FINAL SAMPLING AND ANALYSIS PLAN
FOR THE
CHILLUM PERC SITE
HYATTSVILLE, PRINCE GEORGE'S COUNTY, MARYLAND

Prepared for

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CONTENTS

Section Page

1.0 INTRODUCTION 1

2.0 BACKGROUND 1
- 2.1 SITE LOCATION 2
- 2.2 SITE DESCRIPTION 2
- 2.3 SITE HISTORY 5
- 2.4 PREVIOUS SITE INVESTIGATIONS 6

3.0 PROJECT OBJECTIVES AND DATA USE 7

4.0 PROPOSED FIELD INVESTIGATION 7
- 4.1 SCOPE OF WORK 7
- 4.2 KEY PROJECT PERSONNEL 8
- 4.3 SPECIAL RESOURCES AND EQUIPMENT 10
  - 4.3.1 Direct-Push Technology 10
  - 4.3.2 Trace Atmospheric Gas Analyzer (TAGA) Activities 12
- 4.4 PROPOSED SAMPLING ACTIVITIES 12
  - 4.4.1 Groundwater Sampling 13
  - 4.4.2 Soil Vapor Sampling 15
  - 4.4.3 Indoor Air Sampling 17
- 4.5 SAMPLE HANDLING 21
- 4.6 SAMPLING SUMMARY 22

5.0 ANALYTICAL PARAMETERS AND METHODS 22

6.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES 23
- 6.1 RESPONSIBILITIES 24
- 6.2 SAMPLING EQUIPMENT DECONTAMINATION 24
- 6.3 FIELD QUALITY CONTROL 24
- 6.4 LABORATORY QUALITY CONTROL 25
- 6.5 DATA VALIDATION 25
- 6.6 DATA EVALUATION AND MANAGEMENT 26
  - 6.6.1 Data Evaluation 26
  - 6.6.2 Data Representativeness and Completeness 26
  - 6.6.3 Data Management 27

CONTENTS (Continued)

Section Page

7.0 DELIVERABLES 27

8.0 PROJECT SCHEDULE 27

REFERENCES 29

Appendix

Sample Summary

FIGURES

Figure Page

1 SITE LOCATION MAP 3

2 AREA OF INVESTIGATION MAP 4

3 PROPOSED GROUNDWATER SAMPLING LOCATION MAP 14

4 PROPOSED ACTIVE SOIL VAPOR SAMPLING LOCATION MAP 16

5 PROPOSED AIR SAMPLING LOCATION MAP 19

TABLES

Table Page

1 PROPOSED TETRA TECH PROJECT PERSONNEL 9

2 ANALYTICAL PARAMETERS, METHODS, AND DETECTION LIMITS 23

3 PROJECT SCHEDULE 28

1.0 INTRODUCTION

Under Eastern Area Superfund Technical Assessment and Response Team (START) Contract No. 68-S3-00-02, Technical Direction Document (TDD) No. SE3-03-03-012, U.S. Environmental Protection Agency (EPA) Region 3 tasked Tetra Tech EM Inc. (Tetra Tech), to conduct a removal assessment at the Chillum PERC site in Hyattsville, Prince George’s County, Maryland. The purpose of this removal assessment is to collect supplemental data regarding potential intrusion of tetrachloroethene (also known as perchloroethene, PCE, or PERC) vapors into inhabited buildings near the site. A previous round of sampling was conducted at the residences proposed in this sampling and analysis plan (SAP) in July 2003.

This SAP summarizes site background information in Section 2.0; describes the project objectives and data use in Section 3.0; outlines activities associated with the proposed field investigation in Section 4.0; discusses analytical parameters and methods in Section 5.0; explains Tetra Tech quality assurance and quality control (QA/QC) procedures in Section 6.0; identifies project deliverables in Section 7.0; and provides a schedule to complete the tasks set forth in the TDD in Section 8.0. All references cited in this report are listed after the text. Tetra Tech developed this SAP in accordance with the provisions of the “Quality Assurance Project Plan (QAPP) for START” (Tetra Tech 2001).

2.0 BACKGROUND

This section describes the site location, presents a description of the site, and summarizes the site history and previous site activities and investigations.

2.1 SITE LOCATION

The Chillum PERC site is located at 5901 Eastern Avenue in Hyattsville, Prince George's County, Maryland, at the northern corner of the intersection of Eastern Avenue and Riggs Road, as shown in Figure 1, Site Location Map. The northern side of Eastern Avenue (at the southwestern edge of the site) forms the boundary between Maryland to the north and the District of Columbia to the south (Tetra Tech 2002, 2003c). The site is located at approximately 180 feet above mean sea level at 38.9618° north latitude and 76.9970° west longitude (U.S. Geological Survey [USGS] 1965a, 1965b).

2.2 SITE DESCRIPTION

The Chillum PERC site is located on a rectangular-shaped parcel approximately 0.3 acre in area, as shown on Figure 2, Area of Investigation Map. One single-story building is located on the site. Riggs Road and Eastern Avenue comprise the southern and western boundaries of the site, respectively. An apartment complex is located north of the site, and residential properties are located immediately to the east. The site is currently occupied by House of Kleen, a dry cleaning and shoe repair business that utilizes PCE on site as part of operational procedures (Tetra Tech 2002, 2003c).

For the purposes of this report, the area of investigation includes but is not limited to the commercial properties located in Maryland near the intersection of Eastern Avenue and Riggs Road, including a Sunoco service station, Giant Supermarkets, and Grace Cleaners, and the residential properties in the District of Columbia located southwest of Eastern Avenue between Riggs Road, Kennedy Street, and Eastern Avenue. Residences located along 8th Street, Kensington Place, Oglethorpe Street, and Nicholson Street are also included in the area of investigation. All residences in the area of investigation are duplex- or triplex-style structures that share a single concrete basement slab (Tetra Tech 2003c). One or more groundwater plumes of unknown volume containing aromatic and chlorinated volatile organic compounds (VOC) that may have originated from properties located near the intersection of Eastern Avenue and Riggs Road are present in the area of investigation. Groundwater in the water table aquifer is unconfined and flows approximately to the south (Gannett Fleming, Inc. [Gannett Fleming] 2003a, 2003b).

Most of the properties within 1,000 feet of the site are residential. A Sunoco service station is located approximately 150 feet southeast of the Chillum PERC site on the south side of Riggs Road. The service station was formerly owned by Chevron Products Company (Chevron) and is located in Maryland at 5801 Riggs Road. The southwestern boundary of the former Chevron property abuts the District of Columbia-Maryland boundary. A shopping center occupied by several businesses, including Giant Supermarkets and Grace Cleaners, is located approximately 250 feet east of the Chillum PERC site. Grace Cleaners, located at 5807 Eastern Avenue, Hyattsville, Maryland, conducts dry cleaning activities on site. Grace Cleaners is located approximately 800 feet east of the Chillum PERC site (Tetra Tech 2003c).

2.3 SITE HISTORY

Based on structures visible in historical aerial photographs, the building on the Chillum PERC site was constructed in or about 1955. The facility has operated as House of Kleen since 1984, but dry cleaning has reportedly been conducted on site since 1955. A slant-roofed structure present on aerial photographs taken in 1950 appears to be a single-family home. Prior to 1955, the land southwest of Eastern Avenue was used as pastureland. A single-family home and barn were approximately 500 feet south of the intersection of Eastern Avenue and Riggs Road (Environmental Photographic Interpretation Center 2003).

2.4 PREVIOUS SITE INVESTIGATIONS

No known environmental investigations have been conducted on the Chillum PERC site to date, although several investigations have been and are currently being conducted in vicinity of the site. Independently and in response to an Administrative Order issued by EPA, Chevron has conducted investigations of the former Chevron facility located at 5801 Riggs Road and in residential areas located south of the Chillum PERC site. Most of Chevron's activities in residential areas have been conducted under oversight of EPA's Waste and Chemical Management Division (WCMD), and are related to the presence of gasoline constituents: benzene, toluene, ethyl benzene, and xylene (collectively known as "BTEX") and methyl tert-butyl ether (MTBE). In 2002, Chevron detected PCE in samples collected as part of their ongoing investigation, and reported the finding to EPA (Chevron 2003a, 2003b). Subsequently, EPA's Hazardous Site Cleanup Division (HSCD) has tasked Tetra Tech to conduct investigations in the residential area located south of the intersection of Eastern Avenue and Riggs Road to determine the nature and extent of PCE in groundwater, soil vapor, and indoor air.

From December 2002 to the present, Tetra Tech has conducted passive and active soil vapor sampling, installed small-diameter monitoring wells and permanent soil vapor implants, conducted groundwater sampling, tap water sampling, and indoor air sampling in the site vicinity as part of EPA removal assessment activities. In addition, EPA's Environmental Response Team (ERT) has conducted indoor air monitoring with the Trace Atmospheric Gas Analyzer (TAGA) mobile laboratory in support of indoor air sampling activities.

As of March 2004, an estimated 146 active soil vapor sub-slab samples have been collected from 70 residential properties (not including additional soil vapor samples that are currently being collected as part of EPA WCMD oversight of Chevron activities). At nine of the 70 properties, PCE concentrations in soil vapor samples exceeded the EPA soil screening level (SSL) of 310 micrograms per cubic meter (:g/m^3) at 0 to 5 feet beneath the basement slab (Chevron 2003a, 2003b; Tetra Tech 2003a, 2003b; ERT 2004). In contrast, PCE was detected in only one indoor air (Summa canister) sample above the EPA Removal Action Level (RAL) of 31 :g/m^3

(EPA 2003a). Additionally, PCE was detected in the basement of this residence during TAGA monitoring at a concentration of 110 :g/m^3, but was not detected above sample quantitation limits in soil vapor samples collected from beneath the basement slab during the same sampling event (ERT 2004). Suits labeled "dry-clean only," which may be a household source of PCE, were identified by a resident in a basement closet of this residence during TAGA monitoring (Tetra Tech 2003c; ERT 2004).

3.0 PROJECT OBJECTIVES AND DATA USE

The objective of the sampling event is to (1) conduct a second round of indoor air sampling, soil vapor sampling, and TAGA monitoring at residences from which samples were collected in July 2003, (2) expand the area of study to include areas from which sufficient data may not exist and collect samples where appropriate, (3) conduct a second round of groundwater sampling at wells sampled in July 2003, and (4) use the data collected during this sampling event to further assess potential intrusion of vapor-phase PCE through building foundations and into living spaces. If detected, PCE concentrations will be evaluated to determine the potential threat to human health.

4.0 PROPOSED FIELD INVESTIGATION

This section describes the scope of work, Tetra Tech personnel for performing the described tasks, special resources and equipment to be used, proposed sampling activities, sample handling, and a summary of proposed samples to be collected during the event.

4.1 SCOPE OF WORK

During this sampling event, Tetra Tech will perform the following tasks:

- Use direct-push technology (DPT) to install up to 13 permanent soil vapor implants beneath residential basement slabs
- Utilize ERT's mobile TAGA to screen residences and record ambient conditions prior to placement of air sampling canisters

- Within 24 hours of TAGA monitoring, collect 82 indoor air samples from 41 local residences (two per residence) and up to 10 ambient air samples using Summa canisters and constant-flow regulators; the ambient air sampling locations will be determined during sampling activities
- Collect groundwater samples from the six small-diameter monitoring wells installed and sampled during the previous sampling event at the site

In addition, ERT will be responsible for the sample equipment procurement, sample collection (including appropriate QA/QC samples), and analysis of all soil vapor samples collected during sampling event. The soil vapor samples will be collected from existing permanent implants installed by Tetra Tech in July and September 2003, and from implants proposed as part of this SAP. All soil vapor samples will be analyzed on site by ERT using the TAGA. Prior to sample collection, Tetra Tech will provide ERT with sample identifiers consistent with the sample nomenclature format being used in the project database.

4.2 KEY PROJECT PERSONNEL

The Tetra Tech project manager for the TDD is Mr. Christopher Sklaney. As the project manager, Mr. Sklaney is responsible and accountable for all aspects of the project scope of work, including achieving the technical, financial, and scheduling objectives for the project. Mr. Sklaney will communicate directly with the EPA Work Assignment Manager (WAM) for this project, Mr. Marcos Aquino.

Other Tetra Tech personnel proposed for the project are presented in Table 1. The technical or field support personnel used to support the project may vary depending on the specific needs of the project, site conditions, and staff availability.

TABLE 1

PROPOSED TETRA TECH PROJECT PERSONNEL

Project Function	Name	Role
Project Manager	Mr. Christopher Sklaney	Responsible for implementing all activities identified in the TDD; responsible for developing and implementing the site health and safety plan; has authority to commit resources necessary to complete the work; prepares all deliverables required by the TDD; communicates directly with the EPA WAM, the project team, and any other personnel needed to complete the project
Field Support Personnel	To be determined	Performs necessary sampling or monitoring activities as well as other tasks defined in the TDD or assigned by the EPA WAM or the Tetra Tech project manager; communicates directly with the Tetra Tech project manager and, when appropriate, with the EPA WAM
Health and Safety Officer	Mr. Kevin Scott	Oversees and supports development of the site health and safety plan; communicates directly with the Tetra Tech project manager to ensure that all corporate health and safety protocols applicable to the site are being followed
Chemist	Ms. Marian Murphy	Coordinates directly with the Tetra Tech project manager regarding analytical requirements for the project; solicits and procures necessary laboratory services; reviews sample data and validates data, if necessary; communicates directly with the Tetra Tech project manager, field support personnel, EPA WAM, and START program manager as necessary
Equipment Manager	Mr. Jim Kilpatrick	Coordinates directly with the Tetra Tech project manager regarding the equipment requirements for the project; calibrates and tests equipment before it is sent to the field; facilitates equipment rentals if equipment needed is not in the warehouse
Graphics and Mapping Specialist	Mr. Dan Call	Generates maps and other figures for project deliverables or presentations; assists the Tetra Tech project manager or other personnel when global positioning system activities are required
Financial Manager	Mr. Al Bergey	Works with the Tetra Tech project manager in planning related to the TDD budge and completion date; enters project financial information into the Tetra Tech management information system; prepares regular and special reports to assist the Tetra Tech project manager in managing the project

TABLE 1

PROPOSED TETRA TECH PROJECT PERSONNEL (Continued)

Project Function	Name	Role
Program Manager	Mr. Kevin Scott	Assists the Tetra Tech project manager as necessary to implement the project; commits or helps obtain all necessary company resources to meet the objectives of the TDD; provides document quality control reviews; addresses and helps resolve project management issues with the Tetra Tech project manager

Notes:

EPA = U.S. Environmental Protection Agency
START = Superfund Technical Assessment and Response Team
TDD = Technical Direction Document
Tetra Tech = Tetra Tech EM Inc.
WAM = Work Assignment Manager

4.3 SPECIAL RESOURCES AND EQUIPMENT

Based on the scope of work outlined in the TDD and discussions with the EPA WAM, Tetra Tech has defined a need for subcontracting and special instrumentation to effectively implement the scope of work. Specifically, direct-push technologies, methods of subsurface investigation in which soil cuttings are not produced, will be used to install permanent soil vapor implants, and ERT will utilize the TAGA to conduct indoor air monitoring and analyze active soil vapor samples. This section describes the proposed direct-push and TAGA activities.

4.3.1 Direct-Push Technology

Tetra Tech will install up to 13 permanent soil vapor implants on nine different properties using direct-push technology. Eight of the properties are duplex-style residences that share a concrete basement slab with an adjoining property; one of the properties is a church that does not share its slab with another structure.

No more than one permanent implant will be installed on each residential property. At the request of the WAM, three permanent implants will be installed beneath the basement slab of the church by drilling through the concrete foundation; two implants will be installed at the church from exterior locations.

At locations where the concrete foundation will installed from an exterior location, the implants will be advanced through hollow, carbon-steel rods driven using mechanical or manual methods at an angle no greater than 30° from vertical in order to situate the implant beneath the foundation slab. The implants will be installed no more than 5 vertical feet below the foundation slab. The angle of the rod string from plumb will be measured and approximate depth of the bottom of the basement slab will be estimated to determine the appropriate distance of rod string entry from the building foundation and length of rod string to be advanced.

The permanent implants used by Tetra Tech when conducting installation from exterior locations are pre-fabricated by Geoprobe Systems (Geoprobe). Each implant is 21 inches long and constructed entirely of stainless steel. The top end of an implant contains a barbed fitting, and the bottom end is threaded in order to fit into an expendable stainless steel point. The screened section of the implant is comprised of wire mesh with a 0.0057-inch pore opening (Geoprobe Systems 2003). Packaged, certified-clean, 0.25-inch inner diameter (ID) Teflon tubing will be used to connect the implant to the ground surface. The section of tubing exposed at the surface will be covered with a Teflon cap after installation is complete. All exterior implant installations will be completed with steel, flush-mount protective casings.

In the event a permanent implant cannot be installed at a point below the basement slab, either due to refusal or the presence of groundwater, Tetra Tech will attempt to install a permanent implant at a point beside the foundation to the maximum depth possible. If a permanent implant cannot be installed beside the foundation for any reason, Tetra Tech will discuss the situation with the WAM, if possible, before departing the property.

At the church, the only location where the concrete foundation will be breached, the implants will be installed from inside the building. An outer pilot hole 7/8 or 1 inch in diameter that only partially penetrates the basement slab will be drilled to a depth of approximately 2 inches below the basement floor. An inner pilot hole no larger than 5/16 inches in diameter will be drilled inside the outer pilot hole and will fully penetrate the slab. Swagelok-type components, consisting of stainless steel or brass tubing, threads, and plugs, will be used to create the implant. Unlike the Geoprobe-type permanent implants, the implant created using Swagelok-type components will have an unscreened open hole that does not extend beyond the bottom of the basement slab from which soil vapor samples can be collected.

4.3.2 Trace Atmospheric Gas Analyzer (TAGA) Activities

ERT will provide support for the indoor air and active soil vapor sampling tasks with the TAGA at up to 41 residences. The indoor air in the basement and on the first floor of homes will be screened for the presence of household vapor VOC sources using the TAGA's real-time, mobile air laboratory capabilities. At the request of the WAM, ERT will collect active soil vapor samples and analyze the samples on site using the TAGA. The active soil vapor samples will be collected from the permanent implants installed by Tetra Tech in July and August 2003, and the permanent implants to be installed as part of tasks included in this SAP. Sampling methods are discussed in Section 4.4.2 (Soil Vapor Sampling).

4.4 PROPOSED SAMPLING ACTIVITIES

This section describes the proposed sampling activities and summarizes the identifiers, quantities, and sampling locations for each sample to be collected as part of this sampling event. Tetra Tech will collect groundwater samples from monitoring wells located in public areas and indoor air samples from residential properties located south of the Chillum PERC site. ERT will collect and analyze soil vapor samples. All samples will be designated according to the following format:

123-AB-456,

where the “123” prefix references the random and unique identification number assigned to that residence, “AB” refers to the sample matrix, such as “AS” for air sample, “SV” for soil vapor, and “GW” for groundwater, and the “456” suffix is a unique number for any particular residential identification number. Depending on the matrix, the sample identifier suffix describes several factors, including sample round or method, or sampling method. In order to protect individual resident privacy granted under the Freedom of Information Act (FOIA), sample locations are represented generally. Tax parcels and building foundations are not shown on figures in this report at the request of the WAM. Sample data will be recorded and entered into the existing project database. This section outlines the groundwater, soil vapor, and air sampling proposed for this sampling event.

4.4.1 Groundwater Sampling

Tetra Tech plans to collect eight groundwater samples, including one field duplicate and one trip blank sample, from six small-diameter monitoring wells installed in July and August 2003 during the previous phase of the project. Samples will be purged and collected using low-flow techniques, as described in EPA Region 1 Standard Operating Procedure (SOP) No. GW0001, “Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells” (EPA 1996b), or (where not possible due to insufficient recharge rates) in accordance with ERT SOP No. 2007, “Groundwater Well Sampling” (ERT, 1995a). During the completion of the previous round of sampling at the site in August 2003, the recharge rate in wells WP-101 and WP-102 was insufficient to conduct sampling by mechanical means. Therefore, samples will be collected from wells WP-101 and WP-102 using dedicated, certified-clean Teflon bailers. Monitoring well and proposed groundwater sampling locations are presented on Figure 3, Proposed Groundwater Sampling Location Map.

For wells to be purged and sampled using low-flow techniques, a multi-parameter meter with flow-through cell will be used as described in SOP No. GW0001. Data collected during purging and sampling will be documented on the sample-specific field log sheet. Parameters to be collected include but are not limited to temperature, pH, conductivity, specific conductance, oxidation-reduction potential, dissolved oxygen, and turbidity. Discharge rate, cumulative discharge volume, and water level are other parameters that be recorded on low-flow field logs during purging. For wells to be purged and sampled using manual methods, a partial list of well parameters (temperature, pH, conductivity, specific conductance, and turbidity) will be collected prior to and after sample collection using the multi-parameter meter without the flow-through cell configuration. For all wells, turbidity will be recorded using a separate turbidity meter using groundwater collected prior to entry into the flow-through cell.

4.4.2 Soil Vapor Sampling

Tetra Tech proposes the collection of active soil vapor samples from the 13 existing permanent previously implants installed by Tetra Tech in July and September 2003, and from the 13 permanent implants proposed in this SAP. All soil vapor samples will be collected and analyzed on site using the TAGA. ERT will be responsible for conducting all soil vapor sample preparation, collection, and analysis. Tetra Tech will not provide sample containers, sampling equipment, or any other materials required to collect or analyze the soil vapor samples. Tetra Tech will accompany ERT personnel or contractors during soil vapor sample collection activities to identify permanent implant locations, document activities, and assist where needed. Existing and proposed permanent implant locations and soil vapor sampling locations are presented on Figure 4, Proposed Active Soil Vapor Sampling Location Map.

The method of collection will be determined by ERT; however, samples should be collected using purged Tedlar bags, preferably 1-liter volume, to replicate previous collection methods. Modified EPA method TO-15 will be used to analyze the samples. The reporting limit for real-time monitoring will vary based on calibration results at any particular station. Where conditions permit, the reporting limit for real-time monitoring is 0.5 : g/m^3 for all analytes, including PCE and BTEX compounds. MTBE will not be part of the indoor air analyte list because interference with carbon dioxide prevents accurate quantitation of MTBE with the TAGA.

4.4.3 Air Sampling

Tetra Tech proposes to collect 102 air samples, including field QA/QC samples, from 41 different properties during this phase of the project. The samples will be collected as follows:

- 82 air samples from indoor locations
- 10 ambient air samples
- 5 trip blank samples
- 5 co-located samples.

Tetra Tech will collect indoor air samples in accordance with EPA Environmental Investigations, Standard Operating Procedures and Quality Assurance Manual, Section 14.1.2 (EPA 1996a). Tetra Tech will use 6-liter, stainless-steel, Summa-type canisters to sample indoor air in basements and ground floors of the residences located in the area of investigation. The canisters will be obtained from a Delivery of Analytical Services (DAS) laboratory under an initial vacuum of more than 25 inches of mercury (Hg). The final pressure of the canister will be kept below atmospheric pressure.

At all residences, the indoor residential air sampling procedure will be conducted in four steps: (1) removal of items that contain VOCs and may potentially interfere with sample accuracy from the first floor and basement of the residence, (2) TAGA monitoring of first floor and basements of the residences, (3) placement of Summa canisters inside, and if specified, outside the residences, and (4) retrieval of the Summa canisters from the residences.

Residents will be provided with temporary storage containers, tarps, and other items as necessary to remove items from indoor areas. At least 48 hours prior to TAGA monitoring, where property access permits, Tetra Tech will conduct an inspection of indoor areas to ensure that household items that may contain VOCs have been removed. Any identified items will be placed in plastic totes or similar containers, or will be moved from the first floor or basement of the home until sample collection is complete. Tetra Tech will use a photoionization detector (PID) during this task to ensure, as much as possible, that the appropriate items are removed from the residence. Monitoring results will be recorded in the site logbook. If required, Tetra Tech will return items to indoor areas of the home upon completion of indoor air sampling. Tetra Tech personnel dedicated to placement and retrieval of Summa canisters will not assist with item removal and return in order to avoid sample cross-contamination.

ERT will perform air monitoring by conducting a predetermined, room-by-room walkthrough of the first floor and basement areas of each residence to determine whether any household sources of low-concentration VOCs are present. A sampling hose connected directly to the TAGA will be carried through the residence during the walkthrough. At each monitoring location, an ERT member or contractor will hold the intake of the hose in the breathing zone or near areas of interest for approximately 1 minute. The ERT member or contractor will continue through the home until all targeted areas on the first floor and basement have been monitored. The windows in the basement and first floor of the home are to be closed at least 12 hours prior to TAGA monitoring, and should remain closed until air sampling is completed.

If an internal source of VOCs is detected in a residence during TAGA monitoring, the resident may be asked to remove the source and the home may be rescheduled for TAGA monitoring at a later date. After results of the TAGA monitoring are completed and potential interferences are identified or deemed insignificant by ERT or the WAM, a Tetra Tech sampling team will place a single, 6-liter Summa canister affixed with a 24-hour, continuous-flow regulator on the first floor and in the basement of each residence. If the residence has children up to the age of three years which live in or frequently visit the home, the Summa canisters will be placed on the floor. If a residence does not have children up to the age of 3 years that live in or frequently visit the home, the canisters will be placed approximately 3 feet above the basement floor. In addition, one Summa canister will be placed in an ambient location during each day of sampling. Indoor air sampling locations are presented on Figure 5, Proposed Air Sampling Location Map. Ambient air sampling locations will be determined during sampling activities and are not presented on the map.

The following data will be collected on a sample-specific field log sheet during canister placement:

- Residence address
- Sampling location (floor)
- Sample identifier
- Sample type (e.g., normal field sample, co-located, trip blank)
- Canister identifier
- Regulator identifier
- Sampler's name
- Scribe's name
- Date/time sampling started
- Regulator reading at start of sampling
- Canister height above the floor

A sampling team will retrieve the Summa canister approximately 24 hours after placement. The regulator will be inspected to ensure that a negative pressure remains in the canister. Any canister that is found to have a zero or positive pressure will not be submitted to the laboratory for analysis. In such a case, an unused canister and regulator will be obtained and the sample will be recollected using the same methods and procedures. During canister retrieval, the following data will be recorded on the same sample-specific field log sheet used during canister placement:

- Sampler's name
- Scribe's name
- Date/time sampling ended
- Regulator reading at end of sampling.

Sample tags containing the unique sample identifier, and date and time of sampling will be attached to each Summa canister prior to canister placement. Sampling locations will be photographed and documented where possible during canister placement or retrieval to record sampling procedures and locations.

In the event the flow restrictors and regulators used with the canisters need to be used for additional samples, both will be cleaned between samples by purging the flow restrictor and regulator with ultra-pure nitrogen for at least 1 hour. Flow restrictors and regulators will be purged as required.

The DAS laboratory supplying the Summa canisters will provide (in writing) certification that all canisters were pre-cleaned, and the laboratory will provide the internal vacuum pressure after the canister has been evacuated. The certification of initial vacuum pressures will be supplied at the time the canisters are forwarded to Tetra Tech, and the initial and final vacuum pressures will be provided in the final laboratory report, respectively. The Tetra Tech Chemist will specify these requirements in writing on or as an attachment to the EPA Region 3 Analytical Request Form.

4.5 SAMPLE HANDLING

Tetra Tech personnel will segregate responsibilities, where possible, to minimize cross-contamination from household VOC sources during any residential inspections, and from sources of VOCs in materials and equipment used during completion of groundwater and air sampling activities. Items containing VOCs, such as generators, fuel containers, and permanent markers, will be stored separately from sampling containers. Vehicles used to transport Summa canisters will not be used to transport equipment or supplies containing VOCs during the duration of the project. Groundwater samples will be collected using by using battery-powered pumps, manual methods, or a generator placed at least 50 feet downwind of the sampling location.

Tetra Tech groundwater and air sampling teams will consist of a sampler and a scribe. The sampler will be responsible for handling of the sample containers, such as Summa canisters and glass vials, and equipment such as regulators and Teflon tubing, and will avoid tasks such as removal of items from residences, fueling vehicles or generators, or any other activities in which VOCs may be contacted. The scribe will be responsible for documenting all data and handling VOC products, if required. Fueling of vehicles used for sampling should be accomplished at a full-serve gasoline service station, by Tetra Tech personnel not a part of an air sampling team, or as a last resort, by the scribe. The scribe may handle Summa canisters and regulators if VOC products have not been contacted since the previous hand-washing. Unless required, the sampler and scribe will not change roles during any given day of sampling to minimize the risk of cross-contamination.

Regulations for packaging, marking, labeling, and shipping hazardous materials and wastes have been promulgated by the U.S. Department of Transportation. Air carriers that transport hazardous materials require compliance with the current International Air Transport Association (IATA) Regulations, which apply to shipment and transport of hazardous materials by air carrier. Tetra Tech will comply with all applicable IATA regulations.

4.6 SAMPLING SUMMARY

Sample identifiers, matrices, types, sampling locations, and QA/QC explanations for this sampling event are presented in the appendix. Resident names and addresses are treated as confidential information and will not be listed in the public version of this report at the request of the WAM. Sampling location and resident information is maintained in the Microsoft Access database created by Tetra Tech as part of this project. The identifier for each sample contains an unique segment relating an individual sample to a particular residential property. Each residential property has been assigned an unique identifying segment which will not change for the duration of the project. The installation and sampling locations of six permanent vapor implants have not been specified to date, but will be determined prior to initiation of field activities.

5.0 ANALYTICAL PARAMETERS AND METHODS

Table 2 summarizes the matrices, analytical parameters, analytical methods, detection limits, and maximum holding times for groundwater, soil vapor, and air samples to be collected during the sampling event.

TABLE 2

ANALYTICAL PARAMETERS, METHODS, AND DETECTION LIMITS

Matrix	Analytical Parameter	Analytical Method	Containers and Preservatives	Detection Limit	Holding Time
Groundwater	TCL VOCs	CLP SOW OLC03.1	Three 40-mL vials; HCl pH<2, ice	CRQL	14 days
Soil Vapor	VOCs	Modified EPA Method TO-15	One 1-L Tedlar bag; unpreserved (stored in dark container)	1.0 ppbv (may vary based on atmospheric conditions)	72 hours
Air	VOCs	Modified EPA Method TO-15	One 6-L Summa; unpreserved	1.0 ppbv for all VOC except acetone; 3.0 ppbv for acetone	28 days

Note: Soil vapor samples will be collected by ERT and analyzed using the TAGA.

EPA = U.S. Environmental Protection Agency
TAGA = Trace Atmospheric Gas Analyzer
TCL = Target compound list
CLP SOW = Contract Laboratory Program Scope of Work
CRQL = Contract-required quantitation limit
ERT = Environmental Response Team
L = Liter
ppbv = Parts per billion per volume
VOCs = Volatile organic compounds
HCl = Hydrochloric acid
mL = Milliliter

6.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

This section describes the QA/QC procedures for the sampling at the Chillum PERC. Specifically, this section addresses responsibilities, sampling equipment decontamination, field QC, laboratory QC, data validation, and data evaluation and management for the sampling event.

6.1 RESPONSIBILITIES

Tetra Tech project manager Mr. Sklaney is responsible for ensuring that sample quality and integrity are maintained in accordance with Tetra Tech's "QAPP for START" (Tetra Tech 2001) and that sample labeling and documentation procedures are performed in accordance with Tetra Tech SOP No. 019, "Packaging and Shipping Samples" (Tetra Tech 2000).

6.2 SAMPLING EQUIPMENT DECONTAMINATION

Tetra Tech will not require sampling equipment during this sampling event. Disposable, certified-clean sampling equipment will be used to collect samples to minimize the possibility of cross-contamination. This equipment will be double-bagged and disposed of as dry, industrial waste.

6.3 FIELD QUALITY CONTROL

Tetra Tech personnel with perform sample documentation of field QC measures as described in Tetra Tech's "QAPP for START" (Tetra Tech 2001) and Tetra Tech SOP No. 024, "Recording of Notes in Field Logbook" (Tetra Tech 1999). Field QC measures will consist of collecting trip blank, field duplicate, and co-located samples. The trip blank samples will be used for both groundwater and air matrices to determine whether any contamination may have occurred during transport of the samples. One trip blank sample will be collected and submitted to the laboratory with the groundwater samples. Up to five Summa canisters, or a frequency of one trip blank sample per 20 air samples per shipment will be submitted as trip blanks to the laboratory with the air samples. The canisters will be filled with ultra-pure nitrogen by the laboratory, and at least one trip blank sample will accompany the each sample shipment during the entire sampling event.

One field duplicate sample will be submitted to the laboratory for the aqueous (groundwater) samples. The aqueous field duplicate sample will be used to test the reproducibility of sampling procedures and results. No air matrix field duplicate sample will be submitted due to the unreliability of reproducing air sample collection methods. Co-located samples will be collected at the frequency of one per 20 in order to attempt to replicate the sample results at the assigned locations. No splitting device will be used; the samples will be collected adjacent to one another. Sample identifiers for field duplicate samples will be indistinguishable from field samples to keep the identity hidden from the laboratory.

6.4 LABORATORY QUALITY CONTROL

Groundwater and air samples will be shipped to the CLP and DAS laboratories, respectively, assigned by the EPA Region 3 Office of Analytical Services and Quality Assurance (OASQA). QC measures for the CLP laboratory will consist of all QC elements identified in the CLP Statement of Work (SOW) and will include completion of all forms and deliverables required in the SOW. QC measures for the DAS laboratory will consist of all QC elements identified in modified EPA method TO-15. The DAS laboratory data package requested will be a CLP-like deliverable.

6.5 DATA VALIDATION

EPA Region 3 OASQA staff will perform data validation procedures in accordance with EPA Region 3 modifications to the CLP national functional guidelines for organic data review (EPA 1994). Organic data generated will be validated at the M3 level in accordance with the EPA Region 3 “Innovative Approaches to Data Validation” (EPA 1995b).

6.6 DATA EVALUATION AND MANAGEMENT

This section describes how Tetra Tech will (1) evaluate the data generated from the sampling event, (2) determine whether the data is representative of site conditions, and (3) ensure that the data is secure and retrievable. Resident identities and addresses will be considered confidential information, and will not be included in public documents during completion of tasks outlined in the project TDD.

6.6.1 Data Evaluation

Tetra Tech will review the analytical packages to determine whether any major deficiencies were encountered during analysis and to ensure that the data are interpreted correctly. The soil vapor and indoor air sample results will be compared against SSLs and Removal Action Levels (RALs), respectively, to more quantitatively assess vapor intrusion of PCE and other substances into inhabited buildings.

6.6.2 Data Representativeness and Completeness

This SAP is designed to obtain data that are representative of environmental conditions at the site. If the sampling activities vary significantly from this plan because of unexpected field conditions or other unforeseeable factors, Tetra Tech will discuss the manner in which those variations impacted data representativeness in the trip report.

This SAP is also designed to obtain enough valid and acceptable data to achieve 90 percent completeness when compared against the amount of data collection planned. When validated sample analytical results are received, Tetra Tech will calculate the percent completeness based on an equation in the “QAPP for START” (Tetra Tech 2001). If 90 percent completeness is not achieved because fewer samples than anticipated are collected or because data is rejected during the validation process, the Tetra Tech project manager will discuss the matter with the EPA WAM and will include a discussion of the matter in the trip report.

6.6.3 Data Management

Tetra Tech will require that the laboratory submit the sample analytical data in electronic form as well as in the required hard copy analytical data package. Tetra Tech will compare the electronic data deliverables with the hard copy data package to ensure consistency. Tetra Tech will use the validated data to prepare a trip report for the project. All electronic data will be stored in a password-protected Microsoft® Access database for future retrieval and reference based on the WAM's requirements. Each hard copy analytical package will be kept in the project file located in the Tetra Tech office in Boothwyn, Pennsylvania until the package is officially transferred to EPA.

7.0 DELIVERABLES

Information obtained during and after the sampling event will be compiled in a trip report. The trip report will identify data collection methods and sampling locations, and will include data summary tables, maps, diagrams, and a data quality report, if required.

8.0 PROJECT SCHEDULE

Field activities for the tasks proposed in this SAP are expected to be begin during the week of March 29, 2004. Tetra Tech expects to receive validated analytical data from EPA Region 3 OASQA within 28 days after laboratory receipt of the samples. Tetra Tech will provide EPA with a draft trip report within 30 days after all site activities are completed and validated data is available. Table 3 presents the required tasks and anticipated time frame for completing each task during the initial phase of the project.

TABLE 3

PROJECT SCHEDULE

Task	Completion Time Frame
Conduct permanent implant installation	Week of March 29, 2004
Conduct TAGA screening, soil vapor sampling, air sampling	Weeks of April 12 and 19, 2004
Conduct groundwater sampling	Week of April 26, 2004
Receive verbal report of sample analytical data	14 days after sample receipt by laboratory
Receive hard copy report of sample analytical data	28 days after sample receipt by laboratory
Evaluate data	1 day after receipt of hard copy data report
Develop and submit trip report	30 days after data validation
Meet or call EPA WAM regarding report recommendation	5 days after submittal of trip report
Write AOC and close out TDD	Unknown

Notes:

EPA = U.S. Environmental Protection Agency
AOC = Acknowledgment of Completion
TDD = Technical Direction Document
WAM = Work Assignment Manager

REFERENCES

Environmental Photographic Interpretation Center. 2003. Aerial Photograph of the Lamont-Riggs Section of Washington, District of Columbia/Hyattsville, Maryland, Source unknown. Photograph date April 16, 1950. Scale 1:20,000.

Gannett Fleming, Inc. (Gannett Fleming). 2003a. Draft Description of Current Conditions Report, Former Chevron Facility No. 122208, 5801 Riggs Road, Chillum, Maryland. January 24.

Gannett Fleming. 2003b. Draft Soil Vapor Monitoring Report, Former Chevron Facility No. 122208, 5801 Riggs Road, Chillum, Maryland. January 30.

Geoprobe Systems (Geoprobe). 2003. Tools Catalog.

Tetra Tech. 1999. "Recording of Notes in Field Logbook." Standard Operating Procedure (SOP) No. 024. November.

Tetra Tech. 2000. "Packaging and Shipping Samples." SOP No. 019. January.

Tetra Tech. 2001. "Quality Assurance Project Plan [QAPP] for START." March.

Tetra Tech. 2002. Chillum PERC Site - Field Logbook. Technical Direction Document (TDD) No. SE3-02-07-013. Document Tracking No. 1524.

Tetra Tech. 2003a. Chillum PERC Site - Data Quality Report. TDD No. SE3-02-07-013. Document Tracking No. 1846. February 18.

Tetra Tech. 2003b. Chillum PERC Site - Data Quality Report. TDD No. SE3-02-07-013. Document Tracking No. 1896. April 3.

Tetra Tech. 2003c. Chillum PERC Site - Field Logbook. TDD No. SE3-03-03-012. Document Tracking No. 1899. April 3.

Tetra Tech. 2003d. Chillum PERC Site - Data Quality Report. TDD No. SE3-03-03-012. Document Tracking No. 1956. May 15.

Tetra Tech. 2003e. Chillum PERC Site - Data Quality Report. TDD No. SE3-03-03-012. Document Tracking No. 3009. October 5.

REFERENCES (Continued)

U.S. Environmental Protection Agency (EPA). 1994. "Region III Modifications to the National Functional Guidelines for Organic Data Review." Region 3, Office of Analytical Services and Quality Assurance." Fort Meade, Maryland. September.

EPA-Emergency Response Team Center (ERT). 1995a. "Groundwater Well Sampling." SOP No. 2007. January 26.

EPA. 1995b. "Innovative Approaches to Data Validation." Region 3,Office of Analytical Services and Quality Assurance." Fort Meade, Maryland. September.

ERT. 2004. Executive Summary, Chillum PERC Site, Chillum, Maryland. EPA Work Assignment No. 0-316. January 5.

EPA. 1996a. "Environmental Investigations Standard Operating Procedures and Quality Assurance Manual." Region 4. May.

EPA. 1996b. "Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells." SOP No. GW0001. Region 1. July 30.

EPA. 2003a. Chillum PERC Site - Region III Data QA Review, Case No. R31693, Sample Delivery Group (SDG) Nos. 3169301, 3169314, 3169335. Region 3. TDD No. SE3-03-03-012. September 29.

EPA. 2003b. Chillum PERC Site - Region III Data QA Review, Case No. 32147, SDG No. C2001. Region 3. TDD No. SE3-03-03-012. November 12.

EPA. 2003c. Chillum PERC Site - Region III Data QA Review, Case No. 32147, SDG No. C2005. Region 3. TDD No. SE3-03-03-012. November 12.

U.S. Geological Survey (USGS). 1965 (Photorevised 1979). Washington East, District of Columbia-Maryland 7.5-minute topographic quadrangle. Scale 1:24,000.

USGS. 1965 (Photorevised 1983). Washington West, District of Columbia-Maryland-Virginia 7.5-minute topographic quadrangle. Scale 1:24,000.

APPENDIX

SAMPLING SUMMARY

(Reserved)