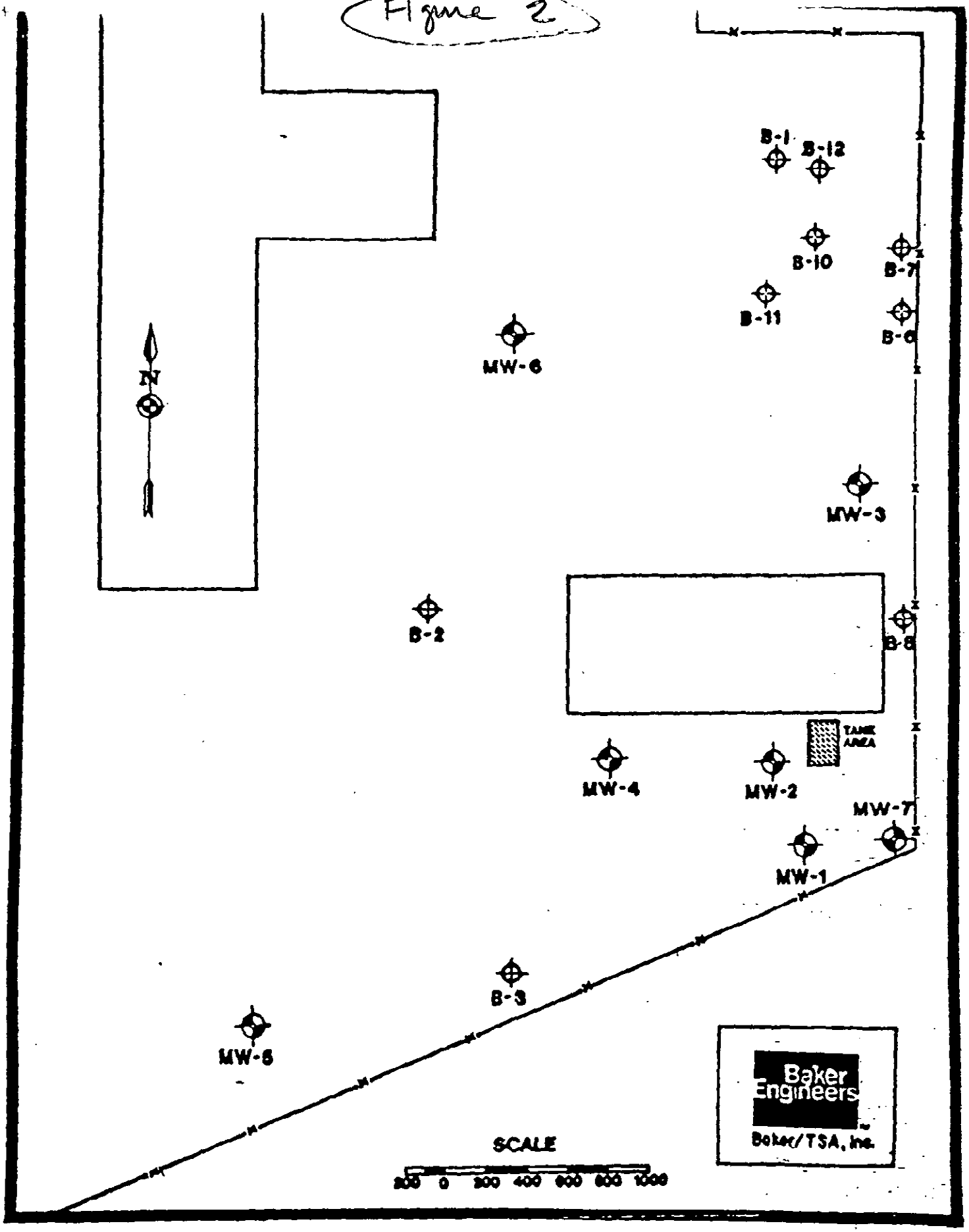

FIGURE 3

SITE PLAN SHOWING THE LOCATIONS OF ALL SOIL BORINGS AND GROUND WATER MONITORING WELLS

Table 2

TABLE 4

LABORATORY RESULTS OF THE SOIL LABORATORY ANALYSIS PROGRAM
PRELIMINARY CONTAMINATION ASSESSMENT
CHICAGO, ILLINOIS

Sample Number	Boring Number	Split-Spoon Number	Depth Intervals	Headspace Gas Analysis (PPM-Benzene Equivalent)	Total Petroleum Hydrocarbon Content (mg/kg)	Benzene Content (ug/kg)	Tolulene Content (ug/kg)	Xylene content (ug/kg)	Total Lead (ug/g)
1001	B-1	S-5	9'-11'	0.0	410	—	—	—	—
1002	B-1	S-4	7'-9'	1.0	440	—	—	—	—
1003	B-1	S-3	5'-7'	0.0	350	—	—	—	—
1004	B-1	S-2	3'-5'	0.2	--	<10	<10	<20	—
1005	B-2	S-1	1'-3'	1.2	1800	—	—	—	—
1006	B-2	S-4	7'-9'	0.0	440	—	—	—	—
1007	B-2	S-3	5'-7'	0.0	--	<10	<10	<20	—
1008	B-3	S-1	1'-3'	0.0	360	—	—	—	—
1009	B-3	S-2	3'-5'	0.0	1100	—	—	—	—
1010	B-3	S-3	5'-7'	0.0	--	<10	<10	<20	—
1011	MW-5	S-1	1'-3'	0.0	720	—	—	—	—
1012	MW-5	S-2	3'-5'	0.0	--	<10	<10	<20	—
1013	MW-5	S-3	5'-7'	0.0	350	—	—	—	—
1014	MW-5	S-4	7'-9'	0.0	410	—	—	—	—
1015	MW-6	S-1	1'-3'	0.1	260	—	—	—	—
1016	MW-6	S-2	3'-5'	0.0	--	<10	<10	<20	—
1017	MW-6	S-3	5'-7'	0.0	330	—	—	—	—
1018	B-6	S-1	1'-3'	0.2	300	—	—	—	—
1019	B-6	S-2	3'-5'	0.6	810	—	—	—	—
1020	B-6	S-5	7'-9'	20	--	1800	4000	3900	7.16
1021	B-7	S-2	3'-5'	2.2	460	—	—	—	—

printed 08/08/2014 1:20PM by Dave.Gambach p. 6/25

Table 2

TABLE 4

LABORATORY RESULTS OF THE SOIL LABORATORY ANALYSIS PROGRAM
PRELIMINARY CONTAMINATION ASSESSMENT
CHICAGO, ILLINOIS
-continued-

Sample Number	Boring Number	Split-Spoon Number	Depth Intervals	Headspace Gas Analysis (PPM-Benzene Equivalent)	Total Petroleum Hydrocarbon Content (mg/kg)	Benzene Content (ug/kg)	Tolulene Content (ug/kg)	Xylene content (ug/kg)	Total Lead (ug/g)
1022	B-7	S-3	5'-7'	9.4	--	10	60	40	—
1023	B-7	S-4	7'-9'	0.8	290	—	—	—	—
1024	B-8	S-1	1'-3'	0.8	1000	—	—	—	—
1025	B-8	S-2	3'-5'	8.2	2600	—	—	—	—
1026	B-8	S-3	5'-7'	78.	--	50	150	90	—
1027	MW-7	S-2	3'-5'	8.6	1600	—	—	—	—
1028	MW-7	S-3	5'-7'	48.	--	60	220	<20	4.15
1029	MW-7	S-4	7'-9'	39.	480	—	—	—	—
1030	B-10	S-2	3'-5'	3.8	4500	—	—	—	—
1031	B-10	S-3	5'-7'	0.5	260	—	—	—	—
1032	B-10	S-4	7'-9'	2.0	--	<10	<10	<20	—
1033	B-11	S-1	1'-3'	2.0	--	<10	<10	<20	—
1034	B-11	S-3	5'-7'	1.0	250	—	—	—	—
1035	B-11	S-5	9'-11'	2.0	--	<10	<10	<20	—
1036	B-11	S-5	3'-5'	0.6	360	—	—	—	—
1037	B-12	S-2	3'-5'	0.6	360	—	—	—	—
1038	B-12	S-3	5'-7'	0.8	--	<10	<10	<20	—
1039	B-12	S-4	7'-9'	0.2	--	<10	<10	<20	—
1040	B-12	S-5	9'-11'	0.2	380	—	—	—	—
1041	B-12	S-1	1'-3'	0.2	--	<10	50	<20	—
1042	B-8	S-4	7'-9'	—	--	—	—	—	—

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Table 3

TABLE 5
LABORATORY RESULTS OF THE GROUNDWATER LABORATORY ANALYSIS PROGRAM
PRELIMINARY CONTAMINATION ASSESSMENT
CHICAGO, ILLINOIS

WELL DESIGNATION	PARAMETER CONCENTRATION (µg/l)			
	BENZENE	TOLULENE	XYLENE	ETHYL BENZENE
MW-5	BDL*	3.0	BDL	BDL
MW-6	BDL	2.0	BDL	2.9
MW-7	780	4,700	BDL	BDL
MW-7 (duplicate)	1,300	7,500	BDL	BDL

* BDL - below detection limit.

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Figure 3

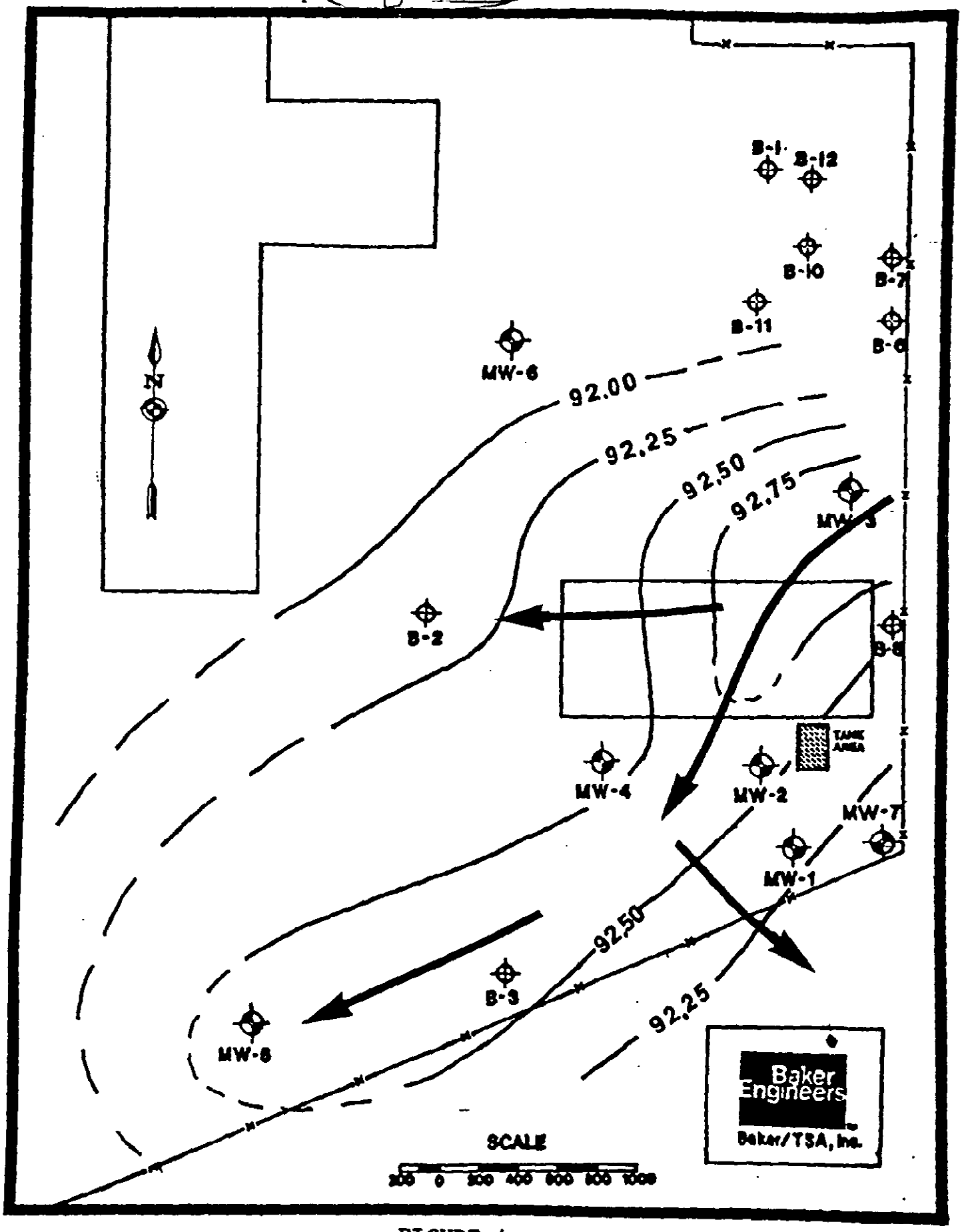

FIGURE 4

PEIZOMETRIC SURFACE MAP AND INTERPRETED GROUNDWATER FLOW DIRECTIONS FOR JULY 7, 1988

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Figure 4

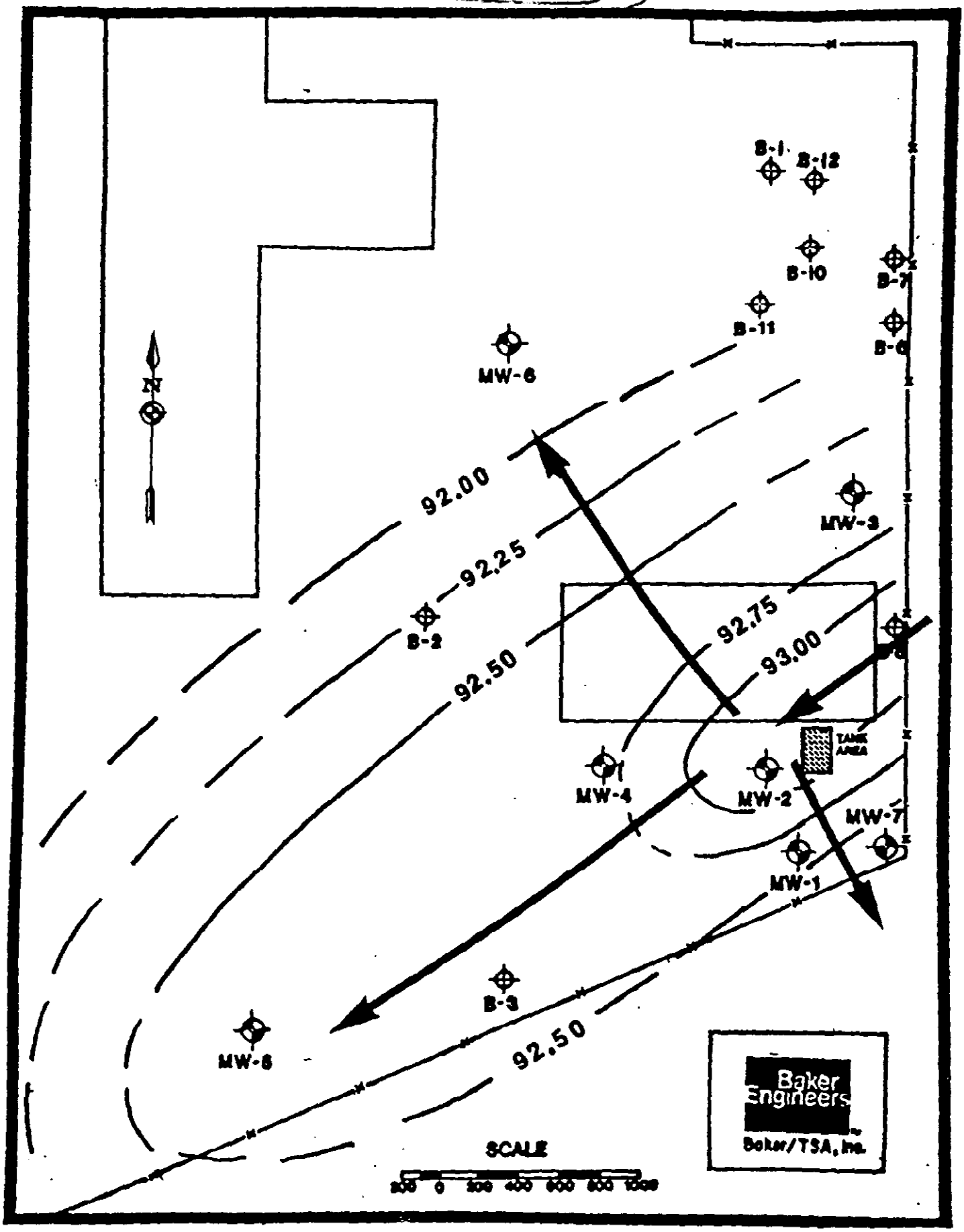

FIGURE 5

PEIZOMETRIC SURFACE MAP AND INTERPRETED GROUNDWATER FLOW DIRECTIONS FOR JULY 20, 1988

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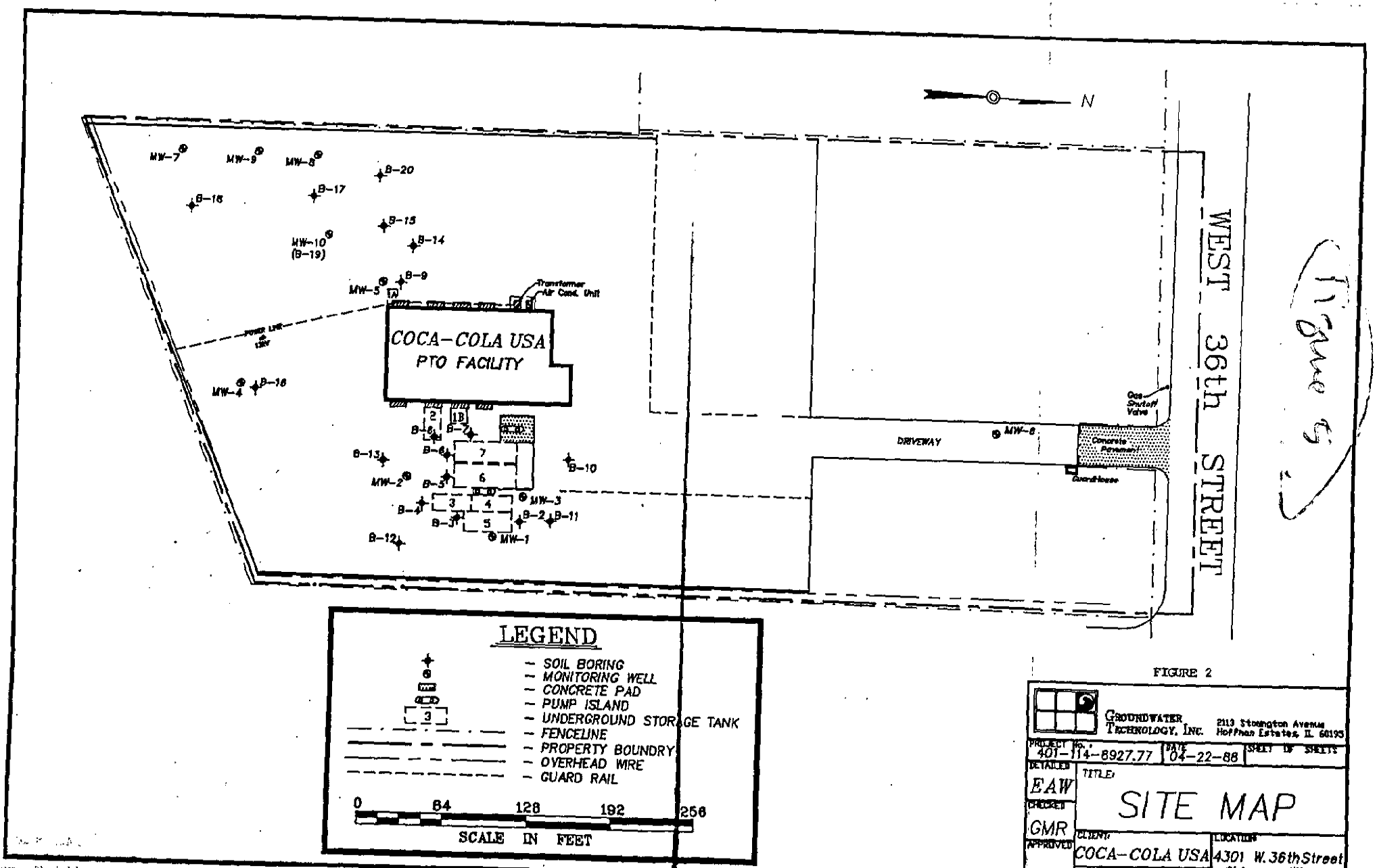

FIGURE 2

GROUNDWATER TECHNOLOGY, INC.
2113 Stonington Avenue
Hoffman Estates, IL 60195

PROJECT No. 401-114-8927.77	DATE 04-22-88
DETAILED EAW	TITLE: SITE MAP
CHECKED GMR	
APPROVED	CLIENT: COCA-COLA USA
	LOCATION: 4301 W. 36th Street Chicago, Illinois
	FILE NUMBER 892703A

printed 08/08/2014 1:20 PM by Dave.Gambach p. 14/28

Table 4

Table III

Soil Sample Analytical Results

Sample Number	Location	TPH (ppm)	BTEX (ppm)
T1A		200	ND
T1B		150	ND
T2		25	ND
T3	North	ND	ND
T3	South	ND	ND
T4	North	18	ND
T4	South	ND	ND
T5	North	140	ND
T5	South	7	ND
T6	North	ND	ND
T6	South	250	ND
T7	North	ND	ND
T7	North	ND	ND
Stockpile A	Grab	2,300	ND
Stockpile N	Grab	1,400	ND
Stockpile S	Grab	2,500	1.0

Notes: BTEX = The sum of Benzene, Toluene, Ethylbenzene and Xylenes
TPH = Total Petroleum Hydrocarbons
ppm = Parts Per Million
ND = None Detected (detection limit unknown)

printed 08/08/2014 4:20PM by Dave Gambach p. 15/25

Table 5

4.2.5 Soil Analysis

Total petroleum hydrocarbon analytical results for soil samples collected during the assessment phase of this project are summarized in Table VII. Selected soil samples were also analyzed for specific hydrocarbon constituents including benzene, toluene, ethylbenzene, xylenes, napthalene, carcinogenic polynuclear aromatic hydrocarbons and non-carcinogenic polynuclear aromatic hydrocarbons. The results of these analyses are summarized in Table VIII. The complete soil analytical results are included in Appendix I.

TABLE VII

Total Petroleum Hydrocarbons in Soil (ppm)

Boring/Well ID	Sample Date	1.0'-2.5'	3.5'-5.5'	8.5'-10.0'
MW-1	5/18/88	---	1000	ND
MW-2	5/18/88	1700	ND	ND
MW-3 (B-1)	5/18/88	---	---	1300
MW-4	5/19/88	1300	---	ND
MW-5	5/19/88	ND	---	---
MW-6	5/19/88	---	ND	---
B-2	5/18/88	---	9400	ND
B-3	5/18/88	1100	200	---
B-4	5/18/88	---	---	ND
B-5	5/18/88	---	ND	---
B-6	5/18/88	900	150	---
B-7	5/18/88	---	1200	ND
B-8	5/18/88	5600	440	ND
B-9	5/19/88	---	16000	---
B-10	6/29/88	---	630	---
B-11	6/29/88	---	3600	---
B-12	6/29/88	---	1700	---
B-13	6/29/88	---	500	---
B-14	6/29/88	---	ND	---
B-15	6/29/88	---	ND	---
B-16	6/29/88	1200	---	---
B-17	6/29/88	---	P.S.	---
MW-7	10/06/88	410	600	150
MW-8	10/06/88	210	390	ND
MW-9	10/06/88	100	380	ND
MW-10 (B-19)	10/06/88	210	1600	130
B-18	10/06/88	1800	4800	ND
B-20	10/06/88	390	240	ND

Notes: ND = None Detected
--- = Sample Not Analyzed
P.S. = Phase Separated Hydrocarbons observed in split-spoon soil sample.

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Table 6

TABLE VIII

BTEX and PAHs in Soil (ppm)

ID	Date Sampled	Sample Depth	Benzene	Toluene	Ethylbenzene	Xylene	Napthalene	C-PAHs	NC-PAHs
MW-7	10/16/88	1.0-2.5'	---	---	---	---	ND	108.8	602
MW-7	10/16/88	3.5-5.0'	ND	ND	ND	ND	ND	49.2	221.4
MW-7	10/16/88	8.5-10.0'	ND	ND	ND	ND	ND	.36	1.44
MW-8	10/16/88	1.0-2.5'	1.3	ND	ND	ND	ND	11.14	23.62
MW-8	10/16/88	3.5-5.0'	0.18	0.27	ND	ND	ND	6.57	10.57
MW-8	10/16/88	8.5-10.0'	ND	ND	ND	ND	ND	0.08	0.25
IEPA	XXXXXXXX	XXXXXXXX	.005	2.0	13.6	.440	15.8	ND	0.046

Notes: --- = Not Sampled
ND = None Detected
C-PAHs = Carcinogenic Polynuclear Aromatic Hydrocarbons
NC-PAHs = Non-Carcinogenic Polynuclear Aromatic Hydrocarbons
IEPA = Illinois EPA Clean-up objective for soil

Table 7

TABLE IX

Petroleum Hydrocarbon Constituents in Water (ppb)

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylene	Napthalene	C-PAHs	NC-PAHs
MW-1	5/27/88	ND	ND	ND	ND	---	---	---
MW-2	5/27/88	ND	ND	ND	ND	---	---	---
MW-3	5/27/88	2.9	0.9	4.1	5.2	---	---	---
MW-4	5/27/88	ND	ND	ND	19	---	---	---
MW-5	5/27/88	ND	ND	ND	ND	---	---	---
MW-6	5/27/88	ND	1.8	ND	ND	---	---	---
MW-2	10/12/88	ND	1.0	ND	ND	---	---	---
MW-5	10/12/88	ND	ND	ND	ND	ND	0.181	0.093
MW-7	10/12/88	---	---	---	---	---	---	---
MW-8	10/12/88	44	5.4	67	61	ND	0.41	2.36
MW-9	10/12/88	24	1.9	3.3	4.5	ND	0.089	0.017
MW-10	10/12/88	---	---	---	---	40	274	1074
IEPA	XXXXXXXX	5	2,000	680	440	790	.0028	2.3

Notes: C-PAHs = Carcinogenic Polynuclear Aromatic Hydrocarbons
NC-PAHs = Noncarcinogenic Polynuclear Aromatic Hydrocarbons
ND = None Detected
--- = Not Sampled
IEPA = Illinois EPA Clean-up objective for groundwater

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Figure 6

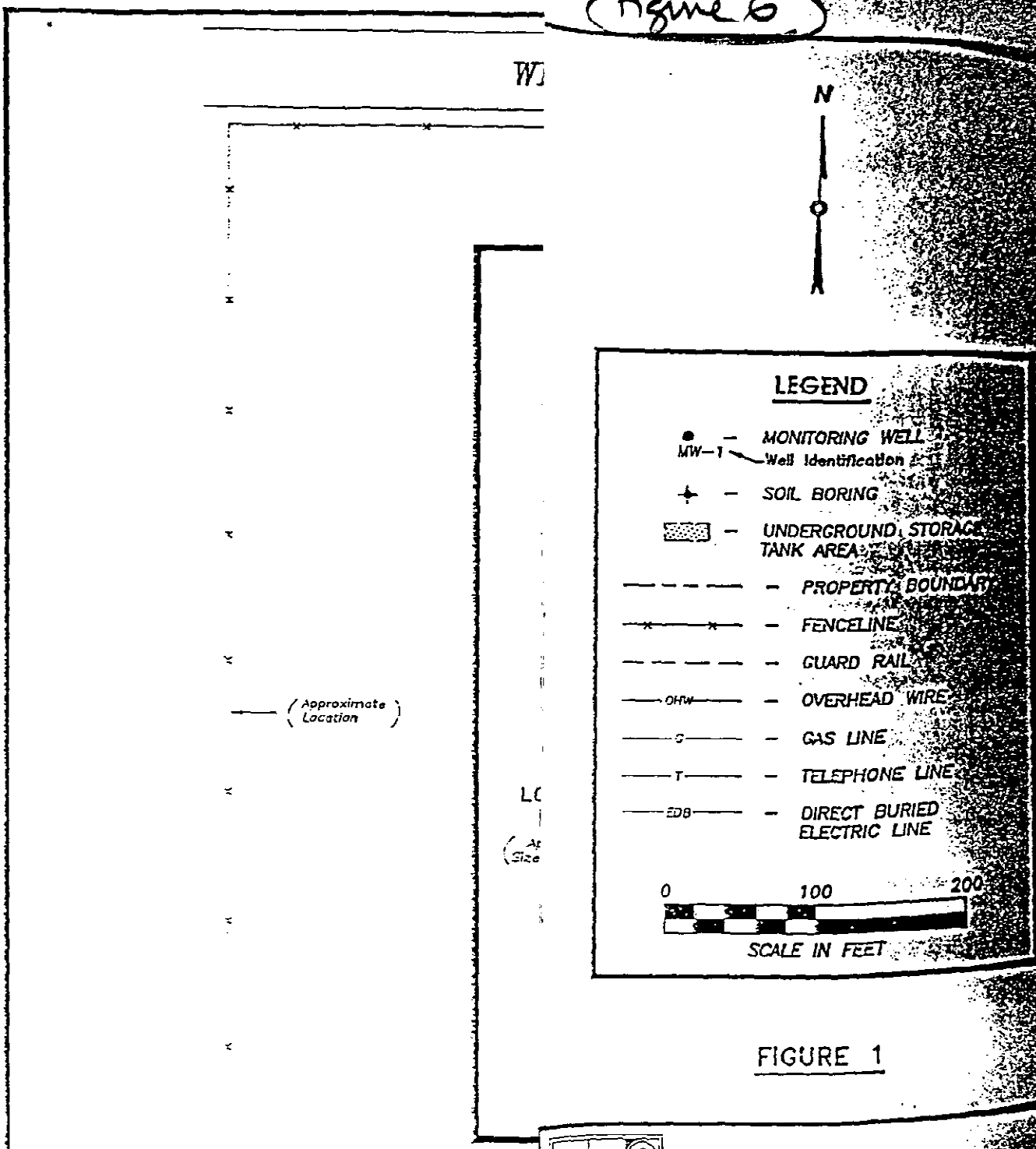

FIGURE 1

GROUNDWATER TECHNOLOGY, INC.
2200 Stonington Avenue
Suite 160
Hoffman Estates, IL 60195

Project #	Drawing #	Date
04010-9526	952601B	8-1-90

Detailed	Title
MWS	LOCATION MAP
Checked	
SLN	
Approved	Client: COCA-COLA USA
	Location: 4301 & 4350 WEST 36th ST. CHICAGO, ILLINOIS

printed 08/08/2014 1:20PM by Dave.Gambach p. 10/29

Table 8

TABLE 1
4301 AND 4359 WEST 36TH STREET
CHICAGO, ILLINOIS
SOIL ANALYTICAL RESULTS (ppm)

Sample Number	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	Total PNAs
B-200-4301	BDL	0.017	BDL	BDL	0.017	11.45
MW-201-4301	BDL	BDL	BDL	BDL	BDL	0.284
MW-202-4301	BDL	BDL	BDL	BDL	BDL	5.89
MW-203-4359	BDL	0.011	BDL	0.023	0.034	ND
MW-203-4359D	BDL	0.013	BDL	0.078	0.091	0.076
MW-204-4359	BDL	BDL	BDL	BDL	BDL	0.639
B-205-4359	BDL	BDL	BDL	BDL	BDL	12.18
MW-206-4359	0.014	0.008	BDL	0.025	0.047	6.548
MW-206-4359D	0.004	0.004	BDL	BDL	0.008	21.92
MW-207-4359	0.015	0.009	BDL	BDL	0.024	103.26
MW-208-4359	0.41	0.03	0.035	0.22	0.695	11.09
MW-209-4359	1.2	0.84	15.0	25.0	42.04	24.28
MW-209-4359D	1.1	0.27	4.1	8.0	13.47	34.26

Notes: ND = NOT DETECTED
BDL = BELOW DETECTION LIMIT

GROUNDWATER TECHNOLOGY, INC.

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TABLE 9

Coca-Cola USA Property
4301 West 36th Street
Groundwater Analytical Results
December 12, 1989

Location	Benzene	Toluene	Ethyl-benzene	Xylene	Total BETX	Total PNAs
MW-1	<.005	<.005	<.005	<.005	<.005	<.010
MW-2	<.005	<.005	<.005	<.005	<.005	<.010
MW-3	<.005	<.005	<.005	<.005	<.005	0.005
MW-4	0.001	<.005	<.005	<.005	0.001	<.010
MW-5	<.005	<.005	<.005	<.005	<.005	<.010
MW-6	<.005	<.005	<.005	<.005	<.005	<.010
MW-7	<.005	<.005	<.005	<.005	<.005	0.069
MW-8	0.54	0.014	0.2	0.095	0.849	0.021
MW-9	<.005	<.005	<.005	0.002	0.002	<.010
MW-10	<.005	<.005	<.005	<.005	<.005	NA
MW-201	<.005	<.005	<.005	<.005	<.005	<.010
MW-202	<.005	<.005	<.005	<.005	<.005	<.010

1. Results in ppm.
2. Total PNAs includes naphthalene. Concentrations are non-carcinogenic PNAs.

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TABLE 10

SSCI Property
4359 West 36th Street
Groundwater Analytical Results
December 12, 1989

Location	Benzene	Toluene	Ethyl-benzene	Xylene	Total BETX	Total PNAs
MW-1	<.005	<.005	<.005	<.005	<.005	<.010
MW-2	0.17	0.004	<.005	0.012	0.186	0.094(1)
MW-3	8.8	0.11	<.005	1.2	10.11	0.127(2)
MW-4	<.005	<.005	<.005	<.005	<.005	0.007
MW-5	<.005	<.005	<.005	<.005	<.005	<.010
MW-6	<.005	<.005	<.005	<.005	<.005	<.010
MW-7	<.005	<.005	<.005	<.005	<.005	0.014
MW-203	<.005	<.005	<.005	<.005	<.005	<.010
MW-204	<.005	<.005	<.005	<.005	<.005	<.010
MW-204	<.005	<.005	<.005	<.005	<.005	<.010
MW-207	0.003	<.005	<.005	<.005	0.003	<.010
MW-208	0.91	0.011	0.002	0.019	0.942	0.038
MW-209	0.53	0.02	<.005	0.043	0.593	0.022

1. Includes 0.015 ppm carcinogenic PNAs.
2. Includes 0.006 ppm carcinogenic PNAs.
3. Results in ppm.
4. Total PNAs includes naphthalene. Concentrations are non-carcinogenic PNAs, unless otherwise noted.

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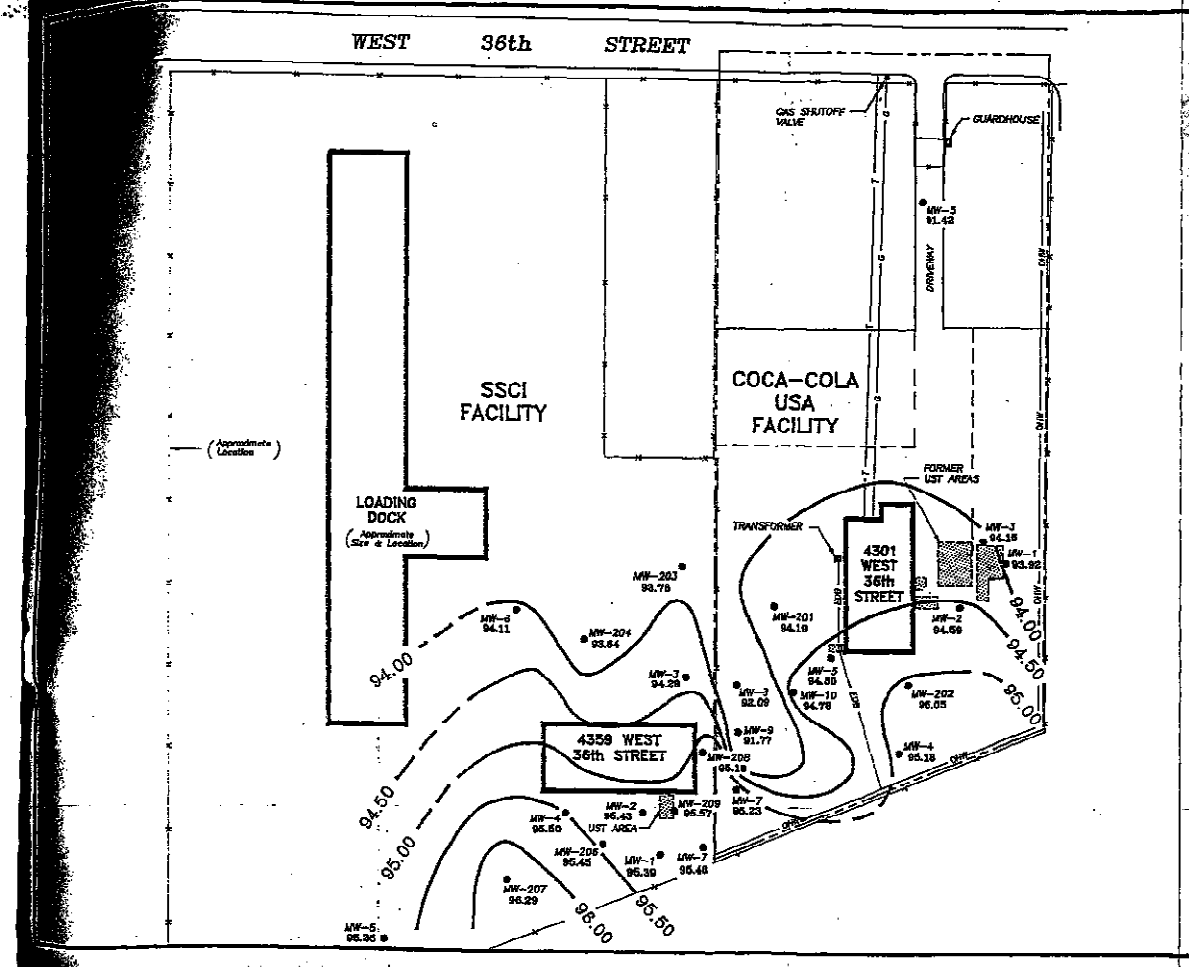

Figure 7

N

LEGEND

- MW-1 / 93.92 — MONITORING WELL (Well Identification / Groundwater Elevation)
- UNDERGROUND STORAGE TANK AREA
- PROPERTY BOUNDARY
- FENCELINE
- GUARD RAIL
- OVERHEAD WIRE
- GAS LINE
- TELEPHONE LINE
- DIRECT BURIED ELECTRIC LINE

Data Collected on 12/28/89
Groundwater Elevation in Feet, Relative to Site Datum

0 100 200
SCALE IN FEET

FIGURE 2

GROUNDWATER TECHNOLOGY, INC.
2200 Stonington Avenue
Suite 160
Hoffman Estates, IL 60193

Project #	Drawing #	Date
04010-9526	952602	8-7-90

Detailed: MWS
Checked: SLN
Approved:

Title: **GROUNDWATER CONTOUR MAP**
12/29/89

Client: COCA-COLA USA

Location: 4301 & 4359 WEST 36th ST. CHICAGO, ILLINOIS

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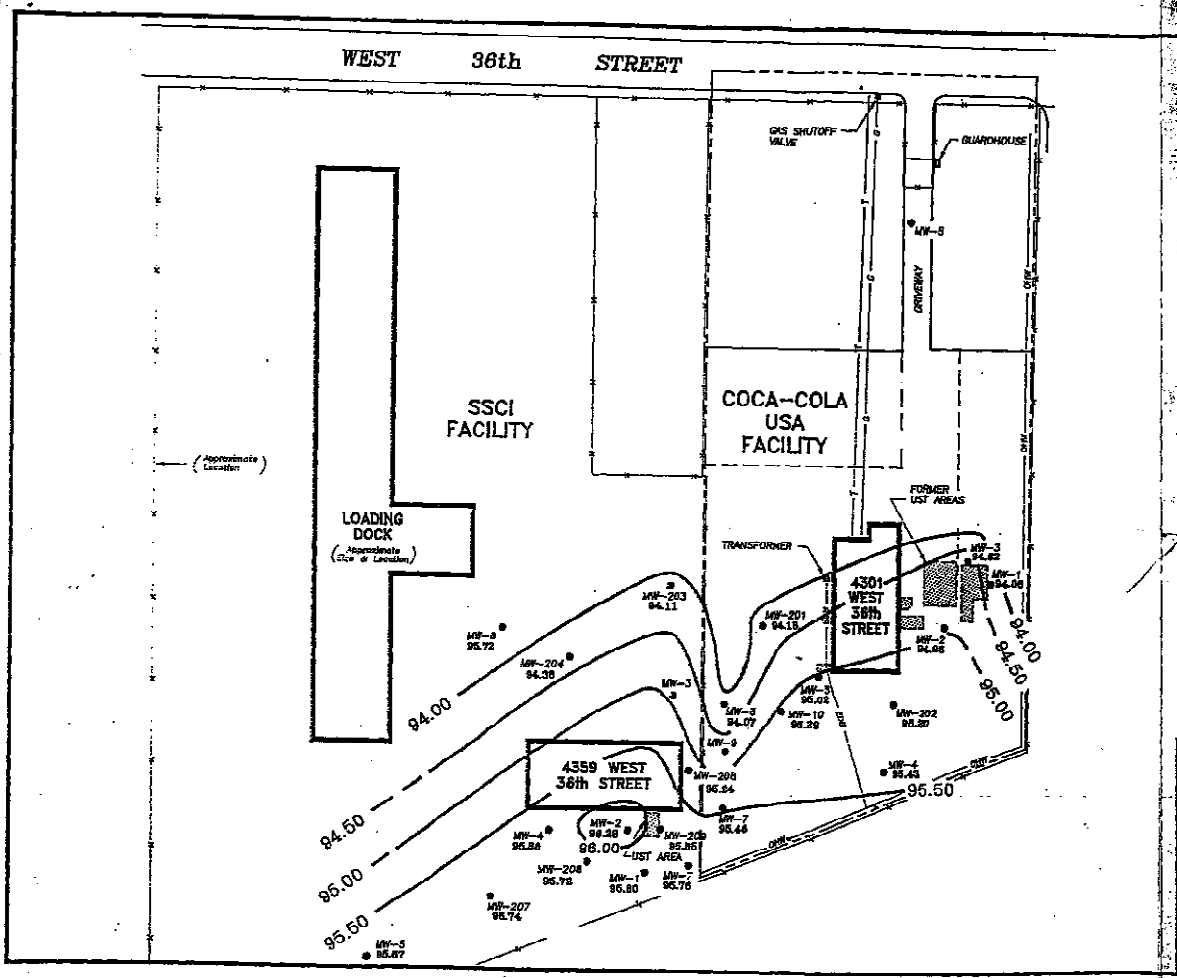
Figure 8



N

LEGEND

- MW-1 / 94.06 — MONITORING WELL (Well Identification / Groundwater Elevation)
- UNDERGROUND STORAGE TANK AREA
- PROPERTY BOUNDARY
- FENCELINE
- GUARD RAIL
- OHW — OVERHEAD WIRE
- G — GAS LINE
- T — TELEPHONE LINE
- EDG — DIRECT BURIED ELECTRIC LINE

Data Collected on 1/17/90
Groundwater Elevation in Feet, Relative to Site Datum

0 100 200
SCALE IN FEET

FIGURE 3

GROUNDWATER TECHNOLOGY, INC.
2200 Stonington Avenue
Suite 100
Hoffman Estates, IL 60195

Project # 10-010-9526	Drawing # 952603	Date 8-7-90
Detailed MWS	Title **GROUNDWATER CONTOUR MAP** 1/17/90	
Checked SLN		
Approved	Client COCA-COLA USA	Location 4301 & 4359 WEST 36th ST. CHICAGO, ILLINOIS

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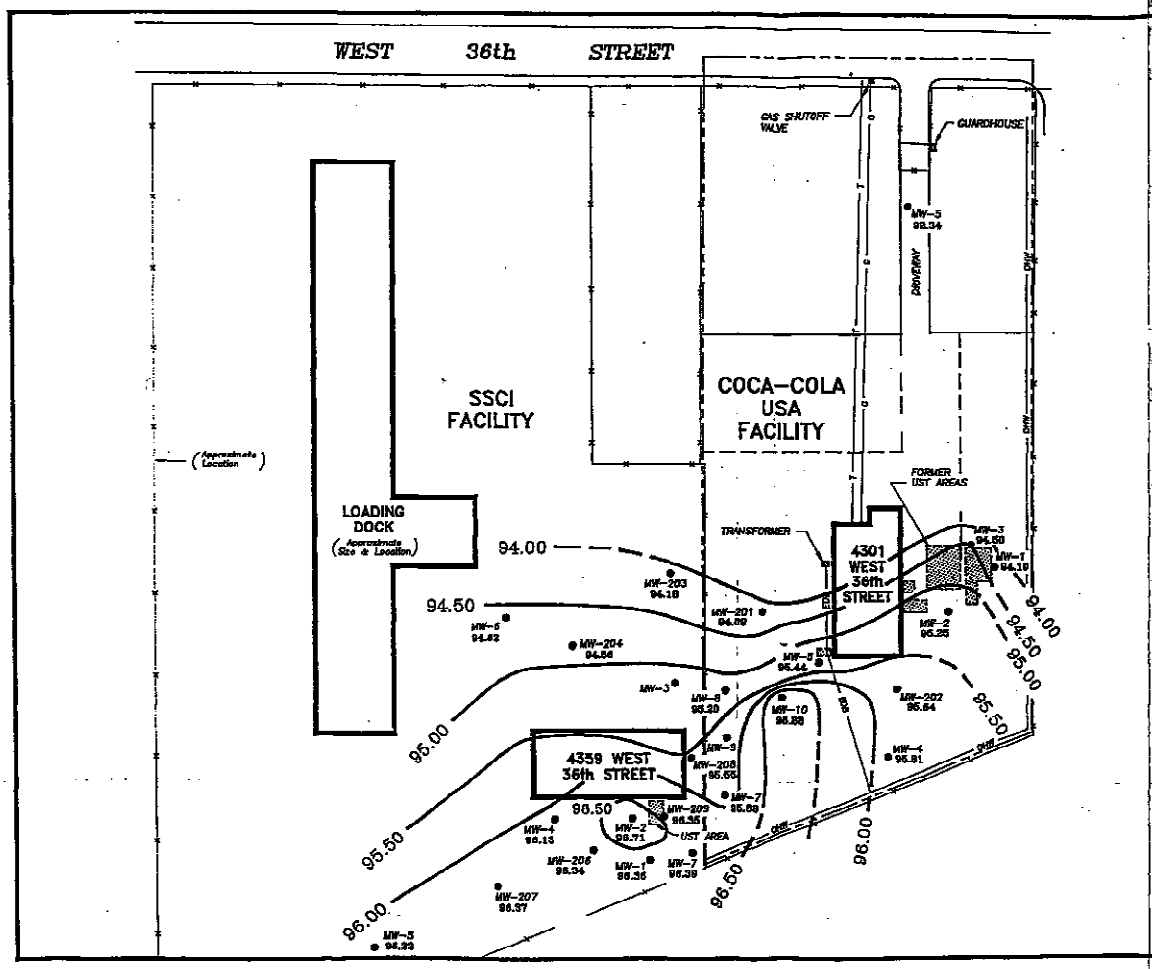
Figure 9



LEGEND

- MW-1 / 94.10 — MONITORING WELL (Well Identification / Groundwater Elevation)
- UNDERGROUND STORAGE TANK AREA
- PROPERTY BOUNDARY
- FENCELINE
- GUARD RAIL
- OHW — OVERHEAD WIRE
- G — GAS LINE
- T — TELEPHONE LINE
- EDB — DIRECT BURIED ELECTRIC LINE

Data Collected on 2/13/90
Groundwater Elevation in Feet, Relative to Site Datum

0 100 200
SCALE IN FEET

FIGURE 4

GROUNDWATER TECHNOLOGY, INC.
3200 Stonington Avenue
Suite 160
Hoffman Estates, IL 60195

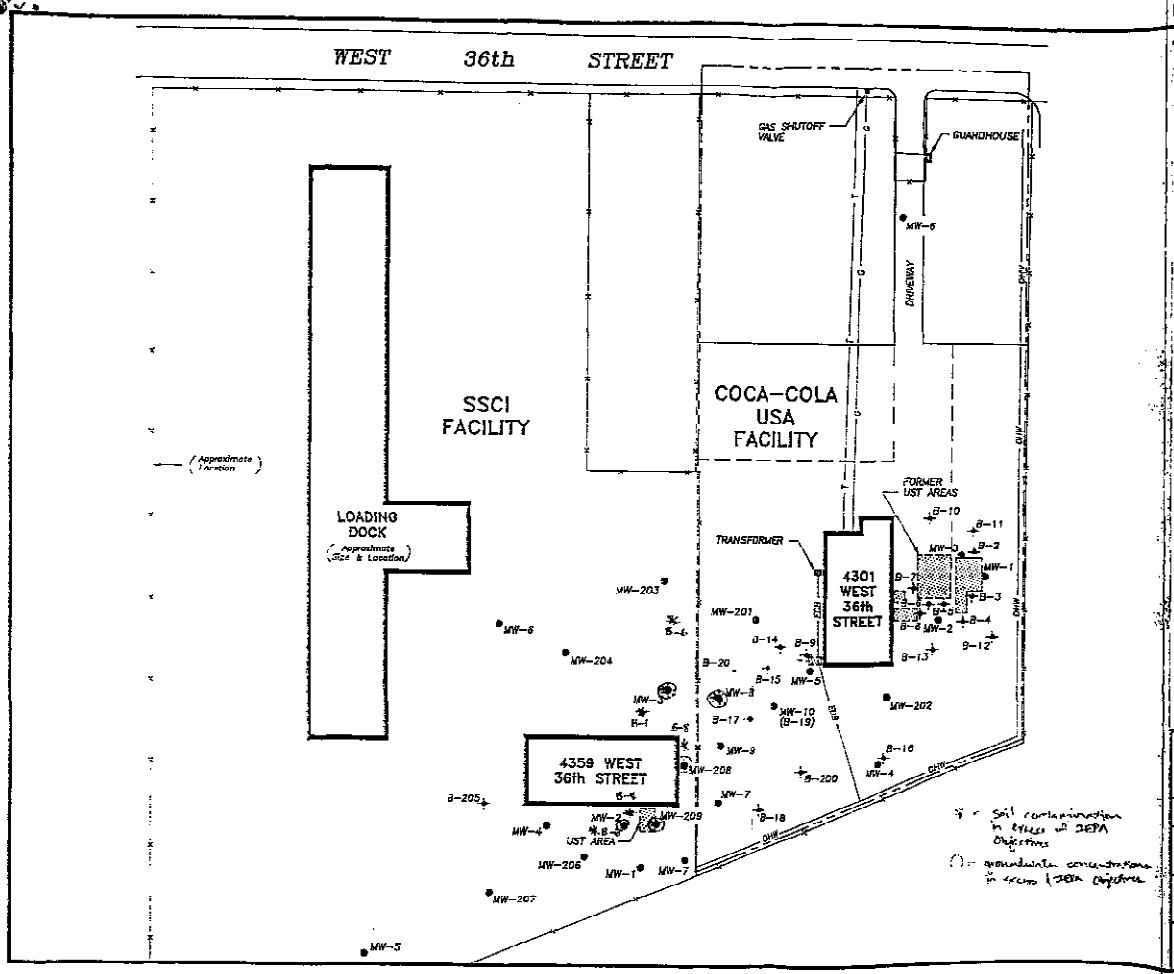
Project #	Drawing #	Date
04010-9526	952604	8-7-90

Drafted: MWS
Checked: SLN
Approved:

Title: **GROUNDWATER CONTOUR MAP**
2/13/90

Client: COCA-COLA USA

Location: 4301 & 4359 WEST 36th ST. CHICAGO, ILLINOIS



N

LEGEND

- MW-1 — MONITORING WELL (Well Identification)
- SOIL BORING
- UNDERGROUND STORAGE TANK AREA
- PROPERTY BOUNDARY
- FENCELINE
- GUARD RAIL
- OHW — OVERHEAD WIRE
- G — GAS LINE
- T — TELEPHONE LINE
- EDB — DIRECT BURIED ELECTRIC LINE

0 100 200
SCALE IN FEET

FIGURE 1

GROUNDWATER TECHNOLOGY, INC.
2550 Stonington Avenue, Suite 140, Hoffman Estates, IL 60195

Project # 04010-9526	Drawing # 9526D1B	Date 8-1-92
Detailed MWS	Title LOCATION MAP	
Checked SLN		
Approved	Client COCA-COLA USA	Location 4301 & 4359 WEST 36th STS. CHICAGO, ILLINOIS

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305/358-3500

227 WEST MONROE STREET
CHICAGO, ILLINOIS 60606-5096
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LOUIS M. RUNDIO, JR.
312/984-7710

August 9, 1990

Kenneth L. Page
Project Manager
Immediate Removal Unit
Remedial Project Manager
Division of Land Pollution Control
Illinois Environmental Protection Agency
Post Office Box 19276
Springfield, Illinois 62794-9276

Re: LPC ~~#03310000000~~ 0316580016 -- Cook County
Chicago/Coca-Cola, USA
4301 West 36th Street
Incident # (None)
LUST/Technical Reports

Dear Mr. Page:

Under separate cover, Groundwater Technology, Inc. is forwarding to you two copies of the report of the investigation that it conducted in regard to the above-referenced matter. I understand that you will forward a copy to Joanne S. Barker of Environmental Science & Engineering, Inc. If you wish, however, I can have Groundwater Technology, Inc. forward a copy to Ms. Barker directly.

If you or Ms. Barker have any questions regarding the report, please do not hesitate to contact me.

Very truly yours,

Louis M. Rundio, Jr.

Louis M. Rundio, Jr.

LMR:mog
6871g
cc: Joanne S. Barker

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Illinois Environmental Protection Agency · P.O. Box 19276, Springfield, IL 62794-9276

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Refer to: LPC # 0310000000 -- Cook County
Chicago/Coca-Cola, USA
4301 West 36th Street
Incident # (None)
LUST/Technical Reports

May 16, 1990

Mr. John R. Parker, Jr.
Coca-Cola USA
P. O. Drawer 1734
Atlanta, GA 30301

Dear Mr. Parker:

The Illinois Environmental Protection Agency has reviewed the December 5, 1988 report prepared by Groundwater Technology, Inc. regarding the underground storage tank removal and site investigation performed at the site referenced above. Because contaminated soils were observed during the UST removal, indicating the presence of a leaking UST, you are required to notify the Illinois Emergency Services Disaster Agency (ESDA) at 800/782-7860.

The Agency has not received any information regarding this site since your December 19, 1988 letter. Please provide to the Agency a summary of actions taken at this site from December 19, 1988 to the present. Submit two copies of this information to the Agency at the address shown above. Include all "Refer to" information in any correspondence.

Should you have any questions, please feel free to contact me at the above telephone number or Ms. Joanne S. Barker, IEPA contract employee, at Environmental Science & Engineering, Inc. (312) 693-6030.

Sincerely,

Kenneth L. Page

Kenneth L. Page, Project Manager
Immediate Removal Unit
Remedial Project Management Section
Division of Land Pollution Control

cc: Division File
Maywood Region
Ken Burch, USEPA-Region V
Joanne Barker, ESE

KLP, JSB/mrc
90051603.JSB

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Coca-Cola USA
Division of
The Coca-Cola Company

December 19, 1988

Ms. Carmen Y. Yung
LUST Program
Field Operations Section
Division of Land Pollution Control
Illinois EPA
1701 1st Avenue
Maywood, Illinois 60153

RE: Coca-Cola USA
Chicago PTO
4301 W. 36th Street
Chicago, Illinois

Dear Ms. Yung:

This letter is to inform you that we have met with the attorneys for SSCI, the joint venture which owns the property at 4359 W. 36th Street that abuts our Chicago PTO site to the west. The meeting was amicable and both parties stated a strong interest in resolving the problem in a responsible, timely and mutually cooperative manner.

The parties have agreed to exchange and compare technical reports. From that information, the parties intend to determine what additional sampling data, if any, is needed; thereafter, the parties intend to collect, mutually and jointly, any additional data needed to determine the extent and source of contamination at the two sites. An appropriate site remediation plan then would be developed. We will, of course, inform IEPA of developments regarding the site.

Thank you for your assistance. My phone number is (404)676-7396 if you have questions or comments.

Sincerely,

John R. Parker, Jr.

John R. Parker, Jr.

vb/JP12162
c: Mr. Shell Bleiweiss
Mr. Robert L. Graham

RECEIVED

P.O. Drawer 1734
Atlanta, GA 30301
404 676-2121

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GROUNDWATER
TECHNOLOGY, INC.

2113 Stonington Avenue, Hoffman Estates, IL 60195 (312) 882-8290
FAX #(312) 882-8606

December 5, 1988

Ms. Carmen Y. Yung
LUST Program
Field Operations Section
Division of Land Pollution Control
Illinois EPA
1701 1st Avenue
Maywood, Illinois 60153

Subject: Coca-Cola USA
4301 W. 36th Street
Chicago, Illinois

Dear Ms. Yung:

On behalf of Coca-Cola USA, Groundwater Technology, Inc. submits the enclosed report entitled "TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT, COCA-COLA USA, 4301 WEST 36th STREET, CHICAGO, ILLINOIS". The report documents all environmental activities conducted to date at the site.

If you have any questions or require any additional information, please contact Mr. John R. Parker, Jr. at (404) 676-7396.

Sincerely,

Groundwater Technology, Inc.

Gary M. Robinson
Hydrogeologist
Territory Manager

GMR/dm

cc: Mr. John R. Parker, Jr. - Coca-Cola USA
Mr. Andrew P. Maness - Coca-Cola USA

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GROUNDWATER TECHNOLOGY, INC.

2113 Stonington Avenue, Hoffman Estates, IL 60195 (312) 882-8290
FAX #(312) 882-8606

TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT
COCA-COLA USA
4301 WEST 36TH STREET
CHICAGO, ILLINOIS

Gener.# 0316580016
no Incident no

Prepared for:

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Manager, Environmental Services
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COCATRR - 12/5/88
Ref. Job #401-144-8928

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GROUNDWATER TECHNOLOGY, INC.

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1.0 EXECUTIVE SUMMARY

On March 23 through 25, 1988 Groundwater Technology, Inc. supervised the excavation and removal of one-20,000 gallon and four-10,000 gallon diesel fuel; one-3,000 gallon waste oil; one-1,000 gallon motor oil; and one-1,000 gallon fuel oil underground storage tanks (Phase I) at Coca-Cola USA's (Coca-Cola) trucking facility located at 4301 West 36th Street in Chicago, Illinois (Figure 1). The removal of the underground storage tanks was initiated by Coca-Cola USA for the purpose of relinquishing the property and verifying the condition of the site. The eight tanks were visually inspected. Two of the 10,000 gallon tanks showed signs of corrosion and holes were visible on both of these tanks. The eight tanks were excavated, transported, and disposed of by R. W. Collins Company of Clearing, Illinois.

Soil excavated from the tank area was screened using an HNU photoionization detector (PID). The soil removed from the excavation was separated into three stockpiles. Stockpile "A" exhibited HNU readings ranging from a low of 20 parts per million (ppm) to a high of 75 ppm. The soil from Stockpile "A" was visibly discolored. Stockpile "N" and "S" had readings ranging from 2 ppm to 10 ppm. Soil from Stockpiles "N" and "S" showed no visible discoloration. Stockpile "A" contained approximately 150 cubic yards of soil and was stockpiled on-site. Stockpiles "N" and "S" were used to backfill the tank excavation area. These stockpiles contained approximately seventy (70) cubic yards of soil, combined.

Soil samples collected from the stockpiles and from under each tank were sent to Groundwater Technology Environmental Laboratories (GTEL) and analyzed for volatile organic compounds (VOCs) (EPA Method 8020) and total petroleum hydrocarbon (TPH) (Standard Methods 503D & E).

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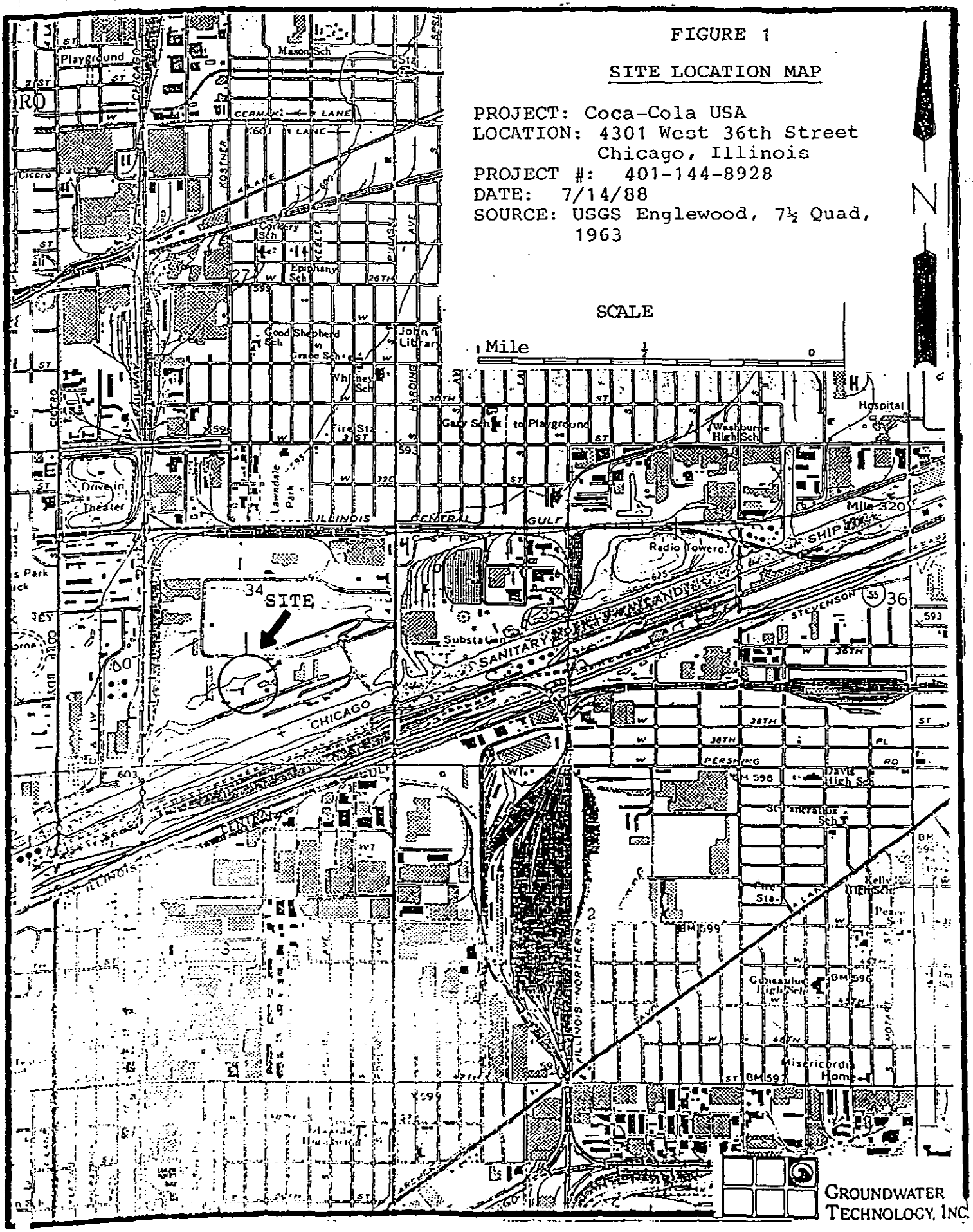
FIGURE 1

SITE LOCATION MAP

PROJECT: Coca-Cola USA
LOCATION: 4301 West 36th Street
Chicago, Illinois
PROJECT #: 401-144-8928
DATE: 7/14/88
SOURCE: USGS Englewood, 7½ Quad, 1963



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A subsurface site assessment was initiated to determine the nature and extent of petroleum hydrocarbon contaminants in the materials beneath the site. The site assessment was conducted in three phases with subsurface explorations conducted on May 18, June 29 and October 6, 1988. Soil borings were drilled and monitoring wells were installed on May 18, 1988 to evaluate the horizontal and vertical extent of petroleum hydrocarbon contamination surrounding the former underground storage tank areas. Soil borings were drilled on June 29, 1988 to further determine the lateral extent of petroleum constituents contained in an organic silt/clay layer at a depth of 3.5 to 5.0 feet below grade. Soil borings were drilled and monitoring wells were installed on October 6, 1988 to define the nature and extent of petroleum hydrocarbons beneath the southwest corner of the property and to ascertain if a contributing petroleum hydrocarbon source is present in that area.

A total of twenty eight soil borings were drilled; monitoring wells were installed in ten of the borings. Soil samples were collected during the installation of the borings. The headspace vapors of each soil sample was analyzed for VOCs using a PID. Selected soil samples were analyzed for TPH, VOCs and polynuclear aromatic hydrocarbons (PAHs). The monitoring wells were gauged to determine groundwater table elevations and the presence or absence of phase-separated organics within the wells. Groundwater samples were collected from the monitoring wells and selected samples were analyzed for VOCs and PAHs.

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Results of the subsurface investigation include the following:

- Subsurface materials consist of 1 to 3 feet of silty clay containing some construction material. This unit overlies 1 to 3 feet of organic material. The organic layer overlies an undetermined thickness of dense, brown to gray silty clay.

- Groundwater is calculated to flow to the north/northwest and is influenced by groundwater mounding at the former underground storage tank locations.

- In general, soil contamination is contained in the upper 5 to 8 feet of the subsurface with adsorbed phased contaminant concentrations significantly decreasing at 8 to 10 feet below grade.

- Phase-separated hydrocarbons were observed in soil samples collected from B-17 and MW-7. A measurable thickness (0.03 feet) of phase-separated hydrocarbons were detected floating in MW-7.

- No public record indicating that private or municipal drinking water wells are located within a 1/2 mile radius of the site was found during this investigation. The area surrounding the site obtains its drinking water from Lake Michigan.

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Based on the results of the tank excavation/disposal and site assessment programs, Groundwater Technology, Inc. submits the following conclusions.

- The calculated direction of groundwater flow beneath the site is to the north/northwest.

- Adsorbed phase petroleum hydrocarbons are contained in the upper 5 to 8 feet of the subsurface. Based on the existing data, the lateral extent of adsorbed phased contamination has not been defined, although the highest levels of petroleum contamination exist around the former underground storage tank areas and in the southwest corner of the site.

- So far as the vicinity of the former underground storage tanks is concerned, soil analytical results suggest that diesel and/or motor oil is the primary contaminant. BTEX groundwater contaminant levels are below the IEPA clean-up objectives in the vicinity of the former underground storage tanks.

- So far as the southwest corner of the site is concerned, phase-separated hydrocarbons and elevated concentrations of dissolved hydrocarbon constituents exist. The source of subsurface contamination in the southwest corner of the site is currently unknown. There is no indication from the existing data that the contamination originated from the former on-site underground storage tank areas since these areas are located downgradient from MW-7. The elevated levels of BTEX in the groundwater at MW-8 are an indication that a secondary contributing volatile organic (gasoline) source may exist.

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2.0 INTRODUCTION

2.1 Background

Groundwater Technology, Inc. was contracted by Coca-Cola USA on March 21, 1988 to remove eight underground storage tanks (Phase I) and execute a site assessment (Phase II) at their trucking facility located at 4301 West 36th Street in Chicago, Illinois (Figure 1).

2.2 Purpose

The tank excavation and site assessment programs were initiated by Coca-Cola USA in preparation for divestiture of the property and to verify the condition of the site.

2.3 Scope of Work

2.3.1 Tank Excavation and Disposal

The tank excavation activities included the following:

- Groundwater Technology personnel supervised the excavation of eight underground storage tanks in accordance with NFPA code 30 and API publication 1604.

- GTI provided documentation of the underground storage tank excavation and disposal program.

- Headspace vapors of soil samples collected from the excavation were analyzed using an HNU photoionization detector to determine the relative concentrations of volatile organic compounds.

- Soil samples collected during tank removal were analyzed by GTEL for petroleum hydrocarbons per EPA Test Method 8020 and Standard Methods 503D and E.

2.3.2 Site Assessment

The components of the site investigation included the following:

- A background investigation was conducted to determine site history, facility operating procedures, potential contaminant sources and receptors, and the location for monitoring wells.

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- A Groundwater Technology geologist supervised the drilling of soil borings and the installation of monitoring wells.

- Soil samples were collected during the drilling of the soil borings.

- The vapor headspace of the soil samples collected during drilling operations were analyzed using an HNU photoionization detector to determine relative concentrations of volatile organic compounds.

- Selected soil samples collected from each boring were analyzed for TPH (Standard Methods 503D & E), PAHs (EPA Method 8310) and VOCs (EPA Method 8020).

- The top of casing of each monitoring well was surveyed to establish elevation control of groundwater and subsurface features.

- The monitoring wells were gauged using an Electronic Interface Probe to determine the depth to groundwater and the presence or absence of a free floating hydrocarbon layer.

- Selected water samples collected from the monitoring wells were analyzed for VOCs (EPA Method 602) and PAHs (EPA Method 610).

- A site map was developed indicating the locations of soil borings and monitoring wells.

- The analytical, geologic and hydrogeologic data collected during field activities was evaluated and the following report was formulated to document the site assessment methodology and results.

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3.0 TANK EXCAVATION AND DISPOSAL

3.1 Methodology

3.1.1 Tank Removal Permitting

A permit was secured from the City of Chicago prior to removal of the underground storage tanks (Appendix A). A representative of the City of Chicago was present at the site to verify the number of tanks removed.

3.1.2 Tank Removal Procedures

3.1.2.1 Tank Preparation and Purging

The underground storage tanks were uncovered by removal of the pavement to expose the tops of the tanks along with fill, vent, and supply lines. The tank locations and identifications are shown on Figure 2 and Table I, respectively. Supply lines were disconnected from the dispensers and product was drained back into the tanks. Supply lines were then disconnected from the tanks and removed. Prior to removing the tanks from the excavation, liquids remaining in the tanks were removed via vacuum truck. Solid carbon dioxide (dry ice) was added to each tank to purge any flammable vapors that accumulated in the tanks. The atmosphere in each tank was tested with a combustible gas indicator to assure that the flammable vapors had been purged from the tanks.

Table I

Tank Identification

Tank ID	Size	Serial Number	Approximate Age	Contents
1A	1,000	H-286463	--	Heating Oil
1B	1,000	--	14	Motor Oil
2	3,000	G-001834	--	Waste Oil
3	10,000	G-719552	12	Diesel Fuel
4	10,000	G-719548	12	Diesel Fuel
5	10,000	G-719556	12	Diesel Fuel
6	20,000	G-399707	14	Diesel Fuel
7	10,000	C-001885	14	Diesel Fuel

NOTE: Serial number plate for tank 1B was destroyed during excavation. The plate was present but unreadable. The age of tanks 1A and 2 was not reported.

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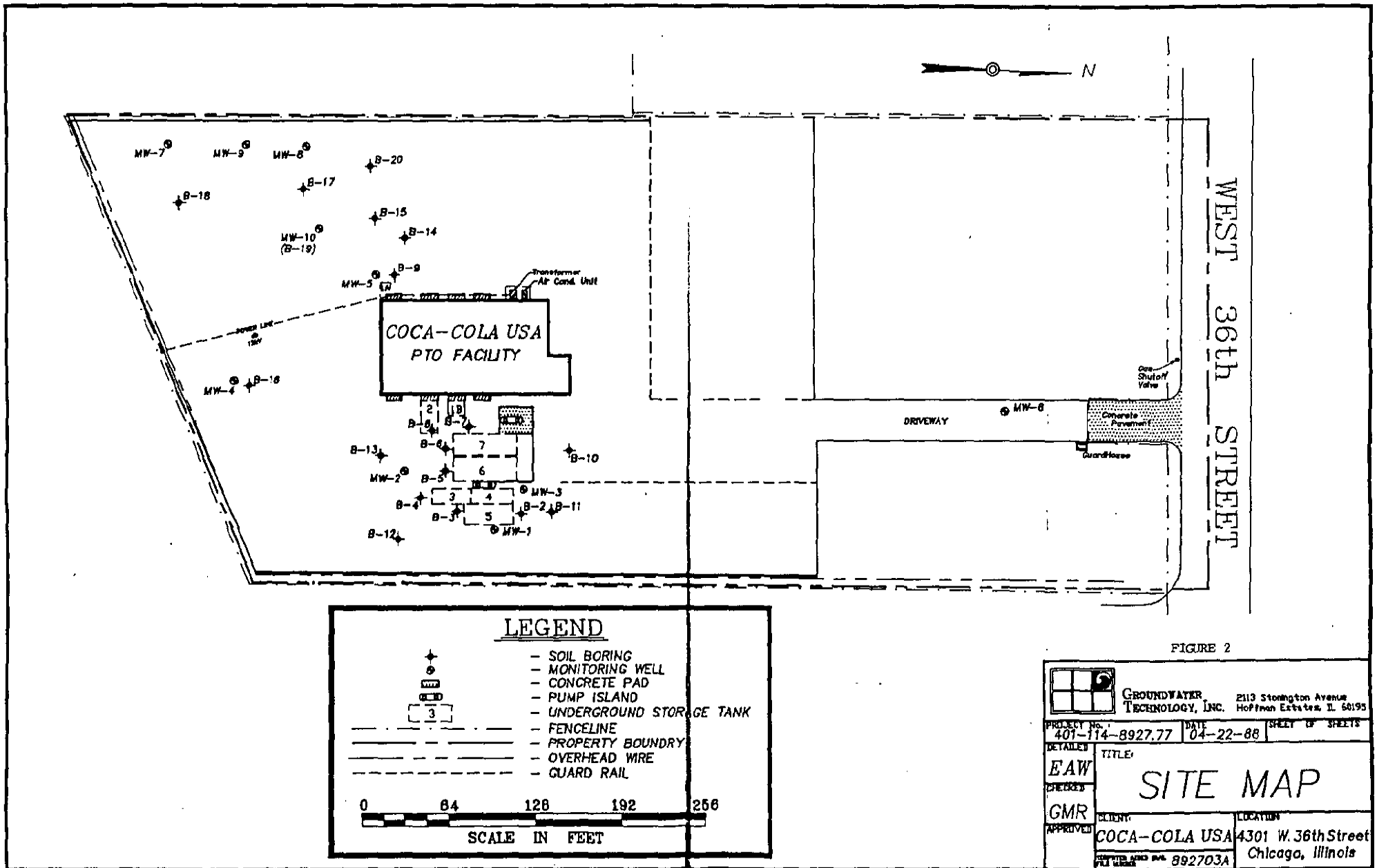

FIGURE 2

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3.1.2.2 Tank Removal and Disposal

The eight underground storage tanks removed from the excavation were placed on their side in order to conduct a visual inspection. Inspection for visible signs of corrosion and holes in the tanks was conducted. After the visual inspection, the tanks were placed on flat bed trailers with the vent holes positioned to the top. This positioning provides adequate ventilation of the tank during transport. The tanks were removed from the site and transported to the R. W. Collins facility in Clearing, Illinois for processing and disposal. The processing and disposal consisted of removing the ends of the tanks, cleaning and removal of the hydrocarbon residue, and cutting the tanks into sections for disposal. A letter from R. W. Collins, Inc. documenting disposal of the USTs is included in Appendix B.

3.1.3 Liquid Disposal

The liquid content of the tanks was removed via vacuum truck by Beaver Oil Company, an EPA licensed waste hauler. The liquid taken from the site was manifested (Appendix C) and properly disposed of at Beaver Oil Company's Hodgkins, Illinois facility.

3.1.4. Soil Removal Procedures

3.1.4.1 Soil Screening and Stockpiling

The soil, predominately backfill material, encountered during excavation of the tanks, was stockpiled at the site. The soil was screened using an HNU photoionization detector to determine the relative organic vapor concentration in the headspace of the samples. The backfill material consisted of a medium to fine grain sand. The sand was separated into three separate stockpiles identified as "A", "N", and "S".

Stockpile "A" soil exhibited headspace vapor readings ranging between 20 ppm and 75 ppm as detected by the HNU photoionization detector (Table II). Approximately 150 yards of discolored soil and backfill material was stockpiled at the site (Stockpile "A"). The stockpile was placed upon and covered with 3 mil thick plas-

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tic sheets. This method was used to avoid possible leaching of any contamination adsorbed to the soil. The soil in Stockpiles "N" and "S" exhibited headspace vapor readings ranging from 2 ppm to 10 ppm (Table II). Stockpiles "N" and "S" contained approximately 70 cubic yards of soil, combined. Soil Stockpiles "N" and "S" were used in the backfilling of the tank excavation pit.

TABLE II

Organic Vapor Concentration of Excavated/Stockpiled Soils

Soil Stockpile	Volume (yd^3)	Organic Vapor Concentration (ppm)
A	150	20-75
N	35	2-10
S	35	2-10

3.1.4.2 Soil Sampling and Analysis

Soil samples were collected under each tank to document TPH concentrations. Two soil samples were collected from either end under the 20,000 and 10,000 gallon tanks and one sample was collected from under each of the 3,000 and 1,000 gallon tanks. The stockpiles were also sampled. The samples were collected and placed in one liter glass containers. The containers were immediately placed on ice and shipped to Groundwater Technology Environmental Laboratories to be analyzed for BTEX and TPH using modified EPA Test Method 8020 and Standard Methods 503D and E, respectively.

3.1.5 Backfilling Excavation

The excavated areas were backfilled with soils from stockpiles "N" and "S" along with 3-inch crushed limestone to a depth of 2 feet from the surface. A top lift of 3/4-inch crushed stone was added to the surface of the excavation.

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3.2 Results

3.2.1 Tank Removal and Visual Inspection

The eight tanks removed from the Coca-Cola USA trucking facility included: one-20,000 gallon; four-10,000 gallon; one-3,000 gallon; and two- 1,000 gallon underground storage tanks.

The visual inspection completed on tanks 1A, 1B, 2, 4, 6, and 7 (Table I and Figure 2) resulted in no visible signs of corrosion. The bottom half of tank #3 had corroded areas. A 1/2-inch hole was detected on the end of the tank. In addition, a seam at the same end was separated. Tank #5 had several holes located at its bottom. Refer to Appendix D for photographic documentation of the excavated tanks.

3.2.2 Soil Analysis

Soil samples collected from under the storage tanks and from the stockpiles were analyzed for VOCs (EPA Method 8020) and TPH (Standard Methods 503D & E). Samples collected from beneath the tanks and identified as T1A, T1B, T2, T3, T4, T5, T6, and T7 (Figure 2) contained non-detectable (ND) concentrations of BTEX. The samples collected from Stockpiles "N" and "A" had non-detectable concentrations of BTEX. The sample collected from Stockpile "S" had a BTEX concentration of 1.0 ppm. The sample collected from Stockpile "A" displayed a TPH value of 2,300 ppm. TPH concentrations for the soil samples collected are summarized in Table III and presented as Appendix E.

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Table III

Soil Sample Analytical Results

Sample Number	Location	TPH (ppm)	BTEX (ppm)
T1A		200	ND
T1B		150	ND
T2		25	ND
T3	North	ND	ND
T3	South	ND	ND
T4	North	18	ND
T4	South	ND	ND
T5	North	140	ND
T5	South	7	ND
T6	North	ND	ND
T6	South	250	ND
T7	North	ND	ND
T7	North	ND	ND
Stockpile A	Grab	2,300	ND
Stockpile N	Grab	1,400	ND
Stockpile S	Grab	2,500	1.0

Notes: BTEX = The sum of Benzene, Toluene, Ethylbenzene and Xylenes
TPH = Total Petroleum Hydrocarbons
ppm = Parts Per Million
ND = None Detected

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4.0 SITE ASSESSMENT

4.1 Methodology

4.1.1 Background Investigation

The site was inspected by a Groundwater Technology geologist who observed the previous locations of the underground storage tanks, underground piping and tank fills used in the storage of petroleum hydrocarbons. Locations for soil borings and monitoring wells were based on the location of potential contaminant sources.

The Illinois State Fire Marshals' office was contacted to identify the location of underground storage tanks near the facility. The State of Illinois Environmental Protection Agency LUST/Superfund group was contacted to determine if a reported petroleum release had been reported near the site.

The Cook County Recorder of Deeds' office was contacted to investigate the previous owners and possible commercial activities at the site.

The locations of potential receptors of any hydrocarbon release were researched. The City of Chicago Water Department and Illinois State Water Survey were contacted concerning possible locations of domestic and municipal water wells near the site.

4.1.2 Monitoring Well Installation

Three separate drilling programs were implemented at the site on May 18, June 29 and October 6, 1988. The programs were initiated to define: the areal and vertical extent of subsurface contamination; hydrogeologic conditions beneath the site; and, potential contaminant sources at the trucking facility.

On May 18, 1988 fourteen soil borings were drilled; monitoring wells were installed in six of these borings. This phase of subsurface exploration was conducted to determine overall subsurface characteristics including: the extent of petroleum hydrocarbon

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soil and groundwater contamination; subsurface geology; and, the direction of groundwater flow beneath the site. On June 29, 1988 eight additional soil borings were installed and sampled and analyzed to determine the extent of adsorbed phased hydrocarbon constituents in the organic clay layer at a depth of 3.5 to 5.5 feet below grade.

The results from these two sets of borings indicated a probable off-site or contributing source(s) of petroleum contamination affecting the southwest corner of the site. Therefore, on October 6, 1988, an additional six soil borings were drilled in the southwest corner; monitoring wells were installed in four of these borings. This final third stage of subsurface investigation was conducted to define subsurface conditions and contaminant levels in the southwest corner of the site.

All soil borings were drilled using 4.0-inch O.D. solid stem rotary augers. The soil boring and monitoring well locations are shown on Figure 2. Monitoring wells MW-1 through MW-6 were constructed of 2-inch diameter Schedule 40 PVC flush threaded 0.010-inch slotted well screen. Monitoring wells MW-7 through MW-10 were constructed of 10 feet of 2-inch diameter Schedule 40 PVC flush threaded 0.010-inch slotted well screen and 2 feet of 2-inch diameter Schedule 40 PVC solid riser. The annular space surrounding the screen and riser was backfilled with clean washed silica sand. A bentonite seal was installed above the sand pack on MW-7 through MW-10 to prevent surface water infiltration into the sand pack material. Locking well caps and protective steel covers were installed to protect each well. The steel covers were set in concrete and installed flush with grade. The components of the monitoring well construction are included on the well logs (Appendix F).

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The ten wells were developed by bailing until the water became free of suspended solids. The wells were developed to increase the hydraulic communication between the well and the surrounding formation.

4.1.3 Top of Casing Elevation Survey

The top of casing elevations of the ten wells were surveyed for elevation control. The top of casing elevations used in conjunction with depth to water gaugings were used to calculate the water table elevation in each monitoring well. The elevation and location of each well was measured relative to an arbitrary bench mark established on site.

4.1.4 Well Gaugings

Groundwater Technology used an Electronic Interface Probe to gauge the depth to water and to determine the presence or absence of a free-floating hydrocarbon layer within each monitoring well. The Interface Probe is capable of measuring the depth to the groundwater and the thickness of any immiscible hydrocarbon layer on the groundwater to an accuracy of 0.01 feet. Well data monitoring forms for May 27, June 14, October 12 and November 9, 1988 are included as Appendix G.

4.1.5 Soil Sampling and Organic Vapor Analysis

The description of the soils encountered during drilling were logged by a Groundwater Technology, Inc. geologist and are included in the well logs (Appendix F). Split spoon soil samples were collected during the drilling of each soil boring as instructed by the supervising geologist. Split spoon soil sampling intervals are indicated on the well logs (Appendix F). The samples were immediately sealed in glass containers. The vapor headspace was subsequently analyzed for VOCs using an HNU. The HNU readings indicate relative concentrations of VOCs in the vapor headspace but do not represent actual concentrations that

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may exist in the soil. The HNU Photoionization detector has a detection range of 1 to 2000 ppm. Photoionization detectors results are included in Appendix H.

During the collection of split-spoon soil samples, the sampling equipment was decontaminated between samples to prevent sample cross-contamination. Sample collection, transport and analytical methods were performed in accordance with standard quality control and quality assurance procedures.

On May 18, 1988, the soil sample which exhibited the highest organic vapor concentration from each boring was sent to Groundwater Technology Environmental Laboratories (GTEL) and analyzed for TPHs using Standard Methods 503D & E. In addition, eleven selected soil samples were collected and analyzed for TPH. These additional samples were selected to identify the vertical distribution of hydrocarbon migration.

Selected soil samples collected while drilling on June 29 and October 6, 1988 were sent to GTEL and analyzed for TPH (Standard Methods 503D & E), volatile organic hydrocarbons (EPA Method 8020) and polynuclear aromatic hydrocarbons (EPA Method 8310). The sample date, sample interval and method of analysis for each soil sample collected during the assessment phase of this project are summarized in Table IV. Complete analytical results are included in Appendix I.

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TABLE IV

Soil Sampling Schedule

Boring/ Well ID	Sample Date	Sample Interval	Analytical Method 503D & E	EPA 8020	EPA 8310
MW-1	5/18/88	3.5-5.5'	X		
MW-1	5/18/88	8.5-10.0'	X		
MW-2	5/18/88	1.0-2.5'	X		
MW-2	5/18/88	3.5-5.5'	X		
MW-2	5/18/88	8.5-10.0'	X		
MW-3	5/18/88	8.5-10.0'	X		
MW-4	5/19/88	1.0-2.5'	X		
MW-4	5/19/88	3.5-5.5'	X		
MW-4	5/19/88	8.5-10.0'	X		
MW-5	5/19/88	1.0-2.5'	X		
MW-6	5/19/88	3.5-5.5'	X		
B-2	5/18/88	3.5-5.5'	X		
B-2	5/18/88	8.5-10.0'	X		
B-3	5/18/88	1.0-2.5'	X		
B-3	5/18/88	3.5-5.5'	X		
B-4	5/18/88	8.5-10.0'	X		
B-5	5/18/88	3.5-5.5'	X		
B-6	5/18/88	1.0-2.5'	X		
B-6	5/18/88	3.5-5.5'	X		
B-7	5/18/88	3.5-5.5'	X		
B-7	5/18/88	8.5-10.0'	X		
B-8	5/18/88	1.0-2.5'	X		
B-8	5/18/88	3.5-5.5'	X		
B-8	5/18/88	8.5-10.0'	X		
B-9	5/19/88	3.5-5.5'	X		
B-10	6/29/88	3.5-5.5'	X		
B-11	6/29/88	3.5-5.5'	X		
B-12	6/29/88	3.5-5.5'	X		
B-13	6/29/88	3.5-5.5'	X		
B-14	6/29/88	3.5-5.5'	X		
B-15	6/29/88	3.5-5.5'	X		
B-16	6/29/88	1.0-2.5'	X		
MW-7	10/6/88	1.0-2.5'	X		X
MW-7	10/6/88	3.5-5.0'	X	X	X
MW-7	10/6/88	8.5-10.0'	X	X	X
MW-8	10/6/88	1.0-2.5'	X	X	X
MW-8	10/6/88	3.5-5.0'	X	X	X
MW-8	10/6/88	8.5-10.0'	X	X	X
MW-9	10/6/88	1.0-2.5'	X		
MW-9	10/6/88	3.5-5.0'	X		
MW-9	10/6/88	8.5-10.0'	X		
MW-10	10/6/88	1.0-2.5'	X		
MW-10	10/6/88	3.5-5.0'	X		
MW-10	10/6/88	8.5-10.0'	X		
B-18	10/6/88	1.0-2.5'	X		
B-18	10/6/88	3.5-5.0'	X		
B-18	10/6/88	8.5-10.0'	X		
B-20	10/6/88	1.0-2.5'	X		
B-20	10/6/88	3.5-5.0'	X		
B-20	10/6/88	8.5-10.0'	X		

X = Analysis Performed

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4.1.6 Groundwater Sampling and Analysis

Groundwater samples were collected from the ten monitoring wells. On May 27, 1988 groundwater samples were collected from MW-1 through MW-6 and on October 12, 1988, groundwater samples were collected from MW-2, MW-5, MW-8, MW-9 and MW-10. Prior to sampling the wells, the wells were bailed dry with a PVC bailer and allowed to recharge. The samples were then collected with a Teflon bailer. Both bailers were thoroughly cleaned with a mild soap solution and rinsed with distilled water before and after each sample was collected to prevent cross contamination between samples. The samples were immediately placed on ice and shipped to GTEL to be analyzed. The sample date and method of analysis for all groundwater samples collected during the assessment phase of this project are summarized in Table V. Analytical results are included in Appendix J.

TABLE V

Groundwater Sampling Schedule

Well ID	Sample Date	Analytical Method MOD 602	EPA 610
MW-1	5/27/88	X	
MW-2	5/27/88	X	
MW-2	10/12/88	X	
MW-3	5/27/88	X	
MW-4	5/27/88	X	
MW-5	5/27/88	X	
MW-5	10/12/88	X	X
MW-6	5/27/88	X	
MW-8	10/12/88	X	X
MW-9	10/12/88	X	X
MW-10	10/12/88		X

Note: On 10/12/88 phase-separated hydrocarbons were found to be present in MW-7.

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4.2 Results

4.2.1 Site Description and History

The Coca-Cola USA trucking facility is located in an industrial area to the west of the intersection of Pulaski and 36th Street in Chicago, Illinois. The underground storage tanks were located on the east side of the site prior to their removal in March of 1988. The tanks contained motor oil, waste oil, heating oil and diesel fuel.

The land use near the site is mixed commercial and industrial. The property to the east (4201 W. 36th Street) is occupied by the Institute of Gas Technology, which conducts research on coal, peat and other forms of potential energy sources. The property to the west (4359 W. 36th Street) is currently occupied by Jones Truck Lines and is a trucking facility. The property to the north and south are vacant lots.

The Illinois State Fire Marshal's office records show registered underground storage tanks at the two adjacent properties. The Institute of Gas Technology has one-6,000 gallon tank containing gasoline and one-5,300 gallon tank containing #6 fuel oil. Jones Truck Lines has not registered any tanks with the Illinois State Fire Marshal. Two-10,000 gallon tanks, for diesel and gasoline, are registered to a Mr. Ron Ferris and Mr. Don Muir in a joint venture, for the address now occupied by Jones Truck Lines.

The State of Illinois Environmental Protection Agency LUST/Superfund group stated on October 11, 1988 that no petroleum release had been reported from 4201 West 36th Street or 4359 West 36th Street. Visual observation of the adjoining property to the west (4359 West 36th Street, Jones Truck Lines) indicates that an excavation has occurred near their underground storage tanks (Figure 3). Evidence of several soil borings and monitoring wells were observed near the underground storage tanks. In addi-

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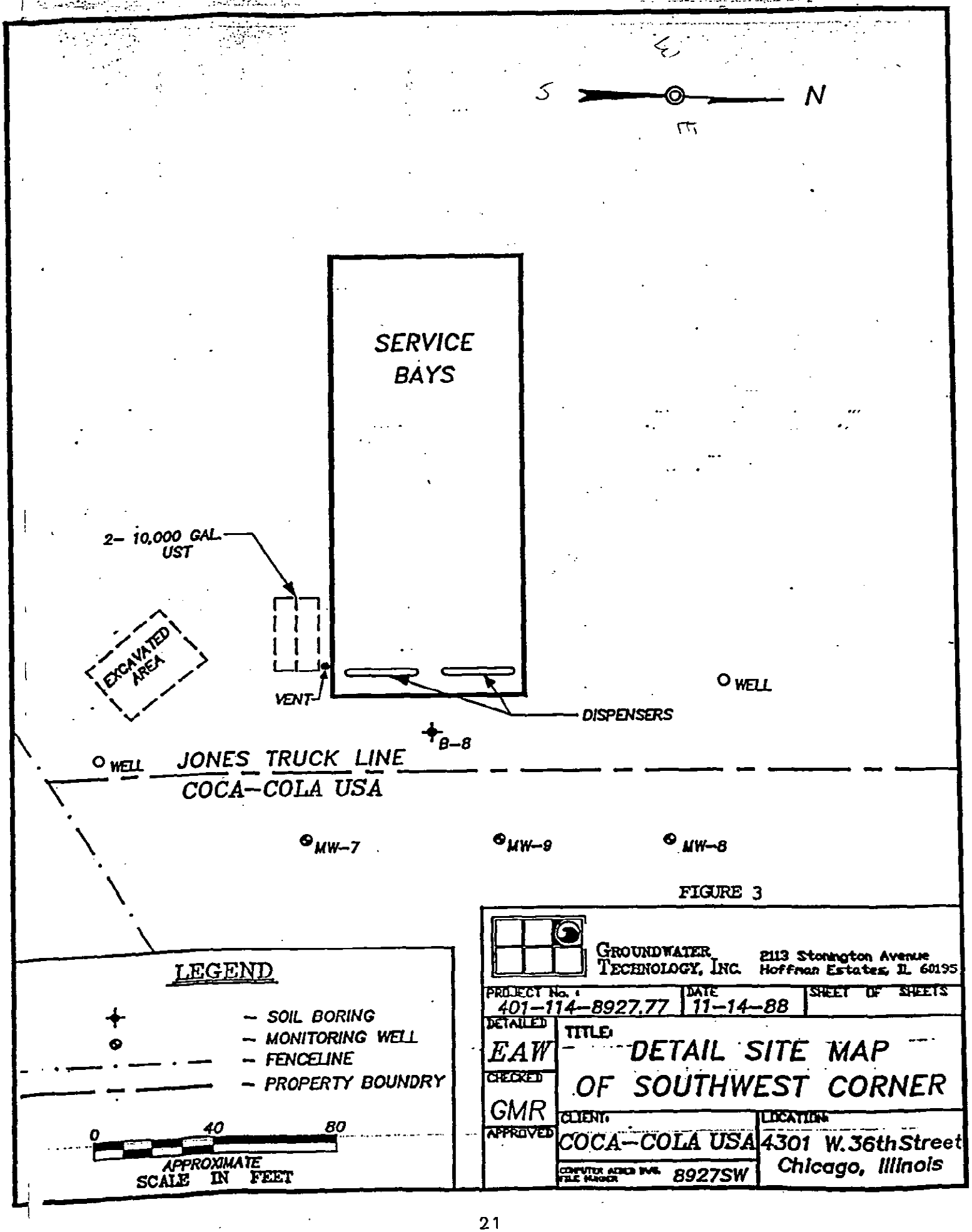

FIGURE 3

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tion, on November 11, 1988, a large tanker truck was observed parked next to the dispensers and visual surface staining of the pavement had occurred under the tanker.

Review of records from the Cook County Recorder of Deeds indicated that Coca-Cola USA purchased the property in 1969 from Elizabeth A. Cleary (Appendix K). The records reviewed did not reveal how long she had owned the property or what activities had taken place previous to Coca-Cola's purchase of the site.

Potential receptors of any off site migration of contaminants include buried water, sewer and utility lines. Municipal water and sewer systems serve the facility. The City of Chicago municipal water supply is from Lake Michigan. The City of Chicago and Illinois State Water Survey have no records of domestic water wells located within a 1/2 mile radius of the site.

4.2.2 Geologic Profile and Local Geology

The surficial deposits at the trucking facility have been previously mapped as the Carmi Member (William and Lineback 1971) of the Equality Formation. Subsurface materials encountered during drilling at the site consisted of a 4-inch cover of asphalt overlying 1 to 3 feet of a brown to black silty clay containing some construction material. This unit overlies 1 to 3 feet of an organic peat with clay. The organic layer overlies a thick (10 feet +), dense, brown to gray silty clay. Well logs are included as Appendix F.

4.2.3 Groundwater

The natural groundwater system under the Coca-Cola facility consists of a shallow water bearing zone. The depth to water beneath the site ranges from 4 to 7 feet below the surface (Appendix G). Groundwater is calculated to flow to the north/northwest.

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Groundwater elevation data collected on November 9, 1988 indicated higher groundwater elevations in the vicinity of the former underground storage tanks. The groundwater mounds observed at the former tank areas are most likely the result of surface water infiltration into these areas. The excavated zones have not been resurfaced and therefore provide areas for enhanced groundwater recharge. In general, groundwater elevations collected on November 9, 1988 indicate groundwater flow to the north/northwest beneath the site. The data also indicates a drop in water level of 1.92 feet between MW-6 and MW-7, over a horizontal distance of 653 feet. This corresponds to a hydraulic gradient between MW-6 and MW-7 of 0.003 feet/foot. Precise groundwater contours for the site cannot be determined unless additional data points are established.

Due to the nature of the subsurface clay material, the rate of groundwater migration is expected to be relatively low. The highest rate of groundwater flow/contaminate migration beneath the site is expected in the upper 5 to 10 foot zone which contains organic clay (peat) and some silt, sand and gravel. This zone would have a higher permeability than the underlying dense clay material.

4.2.4 Organic Vapor Analysis

The HNU analysis of soil samples collected during the drilling programs conducted on May 18, June 29, and October 6, 1988 detected elevated concentrations of volatile organic hydrocarbons in the headspace of selected samples. The highest concentrations of VOC vapors were detected in soil samples collected from the southwest corner of the site (MW-8, MW-9, B-15, B-17, B-18, B-19 and B-20).

The results of the HNU analysis are summarized in Table VI and included in Appendix H.

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TABLE VI

Organic Headspace Vapor Concentration

Boring	Organic Vapor Concentration Range (ppm)
MW-1	ND - 2
MW-2	ND
MW-3 (B-1)	1 - 12
MW-4	ND
MW-5	ND
MW-6	ND
MW-7	ND - 19
MW-8	ND - 20
MW-9	ND - 110
B-2	ND - 24
B-3	ND
B-4	ND
B-5	ND
B-6	ND - 24
B-7	ND - 3
B-8	ND
B-9	ND - 118
B-10	3
B-11	ND
B-12	ND
B-13	ND
B-14	---
B-15	173
B-16	ND
B-17	148
B-18	ND - 60
B-19 (MW-10)	ND - 100
B-20	ND - 40

ND = None Detected

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4.2.5 Soil Analysis

Total petroleum hydrocarbon analytical results for soil samples collected during the assessment phase of this project are summarized in Table VII. Selected soil samples were also analyzed for specific hydrocarbon constituents including benzene, toluene, ethylbenzene, xylenes, napthalene, carcinogenic polynuclear aromatic hydrocarbons and non-carcinogenic polynuclear aromatic hydrocarbons. The results of these analyses are summarized in Table VIII. The complete soil analytical results are included in Appendix I.

TABLE VII

Total Petroleum Hydrocarbons in Soil (ppm)

Boring/Well ID	Sample Date	1.0'-2.5'	3.5'-5.5'	8.5'-10.0'
MW-1	5/18/88	---	1000	ND
MW-2	5/18/88	1700	ND	ND
MW-3 (B-1)	5/18/88	---	---	1300
MW-4	5/19/88	1300	---	ND
MW-5	5/19/88	ND	---	---
MW-6	5/19/88	---	ND	---
B-2	5/18/88	---	9400	ND
B-3	5/18/88	1100	200	---
B-4	5/18/88	---	---	ND
B-5	5/18/88	---	ND	---
B-6	5/18/88	900	150	---
B-7	5/18/88	---	1200	ND
B-8	5/18/88	5600	440	ND
B-9	5/19/88	---	16000	---
B-10	6/29/88	---	630	---
B-11	6/29/88	---	3600	---
B-12	6/29/88	---	1700	---
B-13	6/29/88	---	500	---
B-14	6/29/88	---	ND	---
B-15	6/29/88	---	ND	---
B-16	6/29/88	1200	---	---
B-17	6/29/88	---	P.S.	---
MW-7	10/06/88	410	600	150
MW-8	10/06/88	210	390	ND
MW-9	10/06/88	100	380	ND
MW-10 (B-19)	10/06/88	210	1600	130
B-18	10/06/88	1800	4800	ND
B-20	10/06/88	390	240	ND

Notes: ND = None Detected
--- = Sample Not Analyzed
P.S. = Phase Separated Hydrocarbons observed in split-spoon soil sample.

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The analytical results indicate that elevated concentrations of TPH and PAHs were detected in the soil samples collected from the borings. The data indicate that the majority of contamination is contained within the upper 5 to 8 feet of the subsurface. In general, the highest TPH concentrations were detected in the organic clay material at a depth of 3.5 to 5.5 feet below grade. The highest concentrations of PAHs were detected in the 1 to 2.5-foot sample interval. Concentrations of BTEX were low in the soil samples collected from MW-7 and MW-8. The soil analytical results are an indication that the predominant source of soil contamination is oil, as opposed to gasoline. The Illinois EPA Clean-up Objectives for soil are presented in Table VIII.

Additional soil samples were collected from B-9, B-10, B-13 and B-14 and analyzed for a hydrocarbon fingerprint. The fingerprint analyses were conducted to determine if the native organic material was interfering with the TPH analytical method, thereby resulting in elevated TPH concentrations. The B-9 soil sample was also analyzed for polychlorinated biphenyls (PCBs). The analytical results for these analyses are presented in Appendix I.

The hydrocarbon fingerprint analytical results indicate that the hydrocarbon contamination in B-9, B-10, B-13 and B-14 most closely resembles that of diesel or #2 fuel oil. The analytical results have also determined that PCB contamination is not present in the soil sample collected from B-9.

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TABLE VIII

BTEX and PAHs in Soil (ppm)

ID	Date Sampled	Sample Depth	Benzene	Toluene	Ethylbenzene	Xylene	Napthalene	C-PAHs	NC-PAHs
MW-7	10/16/88	1.0-2.5'	---	---	---	---	ND	108.8	602
MW-7	10/16/88	3.5-5.0'	ND	ND	ND	ND	ND	49.2	221.4
MW-7	10/16/88	8.5-10.0'	ND	ND	ND	ND	ND	.36	1.44
MW-8	10/16/88	1.0-2.5'	1.3	ND	ND	ND	ND	11.14	23.62
MW-8	10/16/88	3.5-5.0'	0.18	0.27	ND	ND	ND	6.57	10.57
MW-8	10/16/88	8.5-10.0'	ND	ND	ND	ND	ND	0.08	0.25
IEPA	XXXXXXXX	XXXXXXXX	.005	2.0	13.6	.440	15.8	ND	0.046

Notes: --- = Not Sampled
ND = None Detected
C-PAHs = Carcinogenic Polynuclear Aromatic Hydrocarbons
NC-PAHs = Non-Carcinogenic Polynuclear Aromatic Hydrocarbons
IEPA = Illinois EPA Clean-up objective for soil

4.2.6 Groundwater Analysis

Groundwater sample analytical results are included as Appendix J and summarized in Table IX.

TABLE IX

Petroleum Hydrocarbon Constituents in Water (ppb)

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylene	Napthalene	C-PAHs	NC-PAHs
MW-1	5/27/88	ND	ND	ND	ND	---	---	---
MW-2	5/27/88	ND	ND	ND	ND	---	---	---
MW-3	5/27/88	2.9	0.9	4.1	5.2	---	---	---
MW-4	5/27/88	ND	ND	ND	19	---	---	---
MW-5	5/27/88	ND	ND	ND	ND	---	---	---
MW-6	5/27/88	ND	1.8	ND	ND	---	---	---
MW-2	10/12/88	ND	1.0	ND	ND	---	---	---
MW-5	10/12/88	ND	ND	ND	ND	ND	0.181	0.093
MW-7	10/12/88	---	---	---	---	---	---	---
MW-8	10/12/88	44	5.4	67	61	ND	0.41	2.36
MW-9	10/12/88	24	1.9	3.3	4.5	ND	0.089	0.017
MW-10	10/12/88	---	---	---	---	40	274	1074
IEPA	XXXXXXXX	5	2,000	680	440	790	.0028	2.3

Notes: C-PAHs = Carcinogenic Polynuclear Aromatic Hydrocarbons
NC-PAHs = Noncarcinogenic Polynuclear Aromatic Hydrocarbons
ND = None Detected
--- = Not Sampled
IEPA = Illinois EPA Clean-up objective for groundwater

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Dissolved petroleum hydrocarbon constituents were detected in groundwater samples collected from MW-3, MW-4, MW-5, MW-6, MW-8, MW-9 and MW-10. The highest concentration of BTEX was detected in the groundwater sample collected from MW-8. Elevated concentrations of BTEX are generally associated with gasoline contamination. The highest concentrations of PAHs were detected in the groundwater sample collected from MW-10. PAHs are generally an indication of a #2 oil or diesel fuel oil source. The Illinois EPA Clean-up Objectives for groundwater are summarized in Table IX.

In addition to the dissolved-phased hydrocarbon constituents detected during the groundwater analytical program, phase-separated hydrocarbons were also detected floating on the groundwater table. MW-7 contained 0.03 feet and a trace (less than 0.01 feet) of phase-separated hydrocarbons on October 12, and November 9, 1988, respectively. These results were confirmed visually using a clean surface sampler.

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5.0 CONCLUSIONS

Based on the results of the tank excavation/disposal and site assessment programs, Groundwater Technology, Inc. submits the following conclusions.

- The calculated direction of groundwater flow beneath the site is to the north/northwest.

- Adsorbed phase petroleum hydrocarbons are contained in the upper 5 to 8 feet of the subsurface. Based on the existing data, the lateral extent of adsorbed phased contamination has not been defined, although the highest levels of petroleum contamination exist around the former underground storage tank areas and in the southwest corner of the site.

- So far as the vicinity of the former underground storage tanks is concerned, soil analytical results suggest that diesel and/or motor oil is the primary contaminate. BTEX groundwater contaminant levels are below the IEPA clean-up objectives in the vicinity of the former underground storage tanks.

- So far as the southwest corner of the site is concerned, phase-separated hydrocarbons and elevated concentrations of dissolved hydrocarbon constituents exist. The source of subsurface contamination in the southwest corner of the site is currently unknown. There is no indication from the existing data that the contamination originated from the former on-site underground storage tank areas since these areas are located downgradient from MW-7. The elevated levels of BTEX in the groundwater at MW-8 are an indication that a secondary contributing volatile organic (gasoline) source may exist.

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APPENDIX A

PERMIT FOR TANK REMOVAL

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER
TECHNOLOGY, INC.

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CITY OF CHICAGO - DEPARTMENT OF INSPECTIONAL SERVICES

PERMIT NO. B. 693691

PERMIT NO	WORK CODE	PLAN NO	PRIMARY ADDRESS	F/R	SECONDARY ADDRESS	CACT
693691	25020		4301- W 36 ST	0	-	3019

DESCRIPTION OF WORK: REMOVE 1-20M 4-10M 1-3M&2-1M TANKS

DATE ISSUED: 3/18/88

					CONTRACTOR LICENSE
OWNER	COCA-COLA	4301 W 36 ST	CHGO	IL	
REFRIG					
GENERAL	R W COLLINS CO	7225 W 66 ST	CHGO	IL	
ARCHITECT					
HEAT/VENT					
MASON					
PLUMBING					

PERMANENT REAL ESTATE INDEX NO

WH	PL FIX	CONST	STORIES	BSMTS	W	L	H	BLDG. VOL	EST COST	D U	OCC. CLASSIFICATION
											J

LOT SIZE	PKG SP	LOAD	APPLIC PHONE	
			767-3030	GARAGE

CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	CD	FEE	TOTAL FEES
												26	20800	208.00

LEGAL DESCRIPTION

PERMISSION is hereby granted the above named person or firm to construct buildings and do other work as indicated in the schedule hereon, at the location shown. All work is to be done in accordance with approved plans and the ordinances of the City of Chicago, and this permit may be revoked at any time for violation of the ordinances in connection with work herein authorized.

APPROVED PLANS AND PERMIT SHALL BE KEPT ON FILE AT THE CONSTRUCTION SITE WHILE THE WORK IS IN PROGRESS (SEC. 45.10) IF WORK DOES NOT START WITHIN SIX MONTHS OF THE DATE OF THIS PERMIT THE PERMIT SHALL BECOME VOID (SEC. 43.9)

EXPLANATION OF FEE CODES

19 ZONING			29 WATER
20 IRON	23 PLUMBING	26 TANKS	30 REFRIGERATION
21 ELECTRICAL	24 ELEVATOR	27 FURNACE	62 WRECKED BLDGS
22 NEW CONST	25 HEAT VENT	28 SMOKE ABATEMENT	82 GARAGES

Any person violating, or resisting, or opposing the enforcement of any of the provisions of the Code pertaining to permits shall be fined not less than $25.00 nor more than $200.00 for each offense. Each day such violation shall continue shall constitute a separate and distinct offense, and any building or contractor who shall construct any building in violation of the provisions of the City Code, and any architect who shall design, draw plans for, or have supervision of such building, or who shall permit it to be constructed, shall be liable for the penalties provided by the section.

Received amount indicated hereon

Dept of Revenue

APPLICANT

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APPENDIX B

TANK DISPOSAL DOCUMENTATION

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER
TECHNOLOGY, INC.

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RW COLLINS Co.
7225 W. 66th. St. CHICAGO ILLINOIS, 60638 767-3030
Excavating and Grading

April 6, 1988

Mr. Gary Robinson
Groundwater Technology, Inc.
2113 Stonington Avenue
Hoffman Estates, IL 60195

Re: Underground tank removal-4301 W. 36th St., Chicago, IL (Coca-Cola)

Dear Gary:

This letter is to certify that the following underground tanks which were removed from the above address on March 23-24, 1988 were hauled into our yard:

1-20,000 gallon tank
4-10,000 gallon tanks
1- 3,000 gallon tank
2- 1,000 gallon tanks

The ends were opened with a hydraulic shear, remains were pumped into our sludge tank (contents of which are removed from time by Beaver Oil & Sludge, Hodgkins, IL), tank was swept clean with Oil-Dri and disposed of at Public Iron & Metal, McCook, IL.

Sincerely,
R. W. Collins Co.

William H. Collins

Signed and sealed this 6th day of April, 1988.

OFFICIAL SEAL
LILLIAN D'ANGELO
NOTARY PUBLIC STATE OF ILLINOIS
MY COMMISSION EXP. JAN.26,1992

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APPENDIX C

LIQUID MANIFEST

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER TECHNOLOGY, INC.

PO BOX 19275

LPC 62 8781

Please print or type (Form designed for use on elite (12-pitch) typewriter) EPA Form 8700-22 (Rev. 9-86) Form Approved OMB No. 2050-0039, Expires 9-30-88

UNIFORM ~~HAZARDOUS~~ WASTE MANIFEST

1. Generator's US EPA ID No.: ILD064418353 — Manifest Document No.:

2. Page 1 of

Information in the shaded areas is not required by Federal law, but is required by Illinois law.

3. Generator's Name and Mailing Address:
BEAVER OIL COMPANY
6037 LENZI AVENUE
HODGKINS, IL 60525

4. Generator's Phone (312) 354-4040

A. Illinois Manifest Document Number: IL 2006765

B. Illinois Generator's ID: 0 3 1 1 2 6 0 0 0 1

5. Transporter 1 Company Name: BEAVER OIL COMPANY

6. US EPA ID Number: ILD064418353

C. Illinois Transporter's ID: 0 0 1 4

D. (312) 354-4040 Transporter's Phone

7. Transporter 2 Company Name:

8. US EPA ID Number:

E. Illinois Transporter's ID:

F. ( ) Transporter's Phone

9. Designated Facility Name and Site Address:
BEAVER OIL COMPANY
6037 LENZI AVENUE
HODGKINS, IL 60525

10. US EPA ID Number: ILD064418353

G. Illinois Facility's ID: 0 3 1 1 2 6 0 0 0 1

H. Facility's Phone: (312) 354-4040

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. ~~WATER & GASOLINE, FLAMMABLE LIQUID, NA1993~~					EPA HW Number: XX ~~D 0 0 1~~ Authorization Number: ~~9 4 1 8 1 2~~
b. WATER & PETROLEUM OILS, NON-HAZARDOUS	001	TT	03500	1	EPA HW Number: XX Authorization Number: 9 2 0 3 3 1
c.					EPA HW Number: XX Authorization Number:
d.					EPA HW Number: XX Authorization Number:

J. Additional Descriptions for Materials Listed Above

~~ITEM A HAS A FLASH POINT UNDER 100°F~~
ITEM B HAS A FLASH POINT OVER 140°F
~~EPA CLASSIFICATION OF ITEM A - HAZARDOUS~~
EPA CLASSIFICATION OF ITEM B - NON-HAZARDOUS

K. Handling Codes for Wastes Listed Above In Item # 14
1 = Gallons 2 = Cubic Yards

15. Special Handling Instructions and Additional Information

JOB FOR: RW COLLINS JOB SITE: 4301 W 36th ST.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: STEVE LIBNER — Signature: Steve Libner — Date (Month Day Year): 03 23 88

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: STEVE LIBNER — Signature: Steve Libner — Date (Month Day Year): 03 23 88

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name: — Signature: — Date (Month Day Year):

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name: JENNY GARDNER — Signature: Jenny Gardner — Date (Month Day Year): 03 23 88

GENERATOR — TRANSPORTER — FACILITY

ILLINOIS 217 / 782-3637 OUTSIDE ILLINOIS 800 / 424-8802 or 202 / 426-2675

DISTRIBUTION: PART - 1 GENERATOR PART - 2 IEPA PART - 3 FACILITY PART - 4 TRANSPORTER PART - 5 IEPA PART - 6 GENERATOR

GENERATOR COPY — PART 1 DO NOT REMOVE PART 1 FROM SET UNTIL COMPLETED

PO BOX 19275

Please print or type (Form designed for use on elite (12-pitch) typewriter.) **EPA Form 8700-22 (Rev. 9-86)** Form Approved OMB No. 2050-0039, Expires 9-30-88

UNIFORM ~~HAZARDOUS~~ WASTE MANIFEST

1. Generator's US EPA ID No.: ILD064418353
Manifest Document No.
2. Page 1 of
Information in the shaded areas is not required by Federal law, but is required by Illinois law

3. Generator's Name and Mailing Address
BEAVER OIL COMPANY
6037 LENZI AVENUE
HODGKINS, IL 60525

4. Generator's Phone (312) 354-4040

A. Illinois Manifest Document Number: IL 2006764
B. Illinois Generator's ID: 0 3 1 1 2 6 0 0 0 1

5. Transporter 1 Company Name: BEAVER OIL COMPANY
6. US EPA ID Number: ILD064418353
C. Illinois Transporter's ID: 0 0 1 4
D. (312) 354-4040 Transporter's Phone

7. Transporter 2 Company Name
8. US EPA ID Number
E. Illinois Transporter's ID
F. ( ) Transporter's Phone

9. Designated Facility Name and Site Address
BEAVER OIL COMPANY
6037 LENZI AVENUE
HODGKINS, IL 60525
10. US EPA ID Number: ILD064418353
G. Illinois Facility's ID: 0 3 1 1 2 6 0 0 0 1
H. Facility's Phone: 312 354-4040

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. ~~WATER & GASOLINE, FLAMMABLE LIQUID, NA1993~~					EPA HW Number: XX ~~D001~~; Authorization Number: ~~9 4 1 8 1 2~~
b. WATER & PETROLEUM OILS, NON-HAZARDOUS	001	TT	05300	1	EPA HW Number: XX; Authorization Number: 9 2 0 3 3 1
c.					EPA HW Number: XX; Authorization Number:
d.					EPA HW Number: XX; Authorization Number:

J. Additional Descriptions for Materials Listed Above
~~ITEM A HAS A FLASH POINT UNDER 100°F~~
ITEM B HAS A FLASH POINT OVER 140°F
~~EPA CLASSIFICATION OF ITEM A - HAZARDOUS~~
EPA CLASSIFICATION OF ITEM B - NON-HAZARDOUS

K. Handling Codes for Wastes Listed Above in Item # 14
1 = Gallons 2 = Cubic Yards

15. Special Handling Instructions and Additional Information
JOB FOR: RW COLLINS JOB SITE: 4301 W 36TH ST.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: STEVE LIBNER
Signature: Steve Libner
Date: Month Day Year 03 23 88

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: STEVE LIBNER
Signature: Steve Libner
Date: Month Day Year 03 23 88

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Date: Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name: JENNY GARDNER
Signature: Jenny Gardner
Date: Month Day Year 03 23 88

ILLINOIS 217 / 782-3637 OUTSIDE ILLINOIS: 800 / 424-8802 or 202 / 426-2675

DISTRIBUTION: PART 1 - GENERATOR PART 2 - EPA PART 3 - FACILITY PART 4 - TRANSPORTER PART 5 - EPA PART 6 - GENERATOR

GENERATOR COPY — PART 1 - DO NOT REMOVE PART 1 FROM SET UNTIL COMPLETED

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Please print or type (12 pitch typewriter) EPA Form 8700-22 (Rev. 9-86) Form Approved OMB No. 2050-0039 Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No: ILD064418353 | Manifest Document No.: | 2. Page 1 of | Information in the shaded areas is not required by Federal law, but is required by Illinois law.

3. Generator's Name and Mailing Address
BEAVER OIL COMPANY
6037 LENZI AVENUE
HODGKINS, IL 60525

4. Generator's Phone (312) (354-4040)

A. Illinois Manifest Document Number: IL 2006755
B. Illinois Generator's ID: 0 3 1 1 2 6 0 0 0 1

5. Transporter 1 Company Name: BEAVER OIL COMPANY
6. US EPA ID Number: ILD064418353
C. Illinois Transporter's ID: 0 0 1 4
D. 312 354-4040 Transporter's Phone

7. Transporter 2 Company Name:
8. US EPA ID Number:
E. Illinois Transporter's ID:
F. ( ) Transporter's Phone

9. Designated Facility Name and Site Address
BEAVER OIL COMPANY
6037 LENZI AVENUE
HODGKINS, IL 60525
10. US EPA ID Number: ILD064418353
G. Illinois Facility's ID: 0 3 1 1 2 6 0 0 0 1
H. Facility's Phone: 312 354-4040

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. ~~[illegible]~~					EPA HW Number: XX [redacted] Authorization Number: [redacted]
b. WATER & PETROLEUM OILS, NON-HAZARDOUS	1	TT	2900	1	EPA HW Number: XX Authorization Number: 920331
c.					EPA HW Number: XX Authorization Number:
d.					EPA HW Number: XX Authorization Number:

J. Additional Descriptions for Materials Listed Above
~~ITEM A HAS A FLASH POINT UNDER 100°F~~
ITEM B HAS A FLASH POINT OVER 140°F
~~EPA CLASSIFICATION OF ITEM A - HAZARDOUS~~
EPA CLASSIFICATION OF ITEM B - NON-HAZARDOUS

K. Handling Codes for Wastes Listed Above In Item # 14
1 = Gallons 2 = Cubic Yards

15. Special Handling Instructions and Additional Information
JOB FOR: R.W. COLLINS
JOB SITE: COCA COLA

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment, OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: DICK DARLING | Signature: Dick Darling | Date: Month Day Year: 032488

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: DICK DARLING | Signature: Dick Darling | Date: Month Day Year: 032488

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: | Signature: | Date: Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name: JENNY GARDNER | Signature: Jenny Gardner | Date: Month Day Year: 032488

GENERATOR / TRANSPORTER / FACILITY

ILLINOIS: 217 / 782-3637 OUTSIDE ILLINOIS: 800 / 424-8802 or 202 / 426-2675

DISTRIBUTION: PART - 1 GENERATOR PART - 2 IEPA PART - 3 FACILITY PART - 4 TRANSPORTER PART - 5 IEPA PART - 6 GENERATOR

GENERATOR COPY — PART 1-DO NOT REMOVE PART 1 FROM SET UNTIL COMPLETED

[illegible]

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APPENDIX D

PHOTOGRAPHS

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER
TECHNOLOGY, INC.

Printed 08/08/2014 1:19PM by Dave.Gambach p. 43/134

PHOTOGRAPHIC DOCUMENTATION OF TANK REMOVAL

COCA–COLA USA

SITE FACING NORTHWEST

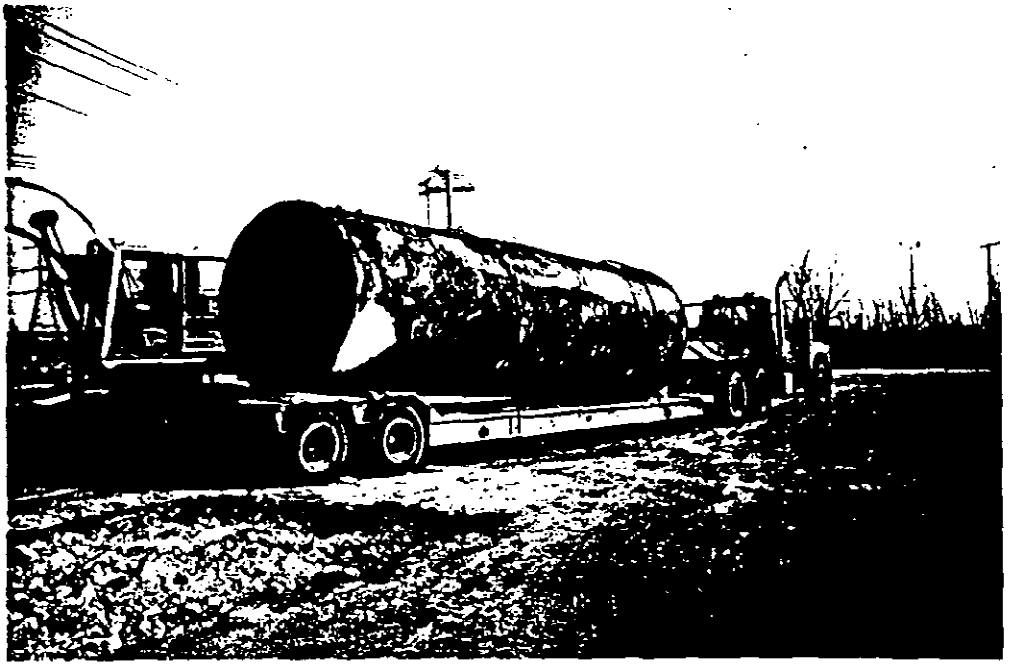
TANK NO. 6
20,000 GAL.

printed 08/08/2014 1:19PM by Dave.Gambach p. 44/134

PHOTOGRAPHIC DOCUMENTATION OF TANK REMOVAL

COCA–COLA USA

TANK NO. 6
20,000 GAL.

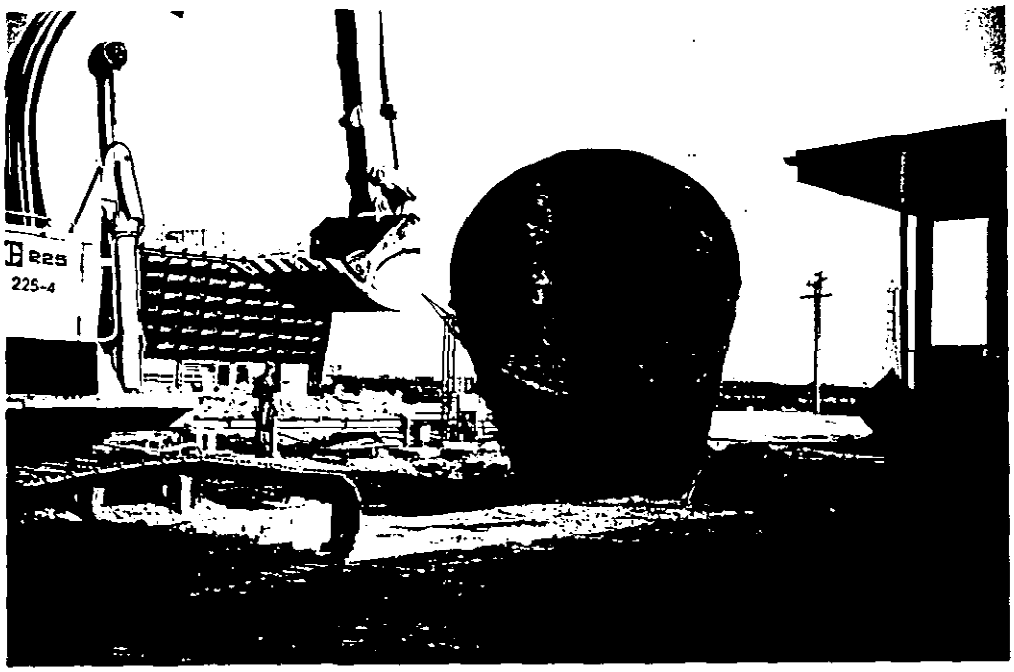


TANK NO. 5
10,000 GAL.

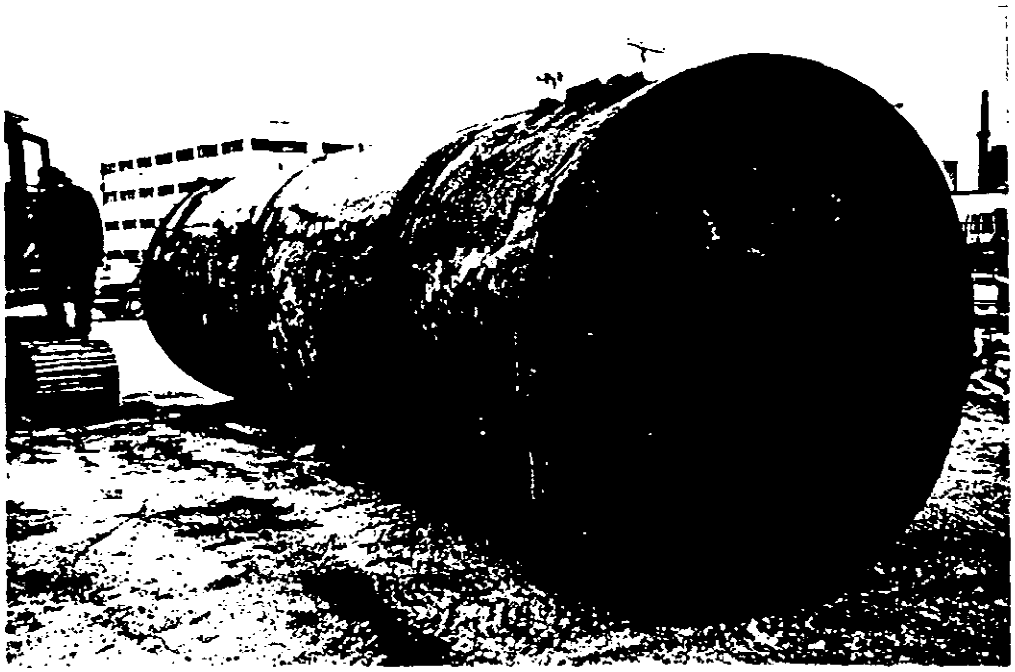
Printed 08/08/2014 1:19PM by Dave.Gambach p. 45/134

PHOTOGRAPHIC DOCUMENTATION OF TANK REMOVAL

COCA–COLA USA



TANK NO. 6
20,000 GAL.

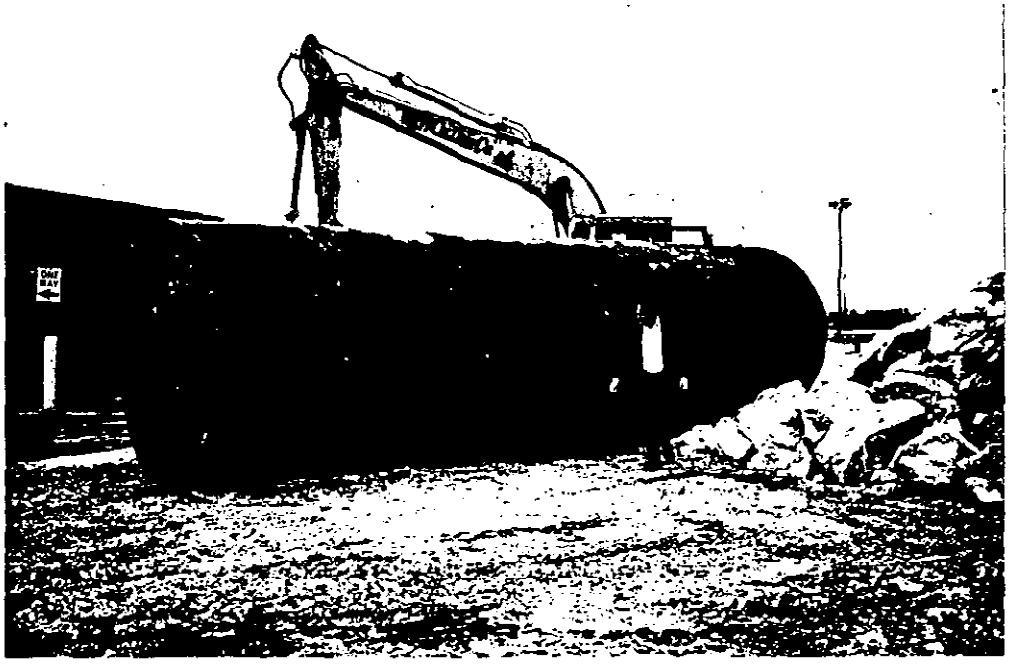


TANK NO. 7
10,000 GAL.

printed 08/08/2014 1:19PM by Dave.Gambach p. 46/134

PHOTOGRAPHIC DOCUMENTATION OF TANK REMOVAL

COCA–COLA USA



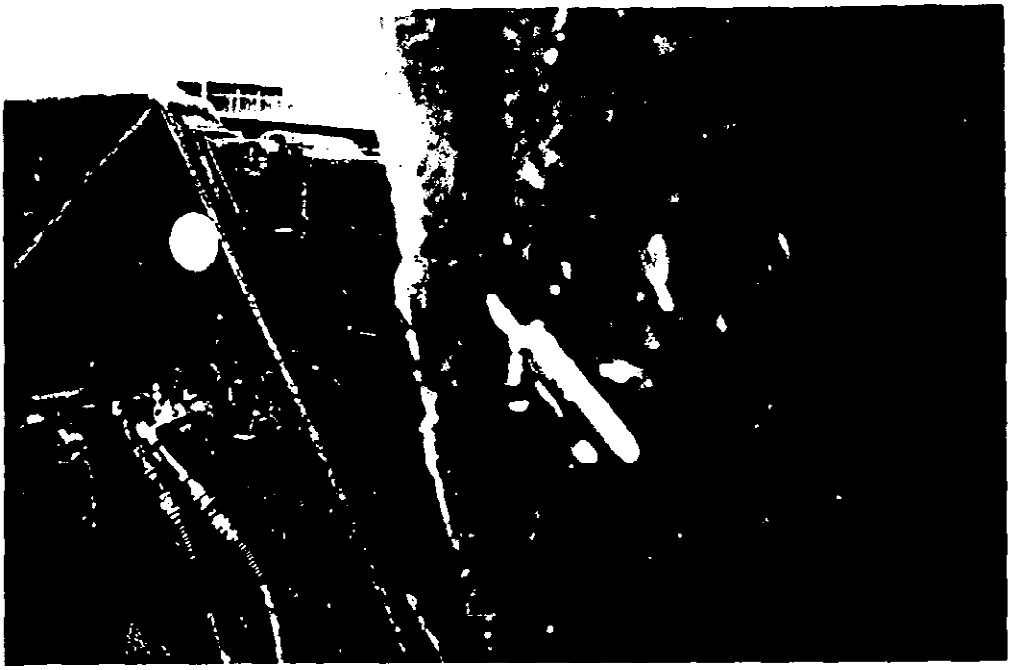
TANK NO. 7
10,000 GAL.

TANK NO. 3

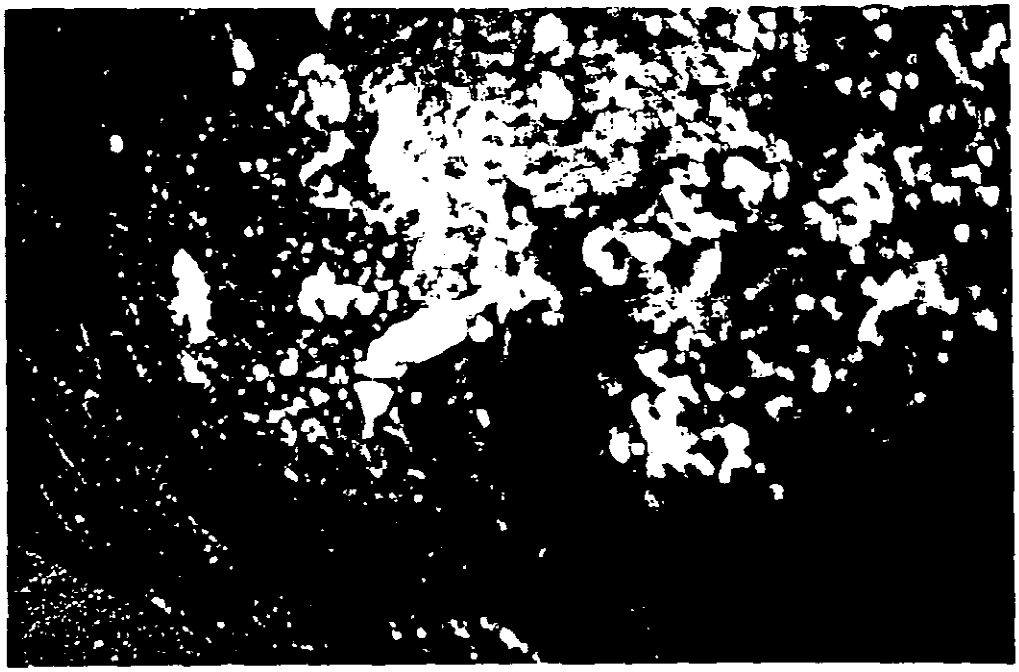
printed 08/08/2014 1:19PM by Dave.Gambach p. 47/134

PHOTOGRAPHIC DOCUMENTATION OF TANK REMOVAL

COCA-COLA USA



TANK NO. 3



TANK NO. 5
10,000 GAL.

printed 08/08/2014 1:19PM by Dave.Gambach p. 48/134

APPENDIX E

SOIL LABORATORY ANALYSIS RESULTS

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER TECHNOLOGY, INC.

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GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

11/29/88 mh

PROJECT MGR: Steve Nalefski
Groundwater Technology, Inc.
2113 Stonington Ave.
Hoffman Estates, Il 60195
PROJECT #:401-144-8927.77-1
LOCATION: Chicago, IL

SAMPLED: 03/24/88 BY: St. Nalefski
RECEIVED: 03/26/88 BY: R. Williams
ANALYZED: 03/21/88 BY: P. Sra
MATRIX: Soil
UNITS: mg/kg (ppm)

TEST RESULTS

COMPOUNDS	LAB # / I.D.#	19341A / IT4 SOUTH	19342A / IT7 SOUTH	19343A / IT3 NORTH	19344A / IT3 SOUTH
Benzene		ND	ND	ND	ND
Toluene		ND	ND	ND	ND
Ethylbenzene		ND	ND	ND	ND
Xylenes		ND	ND	ND	ND
Total BTEX		ND	ND	ND	ND
Misc. Hydrocarbons (C4-C12)		7	3	5	ND
Total Petroleum Hydrocarbons as Gasoline		7	3	5	ND

ND = Not detected.
Results rounded to two significant figures.
METHOD: Modified EPA Method 5030/8020/8015
This report replaces one of the same number dated 03/31/88.

Emma P. Popek

EMMA P. POPEK, Director

printed 08/08/2014 1:10PM by Dave Cambach p. 50/134

GTEL ENVIRONMENTAL LABORATORIES, INC.

11/29/88 mh

Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

PROJECT MGR: Steve Nalefski
Groundwater Technology, Inc.
2113 Stonington Ave.
Hoffman Estates, IL 60195
PROJECT #:401-144-8927.77-2
LOCATION: Chicago, IL

SAMPLED: 03/24/88 BY: S. Nalefski
RECEIVED: 03/26/88 BY: R. Williams
ANALYZED: 03/31/88 BY: R. Lapurga
MATRIX: Soil T. Alusi
UNITS: mg/kg R. Bly

TEST RESULTS

PARAMETER	LAB # / I.D.#	19341B / T4 SOUTH	19342B / T7 SOUTH	19343B / T3 NORTH	19344B / T3 SOUTH
Total Petroleum Hydrocarbons		ND	ND	ND	ND

ND = Not Detected.
METHOD: TPH = EPA 418.1
This report replaces one of the same number dated 04/01/88.

Emma P. Popek

EMMA P. POPEK, Director

printed 08/08/2014 1:19PM by Dave.Gambach p. 51/134

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

11/29/88 mh
PROJECT MGR: Steve Nalefski
Groundwater Technology, Inc.
2113 Stonington Ave.
Hoffman Estates, IL 60195
PROJECT #: 401-144-8927.77-3
LOCATION: Chicago, IL

SAMPLED: 3/23-24/88 BY: S. Nalefski
RECEIVED: 03/26/88 BY: R. Williams
ANALYZED: 03/28/88 BY: P. Sra
MATRIX: Soil
UNITS: mg/kg (ppm)

TEST RESULTS

COMPOUNDS	LAB # / I.D.#	19345A / T5 SOUTH	19346A / T6 NORTH	19347A / T7 NORTH		
Benzene		ND	ND	ND		
Toluene		ND	ND	ND		
Ethylbenzene		ND	ND	ND		
Xylenes		ND	ND	ND		
Total BTEX		ND	ND	ND		
Misc. Hydrocarbons (C4-C12)		1	1	ND		
Total Petroleum Hydrocarbons as Gasoline		1	1	ND		

ND = Not detected.
Results rounded to two significant figures.
This report replaces one of the same number 03/30/88.
METHOD: Modified EPA Method 5030/8020/8015

Emma P. Popek

EMMA P. POPEK, Director

printed 08/08/2014 1:19PM by Dave.Gambach p. 52/134

GTEL ENVIRONMENTAL LABORATORIES, INC.

11/29/88 mh

Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

PROJECT MGR: Steve Nalefski
Groundwater Technology, Inc.
2113 Stonington Ave.
Hoffman Estates, IL 60195
PROJECT #:401-144-8927.77-4
LOCATION: Chicago, IL

SAMPLED: 3/23-24/88 BY: S. Nalefski
RECEIVED: 03/26/88 BY: R. Williams
ANALYZED: 03/31/88 BY: R. Lapurga
MATRIX: Soil T. Alusi
UNITS: mg/kg R. Bly

TEST RESULTS

PARAMETER	LAB # / I.D.#	19345B / T5 SOUTH	19346B / T6 NORTH	19347B / T7 NORTH
Total Petroleum Hydrocarbons		7	ND	ND

ND = Not detected.
METHOD: TPH = EPA 418.1
This report replaces one of the same number dated 04/01/88.

Emma P. Popek

EMMA P. POPEK, Director

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GTEL ENVIRONMENTAL LABORATORIES, INC.

Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

11/29/88 mh

PROJECT MGR: Steve Nalefski
Groundwater Technology, Inc.
2113 Stonington Ave.
Hoffman Estates, IL 60195
PROJECT #: 401-144-8927.77-5
LOCATION: Chicago, IL

SAMPLED: 3/23-24/88 BY: S. Nalefski
RECEIVED: 03/26/88 BY: J. Floro
ANALYZED: 03/28/88 BY: P. Sra
MATRIX: Soil
UNITS: mg/kg (ppm)

TEST RESULTS

LAB # / I.D.#	19350A T4 NORTH	19351A T5 NORTH	19352A T6 SOUTH	19353A T1A
COMPOUNDS				
Benzene	ND	ND	ND	ND
Toluene	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND
Total BTEX	ND	ND	ND	ND
Misc. Hydrocarbons (C4-C12)	3	21	110	62
Total Petroleum Hydrocarbons as Gasoline	3	21	110	62

ND = Not detected.
Results rounded to two significant figures.
METHOD: Modified EPA Method 5030/8020/8015
This report replaces one of the same number dated 03/31/88.

Emma P. Popek

EMMA P. POPEK, Director

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GTEL ENVIRONMENTAL LABORATORIES, INC.

Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

11/29/88 mh

PROJECT MGR: Steve Nalefski
Groundwater Technology, Inc.
555 Tollgate Road #C
Elgin, IL 60123
PROJECT #: 401-144-8927.77-9
LOCATION: Chicago, IL

SAMPLED: 03/24,25/88 BY: S. Nalefski
RECEIVED: 03/28/88 BY: J. Floro
ANALYZED: 03/30/88 BY: P. Sra
MATRIX: Soil
UNITS: mg/kg (ppm)

TEST RESULTS

COMPOUNDS	LAB # / I.D.#	19370A / T2	19371A / T1B	19372A / STCKPILEN	19373A / STCKPILEA	19374A / STCKPILES
Benzene		ND	ND	ND	ND	ND
Toluene		ND	ND	ND	ND	ND
Ethylbenzene		ND	ND	ND	ND	ND
Xylenes		ND	ND	ND	ND	1
Total BTEX		ND	ND	ND	ND	1
Misc. Hydrocarbons (C4-C12)		ND	ND	110	180	210
Total Petroleum Hydrocarbons as Gasoline		ND	ND	110	180	210

ND = Not detected.
Results rounded to two significant figures.
METHOD: Modified EPA Method 5030/8020/8015
This report replaces one of the same number dated 04/01/88.

Emma P. Popek

EMMA P. POPEK, Director

printed 08/09/2014 1:19PM by Dave Gambach p. 55/134

APPENDIX F

WELL LOGS

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER
TECHNOLOGY, INC.

printed 08/08/2014 1:19PM by Dave.Cambach p. 56/124

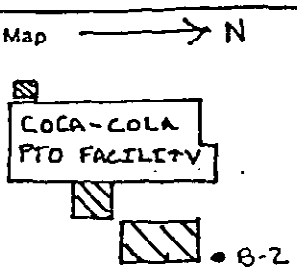
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-2

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/18/88
Total Depth of Hole: 10'
Diameter: 4"
Surface Elevation: ---
Water Level, Initial: 7'
24-hrs.: ---
Screen: Dia.: ---
Length: ---
Slot Size: ---
Casing: Dia.: ---
Length: ---
Type: ---
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary & Rick
Log by: J. Supergan

Sketch Map



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2			SS-1		Brown, dry, very dense, organic, coarse to fine SAND, little backfill material.
3					
4					
5			SS-2		Black staining, moist, medium dense, coarse to fine SAND, trace fine gravel, strong hydrocarbon odor.
6					
7		▼			Gray, saturated, very stiff, CLAY, little shale fragments, little coarse to fine sand.
8					
9			SS-3		
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

printed 08/08/2014 1:19PM by Dave Gambach p. 57/134

GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-3

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8927
Date Drilled: 5/18/88
Total Depth of Hole: 10'
Diameter: 4"
Surface Elevation: --
Water Level, Initial: 7'
24-hrs.: --
Screen: Dia.: --
Length: --
Slot Size: --
Casing: Dia.: --
Length: --
Type: --
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary & Rick
Log by: J. Supergan

Sketch Map → N

Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2			SS-1		Black organic, dry, medium dense, silty SAND, little clay, little coal pieces, trace fine gravel.
3					
4					
5			SS-2		Black, organic, damp, very stiff, silty CLAY, little coal pieces, trace coarse to fine gravel.
6					
7		▼			
8					
9			SS-3		Brown, wet, very stiff, silty CLAY, little coarse to fine sand, trace fine gravel.
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

printed 08/08/2014 1:19PM by Dave.Gambach p. 58/134

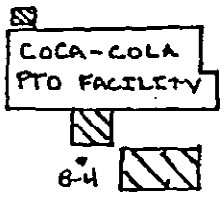
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-4

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/18/88
Total Depth of Hole: 10'
Diameter: 4"
Surface Elevation: --
Water Level, Initial: 8'
24-hrs.: --
Screen: Dia.: --
Length: --
Slot Size: --
Casing: Dia.: --
Length: --
Type: --
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary & Rick
Log by: J. Supergan

Sketch Map



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1, 2			SS-1		4" Asphalt Brown, dry, medium dense, coarse to fine SAND, little coarse to fine gravel, little fill material.
3, 4, 5			SS-2		Black, damp, stiff, organic silty CLAY, little coal pieces, trace coarse to fine gravel.
6, 7, 8, 9		▼	SS-3		Brown and gray mottled, wet, stiff, CLAY, high in organic fibers, little coarse to fine sand.
10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26					

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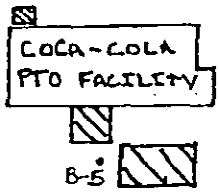
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-5

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/18/88
Total Depth of Hole: 10'
Diameter: 4"
Surface Elevation: --
Water Level, Initial: 8'
24-hrs.: --
Screen: Dia.: --
Length: --
Slot Size: --
Casing: Dia.: --
Length: --
Type: --
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary and Rick
Log by: J. Supergan

Sketch Map → N



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2			SS-1		Black, dry, medium dense, coarse to fine SAND, little clay, little coal pieces.
3					
4					
5			SS-2		Black stained, moist, medium stiff, sandy CLAY, little organics.
6					
7					
8		▼			
9			SS-3		Gray, moist, very stiff, sandy, CLAY, little coarse to fine sand.
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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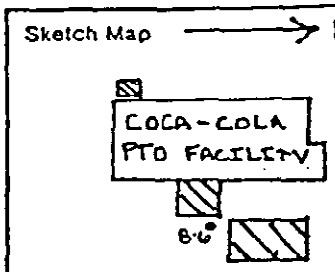
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-6

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/18/88
Total Depth of Hole: 10'
Diameter: 4"
Surface Elevation: --
Water Level, Initial: 8'
24-hrs.: --
Screen: Dia.: --
Length: --
Slot Size: --
Casing: Dia.: --
Length: --
Type: --
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary and Rick
Log by: J. Supergan

Sketch Map



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2			SS-1		Black, dry, very stiff, sandy CLAY, little fill material, little coarse to fine sand, little organic material.
3					
4					Black, moist, stiff, sandy CLAY, little coarse to fine sand.
5			SS-2		
6					Black, moist, stiff, organic CLAY, little coarse to fine sand.
7					
8		▼			
9					
10			SS-3		Gray, saturated, hard, sandy CLAY, little coarse to fine sand.
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-7

Project Coca-Cola USA Owner

Location Chicago, IL Project Number 401-114-8928

Date Drilled 5/18/88 Total Depth of Hole 10' Diameter 4"

Surface Elevation -- Water Level, Initial 7' 24-hrs. --

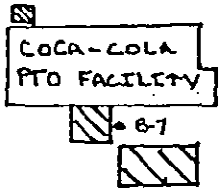
Screen: Dia. -- Length -- Slot Size --

Casing: Dia. -- Length -- Type --

Drilling Company Fox Drilling Drilling Method SSA

Driller Gary & Rick Log by J. Supergan

Sketch Map → N



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
					4" Asphalt
1–2			SS-1		Black, dry, very stiff, sandy CLAY, little backfill material - coal pieces and glass, little coarse to fine gravel.
3–4					
5			SS-2		Black, moist, stiff, sandy CLAY, little organic material, trace fine gravel.
6–8		▼			
9			SS-3		Gray and brown mottled, saturated, very stiff, CLAY, little coarse to fine sand.
10–26					

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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-8

Project Coca-Cola USA Owner

Location Chicago, IL Project Number 401-114-8928

Date Drilled 5/18/88 Total Depth of Hole 10' Diameter 4"

Surface Elevation -- Water Level, Initial 8' 24-hrs. --

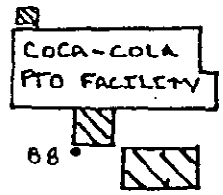
Screen: Dia. -- Length -- Slot Size --

Casing: Dia. -- Length -- Type --

Drilling Company Fox Drilling Drilling Method SSA

Driller Gary & Rick Log by J. Supergan

Sketch Map → N



Notes
EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2			SS-1		Black, dry, very stiff, sandy CLAY, some backfill material - brick pieces, coal pieces, glass, little coarse to fine gravel.
3					
4					
5			SS-2		Black and brown mottled, moist, stiff, sandy CLAY, little coarse to fine gravel, little organics.
6					
7					
8		▼			
9			SS-3		Gray and brown mottled, saturated, stiff, CLAY, little coarse to fine sand.
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
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23					
24					
25					
26					

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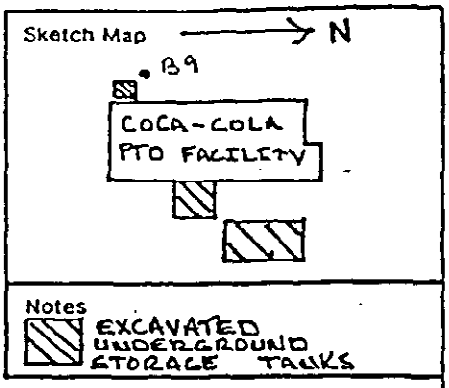
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-9

Project Coca-Cola USA
Owner
Location Chicago, IL
Project Number 401-114-8928
Date Drilled 5/19/88
Total Depth of Hole 10'
Diameter 4"
Surface Elevation --
Water Level, Initial 7'
24-hrs. --
Screen: Dia. --
Length --
Slot Size --
Casing: Dia. --
Length --
Type --
Drilling Company Fox Drilling
Drilling Method SSA
Driller Gary & Rick
Log by J. Supergan

Sketch Map



Notes
EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
					4" Asphalt
1			SS-1		Black stained, dry, very stiff, CLAY, some coarse to fine sand, little fine gravel, little organics, little backfill material.
2					
3					
4					
5			SS-2		Black, damp, very stiff, organic COAL, little coarse to fine sand, strong hydrocarbon odor.
6					
7		▼			
8					
9					
10			SS-3		Gray and brown mottled, wet, stiff, CLAY, little coarse to fine sand.
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
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25					
26					

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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-10

Project Coca-Cola USA Owner

Location Chicago, IL Project Number 401-144-8928

Date Drilled 6/29/88 Total Depth of Hole 3.5 Diameter 4.0"

Surface Elevation --- Water Level, Initial --- 24-hrs. ---

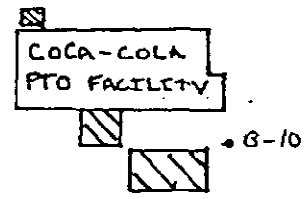
Screen: Dia. --- Length --- Slot Size ---

Casing: Dia. --- Length --- Type ---

Drilling Company Fox Drilling Drilling Method SS/SB

Driller Rob Log by S.L. Nalefski

Sketch Map → N



Notes
EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
					3" Asphalt
1					Brown, dry, coarse to fine SAND and GRAVEL, fill material
2					
3					
4					Black to gray mottled, damp, CLAY, organic plant material
5					
6					End of Boring 3.5'
7					
8					
9					
10					
11					
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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-11

Project Coca-Cola USA Owner ---

Location Chicago, IL Project Number 401-144-8928

Date Drilled 6/29/88 Total Depth of Hole 3.5 Diameter 4.0"

Surface Elevation --- Water Level, Initial --- 24-hrs. ---

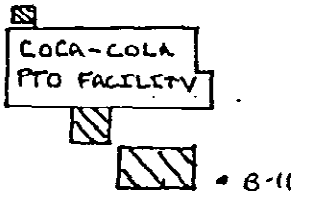
Screen: Dia. --- Length --- Slot Size ---

Casing: Dia. --- Length --- Type ---

Drilling Company Fox Drilling Drilling Method SS/SB

Driller Rob Log by S.L. Nalefski

Sketch Map → N



Notes
EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2					Brown, dry, coarse to fine SAND and GRAVEL, fill material
3					
4					Black to gray mottled, damp, CLAY, organic plant material
5					
6					End of Boring 3.5'
7					
8					
9					
10					
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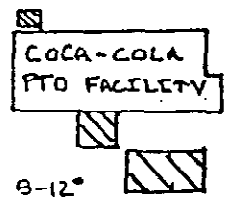
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-12

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-144-8928
Date Drilled: 6/29/88
Total Depth of Hole: 3.5
Diameter: 4.0"
Surface Elevation: ---
Water Level, Initial: ---
24-hrs.: ---
Screen: Dia.: ---
Length: ---
Slot Size: ---
Casing: Dia.: ---
Length: ---
Type: ---
Drilling Company: Fox Drilling
Drilling Method: SS/SB
Driller: Rob
Log by: S.L. Nalefski

Sketch Map → N



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2					Brown, dry, coarse to fine SAND and GRAVEL, fill material
3					
4					Black to gray mottled, damp, CLAY, organic plant material
5					
6					End of Boring 3.5'
7					
8					
9					
10					
11					
12					
13					
14					
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25					
26					

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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-13

Project Coca-Cola USA Owner

Location Chicago, IL Project Number

Date Drilled 6/29/88 Total Depth of Hole 3.5 Diameter 4.0"

Surface Elevation --- Water Level, Initial --- 24-hrs. ---

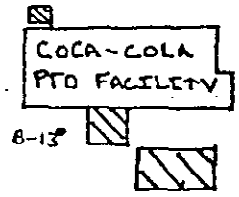
Screen: Dia. --- Length --- Slot Size ---

Casing: Dia. --- Length --- Type ---

Drilling Company Fox Drilling Drilling Method SS/SB

Driller Rob Log by S.L. Nalefski

Sketch Map → N



Notes
EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2					Brown, dry, coarse to fine SAND and GRAVEL, fill material
3					Black to gray mottled, damp, CLAY, organic plant material
4					
5					End of Boring 3.5'
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
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22					
23					
24					
25					
26					

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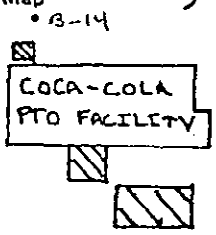
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-14

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-144-8928
Date Drilled: 6/29/88
Total Depth of Hole: 3.5
Diameter: 4.0"
Surface Elevation: ---
Water Level, Initial: ---
24-hrs.:
Screen: Dia.: ---
Length: ---
Slot Size: ---
Casing: Dia.: ---
Length: ---
Type: ---
Drilling Company: Fox Drilling
Drilling Method: SS/SB
Driller: Rob
Log by: S.L. Nalefski

Sketch Map → N



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2					Brown, dry, coarse to fine SAND and GRAVEL fill material
3					
4					Black to gray mottled, damp, CLAY, organic plant material
5					
6					End of Boring 3.5'
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-15

Project Coca-Cola USA Owner

Location Chicago, IL Project Number 401-144-8928

Date Drilled 6/29/88 Total Depth of Hole 3.5 Diameter 4.0"

Surface Elevation --- Water Level, Initial --- 24-hrs. ---

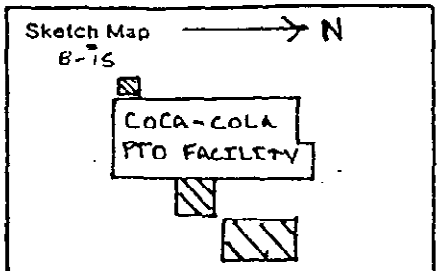
Screen: Dia. --- Length --- Slot Size ---

Casing: Dia. --- Length --- Type ---

Drilling Company Fox Drilling Drilling Method SS/SB

Driller Rob Log by S.L. Nalefski

Sketch Map → N



Notes
EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2					Brown, dry, coarse to fine SAND and GRAVEL, fill material
3					
4					Black to gray mottled, damp, CLAY, organic plant material, strong petroleum odor.
5					
6					End of Boring 3.5'
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-16

Project Coca-Cola USA Owner

Location Chicago, IL Project Number 401-144-8928

Date Drilled 6/29/88 Total Depth of Hole 1.0 Diameter 4.0"

Surface Elevation --- Water Level, Initial --- 24-hrs. ---

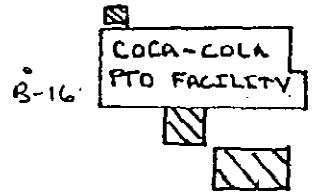
Screen: Dia. --- Length --- Slot Size ---

Casing: Dia. --- Length --- Type ---

Drilling Company Fox Drilling Drilling Method SS/SB

Driller Rob Log by S.L. Nalefski

Sketch Map → N



Notes
EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2					Brown, dry, coarse to fine SAND and GRAVEL, fill material
3					End of Boring 1.0'
4					
5					
6					
7					
8					
9					
10					
11					
12					
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25					
26					

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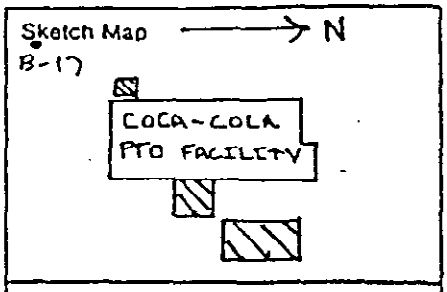
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-17

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-144-8928
Date Drilled: 6/29/88
Total Depth of Hole: 4.5
Diameter: 4.0"
Surface Elevation: ---
Water Level, Initial: ---
24-hrs.: ---
Screen: Dia.: ---
Length: ---
Slot Size: ---
Casing: Dia.: ---
Length: ---
Type: ---
Drilling Company: Fox Drilling
Drilling Method: SS/SB
Driller: Rob
Log by: S.L. Nalefski

Sketch Map → N



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1					4" Asphalt
2					Brown, dry, coarse to fine SAND and GRAVEL, fill material
3					
4					Black to gray mottled, damp, CLAY, organic material, heavy sheen of petroleum on sample
5					
6					End of Boring 4.5'
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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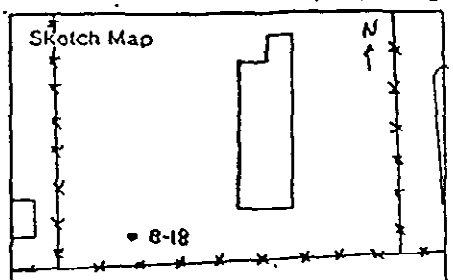
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-18

Project: Coca-Cola — Owner: Coca-Cola USA
Location: Chicago, IL — Project Number: 401-144-8928
Date Drilled: 10/6/88 — Total Depth of Hole: 8.5 — Diameter: 4.0"
Surface Elevation: — — Water Level, Initial: — — 24-hrs.: —
Screen: Dia.: — — Length: — — Slot Size: —
Casing: Dia.: — — Length: — — Type: —
Drilling Company: Fox Drilling — Drilling Method: SSA/SB
Driller: H. Boyde — Log by: S. Nalefski

Sketch Map



Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
					Asphalt 6.0"
1, 2, 3			B-18-1		Black to gray, dry, very stiff, CLAY, some silt, fill material
4			B-18-2		
5					Black, wet, organic CLAY, strong petroleum odor
6, 7, 8			B-18-3		Brown to gray mottled, moist, stiff CLAY
9, 10			B-18-4		End of Boring 8.5'
11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26					

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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-19 (MW-10)

Project Coca-Cola Owner Coca-Cola USA

Location Chicago, IL Project Number 401-144-8928

Date Drilled 10/6/88 Total Depth of Hole 11.0' Diameter 4.0"

Surface Elevation --- Water Level, Initial --- 24-hrs. ---

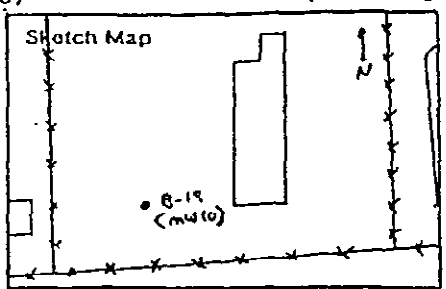
Screen: Dia. 2.0" Length 5.0' Slot Size .010

Casing: Dia. 2.0" Length 3.0' Type Sch 40 PVC

Drilling Company Fox Drilling Drilling Method HSA/SB

Driller H. Boyde Log by S. Nalefski

Sketch Map



Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1		Concrete			Asphalt 6.0"
2		Well box, natural fill	B-19-1		Brown to black, dry, hard, CLAY, some silt
3		Bentonite Seal			
4		Riser	B-19-2		
5					Black, wet, organic CLAY, 3" sand lens
6		Screen	B-19-3		Brown to gray mottled, moist, stiff, CLAY, some silt, trace fine gravel
7		Sand pack			
8					
9			B-19-4		
10					Gray, dry, hard, CLAY, trace medium to fine sand (gray shale)
11			B-19-5		
12					End of Boring 11.0'
13					
14					Note: Well was installed on 10/12/88 with a hand auger.
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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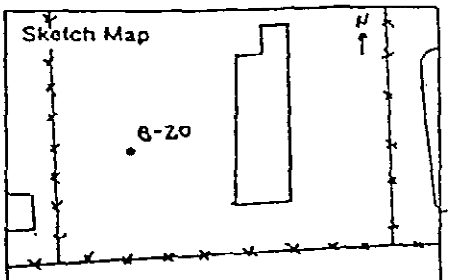
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number B-20

Project Coca-Cola
Owner Coca-Cola USA
Location Chicago, IL
Project Number 401-144-8928
Date Drilled 10/6/88
Total Depth of Hole 11.0'
Diameter 4.0"
Surface Elevation ---
Water Level, Initial 6.0'
24-hrs. ---
Screen: Dia. ---
Length ---
Slot Size ---
Casing: Dia. ---
Length ---
Type ---
Drilling Company Fox Drilling
Drilling Method HSA/SB
Driller H. Boyde
Log by S. Nalefski

Sketch Map



Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
					Asphalt 5.0"
1					Brown to black, dry, hard, CLAY, some silt
2			B-20-1		
3					
4			B-20-2		Black, wet, organic CLAY, strong petroleum odor
5					
6					Tan to gray mottled, wet, medium stiff, CLAY, coarse to fine sand 2.0" lens
7			B-20-3		
8					
9			B-20-4		Gray, dry, hard, CLAY, trace medium to fine sand (gray shale)
10					
11			B-20-5		End of Boring 11.0'
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number MW-1

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/18/88
Total Depth of Hole: 15'
Diameter: 4"
Surface Elevation: ---
Water Level Initial: 14.23'
24-hrs.: 5.01'
Screen: Dia. 2"
Length: 15'
Slot Size: 0.010"
Casing: Dia. ---
Length: ---
Type: ---
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary & Rick
Log by: J. Supergan

Sketch Map

Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1		Well box			4" Asphalt
2		Concrete	SS-1		Brown, dry, medium dense, coarse to fine SAND, trace coarse to fine gravel, little fill material.
3		Screen			
4			SS-2		Black staining, damp, stiff, silty CLAY, some coarse to fine sand, trace fine gravel.
5		Sand pack			
6					
7		▼			
8					
9			SS-3		Gray, wet, medium stiff, CLAY, little coarse to fine sand.
10					
11					
12					
13					
14			SS-4		Gray, saturated, very stiff, silty CLAY, little shale fragments, little coarse to fine sand.
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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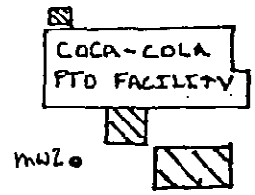
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number MW-2

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/18/88
Total Depth of Hole: 15'
Diameter: 4"
Surface Elevation: --
Water Level, Initial: 7'
24-hrs.: 4.31'
Screen: Dia. 2"
Length: 15'
Slot Size: 0.010"
Casing: Dia. --
Length: --
Type: --
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary & Rick
Log by: J. Supergan

Sketch Map → N



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1		Well box			4" ASPHALT
2		Concrete	SS-1		Black, dry, very stiff, sandy, CLAY, some backfill material - brick pieces, gravel, organics, and glass, little coarse to fine sand.
3		Screen			
4		Sand Pack			Black, moist, very stiff, sandy, organic CLAY, little coal pieces.
5			SS-2		
6					Gray and brown mottled, saturated, stiff, CLAY, little coarse to fine sand, trace fine gravel
7					
8					
9			SS-3		
10					
11					Gray, saturated, hard, CLAY, trace coarse to fine sand.
12					
13					
14			SS-4		
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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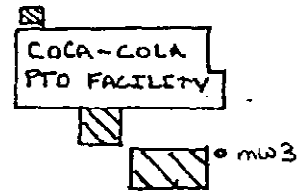
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number MW-3

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/18/88
Total Depth of Hole: 15'
Diameter: 4"
Surface Elevation: ---
Water Level, Initial: 6.5'
24-hrs.: 4.99'
Screen: Dia.: 2"
Length: 15'
Slot Size: 0.010"
Casing: Dia.: ---
Length: ---
Type: ---
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary & Rick
Log by: J. Supergan

Sketch Map → N



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
		Well box			4" Asphalt
1–2		Concrete	SS-1		Black, dry, very stiff, organic, clayey SILT, little backfill material consisting of gravel, wood fibers and brick pieces.
3		Screen			
4–5		Sand pack	SS-2		Black stained, damp, loose, coarse to fine SAND, little silt, strong hydrocarbon odor.
6–8		▼			
9			SS-3		Brown and gray mottled, saturated hard CLAY, little shale fragments, little coarse to fine sand.
10–15					
16–26					

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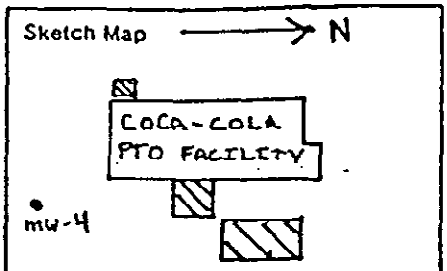
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number MW-4

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/19/88
Total Depth of Hole: 15'
Diameter: 4"
Surface Elevation: --
Water Level, Initial: 7'
24-hrs.: 3.98'
Screen: Dia. 2"
Length: 15'
Slot Size: 0.010"
Casing: Dia. --
Length: --
Type: --
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary & Rick
Log by: J. Supergan

Sketch Map



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1		Well box			4" Asphalt
2		Concrete	SS-1		Black staining, dry, very dense, coarse to fine SAND and GRAVEL, little backfill material.
3					Concrete
4		Screen			
5		Sand pack	SS-2		Black, moist, very stiff, organic coal seam.
6					
7					Gray and brown mottled, saturated, very stiff, CLAY, little coarse to fine sand.
8					
9					
10			SS-3		
11					Large fill stone
12					
13					
14			SS-4		Gray, saturated, very stiff, CLAY, little coarse to fine sand.
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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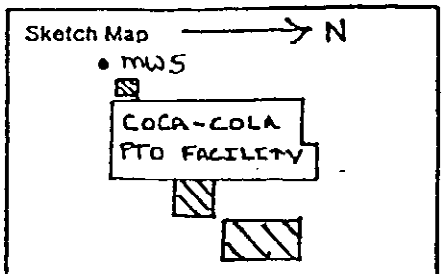
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number MW-5

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/19/88
Total Depth of Hole: 15'
Diameter: 4"
Surface Elevation: --
Water Level, Initial: 8'
24-hrs.: 4.06'
Screen: Dia.: 2"
Length: 15'
Slot Size: 0.010"
Casing: Dia.: --
Length: --
Type: --
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary & Rick
Log by: J. Supergan

Sketch Map



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1	Well box, Concrete, Screen, Sand pack				4" Asphalt
2			SS-1		Gray, dry, very stiff, sandy CLAY, some backfill material, some organics, little coarse to fine gravel.
3					
4					
5			SS-2		Black, damp, stiff, organic COAL, little coarse to fine sand, trace fine gravel.
6					
7					
8		▼			
9			SS-3		Gray and brown mottled, moist, stiff, CLAY, little coarse to fine sand.
10					
11					
12					
13					
14			SS-4		Gray, saturated, hard, CLAY, little coarse to fine sand.
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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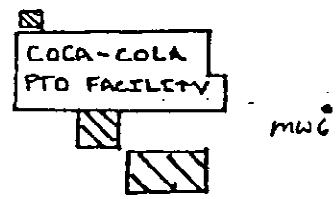
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number MW-6

Project: Coca-Cola USA
Owner:
Location: Chicago, IL
Project Number: 401-114-8928
Date Drilled: 5/19/88
Total Depth of Hole: 15'
Diameter: 4"
Surface Elevation: --
Water Level Initial: 8"
24-hrs.: --
Screen: Dia. 2"
Length: 15'
Slot Size: 0.010
Casing: Dia. --
Length: --
Type: --
Drilling Company: Fox Drilling
Drilling Method: SSA
Driller: Gary & Rick
Log by: J. Supergan

Sketch Map → N



Notes: EXCAVATED UNDERGROUND STORAGE TANKS

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
		Well box			10" Asphalt
1–2		Concrete	SS-1		Black, damp, stiff, CLAY, little coarse to fine sand, little backfill material.
3–4		Sand pack			
5–6		Screen	SS-2		Brown, damp, medium dense, medium to fine SAND, little clay.
7–9		▼	SS-3		Gray and brown mottled, damp, stiff, CLAY, little coarse to fine sand.
10–14			SS-4		Gray and brown mottled, wet, stiff, CLAY, little coarse to fine sand, trace fine gravel.
15–26					

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GROUNDWATER TECHNOLOGY

Drilling Log

Well Number MW-7

Project Coca-Cola Owner Coca-Cola USA

Location Chicago, IL Project Number 401-144-8928

Date Drilled 10/6/88 Total Depth of Hole 12.0' Diameter 4.0"

Surface Elevation --- Water Level, Initial 6.0' 24-hrs. ---

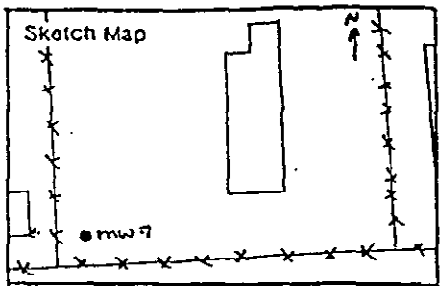
Screen: Dia. 2.0" Length 10.0' Slot Size .010

Casing: Dia. 2.0" Length 2.0' Type Sch 40 PVC

Drilling Company Fox Drilling Drilling Method SSA/SB

Driller H. Boyde Log by S. Nalefski

Sketch Map



Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1		Concrete			Asphalt 6.0"
2		Well box; Native backfill	MW-7-1		Gray to black, dry, very stiff, CLAY, some silt, fill material, cinders, coal
3		Bentonite Seal			
4		Riser	MW-7-2		
5		Screen			Black, wet, organic CLAY
6					
7			MW-7-3		Brown to gray mottled, wet, medium stiff, CLAY, trace fine sand
8		Sand pack			
9			MW-7-4		
10					Gray, dry, hard, CLAY, trace medium to fine sand (gray shale)
11			MW-7-5		
12					End of Boring 11.0'
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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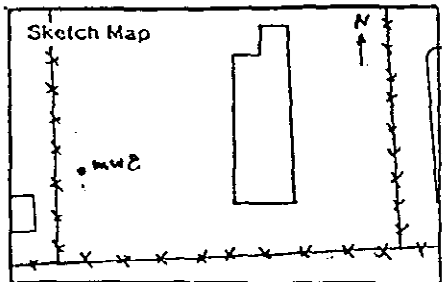
GROUNDWATER TECHNOLOGY

Drilling Log

Well Number MW-8

Project: Coca-Cola — Owner: Coca-Cola USA
Location: Chicago, IL — Project Number: 401-144-8928
Date Drilled: 10/6/88 — Total Depth of Hole: 12.0' — Diameter: 4.0"
Surface Elevation: --- — Water Level, Initial: 7.0' — 24-hrs.: ---
Screen: Dia. 2.0" — Length: 10.0' — Slot Size: .010
Casing: Dia. 2.0" — Length: 2.0' — Type: Sch 40 PVC
Drilling Company: Fox Drilling — Drilling Method: HSA/SB
Driller: H. Boyde — Log by: S. Nalefski

Sketch Map



Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1		Concrete Well box			Asphalt 6.0"
2		Bentonite Seal	MW-8-1		Brown to black, dry, stiff, CLAY, some silt, fill material
3		Riser			
4		Screen	MW-8-2		Black, wet, organic CLAY, strong petroleum odor
5					
6		Sand pack	MW-8-3		Brown to gray, mottled, moist, stiff, CLAY
7					
8					
9			MW-8-4		
10					Gray, dry, very stiff, CLAY
11					
12			MW-8-5		End of Boring 12.0'
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

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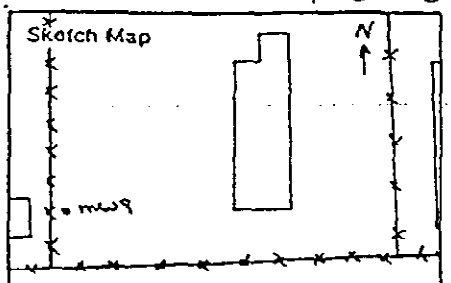
GROUNDWATER TECHNOLOGY

Drilling Log

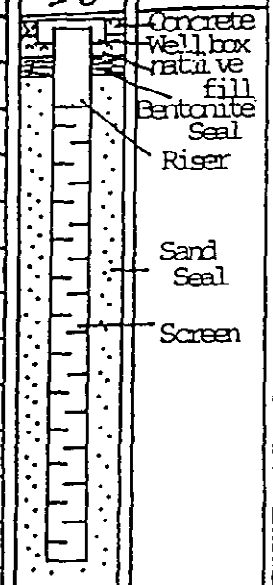
Well Number MW-9

Project	Coca-Cola	Owner	Coca-Cola USA
Location	Chicago, IL	Project Number	401-144-8928
Date Drilled	10/6/88	Total Depth of Hole	12.0'
Diameter	4.0"	Surface Elevation	---
Water Level, Initial	---	24-hrs.	---
Screen: Dia.	2.0"	Length	10.0"
Slot Size	.010	Casing: Dia.	2.0"
Length	2.0"	Type	Sch 40 PVC
Drilling Company	Fox Drilling	Drilling Method	SSA/SB
Driller	H. Boyde	Log by	S. Nalefski

Sketch Map



Notes



Depth (Feet)	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
1				Asphalt 6.0"
2		MW-9-1		Black to gray, dry, very stiff, CLAY, some silt, fill material
3				
4		MW-9-2		
5				Black, wet, organic, CLAY, sheen of product
6				Brown to tan, mottled, moist, stiff, CLAY
7		MW-9-3		
8				
9		MW-9-4		
10				
11				
12				End of Boring 12.0'
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

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APPENDIX G

WELL DATA MONITORING FORMS

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER TECHNOLOGY, INC.

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PROJECT: Coca-Cola USA PROJECT #: 401-144-8928
LOCATION: 36th Street, Chicago, Illinois DATE: 5/27/88
OPERATOR: Brian Thiede METHOD: Interface Probe
EQUIPMENT #: 468

WELL ID#	TOC ELEV.	DTW	DTP	PROD THCK.	PROD GRAV.	CORR DTW	CORR H20 ELEV.
MW-1	99.07	4.45	---	---	---	4.45	94.62
MW-2	99.26	5.07	---	---	---	5.07	94.19
MW-3	98.98	4.32	---	---	---	4.32	94.66
MW-4	99.20	3.79	---	---	---	3.79	95.41
MW-5	99.32	4.01	---	---	---	4.01	95.31
MW-6	99.56	7.31	---	---	---	7.31	92.25

PROJECT: Coca-Cola USA PROJECT #: 401-144-8928
LOCATION: 36th Street, Chicago, Illinois DATE: 6/14/88
OPERATOR: Brian Thiede METHOD: Interface Probe
EQUIPMENT #: 468

WELL ID#	TOC ELEV.	DTW	DTP	PROD THCK.	PROD GRAV.	CORR DTW	CORR H20 ELEV.
MW-1	99.07	5.09	---	---	---	5.09	93.98
MW-2	99.26	4.54	---	---	---	4.54	94.72
MW-3	98.98	4.74	---	---	---	4.74	94.24
MW-4	99.20	4.02	---	---	---	4.02	95.18
MW-5	99.32	4.18	---	---	---	4.18	95.14
MW-6	99.56	7.73	---	---	---	7.73	91.83

TOC ELEV. = Top of Casing Elevation
DTW = Depth to Water
DTP = Depth to Product
PROD THCK. = Product Thickness
PROD GRAV. = Product Specific Gravity
CORR DTW = Corrected Depth to Water
CORR H20 = Corrected Water Elevation

GROUNDWATER TECHNOLOGY, INC.

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JOB: COCA-COLA USA
JOB #: 401-144-8928
METHOD: I.P.

DATE: 10/12/88
OPERATOR: BRIAN THIEDE
EQUIPMENT #: 401

WELL ID#	TOC Elev	DTW	DTO	OIL TCK	PROD GRAV	CORR DTW	CORR WAT ELEV
MW-1	99.07	5.30	---	---	---	5.30	93.77
MW-2	99.26	4.96	---	---	---	4.96	94.30
MW-3	98.98	4.75	---	---	---	4.75	94.23
MW-4	99.20	4.67	---	---	---	4.67	94.53
MW-5	99.32	4.88	---	---	---	4.88	94.44
MW-6	99.56	8.01	---	---	---	8.01	91.55
MW-7	99.88	5.15	5.12	.03	.82	5.12	94.75
MW-8	99.86	10.90	---	---	---	10.90	88.96
MW-9	99.85	10.42	---	---	---	10.42	89.43
MW-10	98.95	6.42	---	---	---	6.42	92.53

JOB: COCA-COLA USA
JOB #: 401-144-8928
METHOD: I.P.

DATE: 11/9/88
OPERATOR: STEVE NALEFSKI
EQUIPMENT #: 0684

WELL ID#	TOC Elev	DTW	DTO	OIL TCK	PROD GRAV	CORR DTW	CORR WAT ELEV
MW-1	99.07	5.15	---	---	---	5.15	93.92
MW-2	99.26	4.66	---	---	---	4.66	94.60
MW-3	98.98	4.37	---	---	---	4.37	94.61
MW-4	99.20	4.47	---	---	---	4.47	94.73
MW-5	99.32	4.44	---	---	---	4.44	94.88
MW-6	99.56	6.64	---	---	---	6.64	92.92
MW-7	99.88	4.72	trace	trace	---	4.72	95.16
MW-8	99.86	5.53	---	---	---	5.53	94.33
MW-9	99.85	4.72	---	---	---	4.72	95.13
MW-10	98.95	4.25	---	---	---	4.25	94.70

GROUNDWATER TECHNOLOGY, INC.

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APPENDIX H

HNU PHOTOIONIZATION RESULTS

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER
TECHNOLOGY, INC.

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HNU PHOTOIONIZATION ANALYSIS

DATE ANALYZED: 5/18/88

PROJECT NAME: Coca-Cola USA

ANALYST: J. Supergan

PROJECT NUMBER: 401-114-8927

CALIBRATION DATA: ---

DATE SAMPLED	BORING NUMBER	DEPTH (Feet)	HNU VALUE (ppm)	BACKGROUND READING (ppm)	CORRECTED HNU VALUE (ppm)	SCALE (ppm)
5/18/88	B1-1	0.5-2.0'	1	0	1	0-20
5/18/88	B1-2	4.0-5.5'	12	0	12	0-20
5/18/88	B1-3A	8.5-10.0'	10	0	10	0-20
5/18/88	B1-3B	8.5-10.0'	4	1	3	0-20
5/18/88	B2-1	0.5-2.0'	1	0	1	0-20
5/18/88	B2-2	4.0-5.5'	26	2	24	0-200
5/18/88	B2-3	8.5-10.0'	0	0	0	0-20
5/18/88	MW1-1	0.5-2.0'	2	0	2	0-20
5/18/88	MW1-2	4.0-5.5'	0	0	0	0-20
5/18/88	MW1-3	8.5-10.0'	0	0	0	0-20
5/18/88	MW1-4	13.5-15.0'	0	0	0	0-20
5/18/88	B3-1	1.0-2.5'	0	0	0	0-20
5/18/88	B3-2	4.0-5.5'	0	0	0	0-20
5/18/88	B3-3	8.5-10.0'	0	0	0	0-20
5/18/88	B4-1	1.0-2.5'	0	0	0	0-20
5/18/88	B4-2	4.0-5.5'	0	0	0	0-20
5/18/88	B4-3	8.5-10.0'	0.	0	0	0-20
5/18/88	B5-1	1.0-2.5'	0	0	0	0-20
5/18/88	B5-2	4.0-5.5'	0	0	0	0-20
5/18/88	B5-3	8.5-10.0'	0	0	0	0-20

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DWG: 00034

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HNU PHOTOIONIZATION ANALYSIS

DATE ANALYZED: 5/18/88

PROJECT NAME: Coca-Cola USA

ANALYST: J. Supergan

PROJECT NUMBER: 401-114-8927

CALIBRATION DATA: ---

DATE SAMPLED	BORING NUMBER	DEPTH (Feet)	HNU VALUE (ppm)	BACKGROUND READING (ppm)	CORRECTED HNU VALUE (ppm)	SCALE (ppm)
5/18/88	B6-1	1.0-2.5'	0	0	0	0-20
5/18/88	B6-2	4.0-5.5'	26	2	24	0-20
5/18/88	B7-1	1.0-2.5'	0	0	0	0-20
5/18/88	B7-2	4.0-5.5'	3	0	3	0-20
5/18/88	B7-3	8.5-10.0'	0	0	0	0-20
5/18/88	MW2-1	1.0-2.5'	0	0	0	0-20
5/18/88	MW2-2	4.0-5.5'	0	0	0	0-20
5/18/88	MW2-3	8.5-10.0'	0	0	0	0-20
5/18/88	MW2-4	13.5-15.0'	0	0	0	0-20
5/18/88	B8-1	1.0-2.5'	0	0	0	0-20
5/18/88	B8-2	4.0-5.5'	0	0	0	0-20
5/18/88	B8-3	8.5-10.0'	0	0	0	0-20

GROUNDWATER TECHNOLOGY, INC.

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HNU PHOTOIONIZATION ANALYSIS

DATE ANALYZED: 5/19/88

PROJECT NAME: Coca-Cola USA

ANALYST: J. Supergan

PROJECT NUMBER: 401-114-8927

CALIBRATION DATA: ---

DATE SAMPLED	BORING NUMBER	DEPTH (Feet)	HNU VALUE (ppm)	BACKGROUND READING (ppm)	CORRECTED HNU VALUE (ppm)	SCALE (ppm)
5/19/88	MW4-1	1.0-2.5'	0	0	0	0-20
5/19/88	MW4-2	4.0-5.5'	0	0	0	0-20
5/19/88	MW4-3	8.5-10.0'	0	0	0	0-20
5/19/88	MW4-4	13.5-15.0	0	0	0	0-20
5/19/88	MW5-1	1.0-2.5'	0	0	0	0-20
5/19/88	MW5-2	4.0-5.5'	0	0	0	0-20
5/19/88	MW5-3	8.5-10.0'	0	0	0	0-20
5/19/88	MW5-4	13.5-15.0	0	0	0	0-20
5/19/88	B9-1	1.0-2.5'	0	0	0	0-20
5/19/88	B9-2	4.0-5.5'	120	2	118	0-200
5/19/88	B9-3	8.5-10.0'	1	0	1	0-20
5/19/88	MW6-1	1.0-2.5'	0	0	0	0-20
5/19/88	MW6-2	4.0-5.5'	0	0	0	0-20
5/19/88	MW6-3	8.5-10.0'	0	0	0	0-20
5/19/88	MW6-4	13.5-15.0	0	0	0	0-20

GROUNDWATER TECHNOLOGY, INC.

00034

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HNU PHOTOIONIZATION ANALYSIS

DATE ANALYZED: 6/29/88

PROJECT NAME: Coca-Cola USA

ANALYST: S. Nalefski

PROJECT NUMBER: 401-144-8928

CALIBRATION DATA: 56 ppm at 9.8

DATE SAMPLED	BORING NUMBER	DEPTH (Feet)	HNU VALUE (ppm)	BACKGROUND READING (ppm)	CORRECTED HNU VALUE (ppm)	SCALE (ppm)
6/29	B-10	3.5-5.0	3	0	3	0-20
6/29	B-11	3.5-5.0	0	0	0	0-20
6/29	B-12	3.5-5.0	0	0	0	0-20
6/29	B-13	3.5-5.0	0	0	0	0-20
6/29	B-14	3.5-5.0	0	0	0	0-20
6/29	B-15	3.5-5.0	175	2	173	0-200
6/29	B-16	1.0-2.5	0	0	0	0-20
6/29	B-17	4.5-6.0	150	2	148	0-200

PAGE___ OF___

GROUNDWATER TECHNOLOGY, INC.

00034

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HNU PHOTOIONIZATION ANALYSIS

DATE ANALYZED: 10/6/88

PROJECT NAME: Coca-Cola USA

ANALYST: S. Nalefski

PROJECT NUMBER: 401-144-8928

CALIBRATION DATA: 56 ppm 9.8

DATE SAMPLED	BORING NUMBER	DEPTH (Feet)	HNU VALUE (ppm)	BACKGROUND READING (ppm)	CORRECTED HNU VALUE (ppm)	SCALE (ppm)
10/6/88	MW-7	1.0-2.5'	0	0	0	0-20
"	"	3.5-5.0'	10	0	10	0-20
"	"	6.0-7.5'	19	0	19	0-20
"	"	8.5-10.0'	2	0	2	0-20
"	"	11.0-12.5'	0	0	0	0-20
"	B-18	1.0-2.5'	0	0	0	0-20
"	"	3.5-5.0'	60	0	60	0-200
"	"	6.0-7.5'	2	0	2	0-20
"	"	8.5-10.0'	0	0	0	0-20
"	B-19	1.0-2.5'	0	0	0	0-20
"	"	3.5-5.0'	100	0	100	0-200
"	"	6.0-7.5'	2	0	2	0-20
"	"	8.5-10.0'	2	0	2	0-20
"	"	11.0-12.5'	0	0	0	0-20
"	B-20	1.0-2.5'	0	0	0	0-20
"	"	3.5-5.0'	40	0	40	0-200
"	"	6.0-7.5'	5	0	5	0-20
"	"	8.5-10.0'	0	0	0	0-20
"	"	11.0-12.5'	0	0	0	0-20

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HNU PHOTOIONIZATION ANALYSIS

DATE ANALYZED: 10/6/88

ROJECT NAME: Coca-Cola USA

ANALYST: S. Naléfski

PROJECT NUMBER: 401-144-8928

CALIBRATION DATA: 56 ppm 9.8

DATE SAMPLED	BORING NUMBER	DEPTH (Feet)	HNU VALUE (ppm)	BACKGROUND READING (ppm)	CORRECTED HNU VALUE (ppm)	SCALE (ppm)
10/6/88	MW-8	1.0-2.5'	0	0	0	0-20
"	"	3.5-5.0'	20	0	20	0-20
"	"	6.0-7.5'	1	0	1	0-20
"	"	8.5-10.0'	0	0	0	0-20
"	"	11.0-12.5'	0	0	0	0-20
"	MW-9	1.0-2.5'	0	0	0	0-20
"	"	3.5-5.0'	110	0	110	0-200
"	"	6.0-7.5'	3	0	3	0-20
"	"	8.5-10.0'	1	0	1	0-20

PAGE___ OF___

GROUNDWATER TECHNOLOGY, INC.

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APPENDIX I

SOIL LABORATORY RESULTS

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER
TECHNOLOGY, INC.

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GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-1

6/20/88
Submitted to: Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/6/88, is a reissue.

Sample Identification:

This report covers soil samples #71316-71334 taken by S.N. on 5/18/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Petroleum Hydrocarbons by Soxhlet extraction and infrared spectrophotometry, GTL Method Code 6020. Method reference: Methods 503D and 503E, Standard Methods for the Examination of Water and Wastes, 16th Edition, APHA, 1985. Petroleum Hydrocarbons is defined by this method as any material which is soluble in freon (1,1,2-trichloro-1,2,2,-trifluoroethane), does not volatilize at 48°C, and is not removed by silica gel treatment to remove biogenic material. The method is applicable to the measurement of most light petroleum fuels, except gasoline. Significant loss of gasoline present can be expected. Heavier residuals of petroleum which are not soluble in freon are not detected.

The data in this set conforms to the GTL Quality Assurance Program including the parameters of sample integrity. Samples were extracted 5/23/88-5/26/88 and analyzed on 5/27/88. Analyst: S.E.T.

Results:
Results are reported as mg/Kg Petroleum Hydrocarbons detected per kilogram of dry soil. For a 10 gram sample the detection limit is 50 mg/Kg.

The data in this report have been reviewed for accuracy and completeness.

Prepared by: Bob Edwards
Bob Edwards
GC Lab Manager

Reissue Approval: Michael Webb
Michael Webb
Quality Assurance

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Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-1

Petroleum Hydrocarbons in Soil
mg/kg

Sample No.	ID	Petroleum Hydrocarbons	Detection Limit
71316	B1, 8.5-10'	1300	53
71317	B2, 4-5.5'	9400	840
71318	B2, 8.5-10'	ND	58
71319	MW1, 4-5.5'	1000	310
71320	MW1, 8.5-10'	ND	83
71321	B3, 1-2.5'	1100	400
71322	B3, 4-5.5'	200	61
71323	B4, 8.5-10'	ND	52
71324	B5, 4-5.5'	ND	62
71325	B6, 1-2.5'	900	39
71326	B6, 4-5.5'	150	44
71327	B7, 4-5.5'	1200	68
71328	B7, 8.5-10'	ND	62
71329	MW2, 1-2.5'	1700	410
71330	MW2, 8.5-10'	ND	77
71331	MW2, 4-5.5'	ND	90
71332	B8, 1-2.5'	5600	370
71333	B8, 4-5.5'	440	48
71334	B8, 8.5-10'	ND	48

Notes:

ND = None Detected

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Report No.
401-144-8928-2

6/21/88
Submitted to: Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/1/88, previously numbered 401-114-8827-77-1, is a reissue.

Sample Identification:

This report covers soil samples # 71390-71394 taken by J.S. on 5/19/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Petroleum Hydrocarbons by Soxhlet extraction and infrared spectrophotometry, GTL Method Code 6020. Method reference: Methods 503D and 503E, Standard Methods for the Examination of Water and Wastes, 16th Edition, APHA, 1985. Petroleum Hydrocarbons is defined by this method as any material which is soluble in freon (1,1,2-trichloro-1,2,2,-trifluoroethane), does not volatilize at 48°C, and is not removed by silica gel treatment to remove biogenic material. The method is applicable to the measurement of most light petroleum fuels, except gasoline. Significant loss of gasoline present can be expected. Heavier residuals of petroleum which are not soluble in freon are not detected.

The data in this set conforms to the GTL Quality Assurance Program including the parameters of sample integrity. Samples were extracted 5/26/88 and analyzed on 5/27/88. Analyst: S.E.T.

Results:
Results are reported as mg/Kg Petroleum Hydrocarbons detected per kilogram of dry soil. For a 10 gram sample the detection limit is 50 mg/Kg.

The data in this report have been reviewed for accuracy and completeness.

Prepared by:
Dave Reese
Dave Reese
Extractable Organics Manager

Reissue Approval:
Michael Webb
Michael Webb

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Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-2

Petroleum Hydrocarbons in Soil
mg/kg

Sample	ID	Petroleum Hydrocarbons	Detection Limit
71390	MW4, 1-2.5'	1300	76
71391	MW4, 8.5-10'	ND	77
71392	MW5, 1-2.5'	ND	49
71393	B9, 4-5.5'	16000	670
71394	MW6, 4-5.5'	ND	48

Notes:

ND = None Detected

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GTEL Report No.
401-144-8928-3

June 21, 1988

Mr. Steve Naleski
Groundwater Technology, Inc.
2113 Stonington Ave.
Hoffman Estates, IL 60195

Sampling Site: Chicago, IL
Date Sampled: 5/18/88
Sampler: Judith Supergan

The enclosed data reports the analysis of soil sample # 71720 for polychlorinated biphenyls (PCB's).

Samples are extracted in accordance with EPA Method 8080, and within the seven-day holding period. Samples are analyzed by gas chromatography with electron capture detection. Confirmation of samples testing positive is accomplished by analysis using a second gc column. Quality control procedures, including method blanks, matrix spikes and surrogate addition are used to demonstrate acceptable accuracy and precision.

For PCB's: An acid cleanup of a portion of the sample extract was performed to reduce matrix interferances.

Analyst: L. Schlickenrieder

Prepared by:

Dave Reese
Extractable Organics Manager

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GTEL Report No.
401-144-8928-3

June 21, 1988

Method 8080 PCB Analytical Results (ug/g)

Sampling Site: Chicago, IL
Sampling Date: 5/19/88
Sampler: Judith Supergan
Extraction Date: 5/26/88
Analysis Date: 5/28/88

Sample Lab #:	71720
Field ID:	B9-2-H

Aroclor	ug/g (ppm)
PCB-1221	<1.60
PCB-1232	<1.60
PCB-1016 (1242)	<0.80
PCB-1248	<0.65
PCB-1254	<0.65
PCB-1260	<0.65
PCB-1262	<0.65

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Report No.
401-144-8928-4

6/20/88
Submitted to:

Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/8/88, previously numbered 401-114-8927-77-3, is a reissue.

Sampling Date: 5/19/88
Site Location: Chicago, Illinois.

This reports the analysis of soil sample 71721 extracted in freon for a hydrocarbon fingerprint. This is a customized analysis which provides a comparison between the sample and represenative fuel samples. It compares the molecular weight distribution of the sample and known fuels, and provides an identification on this basis.

Samples are analyzed by gas chromatography with flame ionization detection. Sample constituents are separated on a DB-1 capillary column, 30 meter x 0.53 mm, using Helium carrier gas at 6 cc/min. The column oven is temperature programmed as follows: 40 degrees C initial T, programmed at 5 degrees/min to a final T of 230 degrees C, which is held for 10 minutes.

The accompanying data provides simulated distillation information for each sample and known fuel products. This data is also graphically displayed as percentage composition vs simulated boiling point (g.c. retention time).

Prepared by:

Bob Edwards
GC Lab Manager

Analyst: A. Naber

Reissue Approval:

Michael Webb
Quality Assurance

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SIMULATED DISTILLATION
401-144-8928-4
Coca Cola USA

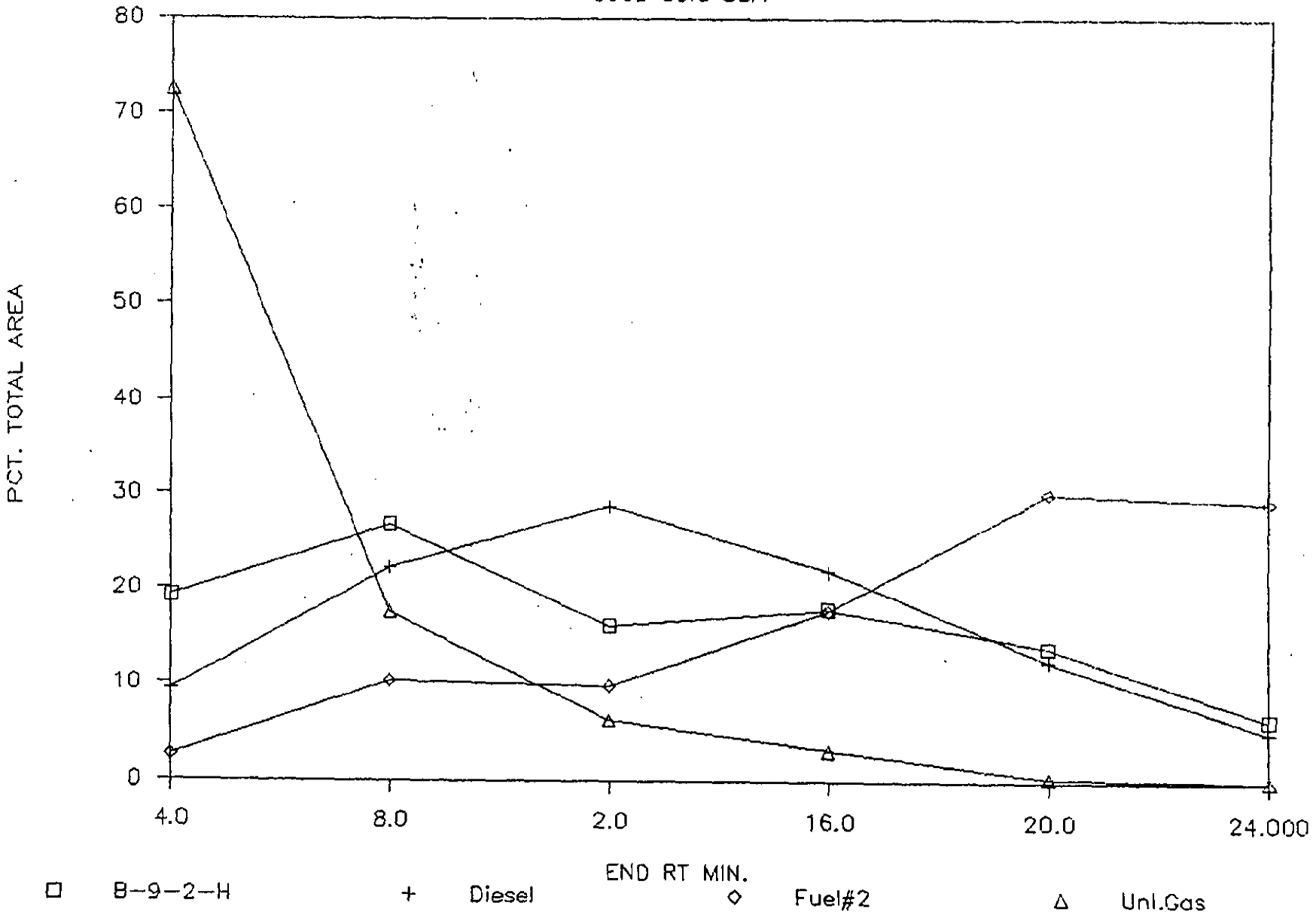
PERCENT OF TOTAL AREA USING
4 MIN INTERVALS

END RT.	71721	Diesel	Fuel #2	Unl. Gas
4	19.2	9.35	2.47	72.5
8	26.7	22.2	10.3	17.5
12	16.1	28.7	9.84	6.22
16	17.9	21.9	17.7	3.10
20	13.9	12.5	30.1	.319
24	6.37	5.03	29.2	.03
TOTAL %	100.2	99.7	99.6	99.7
I.B.P.	.349	.655	2.22	.528

LEGEND
Diesel = Diesel Fuel
Fuel #2 = Home Heating Fuel #2
Unl. Gas = Regular Unleaded Gasoline
I.B.P. = Initial Boiling Point in Minutes
RT. = Retention Time in Minutes
71721 = B-9-2-H

SIMULATED DISTILLATION

Coca Cola USA



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Report No.
401-144-8928-7

11/14/88
Submitted to: Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL 60195

This report previously dated 7/18/88, is a reissue.

Sample Identification:
This report covers soil samples # 74910-74912 taken by S.L.N., on 6/29/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Petroleum Hydrocarbons by Soxhlet extraction and infrared spectrophotometry, GTEL Method Code 6020. Method reference: Methods 503D and 503E, Standard Methods for the Examination of Water and Wastes, 16th Edition, APHA, 1985. Petroleum Hydrocarbons is defined by this method as any material which is soluble in freon (1,1,2-trichloro-1,2,2,-trifluoroethane), does not volatilize at 48'C, and is not removed by silica gel treatment to remove biogenic material. The method is applicable to the measurement of most light petroleum fuels, except gasoline. Significant loss of gasoline present can be expected. Heavier residuals of petroleum which are not soluble in freon are not detected.

The data in this set conforms to the GTEL Quality Assurance Program including the parameters of sample integrity. Samples were extracted 7/12/88 and analyzed on 7/12/88. Analyst: S.E.T.

Results:
Results are reported as mg/Kg Petroleum Hydrocarbons detected per kilogram of dry soil. For a 10 gram sample the detection limit is 50 mg/Kg.

The data in this report have been reviewed for accuracy and completeness.

Respectfully submitted,

Susan C. Uhler
Susan C. Uhler
Laboratory Director

Roseanna Dube
Roseanna Dube
Quality Assurance

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Report No.
401-144-8928-7

Petroleum Hydrocarbons in Soil
mg/kg

Sample	ID	Petroleum Hydrocarbons
74910	TB-5	ND
74911	TB-6	ND
74912	TB-7	1200

Notes:

ND = None Detected

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Report No.
401-144-8928-10

8/16/88
Submitted to:

Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

Sampling Date: 6/29/88
Site Location: Chicago, Illinois

This reports the analysis of product samples # 77399-77401 for a hydrocarbon fingerprint. This is a customized analysis which provides a comparison between the sample and represenative fuel samples. It compares the molecular weight distribution of the sample and known fuels, and provides an identification on this basis.

Samples are analyzed by gas chromatography with flame ionization detection. Sample constituents are separated on a DB-5 capillary column, 30 meter x 0.53 mm, using Helium carrier gas at 6 cc/min. The column oven is temperature programmed as follows: 40 degrees C initial T, programmed at 5 degrees/min to a final T of 300 degrees C, which is held for 15 minutes.

The accompanying data provides simulated distillation information for each sample and known fuel products. This data is also graphically displayed as percentage composition vs simulated boiling point (g.c. retention time).

Respectfully submitted,

Bob Edwards

Bob Edwards
Gas Chromatography Manager

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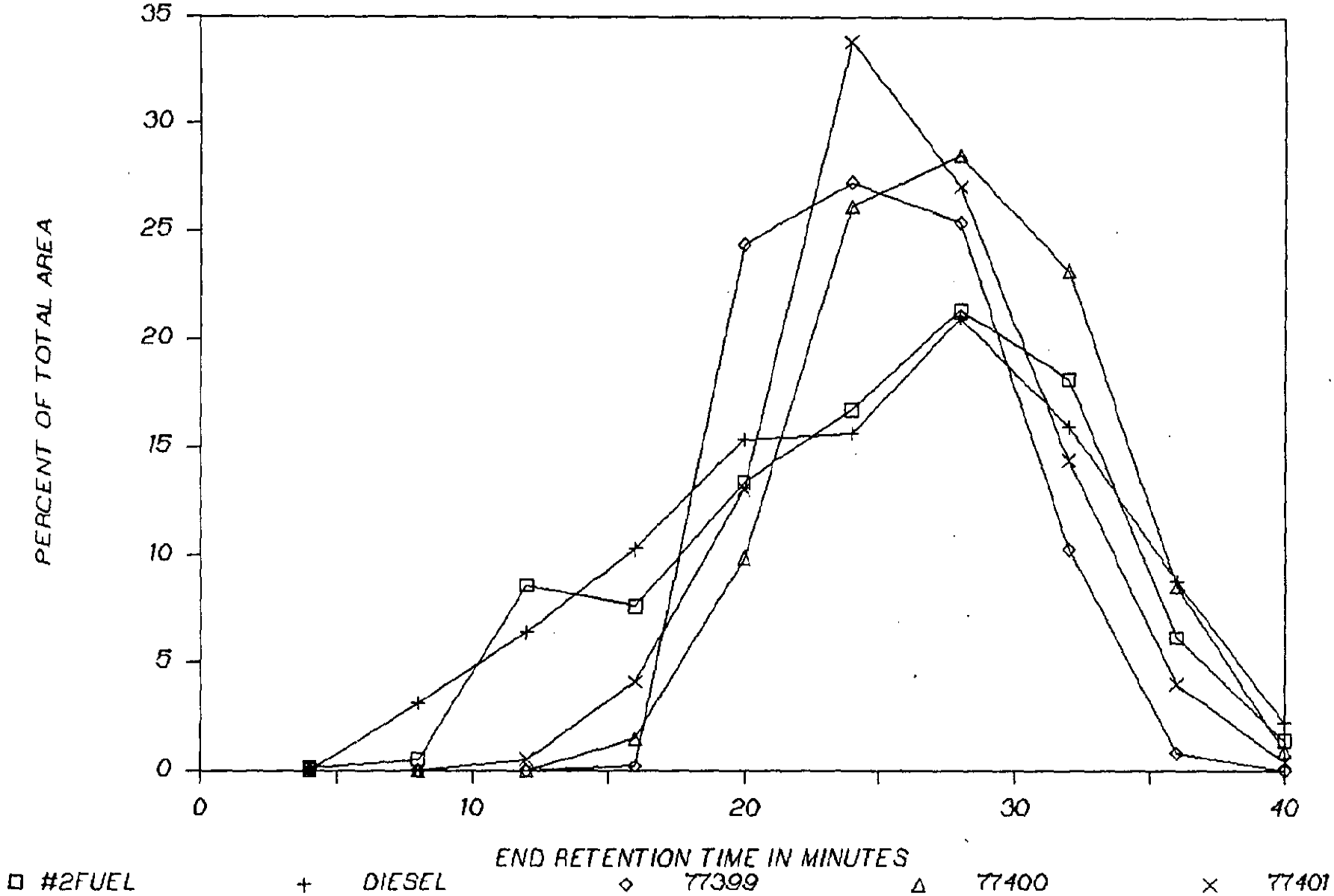
SIMULATED DISTILLATION ANALYSIS
COCA COLA USA
401-144-8928-10

ID	#2 HEATING FUEL	DIESEL FUEL	77399 B-13	77400 B-14	77401 B-10
END RETENTION TIME IN MINUTES	PERCENT OF TOTAL AREA USING 4 MIN. INTERVALS				
4.0	0.1	0.0	0.0	0.0	0.0
8.0	0.5	3.1	0.0	0.0	0.0
12.0	8.6	6.4	0.0	0.0	0.5
16.0	7.6	10.3	0.2	1.5	4.1
20.0	13.4	15.4	24.4	9.9	13.1
24.0	16.8	15.7	27.3	26.2	33.8
28.0	21.4	21.0	25.4	28.5	27.1
32.0	18.2	16.0	10.3	23.2	14.4
36.0	6.2	8.8	0.8	8.6	4.0
40.0	1.4	2.2	0.0	0.9	0.4
TOTAL %	92.8	96.7	88.4	97.9	97.0
I.B.P. MIN.	4.6	4.5	14.2	14.5	13.2

LEGEND
I.B.P. = INITIAL BOILING POINT

SIMULATED DISTILLATION ANALYSIS

COCA COLA USA



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Milford, NH 03055
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Report No.
401-144-8928-11

11/14/88
Submitted To:

Gary Robinson
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 10/25/88, is a reissue.

Sample Identification:
The attached report covers 5 soil samples # 82977-82981 taken by S.N., on 10/06/88 at site # 401-144-8928, Chicago, Illinois. Samples were extracted on 10/13/88 by N.P.B.

Method:
Analysis was performed for volatile organics by purge and trap gas chromatography, EPA Method 5030, with flame ionization detection and photoionization detection as per EPA Methods 8015 and 8020. Quantification was performed on a very polar column. This modification fractionates aliphatics (up to C12) away from the volatile aromatics. Chromatographic conditions are referenced in GTL Method Code 119. Hexane and orthoxylene are used as calibration standards for the aliphatic hydrocarbons and miscellaneous aromatics, respectively.

Sampling, sample handling, and preservation are specified by this laboratory to be as per EPA Method 5030. Any irregularities are referenced as notes to the analytical report.

E.A. was the performing analyst.

Results:
Results are reported in ppm (mg/kg) dry soil.

Respectfully submitted,

Bob Edwards
Gas Chromatography Manager

Reissue Approval:

Roseanna Dube
Quality Assurance

printed 08/08/2014 1:19PM by Dave.Gambach p. 110/134

Report No.
401-144-8928-11

Analytical Results
Hydrocarbons in Soil mg/kg (ppm)

Sample	ID	Date Run	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Total BTEX
82977	MW-7 3.5-5'	10/18/88	ND	ND	ND	ND	ND
82978	MW-7 8.5-10'	10/18/88	ND	ND	ND	ND	ND
82979	MW-8 1-2.5'	10/18/88	1.3	ND	ND	ND	1.3
82980	MW-8 3.5-5'	10/18/88	0.18	0.27	ND	ND	0.45
82981	MW-8 8.5-10'	10/18/88	ND	ND	ND	ND	ND
Detection Limits			0.11	0.27	0.43	0.91	

Notes:

ND = None Detected

GTEL ENVIRONMENTAL LABORATORIES, INC.

printed 08/09/2014 1:19PM by Dave Gambach p. 111/134

Report No.
401-144-8928-11

Analytical Results
Hydrocarbons in Soil mg/kg (ppm)

Sample No.	ID	C4-C12 Aliphatic Hydrocarbons	C8-C10 Aromatic Hydrocarbons	Total
82977	MW-7 3.5-5'	ND	ND	ND
82978	MW-7 8.5-10'	ND	ND	ND
82979	MW-8 1-2.5'	ND	8.5	9.8
82980	MW-8 3.5-5'	ND	15	15
82981	MW-8 8.5-10'	ND	ND	ND
Detection Limits		8.1	5.4	

Notes:

ND = None Detected

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NOV 14 1988

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-12

11/08/88
Submitted to: Gary Robinson
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

Sample Identification:

This report covers soil samples # 82993-83010 taken by S.N. on 10/06/88 at site # 401-144-8928, Chicago, Illinois.

Method:

Petroleum Hydrocarbons by Soxhlet extraction and infrared spectrophotometry, GTL Method Code 6020. Method reference: Methods 503D and 503E, Standard Methods for the Examination of Water and Wastes, 16th Edition, APHA, 1985. Petroleum Hydrocarbons is defined by this method as any material which is soluble in freon (1,1,2-trichloro-1,2,2,-trifluoroethane), does not volatilize at 48'C, and is not removed by silica gel treatment to remove biogenic material.

The data in this set conforms to the GTL Quality Assurance Program including the parameters of sample integrity. Samples were extracted 11/03/88 & 11/04/88 and analyzed on 11/05/88. Analysts: M.H./J.B./B.C.

Results:

Results are reported as mg Petroleum Hydrocarbons detected per kilogram of dry soil. For a 10 gram sample the detection limit is 50 mg/Kg.

The data in this report have been reviewed for accuracy and completeness.

Respectfully Submitted,

Susan C. Uhler
Laboratory Director

printed 08/08/2014 1:19PM by Dave.Gambach p. 113/134

Report No.
401-144-8928-12

Petroleum Hydrocarbons in Soil
mg/kg

Sample	ID	Petroleum Hydrocarbons	Detection Limit
82993	MW-7(1-2.5)	410	38
82994	MW-7(3.5-5)	600	50
82995	MW-7(8.5-10)	150	50
82996	B-19(1-2.5)	210	45
82997	B-19(3.5-5)	1600	50
82998	B-19(8.5-10)	130	50
82999	MW-8(1-2.5)	210	50
83000	MW-8(3.5-5)	390	46
83001	MW-8(8.5-10)	ND	50
83002	B-18(1-2.5)	1800	45
83003	B-18(3.5-5)	4800	50
83004	B-18(8.5-10)	ND	45
83005	B-20(1-2.5)	390	45
83006	B-20(3.5-10)	240	50
83007	B-20(8.5-10)	ND	56
83008	MW-9(1-2.5)	100	50
83009	MW-9(3.5-5)	380	50
83010	MW-9(8.5-10)	ND	51

Notes:

ND = None Detected

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Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

GTEL Report No.
401-144-8928-13

11/14/88
Submitted to:

Gary Robinson
Groundwater Technology, Inc
2113 Stonington Ave.
Hoffman Estates, IL 60195

Sample Identification:
The attached report covers soil samples # 82987-82992 taken on 10/06/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Analysis was performed for polynuclear aromatic hydrocarbons by High Performance Liquid Chromatography as per EPA Method 8310. Analysis was performed using dual UV and Fluorescence detection. Quality Control procedures, including method blanks and matrix spikes were employed to demonstrate accuracy and precision.

Sampling and sample handling and preservation are specified by this laboratory to be as per EPA Method 8310.

Results:
Results are reported in ug/kg (ppb).

Prepared by:

for Dave Reese

Dave Reese
Extractable Organics Manager

printed 08/08/2014 1:19PM by Dave.Gambach p. 115/134

GTEL Report No.
401-144-8928-13

Polynuclear Aromatic Hydrocarbons Analysis

Sample No.	82987	82988
Field ID	MW 7-1-2.5'	MW 7-3.5-5'
Date Sampled	10/06/88	10/06/88
Date Analyzed	11/11/88	11/11/88

Parameter	Concentration ug/kg		Detection Limit ug/kg
Naphthalene	ND	ND	60
Acenaphthylene	ND	ND	77
1-Methylnaphthalene	ND	ND	60
2-Methylnaphthalene	ND	ND	60
Acenaphthene	18000	ND	60
Fluorene	ND	ND	7.0
Phenanthrene	60000	62000	28
Anthracene	78000	39000	22
Fluoranthene	78000	41000	7.0
Pyrene	320000	59000	9.0
Benzo(a)anthracene	32000	16000	0.43
Chrysene	24000	11000	5.0
Benzo(b)fluoranthene	24000	9700	0.60
Benzo(k)fluoranthene	11000	4600	0.57
Benzo(a)pyrene	24000	10000	0.77
Dibenz(ah)anthracene	4800	2500	1.0
Benzo(ghi)perylene	18000	7500	2.5
Indeno(1,2,3-cd)pyrene	19000	8300	1.4
	*1	*1	

ND = Not Detected
*1 = Sample diluted: MDL times 100.

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GTEL Report No.
401-144-8928-13

Polynuclear Aromatic Hydrocarbons Analysis

Sample No.	82989	82990
Field ID	MW 7-8.5-10'	MW 8-1-2.5'
Date Sampled	10/06/88	10/06/88
Date Analyzed	11/11/88	11/11/88

Parameter	Concentration ug/kg		Detection Limit ug/kg
Naphthalene	ND	ND	60
Acenaphthylene	ND	ND	77
1-Methylnaphthalene	ND	ND	60
2-Methylnaphthalene	ND	ND	60
Acenaphthene	ND	ND	60
Fluorene	ND	ND	7.0
Phenanthrene	ND	ND	28
Anthracene	ND	5300	22
Fluoranthene	ND	4800	7.0
Pyrene	1400	10000	9.0
Benzo(a)anthracene	130	2500	0.43
Chrysene	ND	4600	5.0
Benzo(b)fluoranthene	130	1700	0.60
Benzo(k)fluoranthene	41	820	0.57
Benzo(a)pyrene	99	1800	0.77
Dibenz(ah)anthracene	ND	540	1.0
Benzo(ghi)perylene	ND	1400	2.5
Indeno(1,2,3-cd)pyrene	ND	1300	1.4
	*2	*1	

ND = Not Detected

*1 = Sample diluted: MDL times 100.
*2 = Sample diluted: MDL times 50.

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GTEL Report No.
401-144-8928-13

Polynuclear Aromatic Hydrocarbons Analysis

Sample No.	82991	82992
Field ID	MW 8-3.5-5'	MW 8-8.5-10'
Date Sampled	10/06/88	10/06/88
Date Analyzed	11/11/88	11/11/88

Parameter	Concentration ug/kg		Detection Limit ug/kg
Naphthalene	ND	ND	60
Acenaphthylene	ND	ND	77
1-Methylnaphthalene	ND	ND	60
2-Methylnaphthalene	ND	ND	60
Acenaphthene	ND	ND	60
Fluorene	ND	ND	7.0
Phenanthrene	ND	36	28
Anthracene	ND	ND	22
Fluoranthene	2600	34	7.0
Pyrene	5400	77	9.0
Benzo(a)anthracene	1200	14	0.43
Chrysene	3200	37	5.0
Benzo(b)fluoranthene	930	13	0.60
Benzo(k)fluoranthene	450	4.8	0.57
Benzo(a)pyrene	1000	12	0.77
Dibenz(ah)anthracene	240	1.9	1.0
Benzo(ghi)perylene	1200	14	2.5
Indeno(1,2,3-cd)pyrene	920 *1	10	1.4

ND = Not Detected

*1 = Sample diluted: MDL times 100.

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APPENDIX J

GROUNDWATER LABORATORY RESULTS

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER TECHNOLOGY, INC.

printed 08/08/2014 1:10PM by Dave.Gambach p. 119/134

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-5

11/14/88
Submitted To: Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/2/88, is a reissue.

Sample Identification:
The attached report covers water samples #72296-72300 taken by J.S., using 40 ml septum-capped glass vials at site # 401-144-8928, Chicago, Illinois.

Method:
Analysis was performed for purgeable aromatic priority pollutants and xylenes by purge and trap gas chromatography with photo-ionization and flame ionization detection, as per a modified EPA Method 602. FID quantitation was performed on a very polar column which fractionates aliphatics (up to C12) away from volatile aromatics. Chromatographic conditions are referenced in GTEL Method Code 2010. Hexane and orthoxylene are used as calibration standards for the aliphatic hydrocarbons and miscellaneous aromatics, respectively, if reported.

Samples diluted in order to maintain the calibration range are so indicated by a footnote giving the factor by which the MDL is raised.

Sampling, sample handling, and preservation are specified by this laboratory to be as per EPA Method 602. Any irregularities are referenced as notes to the analytical report.

Results:
Results are reported in ppb (ug/l).

Prepared By:
Bob Edwards
Bob Edwards
Gas Chromatography Manager

Analyst: D.A.R.

Roseanna Dube
Roseanna Dube
Quality Assurance

printed 08/08/2014 1:10PM by Dave.Gambach p. 120/134

Report No.
401-144-8928-5

Analytical Results
Hydrocarbons in Water ug/L (ppb)

Sample	ID	Date Sampled	Date Run	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Total BTEX
72296	MW-3	5/27/88	6/1/88	2.9	0.9	4.1	5.2	13
72297	MW-1	5/27/88	6/1/88	ND	ND	ND	ND	ND
72298	MW-2	5/27/88	6/1/88	ND	ND	ND	ND	ND
72299	MW-5	5/27/88	6/1/88	ND	ND	ND	ND	ND
72300	MW-6	5/27/88	6/1/88	ND	1.8	ND	ND	1.8
Detection Limits				0.2	0.5	0.8	1.7	

ND = None Detected

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Report No.
401-144-8928-5

Analytical Results
Hydrocarbons in Water ug/L (ppb)

Sample No.	ID	C4-C12 Aliphatic Hydrocarbons	C8-C10 Aromatic Hydrocarbons	Total
72296	MW-3	11	130	150
72297	MW-1	ND	ND	ND
72298	MW-2	ND	ND	ND
72299	MW-5	ND	ND	ND
72300	MW-6	ND	ND	1.8
Detection Limits		15	10	

ND = None Detected

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ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-6

11/14/88
Submitted to: Steve Nalefski
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 6/6/88, is a reissue.

Sample Identification:
The attached report covers water sample #72301 taken on 5/27/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Analysis was performed for volatile organics by purge and trap GC/MS as per EPA Method 624. Detection limits are listed on the report. Samples are diluted in order to maintain the calibrated range of the instrument and so indicated by a footnote giving the factor by which the MDL is raised.

Sampling and sample handling and preservation are specified by this laboratory to be as per EPA Method 624.

Results:
Results are reported in ug/L (ppb.).

Prepared by:

Susan C. Weber for
Dave Reese
GC/MS Manager
DRR/ch

Roseanna Dube
Roseanna Dube
Quality Assurance

printed 08/08/2014 1:19PM by Dave.Gambach p. 123/134

Report No.
401-144-8928-6

Volatile Organics Analysis

Sample No.	72301
ID	MW-4
Date Sampled	5-27-88
Date Analyzed	6-01-88

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	ND	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	ND	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	ND	4.5
Total-Xylene	19	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1

Notes: ND = Not Detected

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ENVIRONMENTAL LABORATORIES, INC.

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ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
401-144-8928-14

11/14/88
Submitted To:

Gary Robinson
Groundwater Technology
2113 Stonington Ave.
Hoffman Estates, IL 60195

This report previously dated 10/25/88, is a reissue.

Sample Identification:
The attached report covers water samples # 83483-83486 taken by S.N., on 10/12/88 using 40 ml septum-capped glass vials at site # 401-144-8928, Chicago, Illinois.

Method:
Analysis was performed for purgeable aromatic priority pollutants and xylenes by purge and trap gas chromatography with photoionization and flame ionization detection, as per a modified EPA Method 602. FID quantitation was performed on a very polar column which fractionates aliphatics (up to C12) away from volatile aromatics. Chromatographic conditions are referenced in GTEL Method Code 2010. Hexane and ortho-xylene are used as calibration standards for the aliphatic hydrocarbons and miscellaneous aromatics, respectively, if reported.

Samples diluted in order to maintain the calibration range are so indicated by a footnote giving the factor by which the MDL is raised.

Sampling, sample handling, and preservation are specified by this laboratory to be as per EPA Method 602. Any irregularities are referenced as notes to the analytical report.

E.A. was the performing analyst.

Results:
Results are reported in ppb (ug/l).

Respectfully submitted,

Bob Edwards
Gas Chromatography Manager

Roseanna Dube
Quality Assurance

printed 08/08/2014 1:19PM by Dave.Gambach p. 125/134

Report No.
401-144-8928-14

Analytical Results
Hydrocarbons in Water ug/L (ppb)

Sample	ID	Date Run	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Total BTEX
83483	MW-8	10/19/88	44	5.4	67	61	180
83484	MW-9	10/19/88	24	1.9	3.3	4.5	34
83485	MW-5	10/19/88	ND	ND	ND	ND	ND
83486	MW-2	10/19/88	ND	1.0	ND	ND	1.0
Detection Limits			0.2	0.5	0.8	1.7	

Notes:

ND = None Detected

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ENVIRONMENTAL LABORATORIES, INC.

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Report No.
401-144-8928-14

Analytical Results
Hydrocarbons in Water ug/L (ppb)

Sample No.	ID	C4-C12 Aliphatic Hydrocarbons	C8-C10 Aromatic Hydrocarbons	Total
83483	MW-8	1600	300	2100
83484	MW-9	300	150	480
83485	MW-5	ND	ND	ND
83486	MW-2	ND	ND	1.0
Detection Limits		15	10	

Notes:

ND = None Detected

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ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

GTEL Report No.
401-144-8928-15

11/14/88
Submitted to:

Gary Robinson
Groundwater Technology, Inc.
2113 Stonington Ave.
Hoffman Estates, IL. 60195

This report previously dated 11/7/88, is a reissue.

Sample Identification:
The attached report covers water samples # 83778-83781 taken on 10/14/88 at site # 401-144-8928, Chicago, Illinois.

Method:
Analysis was performed for polynuclear aromatic hydrocarbons by High Performance Liquid Chromatography as per EPA Method 8310. Analysis was performed using dual UV and Fluorescence detection. Quality Control procedures, including method blanks and matrix spikes were employed to demonstrate accuracy and precision. In case of samples requiring dilutions the footnote give the factor by which the MDL is raised.

Sampling and sample handling and preservation are specified by this laboratory to be as per EPA Method 8310.

Results:
Results are reported in ug/L (ppb).

Prepared by:

Susan L. Uhlir for
Dave Reese
Extractable Organics Manager

Roseanna Dube
Roseanna Dube
Quality Assurance

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GTEL Report No.
401-144-8928-15

Polynuclear Aromatic Hydrocarbons Analysis

Sample No.	83778
Field ID	MW8
Date Sampled	10/14/88
Date Analyzed	10/28/88

Parameter	Concentration ug/L	Detection Limit ug/L
Naphthalene	ND	1.8
Acenathylene	ND	2.3
1-Methylnaphthalene	ND	1.8
2-Methylnaphthalene	ND	1.8
Acenaphthene	ND	1.8
Fluorene	0.27	0.21
Phenanthrene	1.4	0.64
Anthracene	ND	0.66
Fluoranthene	0.37	0.21
Pyrene	ND	0.27
Benzo(a)anthracene	0.13	0.013
Chrysene	ND	0.15
Benzo(b)fluoranthene	0.14	0.018
Benzo(k)fluoranthene	0.069	0.017
Benzo(a)pyrene	0.14	0.023
Dibenz(ah)anthracene	ND	0.030
Benzo(ghi)perylene	ND	0.076
Indeno(1,2,3-cd)pyrene	0.26	0.043

ND = Not Detected

GTEL
ENVIRONMENTAL LABORATORIES, INC.

GTEL Report No.
401-144-8928-15

Polynuclear Aromatic Hydrocarbons Analysis

Sample No.	83779
Field ID	MW9
Date Sampled	10/14/88
Date Analyzed	10/28/88

Parameter	Concentration ug/L	Detection Limit ug/L
Naphthalene	ND	1.8
Acenathylene	ND	2.3
1-Methylnaphthalene	ND	1.8
2-Methylnaphthalene	ND	1.8
Acenaphthene	ND	1.8
Fluorene	ND	0.21
Phenanthrene	ND	0.64
Anthracene	ND	0.66
Fluoranthene	ND	0.21
Pyrene	ND	0.27
Benzo(a)anthracene	0.018	0.013
Chrysene	ND	0.15
Benzo(b)fluoranthene	0.047	0.018
Benzo(k)fluoranthene	0.017	0.017
Benzo(a)pyrene	0.024	0.023
Dibenz(ah)anthracene	ND	0.030
Benzo(ghi)perylene	ND	0.076
Indeno(1,2,3-cd)pyrene	ND	0.043

ND = Not Detected

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GTEL Report No.
401-144-8928-15

Polynuclear Aromatic Hydrocarbons Analysis

Sample No.	83780
Field ID	MW5
Date Sampled	10/14/88
Date Analyzed	10/28/88

Parameter	Concentration ug/L	Detection Limit ug/L
Naphthalene	ND	1.8
Acenathylene	ND	2.3
1-Methylnaphthalene	ND	1.8
2-Methylnaphthalene	ND	1.8
Acenaphthene	ND	1.8
Fluorene	ND	0.21
Phenanthrene	ND	0.64
Anthracene	ND	0.66
Fluoranthene	ND	0.21
Pyrene	ND	0.27
Benzo(a)anthracene	0.062	0.013
Chrysene	ND	0.15
Benzo(b)fluoranthene	0.058	0.018
Benzo(k)fluoranthene	0.027	0.017
Benzo(a)pyrene	0.061	0.023
Dibenz(ah)anthracene	ND	0.030
Benzo(ghi)perylene	ND	0.076
Indeno(1,2,3-cd)pyrene	0.066	0.043

ND = Not Detected

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printed 08/09/2014 1:10PM by Dave.Cambach p. 131/134

GTEL Report No.
401-144-8928-15

Polynuclear Aromatic Hydrocarbons Analysis

Sample No.	83781
Field ID	MW10
Date Sampled	10/14/88
Date Analyzed	10/28/88

Parameter	Concentration ug/L	Detection Limit ug/L
Naphthalene	40	1.8
Acenathylene	ND	2.3
1-Methylnaphthalene	63	1.8
2-Methylnaphthalene	160	1.8
Acenaphthene	ND	1.8
Fluorene	62	0.21
Phenanthrene	180	0.64
Anthracene	230	0.66
Fluoranthene	160	0.21
Pyrene	68	0.27
Benzo(a)anthracene	68	0.013
Chrysene	58	0.15
Benzo(b)fluoranthene	62	0.018
Benzo(k)fluoranthene	32	0.017
Benzo(a)pyrene	69	0.023
Dibenz(ah)anthracene	17	0.030
Benzo(ghi)perylene	62	0.076
Indeno(1,2,3-cd)pyrene	57	0.043
	*1	

ND = Not Detected

*1 = Sample diluted; MDL times 20.

GTEL ENVIRONMENTAL LABORATORIES, INC.

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APPENDIX K

DEED OF PROPERTY

Tank Excavation and Removal
and Site Assessment

Coca-Cola USA
4301 West 36th Street
Chicago, Illinois

GROUNDWATER
TECHNOLOGY, INC.

printed 08/08/2014 1:19PM by Dave.Gambach p. 133/134

No. 823

QUIT CLAIM DEED—Statutory

(INDIVIDUAL TO CORPORATION)

Approved by: Chicago Title and Trust Co. / Chicago Real Estate Board

UHTC 5890378

COOK COUNTY, ILL. FILED FOR RECORD AUG 20 '69 2 12 PM

20 936 445

(The Above Space For Recorder's Use Only)

*20936445

THE GRANTOR Elizabeth Ann Cleary, a spinster

of the City of Chicago County of Cook State of Illinois for the consideration of ---------TEN ($10.00)---------- DOLLARS, and other good and valuable consideration in hand paid, CONVEYS and QUIT CLAIMS to THE COCA-COLA COMPANY

a corporation organized and existing under and by virtue of the laws of the State of Delaware having its principal office in the City of Atlanta County of and State of Georgia all interest in the following described Real Estate situated in the County of Cook and State of Illinois, to wit:

See attached Legal Description.

4.00

AFFIX "RIDERS" OR REVENUE STAMPS HERE

NO TAXABLE CONSIDERATION

hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of the State of Illinois.

DATED this 8th day of August 1969

PLEASE PRINT OR TYPE NAME(S) BELOW SIGNATURE(S)

Elizabeth Ann Cleary (Seal) (Seal)

(Seal) (Seal)

State of Illinois, County of Cook ss., I, the undersigned, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY that

Elizabeth Ann Cleary, a Spinster

personally known to me to be the same person whose name subscribed to the foregoing instrument appeared before me this day in person, and acknowledged that she signed, sealed and delivered the said instrument as her free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

LILLIAN DANIEL NOTARY PUBLIC COOK COUNTY

Given under my hand and official seal, this 5th day of August 1969

Commission expires February 21 1972 Lillian Daniel

NOTARY PUBLIC

ADDRESS OF PROPERTY:

THE ABOVE ADDRESS IS FOR STATISTICAL PURPOSES ONLY AND IS NOT A PART OF THIS DEED.

SEND SUBSEQUENT TAX BILLS TO

(NAME)

(ADDRESS)

MAIL TO: CHICAGO TITLE AND TRUST COMPANY
NAME 111 WEST WASHINGTON
ADDRESS CHICAGO, ILLINOIS 60602
CITY AND STATE ATTN P. BAKER

OR RECORDER'S OFFICE BOX NO. 533

DOCUMENT NUMBER 20 936 445

printed 08/08/2014 1:19PM by Dave.Cambash p. 124/124

Legal Description:

A parcel of land consisting of a part of each of Lots 1, 7 and 8, in County Clerk's Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principal Meridian; said parcel of land being bounded and described as follows:

Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is 861.97 feet south from the North line of said Southeast quarter, and running

thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet;

thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 859.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago;

thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of Section 34, and

thence north along said parallel line, a distance of 719.01 feet to the point of beginning;

containing 276,231 square feet of land, more or less.

20 936 445

END OF RECORDED DOCUMENT

printed 08/08/2014 1:18PM by Dave Gambach p. 1/2

Illinois Environmental Protection Agency 1701 First Avenue, Maywood, IL 60153
312/345-9780

RECEIVED
NOV 18 1988
IEPA-DLPC

Refer to: LPC ~~0310000000~~ 0316580016 - Cook County
4301 W. 36th Street - Coca-Cola USA
Superfund/LUST

November 14, 1988

CERTIFIED MAIL
Return Receipt
#P 584 055 044

Coca-Cola U.S.A.
Post Office Drawer 1734
Atlanta, Georgia, 30303

Attn: Mr. John Palka

Dear Mr. Palka:

This is a follow-up to our telephone conversation on November 10, 1988 regarding the removal of tanks at 4301 W. 36th Street, Chicago, Illinois. The Illinois Environmental Protection Agency is requesting that a report including the following be submitted:

1. A map showing the location and depth of tanks that had been removed. Please also indicate the size and contents of tanks and a report summarizing tank handling and soil disposal activities.

2. A summary of inventory losses for the year prior to removal.

3. Results of any tank and line integrity tests taken over the past year. Indicate type of test.

4. A map showing the location of soil boring placements and the boundaries of the plume as determined from the soil borings. Submit boring logs to the Agency.

5. Information on groundwater monitoring, water elevation and gradient.

6. Analytical results of soil and water samples.

7. Propose recovery options to remove the contaminants.

8. Develop and submit an emergency contingency plan outlining immediate steps to be taken should sewers, streams, and/or buildings become affected by the release. Immediate state notification should be made to the Illinois ESDA communications network at 800/782-7860 and to the local fire department should such emergency conditions arise.

SCREENED
JUL 26 1995
DJH

printed 08/08/2014 1:18PM by Dave.Cambach p. 2/2

These requirements are consistent with the underground waters protection strategy currently being implemented by this Agency, as well as assuring compliance with requirements specified in Illinois Rev. Stat. ch. 111 1/2, Sect. 1012(a) and (d). We shall expect a written reply addressing completion of the above actions submitted in duplicate to the Agency within ten (10) days of receipt of this letter.

Should you have any questions, contact me at 312/345-9780.

Sincerely,

Carmen Y. Yung

Carmen Y. Yung
LUST Program
Field Operations Section
Division of Land Pollution Control

CY:sa:0480S

cc: Steve Colantino, LUST
Ken Moler
Division File
Maywood File

printed 08/08/2014 1:18PM by Dave.Cambosh.p 1/1

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND POLLUTION CONTROL

TELEPHONE CONVERSATION RECORD

Cook COUNTY - LPC

/ SITE INVENTORY NO.

Re: 4301 W. 36th Street, Coca-Cola U.S.A.

Conversation With: John Palka, Coca-Cola

(X) I Called Party ( ) Party Called Me DATE: Nov 10, 88 TIME: 2:30 pm.

What I Said:

(1) How many underground storage tanks were removed? Any release / contamination discovered

(2) Can you send a report detailing tank removal activities and site investigation?

(3) A letter will be sent out to Coca Cola.

What Other Party Said:

(1) A number of tanks were removed, soil borings and monitoring wells installed, found contamination in soil and groundwater, believed the source from off-site. Groundwater Technologies retained, a report would be ready by mid November

(2) Yes, but would appreciate if the Agency can put the request in writing to the attention of John Palka Post Office Drawer 1734 Atlanta Georgia 30303 (404) 676-7396

Carmen Yung

TITLE: LUST Program

LPC 10 1/79 3,000

printed 08/08/2014 1:18PM by Dave.Gambach p. 1/40

BUREAU ID:

0 3 1 6 5 8 0 0 1 6

CATEGORY:

20E

DOCUMENT DATE:

01/10/2013

COMMENT:

L P 8 0 2 2 9

IEPA - DIVISION OF RECORDS MANAGEMENT
RELEASABLE

JAN 10 2013

REVIEWER MED

80-229

DATE: January 3, 2000

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
LISTING OF CHECKS TRANSMITTED TO STATE TREASURER'S OFFICE

DEPOSIT ACCOUNT NUMBER & TITLE: 2370270892 / Haz. Waste Pen. & C/R

Fund: 0828 Account: 101 Agency: 53230

	INCOME	CUSAS	SAMS	Sub-Act	Reference 2
C/R:	LPCC/R	238-000	0127	01	COSTRECOVERY
PEN:	CRTORD or PCBORD	820-000	0582	60 - 63	EPACTPENALTY
INT:	CRTINT or PCBINT	843-061	0794	70 - 73 or 76	PENLTYINTRST

EPA LOG #	REMITTER	BUSINESS ID	SUB	AMOUNT
506217	The Coca-Cola Company Former Coca-Cola PTO/Chicago INCOME TYPE: LPCC/R	0316580016	01	768.08
506220	American Express Former Reichhold Chemical Site/Chicago INCOME TYPE: LPCC/R	0316070001	01	1,517.95
506221	The Fidelity Mutual Life Insurance Airborne Express/Franklin Park INCOME TYPE: LPCC/R	0310965295	01	328.83
506222	Marathon Ashland Petroleum LLC Former Marathon Pipe Line/Chicago INCOME TYPE: LPCC/R	0316555055	01	357.49
506224	City of Chicago Chicago Union Stock Yards/Chicago INCOME TYPE: LPCC/R	0316615267	01	247.30
	INCOME TYPE: LPCC/R			
	INCOME TYPE: LPCC/R			
	INCOME TYPE: LPCC/R			

2/1/00 JM

PAGE TOTAL Batch #_____ Log_____ 3,219.65

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/785-8604
Fax: 217/524-1991

November 19, 1999

Certified # Z 416 149 242

The Coca-Cola Company
Attn: Mr. Gregory J. Koch
One Coca-Cola Plaza
Atlanta, GA 30313

Re: LPC # 0316580016 -- Cook County
Former Coca-Cola PTO, 4301 W. 36th Street/Chicago
SRP/Fiscal

Dear Mr. Koch:

Attached is an itemized statement and supporting documentation for costs incurred and paid by the State at the Former Coca-Cola PTO, 4301 W. 36th Street site in Chicago for the time period inception through September, 1999. This bill is pursuant to the signed Service Agreement dated April 8, 1999.

Also included in this bill is the No Further Remediation Assessment amount, which is due for the Former Coca-Cola PTO, 4301 W. 36th Street site in Chicago. This amount is pursuant to Title 17 of the Act (415 ILCS 5/58.10).

The total amount is due within 45 days of receipt of this request. Please follow the instructions below:

1. Checks should be made payable to:
   Treasurer - State of Illinois
   For Deposit into the Hazardous Waste Fund

2. Please identify your federal employer identification number (FEIN) or Social Security Number on your check.

3. Please write your LPC number on your check.

4. Mail your remittance, along with a copy of the bill to:
   Illinois Environmental Protection Agency
   Division of Administration, Fiscal Services Section
   1021 North Grand Avenue East - P.O. Box 19276
   Springfield, IL 62794-9276

printed 08/08/2014 1:18PM by Dave.Gambach p. 4/40

If you have any questions concerning this, please contact the Project Manager identified on the attached bill.

Sincerely,

Mary Remmers

Mary Remmers, Manager
Financial Management Unit
Planning & Reporting Section
Bureau of Land

MR:GM:ah

Attachment

bc: Division File
Ginger Miller
Jay Gaydosh

INVOICE #
80-229-1

BILLING DATE: NOVEMBER 19, 1999

STATEMENT OF IEPA COSTS INCURRED & PAID

INCEPTION THROUGH SEPTEMBER 1999

FOR FORMER COCA-COLA PTO, 4301 WEST 36TH STREET/CHICAGO

LPC #0316580016

PERSONAL SERVICES, FRINGE BENEFITS, ALLOCATED AND INDIRECT		$634.04
TRAVEL		0
CONTRACTUAL	PROFESSIONAL SERVICES	0
	LABORATORY SERVICES	0
	OTHER	0
SUPPLIES		0
NFR ASSESSMENT		$634.04
SUBTOTAL		$1,268.08
PREPAYMENT		($500.00)
TOTAL PAYMENT DUE WITHIN 45 DAYS		$768.08

ANY QUESTIONS SHOULD BE DIRECTED TO:

JAY GAYDOSH, PROJECT MANAGER
LEAKING UNDERGROUND STORAGE TANK SECTION
DIVISION OF REMEDIATION MANAGEMENT
PHONE # 217/785-0231

IN ORDER TO RECEIVE PROPER CREDIT, PLEASE RETURN A COPY OF THIS PAGE WITH YOUR REMITTANCE.

COCA COLA USA/CHICAGO
LP 80 229

Assgn Div	Unit Code	Pay Prd	Employee	Total Hours	Amount Total	Allocated Program Costs	Indirect	Total Cost
LP	L	9915	GAYDOSH JAY F	10.00	319.15			
			Fiscal Year: 00		319.15	84.85	166.97	570.97
LP	W	9908	O'HARA ROBERT E	1.50	45.07			
			Fiscal Year: 99		45.07	1.03	16.97	63.07
			Assigned Division: LP		364.22	85.88	183.94	634.04
			Grand Total		364.22	85.88	183.94	634.04

80-229

Z 416 149 242

24

US Postal Service GMIMR

Receipt for Certified Mail

No Insurance Coverage Provided.

(See reverse)

The Coca-Cola Company
Mr. Gregory J. Koch
One Coca-Cola Plaza
Atlanta, GA 30313

Postage	$
Certified Fee	1.40
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	1.25
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form 3800, April 1995

80-229

SENDER:

- ☐ Complete items 1 and/or 2 for additional services. Complete items 3, 4a, and 4b.
- ☐ Print your name and address on the reverse of this form so that we can return this card to you.
- ☐ Attach this form to the front of the mailpiece, or on the back if space does not permit.
- ☐ Write *"Return Receipt Requested"* on the mailpiece below the article number.
- ☐ The Return Receipt will show to whom the article was delivered and the date delivered.

GM/MR

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

24

3. Article Addressed to:

The Coca-Cola Company
Mr. Gregory J. Koch
One Coca-Cola Plaza
Atlanta, GA 30313

4a. Article Number
Z 416 149 242

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
11/12/99

5. Received By: *(Print Name)*

8. Addressee's Address *(Only if requested and fee is paid)*

6. Signature

PS Form 38

Is your RETURN ADDRESS completed on the reverse side?

Thank you for using Return Receipt Service.

From: GINGER MILLER
To: Gaydosh, Jay
Date: 11/17/99 2:00PM
Subject: Coca Cola USA

Jay, I downloaded this file through September (the date of the revised NFR) expecting to see additional charges for the time for the NFR revision. There was no time charged in September. Do you recall where you charged your time when you was working on this revision?

Thanks

Ginger

From: Jay Gaydosh
To: MILLER, GINGER
Date: 11/17/99 2:30PM
Subject: Re: Coca Cola USA

I looked through my time sheets and couldn't find any time attributed to work at the Former Coca Cola USE site. The reissuance on the NFR would have taken under 1 hour approximately three days prior to the date the Reissued NFR was mailed.

Could you include the SRP number in furure requests? It makes for a quicker response and easier search.

Thanks, Jay G.

printed 08/08/2014 1:18PM by Dave.Gambach p. 10/40

80-229

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/782-6762

CERTIFIED MAIL
2414155813

SEP 24 1999

The Coca-Cola Company
Attention: Gregory J. Koch
One Coca-Cola Plaza
Atlanta, Georgia 30313

Re: LPC #0316580016 -- Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Mr. Koch:

The Site Investigation Report and the Remedial Action Completion Report ("Report") (dated April 4, 1999, Log No. 99-701), as prepared by Conestoga-Rovers & Associates for the former Coca-Cola PTO property, has been reviewed by the Illinois Environmental Protection Agency ("Illinois EPA"). The Report demonstrates that the remedial action was successfully completed. Note: This NFR letter is being reissued to correct the Parcel Index Number listed on the Environmental Notice.

The remediation site, consisting of 6.7 acres, is legally described in the attached Environmental Notice and is commonly known as 4301 West 36th Street, Chicago, Illinois. Pursuant to Section 58.10 of the Environmental Protection Act ("Act") (415 ILCS 5/58.10), your request for a "No Further Remediation Determination" is granted under the conditions and terms specified in this No Further Remediation Letter ("Letter").

Issuance of this focused Letter signifies a release from further responsibilities under the Act in performing the approved remedial action. The Letter shall be considered prima facie evidence that the remediation site described in the attached Site Remediation Program ("SRP") Environmental Notice and shown in the attached Site Base Map does not constitute a threat to human health and the environment for the specified recognized environmental conditions so long as the site is utilized in accordance with the terms of this Letter.

printed 08/08/2014 1:18PM by Dave.Gambach p. 11/40

CONDITIONS AND TERMS OF APPROVAL

LEVEL OF REMEDIATION AND LAND USE LIMITATIONS

1. The recognized environmental conditions, as characterized in the above-referenced Report, are identified in Table A.

2. The remediation objectives for the above-referenced site described in the SRP Environmental Notice of this Letter were established in accordance with the requirements of the Tiered Approach to Corrective Action Objectives (TACO, 35 Illinois Administrative Code Part 742) rules.

3. In accordance with Section 58.8(c) and 58.10(b)(3)of the Act (415 ILCS 5/58.8(c), 415 ILCS 5/58.10(b)(3)), the remediation site described in the attached SRP Environmental Notice and shown on the attached Site Base Map of this Letter is limited to residential or industrial/ commercial uses.

4. The land use specified in this Letter may be revised if:

   a) Further investigation or remedial action has been conducted that documents the attainment of objectives appropriate for the new land use; and

   b) A new Letter is obtained and recorded in accordance with Title XVII of the Act and regulations adopted thereunder.

PREVENTIVE, ENGINEERING, AND INSTITUTIONAL CONTROLS

5. Preventive: None.

   Engineering: None.

   Institutional: Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") effectively prohibits the installation of potable water supply wells (and the use of such wells) and is an acceptable institutional control under the following conditions:

   Each affected property owner and the City of Chicago must receive written notification from the Remediation Applicant desiring to use the ordinance as an institutional control that groundwater remediation objectives have been approved by the Illinois EPA. Written proof of this notification shall be submitted to the Illinois EPA within 45 days from the date of this Letter. The notification shall include:

   a) The name and address of the local unit of government;

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b) The citation of the ordinance used as an institutional control in this Letter.

c) A description of the property being sent notice by adequate legal description or by reference to a plat showing the boundaries;

d) A statement that the ordinance restricting the groundwater use has been used by the Illinois EPA in reviewing a request for groundwater remediation objectives;

e) A statement as to the nature of the release and response action with the name, address, and Illinois EPA inventory identification number; and

f) A statement as to where more information may be obtained regarding the ordinance.

The following activities shall be grounds for voidance of the ordinance as an institutional control and this Letter:

a) Modification of the reference ordinance to allow potable uses of groundwater;

b) Approval of a site-specific request, such as a variance, to allow use of groundwater at the site;

c) Violation of the terms of an institutional control recorded.

As a part of its corrective action plan, the remediation site has relied upon Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, prohibiting potable uses of groundwater as defined therein. Proof of notification of affected parties, if any, shall be submitted in accordance with 35 Ill. Adm. Code 742.1015(b) and (c) within 45 days of the issuance of this NFR Letter.

6. Failure to establish, operate and maintain controls in full compliance with the Act, applicable regulations, and the above-referenced Report may result in voidance of this Letter.

OTHER TERMS

7. Any contaminated soil or groundwater that is removed, excavated, or disturbed from the above-referenced site must be handled in accordance with all applicable laws and regulations.

printed 08/08/2014 1:18PM by Dave.Gambach p. 13/40

8. Where the Remediation Applicant is not the sole owner of the remediation site, the Remediation Applicant shall complete the attached "Property Owner Certification of NFR Letter Under the Site Remediation Program" form. This certification by original signature of each property owner, or the authorized agent of the owner(s), of the remediation site or any portion thereof who is not a Remediation Applicant shall be recorded along with this Letter.

9. Further information regarding this remediation site can be obtained through a written request under the Freedom of Information Act (5 ILCS 140) to:

   Illinois Environmental Protection Agency
   Attention: Freedom of Information Act Officer
   Bureau of Land -- #24
   1021 North Grand Avenue East
   Post Office Box 19276
   Springfield, IL 62794-9276

10. Pursuant to Section 58.10(f) of the Act (415 ILCS 5/58.10(f)), should the Illinois EPA seek to void this Letter, the Illinois EPA shall provide notice to the current title holder and to the Remediation Applicant at the last known address. The notice shall specify the cause for the voidance, explain the provisions for appeal, and describe the facts in support of this cause. Specific acts or omissions that may result in the voidance of this Letter under Sections 58.10(e)(1)-(7) of the Act (415 ILCS 5/58.10(e)(1)-(7)) include, but shall not be limited to:

    a) Any violation of institutional controls or the designated land use restrictions;

    b) The failure to operate and maintain preventive or engineering controls or to comply with any applicable groundwater monitoring plan;

    c) The disturbance or removal of contamination that has been left in place in accordance with the above-referenced Report. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected consistent with the above-referenced Report;

    d) The failure to comply with the recording requirements for this Letter;

    e) Obtaining the Letter by fraud or misrepresentation;

    f) Subsequent discovery of contaminants, not identified as part of the investigative or remedial activities upon which the issuance of the Letter was based, that pose a threat to human health or the environment;

    g) The failure to pay the No Further Remediation Assessment Fee within 45 days after receiving a request for payment from the Illinois EPA;

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h) The failure to pay in full the applicable fees under the Review and Evaluation Services Agreement within 45 days after receiving a request for payment from the Illinois EPA.

11. Pursuant to Section 58.10(d) of the Act, this Letter shall apply in favor of the following persons:

a) The Coca-Cola Company;

b) The owner and operator of the remediation site;

c) Any parent corporation or subsidiary of the owner of the remediation site;

d) Any co-owner, either by joint-tenancy, right of survivorship, or any other party sharing a relationship with the owner of the remediation site;

e) Any holder of a beneficial interest of a land trust or inter vivos trust, whether revocable or irrevocable, involving the remediation site;

f) Any mortgagee or trustee of a deed of trust of the owner of the remediation site or any assignee, transferee, or any successor-in-interest of the owner of the remediation site;

g). Any successor-in-interest of the owner of the remediation site;

h) Any transferee of the owner of the remediation site whether the transfer was by sale, bankruptcy proceeding, partition, dissolution of marriage, settlement or adjudication of any civil action, charitable gift, or bequest;

i) Any heir or devisee of the owner of the remediation site;

j) Any financial institution, as that term is defined in Section 2 of the Illinois Banking Act and to include the Illinois Housing Development Authority, that has acquired the ownership, operation, management, or control of the remediation site through foreclosure or under the terms of a security interest held by the financial institution, under the terms of an extension of credit made by the financial institution, or any successor in interest thereto; or

k) In the case of a fiduciary (other than a land trustee), the estate, trust estate, or other interest in property held in a fiduciary capacity, and a trustee, executor, administrator, guardian, receiver, conservator, or other person who holds the remediated site in a fiduciary capacity, or a transferee of such party.

12. This Letter, including all attachments, must be recorded as a single instrument with the Office of the Recorder or Registrar of Titles of Cook County. For recording purposes, the SRP Environmental Notice attached to this Letter should be the first page of the instrument filed. In addition, the City of Chicago's Memorandum of Understanding must be filed as an

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attachment of this Letter with the Office of the Recorder or Registrar of Titles of Cook County. This Letter shall not be effective until officially recorded by the Office of the Recorder or Registrar of Titles of Cook County in accordance with Illinois law so that it forms a permanent part of the chain of title for the Former Coca-Cola PTO property. Within 30 days of this Letter being recorded by the Office of the Recorder or Registrar of Titles of Cook County, a certified copy of this Letter and all attachments, as recorded, shall be obtained and submitted to the Illinois EPA as indicated below.

Mr. Robert O'Hara
Illinois Environmental Protection Agency
Bureau of Land/RPM Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

13. In accordance with Section 58.10(g) of the Act, a No Further Remediation Assessment Fee based on the costs incurred for the remediation site by the Illinois EPA for review and evaluation services will be applied in addition to the fees applicable under the Review and Evaluation Services Agreement. Request for payment of the No Further Remediation Assessment Fee will be included with the final billing statement.

If you have any questions regarding this correspondence, you may contact the Illinois EPA project manager, Jay F. Gaydosh, at 217/785-0231.

Sincerely,

Hernando A. Albarracin

Hernando A. Albarracin
Unit Manager
Leaking Underground Storage Tank Section
Division of Remediation Management
Bureau of Land

bcc: Hernando Albarracin
Division
Jay Gaydosh
Ginger Miller
Bob O'Hara

HAA:JFG:ct\991433.WPD

Enclosures: SRP Environmental Notice
Table A
Site Base Map
Property Owner Certification Form
Chicago Memorandum of Understanding

cc: Conestoga-Rovers & Associates

PREPARED BY:

Name: Former Coca-Cola PTO

Address: 4301 West 36th Street
Chicago, Illinois 60632

RETURN TO:

Name: The Coca-Cola Company
Attn: Gregory J. Koch

Address: One Coca-Cola Plaza
Atlanta, GA 30313

THE ABOVE SPACE FOR RECORDER'S OFFICE

THIS ENVIRONMENTAL NO FURTHER REMEDIATION LETTER MUST BE SUBMITTED BY THE REMEDIATION APPLICANT, WITHIN 45 DAYS OF ITS RECEIPT, TO THE OFFICE OF THE RECORDER OR REGISTRAR OF TITLES OF COOK COUNTY.

Illinois State EPA Number: 0316580016
The Coca-Cola Company, the Remediation Applicant, whose address is One Coca-Cola Plaza, Atlanta, GA, has performed investigative and/or remedial activities for the remediation site depicted on the attached Site Base Map and which remediation site can be identified by the following:

1. Legal description or Reference to a Plat Showing the Boundaries:

   A parcel of land consisting of a part of Lots 1, 7, and 8, in County Clerks Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principle Meridian; said parcel of land being bounded and described as follows:

   Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is 861.97 feet south from the North line of said Southeast quarter, and running thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet; thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 859.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago; thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southwest quarter of Section 34, and thence north along said parallel line, a distance of 719.01 feet to the point of beginning; containing 276,231 square feet of land, more or less.

printed 08/08/2014 1:18PM by Dave.Gambach p. 17/40

2. Common Address: 4301 West 36th Street, Chicago, Illinois

3. Real Estate Tax Index/Parcel Index Numbers: 16-34-400-006-0000, 16-34-400-018-000

4. Remediation Site Owner: The Coca-Cola Company

5. Land Use Limitation: Residential or Industrial/Commercial

6. Site Investigation: Focused

See attached No Further Remediation Letter for other terms.

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Table A: Contaminants of Concern

Volatiles

CAS No.	Compound Name
71-43-2	Benzene
75-25-2	Bromoform
56-23-5	Carbon tetrachloride
108-90-7	Chlorobenzene
67-66-3	Chloroform
107-06-2	1,2-Dichloroethane
75-35-4	1,1-Dichloroethene
156-60-5	trans-1,2-Dichloroethene
78-87-5	1,2-Dichloropropane
542-75-6	1,3-Dichloropropene
10-41-4	Ethylbenzene
127-18-4	Tetrachloroethene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethene
75-01-4	Vinyl chloride
1330-210-7	Xylenes (total)

Polynuclear Aromatics

CAS No.	Compound Name
83-32-9	Acenaphthene
120-12-7	Anthracene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene
206-44-0	Fluoranthene
86-73-7	Fluorene
193-39-5	Indeno(1,2,3-c,d)pyrene
91-20-3	Naphthalene
129-00-0	Pyrene
208-96-8	Acenaphthalene
191-24-2	Benzo(g,h,i)perylene
85-01-8	Phenanthrene

PROPERTY OWNER CERTIFICATION OF NFR LETTER UNDER THE SITE REMEDIATION PROGRAM

If the Remediation Applicant is not the sole owner of the remediation site, include the full legal name, title, the company, the street address, the city, the state, the ZIP Code, and the telephone number of all other property owners. Include the site name, street address, city, ZIP code, county, Illinois Inventory I.D. number and real estate tax index/parcel index number. The property owner(s), or the duly authorized agent of the owner(s) must certify, by original signature, the statement appearing below.

A duly authorized agent means a person who is authorized by written consent or by law to act on behalf of a property owner including, but not limited to:

1. For corporations, a principal executive officer of at least the level of vice-president;
2. For a sole proprietorship or partnership, the proprietor or a general partner, respectively; and
3. For a municipality, state or other public Agency, the head of the Agency or ranking elected official.

For multiple property owners, attach additional sheets containing the information described above, along with a signed, dated certification for each. All property owner certifications must be recorded along with the attached No Further Remediation Letter.

Property Owner Information

Owner's Name: _____

Title: _____

Company: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____ Phone: _____

Site Information

Site Name: _____

Site Address: _____

City: _____ State: _____ Zip Code: _____ County: _____

Illinois Inventory ID Number: _____

Real Estate Tax Index/Parcel Index No. _____

I hereby certify that I have reviewed the attached No Further Remediation Letter, and that I accept the terms and conditions and any land use limitations set forth in the Letter.

Owner's Signature: _____ Date: _____

SUBSCRIBED AND SWORN TO BEFORE ME
this _____ day of _____, 19__

_____
Notary Public

The Illinois EPA is authorized to require this information under Sections 415 ILCS 5/58 - 58.12 of the Environmental Protection Act and regulations promulgated thereunder. If the Remediation Applicant is not also the sole owner of the remediation site, this form must be completed by all owners of the remediation site and recorded with the NFR Letter. Failure to do so may void the NFR Letter. This form has been approved by the Forms Management Center. All information submitted to the Site Remediation Program is available to the public except when specifically designated by the Remediation Applicant to be treated confidentially as a trade secret or secret process in accordance with the Illinois Compiled Statutes, Section 7(a) of the Environmental Protection Act, applicable Rules and Regulations of the Illinois Pollution Control Board and applicable Illinois EPA rules and guidelines.

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276
THOMAS V. SKINNER, DIRECTOR

RECORDING REQUIREMENTS FOR NO FURTHER REMEDIATION LETTERS

Introduction

The Illinois EPA's Bureau of Land (BOL) issues a No Further Remediation (NFR) Letter at the completion of site remediation activities under the LUST Program and the SRP. The letter signifies that 1) the person conducting remediation has satisfied the respective BOL laws and regulations, and 2) that no further remediation is necessary to protect human health and the environment for the property described in the letter, so long as the site is used in accordance with the terms of the NFR letter.

Significance

When properly recorded, the NFR Letter holds legal significance for all applicable parties outlined in the Illinois Environmental Protection Act for the program in question. (See 415 ILCS 5/57.10(d) and 58.10(d)). However, if not properly recorded, the NFR Letter *holds no legal significance for anyone*. Furthermore, if not properly recorded, the Illinois EPA *will* take steps to void the NFR letter in accordance with the regulations pertaining to the program under which the remediation was performed.

Duty to Record

The duty to record the NFR Letter is *mandatory*. You *must* submit the letter to the Office of the Recorder or the Registrar of Titles of the county where the site is located *within 45 days after receipt of the letter*. You must record both the NFR Letter and the Environmental Notice. The letter must be recorded in accordance with Illinois law so that it forms a permanent part of the chain of title to ensure current and future users of the property will be informed of the conditions of the institutional controls. A certified copy of the letter as recorded must be sent to the Illinois EPA. Failure to record the NFR Letter in accordance with the regulations will make the letter voidable.

For More Information

Please refer to Tiered Approach to Corrective Action Objectives (TACO) Fact Sheet 3 available from the Illinois EPA by calling 1-888-299-9533 or contact the project manager whom you have been working with in the BOL.

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80-229

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

THOMAS V. SKINNER, DIRECTOR

217/782-6762

AUG 11 1999

CERTIFIED MAIL

P344297902

The Coca-Cola Company
Attention: Gregory J. Koch
One Coca-Cola Plaza
Atlanta, Georgia 30313

Re: LPC #0316580016 -- Cook County
Chicago/Former Coca-Cola PTO
4301 West 36th Street
Project Code LP80-229
Site Remediation Technical

Dear Mr. Koch:

The Site Investigation Report and the Remedial Action Completion Report ("Report") (dated April 4, 1999, Log No. 99-701), as prepared by Conestoga-Rovers & Associates for the former Coca-Cola PTO property, has been reviewed by the Illinois Environmental Protection Agency ("Illinois EPA"). The Report demonstrates that the remedial action was successfully completed.

The remediation site, consisting of 6.7 acres, is legally described in the attached Environmental Notice and is commonly known as 4301 West 36th Street, Chicago, Illinois. Pursuant to Section 58.10 of the Environmental Protection Act ("Act") (415 ILCS 5/58.10), your request for a "No Further Remediation Determination" is granted under the conditions and terms specified in this No Further Remediation Letter ("Letter").

Issuance of this focused Letter signifies a release from further responsibilities under the Act in performing the approved remedial action. The Letter shall be considered prima facie evidence that the remediation site described in the attached Site Remediation Program ("SRP") Environmental Notice and shown in the attached Site Base Map does not constitute a threat to human health and the environment for the specified recognized environmental conditions so long as the site is utilized in accordance with the terms of this Letter.

CONDITIONS AND TERMS OF APPROVAL

LEVEL OF REMEDIATION AND LAND USE LIMITATIONS

1. The recognized environmental conditions, as characterized in the above-referenced Report, are identified in Table A.

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2. The remediation objectives for the above-referenced site described in the SRP Environmental Notice of this Letter were established in accordance with the requirements of the Tiered Approach to Corrective Action Objectives (TACO, 35 Illinois Administrative Code Part 742) rules.

3. In accordance with Section 58.8(c) and 58.10(b)(3)of the Act (415 ILCS 5/58.8(c), 415 ILCS 5/58.10(b)(3)), the remediation site described in the attached SRP Environmental Notice and shown on the attached Site Base Map of this Letter is limited to residential or industrial/ commercial uses.

4. The land use specified in this Letter may be revised if:

   a) Further investigation or remedial action has been conducted that documents the attainment of objectives appropriate for the new land use; and

   b) A new Letter is obtained and recorded in accordance with Title XVII of the Act and regulations adopted thereunder.

PREVENTIVE, ENGINEERING, AND INSTITUTIONAL CONTROLS

5. Preventive: None.

   Engineering: None.

   Institutional: Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago as amended by Ordinance Number 097990 ("Potable Water Supply Well Ordinance") effectively prohibits the installation of potable water supply wells (and the use of such wells) and is an acceptable institutional control under the following conditions:

   Each affected property owner and the City of Chicago must receive written notification from the Remediation Applicant desiring to use the ordinance as an institutional control that groundwater remediation objectives have been approved by the Illinois EPA. Written proof of this notification shall be submitted to the Illinois EPA within 45 days from the date of this Letter. The notification shall include:

   a) The name and address of the local unit of government;

   b) The citation of the ordinance used as an institutional control in this Letter.

   c) A description of the property being sent notice by adequate legal description or by reference to a plat showing the boundaries;

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d) A statement that the ordinance restricting the groundwater use has been used by the Illinois EPA in reviewing a request for groundwater remediation objectives;

e) A statement as to the nature of the release and response action with the name, address, and Illinois EPA inventory identification number; and

f) A statement as to where more information may be obtained regarding the ordinance.

The following activities shall be grounds for voidance of the ordinance as an institutional control and this Letter:

a) Modification of the reference ordinance to allow potable uses of groundwater;

b) Approval of a site-specific request, such as a variance, to allow use of groundwater at the site;

c) Violation of the terms of an institutional control recorded.

As a part of its corrective action plan, the remediation site has relied upon Sections 11-8-385 and 11-8-390 of the Municipal Code of Chicago, as amended by Ordinance No. 097990, prohibiting potable uses of groundwater as defined therein. Proof of notification of affected parties, if any, shall be submitted in accordance with 35 Ill. Adm. Code 742.1015(b) and (c) within 45 days of the issuance of this NFR Letter.

6. Failure to establish, operate and maintain controls in full compliance with the Act, applicable regulations, and the above-referenced Report may result in voidance of this Letter.

OTHER TERMS

7. Any contaminated soil or groundwater that is removed, excavated, or disturbed from the above-referenced site must be handled in accordance with all applicable laws and regulations.

8. Where the Remediation Applicant is not the sole owner of the remediation site, the Remediation Applicant shall complete the attached "Property Owner Certification of NFR Letter Under the Site Remediation Program" form. This certification by original signature of each property owner, or the authorized agent of the owner(s), of the remediation site or any portion thereof who is not a Remediation Applicant shall be recorded along with this Letter.

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9. Further information regarding this remediation site can be obtained through a written request under the Freedom of Information Act (5 ILCS 140) to:

   Illinois Environmental Protection Agency
   Attention: Freedom of Information Act Officer
   Bureau of Land -- #24
   1021 North Grand Avenue East
   Post Office Box 19276
   Springfield, IL 62794-9276

10. Pursuant to Section 58.10(f) of the Act (415 ILCS 5/58.10(f)), should the Illinois EPA seek to void this Letter, the Illinois EPA shall provide notice to the current title holder and to the Remediation Applicant at the last known address. The notice shall specify the cause for the voidance, explain the provisions for appeal, and describe the facts in support of this cause. Specific acts or omissions that may result in the voidance of this Letter under Sections 58.10(e)(1)-(7) of the Act (415 ILCS 5/58.10(e)(1)-(7)) include, but shall not be limited to:

    a) Any violation of institutional controls or the designated land use restrictions;

    b) The failure to operate and maintain preventive or engineering controls or to comply with any applicable groundwater monitoring plan;

    c) The disturbance or removal of contamination that has been left in place in accordance with the above-referenced Report. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected consistent with the above-referenced Report;

    d) The failure to comply with the recording requirements for this Letter;

    e) Obtaining the Letter by fraud or misrepresentation;

    f) Subsequent discovery of contaminants, not identified as part of the investigative or remedial activities upon which the issuance of the Letter was based, that pose a threat to human health or the environment;

    g) The failure to pay the No Further Remediation Assessment Fee within 45 days after receiving a request for payment from the Illinois EPA;

    h) The failure to pay in full the applicable fees under the Review and Evaluation Services Agreement within 45 days after receiving a request for payment from the Illinois EPA.

11. Pursuant to Section 58.10(d) of the Act, this Letter shall apply in favor of the following persons:

    a) The Coca-Cola Company;

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b) The owner and operator of the remediation site;

c) Any parent corporation or subsidiary of the owner of the remediation site;

d) Any co-owner, either by joint-tenancy, right of survivorship, or any other party sharing a relationship with the owner of the remediation site;

e) Any holder of a beneficial interest of a land trust or inter vivos trust, whether revocable or irrevocable, involving the remediation site;

f) Any mortgagee or trustee of a deed of trust of the owner of the remediation site or any assignee, transferee, or any successor-in-interest of the owner of the remediation site;

g) Any successor-in-interest of the owner of the remediation site;

h) Any transferee of the owner of the remediation site whether the transfer was by sale, bankruptcy proceeding, partition, dissolution of marriage, settlement or adjudication of any civil action, charitable gift, or bequest;

i) Any heir or devisee of the owner of the remediation site;

j) Any financial institution, as that term is defined in Section 2 of the Illinois Banking Act and to include the Illinois Housing Development Authority, that has acquired the ownership, operation, management, or control of the remediation site through foreclosure or under the terms of a security interest held by the financial institution, under the terms of an extension of credit made by the financial institution, or any successor in interest thereto; or

k) In the case of a fiduciary (other than a land trustee), the estate, trust estate, or other interest in property held in a fiduciary capacity, and a trustee, executor, administrator, guardian, receiver, conservator, or other person who holds the remediated site in a fiduciary capacity, or a transferee of such party.

12. This Letter, including all attachments, must be recorded as a single instrument with the Office of the Recorder or Registrar of Titles of Cook County. For recording purposes, the SRP Environmental Notice attached to this Letter should be the first page of the instrument filed. In addition, the City of Chicago's Memorandum of Understanding must be filed as an attachment of this Letter with the Office of the Recorder or Registrar of Titles of Cook County. This Letter shall not be effective until officially recorded by the Office of the Recorder or Registrar of Titles of Cook County in accordance with Illinois law so that it forms a permanent part of the chain of title for the Former Coca-Cola PTO property. Within 30 days of this Letter being recorded by the Office of the Recorder or Registrar of Titles of Cook County, a certified copy of this Letter and all attachments, as recorded, shall be obtained and submitted to the Illinois EPA as indicated below.

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Mr. Robert O'Hara
Illinois Environmental Protection Agency
Bureau of Land/RPM Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

13. In accordance with Section 58.10(g) of the Act, a No Further Remediation Assessment Fee based on the costs incurred for the remediation site by the Illinois EPA for review and evaluation services will be applied in addition to the fees applicable under the Review and Evaluation Services Agreement. Request for payment of the No Further Remediation Assessment Fee will be included with the final billing statement.

If you have any questions regarding this correspondence, you may contact the Illinois EPA project manager, Jay F. Gaydosh, at 217/785-0231.

Sincerely,

Hernando A. Albarracin

Hernando A. Albarracin
Unit Manager
Leaking Underground Storage Tank Section
Division of Remediation Management
Bureau of Land

HAA:JFG:ct\991433.FRM

Enclosures: SRP Environmental Notice
Table A
Site Base Map
Property Owner Certification Form
Chicago Memorandum of Understanding

cc: Conestoga-Rovers & Associates

bcc: Division
Hernando Albarracin, w/o MOU
Jay Gaydosh, w/o MOU
Ginger Miller, w/o MOU
Bob O'Hara, w/o MOU

Table A: Contaminants of Concern

Volatiles

CAS No.	Compound Name
71-43-2	Benzene
75-25-2	Bromoform
56-23-5	Carbon tetrachloride
108-90-7	Chlorobenzene
67-66-3	Chloroform
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75-35-4	1,1-Dichloroethene
156-60-5	trans-1,2-Dichloroethene
78-87-5	1,2-Dichloropropane
542-75-6	1,3-Dichloropropene
10-41-4	Ethylbenzene
127-18-4	Tetrachloroethene
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethene
75-01-4	Vinyl chloride
1330-210-7	Xylenes (total)

Polynuclear Aromatics

CAS No.	Compound Name
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120-12-7	Anthracene
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205-99-2	Benzo(b)fluoranthene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene
206-44-0	Fluoranthene
86-73-7	Fluorene
193-39-5	Indeno(1,2,3-c,d)pyrene
91-20-3	Naphthalene
129-00-0	Pyrene
208-96-8	Acenaphthalene
191-24-2	Benzo(g,h,i)perylene
85-01-8	Phenanthrene

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PREPARED BY:

Name: Former Coca-Cola PTO

Address: 4301 West 36th Street
Chicago, Illinois 60632

RETURN TO:

Name: The Coca-Cola Company
Attn: Gregory J. Koch

Address: One Coca-Cola Plaza
Atlanta, GA 30313

THE ABOVE SPACE FOR RECORDER'S OFFICE

THIS ENVIRONMENTAL NO FURTHER REMEDIATION LETTER MUST BE SUBMITTED BY THE REMEDIATION APPLICANT, WITHIN 45 DAYS OF ITS RECEIPT, TO THE OFFICE OF THE RECORDER OR REGISTRAR OF TITLES OF COOK COUNTY.

Illinois State EPA Number: 0316580016
The Coca-Cola Company, the Remediation Applicant, whose address is One Coca-Cola Plaza, Atlanta, GA, has performed investigative and/or remedial activities for the remediation site depicted on the attached Site Base Map and which remediation site can be identified by the following:

1. Legal description or Reference to a Plat Showing the Boundaries:

   A parcel of land consisting of a part of Lots 1, 7, and 8, in County Clerks Division of the West half of the Southeast quarter of Section 34, Township 39 North, Range 13 East of the third Principle Meridian; said parcel of land being bounded and described as follows:

   Beginning on a line which is 2230.00 feet west from and parallel with the East line of the Southeast quarter of said Section 34 at a point thereon which is 861.97 feet south from the North line of said Southeast quarter, and running thence west along a line parallel with the East and West center line of said Section 34, a distance of 350.00 feet; thence south along a line which is 2580.00 feet west from and parallel with the East line of said Southeast quarter of Section 34, a distance of 859.45 feet to its intersection with a line which is 315.00 feet, measured perpendicularly, northwesterly from and parallel with the Northwesterly line of the lands of the Metropolitan Sanitary District of Greater Chicago; thence northeastwardly along the last described parallel line, a distance of 377.12 feet to its intersection with said line which is 2230.00 feet west from and parallel with the East line of the Southwest quarter of Section 34, and thence north along said parallel line, a distance of 719.01 feet to the point of beginning; containing 276,231 square feet of land, more or less.

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2. Common Address: 4301 West 36th Street, Chicago, Illinois

3. Real Estate Tax Index/Parcel Index Numbers:

   S-020499-WP-001
   S-020499-WP-002
   S-020499-WP-003
   S-020499-WP-004
   S-020499-WP-005
   S-020499-WP-006
   S-020499-WP-007
   GW-020499-WP-008
   S-020499-WP-009
   S-020499-WP-010
   S-020499-WP-011
   GW-020499-WP-012
   S-020499-WP-013
   S-020499-WP-014
   S-020499-WP-015

4. Remediation Site Owner: The Coca-Cola Company

5. Land Use Limitation: Residential or Industrial/Commercial

6. Site Investigation: Focused

See attached No Further Remediation Letter for other terms.

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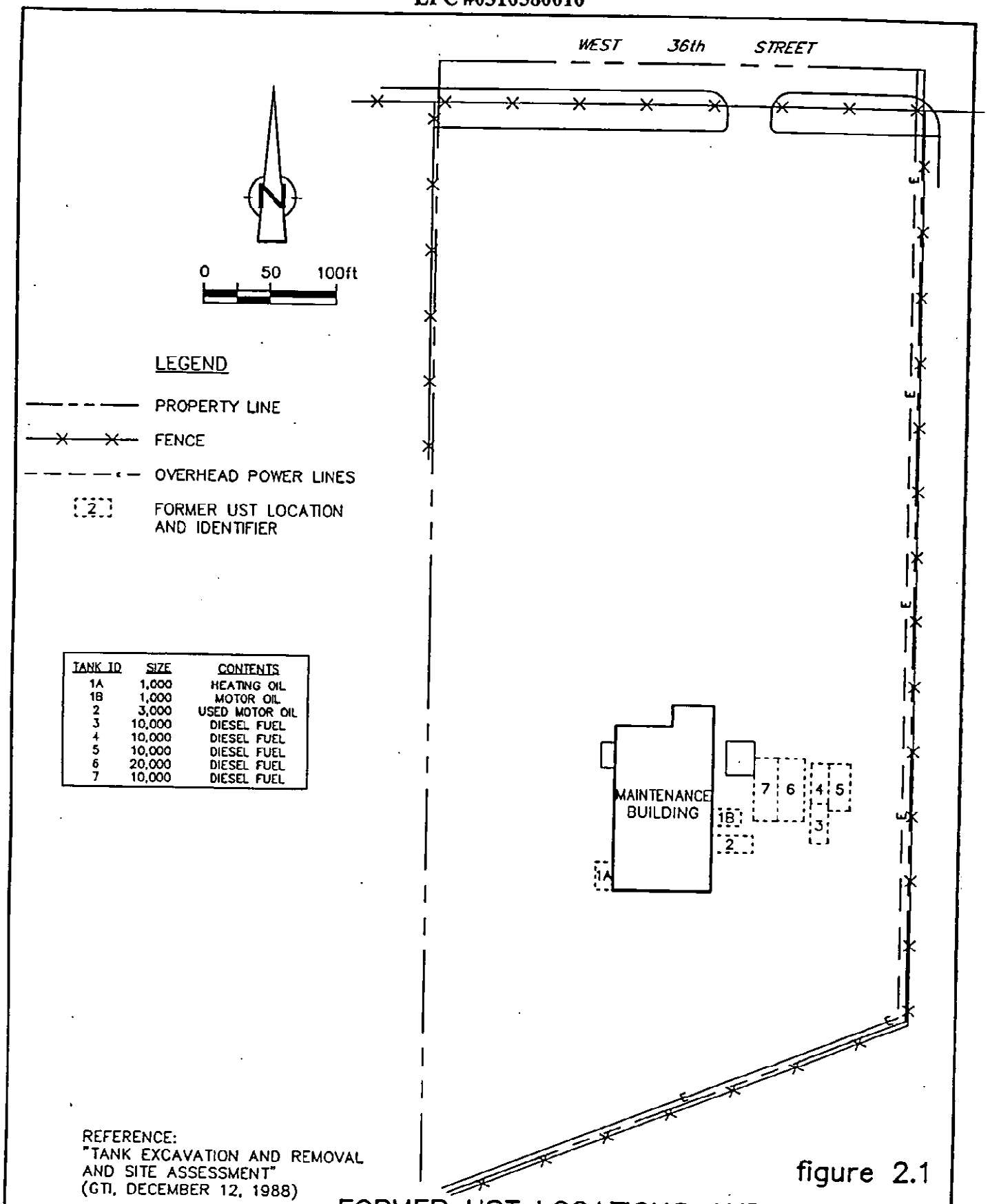
LPC #0316580016



TANK ID	SIZE	CONTENTS
1A	1,000	HEATING OIL
1B	1,000	MOTOR OIL
2	3,000	USED MOTOR OIL
3	10,000	DIESEL FUEL
4	10,000	DIESEL FUEL
5	10,000	DIESEL FUEL
6	20,000	DIESEL FUEL
7	10,000	DIESEL FUEL

REFERENCE:
"TANK EXCAVATION AND REMOVAL AND SITE ASSESSMENT"
(GTI, DECEMBER 12, 1988)

figure 2.1

FORMER UST LOCATIONS AND CONTENTS
FORMER COCA-COLA SITE
Chicago, Illinois

CRA

13230-00(002)GN-C0002 APR 07/99

PROPERTY OWNER CERTIFICATION OF NFR LETTER UNDER THE SITE REMEDIATION PROGRAM

If the Remediation Applicant is not the sole owner of the remediation site, include the full legal name, title, the company, the street address, the city, the state, the ZIP Code, and the telephone number of all other property owners. Include the site name, street address, city, ZIP code, county, Illinois Inventory I.D. number and real estate tax index/parcel index number. The property owner(s), or the duly authorized agent of the owner(s) must certify, by original signature, the statement appearing below.

A duly authorized agent means a person who is authorized by written consent or by law to act on behalf of a property owner including, but not limited to:

1. For corporations, a principal executive officer of at least the level of vice-president;
2. For a sole proprietorship or partnership, the proprietor or a general partner, respectively; and
3. For a municipality, state or other public Agency, the head of the Agency or ranking elected official.

For multiple property owners, attach additional sheets containing the information described above, along with a signed, dated certification for each. All property owner certifications must be recorded along with the attached No Further Remediation Letter.

Property Owner Information

Owner's Name:_____
Title:_____
Company:_____
Street Address:_____
City:_____ State:_____ Zip Code: _____ Phone:_____

Site Information

Site Name: _____
Site Address: _____
City: _____ State:_____ Zip Code: _____ County: _____
Illinois Inventory ID Number:_____
Real Estate Tax Index/Parcel Index No._____

I hereby certify that I have reviewed the attached No Further Remediation Letter, and that I accept the terms and conditions and any land use limitations set forth in the Letter.

Owner's Signature: _____ Date: _____

SUBSCRIBED AND SWORN TO BEFORE ME
this _____day of _____, 19__

_____
Notary Public

The Illinois EPA is authorized to require this information under Sections 415 ILCS 5/58 - 58.12 of the Environmental Protection Act and regulations promulgated thereunder. If the Remediation Applicant is not also the sole owner of the remediation site, this form must be completed by all owners of the remediation site and recorded with the NFR Letter. Failure to do so may void the NFR Letter. This form has been approved by the Forms Management Center. All information submitted to the Site Remediation Program is available to the public except when specifically designated by the Remediation Applicant to be treated confidentially as a trade secret or secret process in accordance with the Illinois Compiled Statutes, Section 7(a) of the Environmental Protection Act, applicable Rules and Regulations of the Illinois Pollution Control Board and applicable Illinois EPA rules and guidelines.

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80-229

DATE: April 21, 1999

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
LISTING OF CHECKS TRANSMITTED TO STATE TREASURER'S OFFICE

DEPOSIT ACCOUNT NUMBER & TITLE: 2370270892 / Haz. Waste Pen. & C/R

Fund: 0828 Account: 101 Agency: 53230 Sub-Act: (BELOW)
C/R - CUSAS: 238-000 Income: LPCC/R Ref. 2: COSTRECOVERY SAMS Code: 0127
PEN - CUSAS: 820-000 Income: LPCPEN Ref. 2: EPACTPENALTY SAMS Code: 0582

EPA LOG #	REMITTER	BUSINESS ID	SUB	AMOUNT
910942	[redacted] INCOME/TYPE: LPCC/R	1610455205	01	274.00
[redacted]	[redacted] INCOME TYPE: LPCC/R	1610650009	01	1,250.00
910938	Conestoga-Rovers & Associates, Inc. Coca Cola USA (Prepayment) INCOME TYPE: LPCC/R	0316580016	01	500.00

Baydosh

4/22/99 GM

PAGE TOTAL Batch #_____ Log_____ 2,024.00

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0316580016 -- Cook County
Chicago/Coca Cola USA/
Site Remediation/Tech. Reports

80-229

CRA

Conestoga-Rovers & Associates
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631
(773) 380-9933 Office (773) 380-6421 Fax

April 20, 1999

Reference No. 13230

Mr. Rick Lucas
Manager – Voluntary Site Remediation Unit
Bureau of Land
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62794-9276

HAND DELIVERED

Dear Mr. Lucas:

Re: Former Coca-Cola PTO Property
Chicago, Illinois

Enclosed, please find four copies of the document entitled *"Focused Site Investigation and Remedial Action Completion Report, Former Coca-Cola USA Facility, Chicago, Illinois"* prepared by Conestoga-Rovers & Associates (CRA) on behalf of The Coca-Cola Company. The enclosed report documents the scope of work, investigative protocols, and the results of a focused site investigation designed to identify any historical benzene, toluene, ethylbenzene, and xylenes (BTEX) in the area proximal to an area where eight underground storage tanks (USTs) were formerly located on the property. The eight tanks were closed by removal in 1988. The focused site investigation was completed in accordance with the requirements of 35 Ill. Adm. Code Part 740.430.

To meet the specific concerns raised in the context of the pending sale of the property, the site investigation completed by CRA was focused in two respects. First, the investigation was focused on the compounds of concern previously identified in correspondence from the Illinois Environmental Protection Agency (IEPA). Second, the investigation was focused on soil in the immediate vicinity of the USTs that were closed by removal in 1988. At this juncture, based upon the results of the focused site investigation, The Coca-Cola Company would like to enroll in the Site Remediation Program and obtain a focused No Further Remediation (NFR) letter from the IEPA. To facilitate this, attached hereto are a Site Remediation Program Application Services Agreement and Report Submittal forms (DRM-1 and DRM-2), an Election to Proceed under the Site Remediation Program form, and a $500 check payable to the Treasurer of the State of Illinois.

Please feel free to contact me should you have any questions or comments concerning this matter.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Steven J. Wanner

Steven J. Wanner

SJW//
Encl.
c.c.: G. Koch
P. Sharkey
R. Pyle

TSOI TREASURER STATE OF ILLINOIS CHECK 45546

INVOICE NUMBER	DATE	GROSS	DISCOUNT	NET PAID
ENTRY FEE	07/04/99	500.00	0.00	500.00
	TOTALS:	500.00	0.00	500.00

CONESTOGA-ROVERS & ASSOCIATES, INC.

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
2055 Niagara Falls Boulevard, Suite 3
Niagara Falls, New York 14304

THE BANK OF NOVA SCOTIA
101 FEDERAL ST., BOSTON, MA. 02110

CHECK
45546
5-173/110

PAY **FIVE HUNDRED and 00/100 DOLLARS

TO THE ORDER OF

TREASURER STATE OF ILLINOIS

UNITED STATES DOLLAR ACCOUNT

DATE	U.S. DOLLARS
7 Apr 99	$ 500.00

CONESTOGA-ROVERS & ASSOCIATES, INC.

PER: AUTHORIZED SIGNING OFFICER

PER: AUTHORIZED SIGNING OFFICER

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Illinois Environmental Protection Agency
Bureau of Land
Remedial Project Management Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

FOR ILLINOIS EPA USE:
LOG NO. _____
☐ $500 Advance Partial Payment Included
☐ DRM-2 SRP Form Included
☐ DRM-3 Request for Assessment Included

Site Remediation Program Application and Services Agreement (DRM- 1)

I. Site Identification:

Site Name: FORMER COCA-COLA PTO
Street Address: 4301 WEST 36TH STREET
City: CHICAGO, ILLINOIS ZIP Code: 60632
County: COOK Approximate Size of Site (Acres): 6.7
Illinois Inventory I. D. Number: N/A U.S. EPA I.D. Number: N/A
Site Base Map Attached? Yes: X No: __ Illinois EPA Permit(s): N/A
LUST/IEMA Incident numbers (if applicable) NONE

II. Remediation Applicant:

Applicant's Name: Gregory J. Koch Title: Manager, Environmental Technologies
Company: The Coca-Cola Company
Street Address: One Coca-Cola Plaza
City: Atlanta State: GA ZIP Code: 30313
Phone: (404) 676-7698 FEIN or SSN: 58-0628465

I hereby certify that I am authorized to sign this application and services agreement. I certify that the proposed project meets the eligibility criteria set forth in Section 58.1(a)(2) of the Environmental Protection Act (415 ILCS 5/58.1(a)(2)) and regulations promulgated thereunder and that this submittal and all attachments were prepared at my direction. In consideration for the Illinois EPA's agreement to provide (subject to applicable law, available resources, and receipt of the advance partial payment) review and evaluation services for activities carried out pursuant to Title 17 of the Illinois Environmental Protection Act (415 ILCS 5/58-58.12), I agree to:

(1) Conform with the procedures of Title 17 of the Illinois Environmental Protection Act (415 ILCS 5/58 - 58.12) and implementing regulations;

(2) Allow for or otherwise arrange site visits or other site evaluation by the Illinois EPA when requested;

(3) Agree to pay any reasonable costs incurred and documented by the Illinois EPA in providing such services; and

(4) Make an advance partial payment to the Illinois EPA for such anticipated services provided in Section IV of this application.

As the Remediation Applicant, I understand that I may terminate this services agreement at any time, by notifying the Illinois EPA in writing that services previously requested under the services agreement are no longer wanted. Within 180 days after receipt of the notice, the Illinois EPA shall provide me with a final invoice for services provided until the date of receipt of such notification.

To the best of my knowledge and belief, this request and all attachments are true, accurate and complete. I hereby certify that I have the authority to enter into this agreement.

Remediation Applicant's Signature: Gregory J. Koch Date: April 8, 1999

III. Written Permission from the Property Owner (if not Remediation Applicant):

Owner's Name: N/A

Title: _____

Company: _____

Street Address: _____

City: _____ State: _____ ZIP Code: _____ Phone: _____

I hereby certify that the Remediation Applicant has my permission to enroll the site identified in Section I of this application into the Illinois EPA Site Remediation Program. I certify that the Remediation Applicant or designated representative has permission to enter upon the indicated premises for the purpose of conducting remedial investigations or remediation.

Owner's Signature: _____ Date: _____

For multiple property owners attach additional sheets containing all the information above along with a signed, dated certification for each.

IV. Advance Partial Payment:

The Remediation Applicant shall identify which advance partial payment plan is selected:

XX Plan 1: A $500 advance partial payment is included with this application. Please make the check payable to: "Treasurer, State of Illinois". Please include "Hazardous Waste Fund" and the Remediation Applicant's FEIN or SSN on the check; or

☐ Plan 2: Request the Illinois EPA determine the appropriate partial payment (i.e., one-half of the total anticipated costs of the Illinois EPA or $5,000, whichever sum is less). Information on Form DRM-3 ("Request for Assessment of Advance Partial Payment for Anticipated Services") must accompany this application in order for the Illinois EPA to determine the appropriate advance partial payment specific to the services requested.

NOTE: Illinois EPA cannot refund payments without a legislative appropriation. Payment under Plan 1 accelerates the review process but increases the risk of forfeiting the payment if the applicant is ineligible. Payment under Plan 2 may result in a larger advance partial payment when a final determination is made on the application, but it reduces the risk of forfeiture.

V. Project Objectives:

If known, identify the recognized environmental conditions and related contaminants of concern and whether a comprehensive NFR Letter, a Focused NFR Letter, or a limited release under Section 4(y) of the Environmental Protection Act is being sought:

A Focused NFR Letter for BTEX analytes in former UST area. See attached report.

Identify any support services being sought from the Illinois EPA in addition to the review and evaluation services:

None, in additin to review and evaluation

Anticipated Schedule Attached? Yes: _____ No: x

Identify the current and post-remediation uses of the remediation site: Commercial/Industrial

☞ **If this application contains plans and reports for review and evaluation by the Illinois EPA, Form DRM-2 must also accompany this submittal.**

The Illinois EPA is authorized to require this information under Section 415 ILCS 5/58-58.12 of the Environmental Protection Act and regulations promulgated thereunder. Disclosure of this information is required as a condition of participation in the Site Remediation Program. Failure to do so may prevent this form from being processed and could result in your application being rejected. This form has been approved by the Forms Management Center. All information submitted as part of this Application is available to the public except when specifically designated by the Remediation Applicant to be treated confidentially as a trade secret or secret process in accordance with the Illinois Compiled Statutes, Section 7(a) of the Environmental Protection Act, applicable Rules and Regulations of the Illinois Pollution Control Board and applicable Illinois EPA rules and guidelines.

Illinois Environmental Protection Agency
Bureau of Land
Remedial Project Management Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

FOR ILLINOIS EPA USE:
LOG NO. _____

Site Remediation Program Form (DRM-2)
(To Be Submitted with all Plans and Reports)

I. Site Identification

Site Name: FORMER COCA-COLA PTO
Street Address: 4301 36TH STREET
City: CHICAGO, ILLINOIS Illinois Inventory I. D. Number: NONE
IEMA Incident Number: NONE

II. Remediation Applicant:

Applicant's Name: Gregory J. Koch Company: The Coca-Cola Company
Street Address: One Coca-Cola Plaza
City: Atlanta State: GA ZIP Code: 30313 Phone: (404) 676-7693

I hereby request that the Illinois EPA review and evaluate the attached project documents in accordance with the terms and conditions of the Environmental Protection Act (415 ILCS 5), implementing regulations, and the review and evaluation services agreement.

Remediation Applicant's Signature: Gregory J. Koch Date: April 8, 1999

III. Contact Person:

Contact's Name: STEVEN WANNER Company: CONESTOGA-ROVERS & ASSOCIATES
Street Address: 8615 WEST BRYN MAWR
City: CHICAGO State: IL ZIP Code: 60631 Phone: (773)380-9933

IV. Review & Evaluation Licensed Professional Engineer ("RELPE"), if applicable:

RELPE's Name: _____ Company: _____
Street Address: _____
City: _____ State: _____ ZIP Code: _____ Phone: _____

All information submitted is available to the public except when specifically designated by the Remediation Applicant to be treated confidentially as a trade secret or secret process in accordance with the Illinois Compiled Statutes, Section 7(a) of the Environmental Protection Act, applicable Rules and Regulations of the Illinois Pollution Control Board and applicable Illinois EPA rules and guidelines. The Illinois EPA is authorized to require this information under Sections 415 ILCS 5/58 - 58.12 of the Environmental Protection Act and regulations promulgated thereunder. Disclosure of this information is required as a condition of participation in the Site Remediation Program. Failure to do so may prevent this form from being processed and could result in your plan(s) or report(s) being rejected. This form has been approved by the Forms Management Center.

V. Project Documents Being Submitted:

Document Title: FOCUSED SITE INVESTIGATION AND REMEDIAL ACTION COMPLETION REPORT Date of Preparation of Plan or Report: MARCH 1999

Prepared by: CONESTOGA-ROVERS & ASSOCIATES

Prepared for: THE COCA-COLA COMPANY

Type of Document Submitted:

- ☐ Site Investigation Report - Comprehensive
- ☒ Site Investigation Report - Focused
- ☐ Remediation Objectives Report
- ☐ Remedial Action Plan
- ☒ Remedial Action Completion Report
- ☐ Sampling Plan
- ☐ Health and Safety Plan
- ☐ Community Relations Plan
- ☐ Risk Assessment
- ☐ Contaminant Fate & Transport Modeling
- ☐ Other: _____

Document Title: _____ Date of Preparation of Plan or Report: _____

Prepared by: _____

Prepared for: _____

Type of Document Submitted:

- ☐ Site Investigation Report - Comprehensive
- ☐ Site Investigation Report - Focused
- ☐ Remediation Objectives Report
- ☐ Remedial Action Plan
- ☐ Remedial Action Completion Report
- ☐ Sampling Plan
- ☐ Health and Safety Plan
- ☐ Community Relations Plan
- ☐ Risk Assessment
- ☐ Contaminant Fate & Transport Modeling
- ☐ Other: _____

Document Title: _____ Date of Preparation of Plan or Report: _____

Prepared by: _____

Prepared for: _____

Type of Document Submitted:

- ☐ Site Investigation Report - Comprehensive
- ☐ Site Investigation Report - Focused
- ☐ Remediation Objectives Report
- ☐ Remedial Action Plan
- ☐ Remedial Action Completion Report
- ☐ Sampling Plan
- ☐ Health and Safety Plan
- ☐ Community Relations Plan
- ☐ Risk Assessment
- ☐ Contaminant Fate & Transport Modeling
- ☐ Other: _____

VI. Professional Engineer's Seal or Stamp:

I attest that all site investigations or remedial activities that are the subject of this plan(s) or report(s) were performed under my direction, and this document and all attachments were prepared under my direction or reviewed by me, and to the best of my knowledge and belief, the work described in the plan and report has been designed or completed in accordance with the Illinois Environmental Protection Act (415 ILCS 5), 35 Ill. Adm. Code 740, and generally accepted engineering practices, and the information presented is accurate and complete.

Engineer Name: RONALD FREHNER

Company: CRA ENGINEERING, INC Phone: (651)639-0913

Registration Number: 0062-051867

Signature: _____

Professional Engineer's Seal or Stamp: RONALD FREHNER 0062-051867 PROFESSIONAL ENGINEER OF ILLINOIS

License Expiration Date: 11/30/99

The Illinois EPA is authorized to require this information under Title XVII of the Environmental Protection Act (415 ILCS 5/58.1(a)(2)). Failure to disclose this information may prevent this form from being processed and could also prevent acceptance into the Site Remediation Program. This form has been approved by the Forms Management Center.

Illinois Environmental Protection Agency
Leaking Underground Storage Tank Program
Election to Proceed under the Site Remediation Program

(this form applies only to owners/operators electing to conduct remediation under SRP)

A. SITE IDENTIFICATION

IEMA #: N/A IEPA Inventory ID #: _____

Site Name: Former Coca-Cola PTO

Site Address (Not a P.O. Box): 4301 West 36TH Street

City: Chicago , Illinois County: Cook

B. CERTIFICATION

In accordance with Section 58.1(b) of the Environmental Protection Act ("Act") (415 ILCS 5/58.1(b)), the following statement of election is made:

As the Owner and/or Operator of this tank system, I/we am/are electing to proceed with remediation in accordance with Title XVII of the Act (415 ILCS 5/58 et seq.) and 35 Illinois Administrative Code ("35 IAC") Part 740. I/we am/are aware of the following:

- *Completion of the Site Remediation Program ("SRP") Application and Service Agreement Form (DRM-1) is required to enroll into the Program.*
- *I/we am/are subject to an advance partial payment for requested services in the amount of $500 or request that the Illinois Environmental Protection Agency ("Illinois EPA") estimate the total costs to provide the requested services and assess an advance partial payment not to exceed $5,000 or one-half of the total anticipated costs of the Illinois EPA, whichever is less. If the second option is selected, Form DRM-3 must be completed and attached to the application and service agreement.*
- *The advance partial payment is not refundable.*
- *I/we am/are subject to payments for costs incurred by the Illinois EPA for the performance of services under the SRP once the advance partial payment has been depleted. In addition, a No Further Remediation ("NFR") letter assessment fee is required based on Illinois EPA-incurred costs up to a maximum of $2,500.*
- *I/we am/are no longer eligible to seek reimbursement from the Underground Storage Tank Fund for costs incurred after the date the SRP Application and Service Agreement Form (DRM-1) is signed by the Remediation Applicant and accepted by the Illinois EPA.*
- *I/we am/are subject to the report requirements of 35 Ill. Adm. Code Part 740, which includes, but not limited to, submitting a Site Investigation Report, Remediation Objectives Report, Remedial Action Plan, and Remedial Action Completion Report.*

- *All plans and reports submitted for review and evaluation must be prepared by, or under the supervision of, an Illinois licensed professional engineer. Any plan or report submitted to the Illinois EPA for review and evaluation must be accompanied by Form DRM-2.*

- *That an NFR letter issued pursuant to Section 57.10 of the Act (LUST) signifies that all statutory and regulatory corrective action requirements applicable to the occurrence have been complied with; whereas, an NFR letter issued pursuant to Section 58.10 of the Act (SRP) signifies a release from further responsibilities under the Act in performing the approved remedial action and shall be considered prima facie evidence that the site does not constitute a threat to human health and the environment. The NFR letter issued pursuant to Section 58.10 of the Act may not address all recognized environmental conditions or contaminants of concern subject to LUST regulations. Therefore, the content of the NFR letter issued pursuant to Section 58.10 of the Act may reflect that fact.*

- *I/we am/are responsible for any environmental conditions or contaminants of concern associated with a LUST release not addressed in the NFR letter issued pursuant to Section 58.10 of the Act, including, but not limited to, off-site soil and/or groundwater contamination.*

- *If I/we am/are also the Remediation Applicant under the SRP, I/we further agree that any NFR letter issued pursuant to Section 58.10 of the Act is voidable by the Illinois EPA if I/we fail to address such conditions or contaminants as required by law.*

C. SIGNATURES

Owner:		**Operator:**	
Name:	The Coca-Cola Company	Name:	same as owner
Contact:	Gregory J. Koch	Contact:	
Address:	One Coca-Cola Plaza	Address:	
	Mail Code TEC 803		Atlanta, GA 30313
Signature:	[signature]	Signature:	
Date:	April 8, 1999	Date:	
Phone:	(404) 676-7698	Phone:	

Submit this form to:

Illinois Environmental Protection Agency
Bureau of Land – #24
LUST Section
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Printed on Recycled Paper

PARCEL T FOIA INFORMATION

Facility ID	Facility Status	Facility Name	Address	City	County	Zip	Facility Type	Owner ID	Owner Name	Owner Address	Owner City	Owner State	Owner Zip	Tank ID	Tank Status	Tank Capacity	Product	Removed Date	OSFM First Notify Date	Fee Due	Pending NOV
2006216	Closed	Institute Of Gas Technology	4201 W 36Th St	Chicago	Cook	60632	None	U0007554	Institute Of Gas Technology	3424 S State St	Chicago	IL	60616	1	Removed	6000	Gasoline	12/11/1991	3/26/1986	$0.00	N
2006216	Closed	Institute Of Gas Technology	4201 W 36Th St	Chicago	Cook	60632	None	U0007554	Institute Of Gas Technology	3424 S State St	Chicago	IL	60616	2	Removed	5300	Fuel Oil	12/11/1991	3/26/1986	$0.00	N