ATTACHMENT B

FIELD SAMPLING PLAN

COPLEY SQUARE PLAZA SITE – OPERABLE UNIT 1
REMEDIAL DESIGN

REMEDIAL ACTION CONTRACT 2
FOR REMEDIAL, ENFORCEMENT OVERSIGHT, AND
NON-TIME-CRITICAL REMOVAL ACTIVITIES
IN REGION 5

ATTACHMENT B

FIELD SAMPLING PLAN
COPLEY SQUARE PLAZA SITE – OPERABLE UNIT 1
REMEDIAL DESIGN
SUMMIT COUNTY, OHIO

Prepared for
United States Environmental Protection Agency
Region 5
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Chicago, IL 60604

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ACRONYMS AND ABBREVIATIONS

µg/kg	Micrograms per kilogram
CFR	*Code of Federal Regulations*
CLP	Contract Laboratory Program
COC	Chain of custody
CRL	Central Regional Laboratory
DCE	Dichloroethene
DDC	Danton Dry Cleaners
DO	Dissolved oxygen
DOT	U.S. Department of Transportation
EC	Electrical conductivity
EPA	U.S. Environmental Protection Agency
ESI	Expanded site inspection
FS	Feasibility study
FSP	Field sampling plan
FTL	Field team leader
GC	Gas chromatography
GPS	Global positioning system
HASP	Health and safety plan
HCl	Hydrochloric acid
HDER	Historical data evaluation report
ID	Identification
IDW	Investigation-derived waste
IDEM	Indiana Department of Environmental Management
ITRC	Interstate Technology Regulatory Council
MCL	Maximum contaminant level
MIP	Membrane interface probe
mass spec	Mass spectrometry
MS	Matrix spike
MSD	Matrix spike duplicate
NA	Not applicable
NPL	National Priorities List
Ohio EPA	Ohio Environmental Protection Agency
OSC	On-Scene Coordinator
OU	Operable Unit

PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene
PID	Photoionization detector
PPE	Personal protective equipment
QA	Quality assurance
QAPP	Quality assurance project plan
QC	Quality control
RAC	Remedial action contract
RD	Remedial design
RI	Remedial investigation
ROD	Record of decision
SAP	Sampling and analysis plan
SI	Site inspection
SIM	Selective ion monitoring
SMO	Sample Management Office
SOP	Standard operating procedure
SOW	Statement of work
SSD	Sub-slab depressurization
SVOC	Semivolatile organic compound
TAL	Target analyte list
TCE	Trichloroethene
TCL	Target compound list
VC	Vinyl chloride
VOC	Volatile organic compound
WA	Work assignment

1.0 INTRODUCTION

SulTRAC has prepared this field sampling plan (FSP) as part of the sampling and analysis plan (SAP) for the remedial design for Operable Unit (OU) 1 of the Copley Square Plaza Site (Site) in Summit County, Ohio, under the U.S. Environmental Protection Agency (EPA) Remedial Action Contract (RAC) II for Region 5, Contract No. EP-S5-06-02, Work Assignment (WA) No. 058-RDRD-05XW. A remedial design (RD) for Copley Square Plaza Site will be prepared as defined in the record of decision (ROD) issued on October 13, 2009. The RD is intended to address contamination in subsurface soil and shallow groundwater by in situ chemical reduction system, and to ensure pathways to receptors are not completed. This is accomplished by providing public water and sub-slab depressurization (SSD) systems to affected residents. The objective of the RD field sampling activities is to generate sufficient data to aid in the design of the selected remedy defined in the ROD.

Remedial investigation and feasibility study (RI/FS) work is also being performed at the site under a separate WA for OU2. OU2 addresses bedrock aquifer groundwater and consists of related site characterization activities. The FSP for OU2 will address field sampling activities for the bedrock groundwater aquifer (OU2) and shallow groundwater aquifer (OU1) as well.

The SAP consists of this FSP (Attachment B), the OU2 FSP (Attachment A), and the quality assurance project plan (QAPP) (Attachment C), which are among the site-specific plans to be prepared under the WA No. 057-RICO-O5XW and WA No. 058-RDRD-05XW in accordance with Task 1 in the EPA statement of work (SOW) (EPA 2009a and EPA 2009b). Although separate FSPs have been prepared for each OU, quality assurance (QA) and quality control (QC) protocols associated with sampling and analysis to be performed for both OUs are presented in one QAPP prepared under WA No. 058-RDRD-05XW.

SulTRAC will perform various field sampling activities for data acquisition to support the RD. The primary goals of the field sampling activities are to (1) obtain updated surface water quality data and (2) obtain indoor air, sub-slab, and soil gas data. Field sampling activities to obtain shallow groundwater data for the RD are included under the OU2 FSP. This FSP addresses the following field sampling investigations at the Copley Square Plaza Site:

- Hydrologic Investigation – SulTRAC will collect three surface water samples from the ditch located east of the former dry cleaner's building.

- Air Investigation – SulTRAC will collect indoor air and sub-slab soil gas samples for volatile organic compounds (VOC) analysis at up to 80 locations; the sampling area is defined by the shallow groundwater plume depicted in the feasibility study (Weston 2009) plus a 300-foot buffer zone. The sampling area is also extended to the southeast to include the nine residences along Copley Road, Plainview Drive, and Appletree Road that were involved in the 1995 removal action conducted by EPA. In addition, 25 soil gas samples will be collected from nearby structures.

The surface water samples will be analyzed by EPA's Contract Laboratory Program (CLP) laboratories. The indoor air, soil gas, and sub-slab samples will be analyzed by a subcontracted laboratory due to the large number of samples required and the rapid turnaround needed.

2.0 SITE DESCRIPTION AND HISTORY

The Copley Square Plaza Site (Site) is located at 2777 and 2799 Copley Road in Copley Township, Summit County, Ohio (see Figure 1). The Site spans approximately 86 acres, including the Copley Square Plaza and the extent of groundwater contamination. The area surrounding the Site is both commercial and residential. The Copley Square Plaza is bordered to the north by a vacant lot and condominium complex, to the east by undeveloped land and a condominium development property, to the south by Copley Road and residential land, and to the west by commercial businesses and residential land. Sampling of public and private wells in the Site area from 1990 to present has indicated impact of the local groundwater by VOC contamination.

The topography of the Site and the surrounding area generally slopes from west to east. The Site geology consists of unconsolidated glacial deposits overlying bedrock. The glacial till generally consists of interbedded silt, sand, clay, and gravel, and ranges in thickness from about 10 to 20 feet near the Copley Square Plaza to up to 40 to 60 feet east and south of the plaza. The bedrock beneath the Site has been characterized as the Cuyahoga Group and has a weathered zone at its surface, an intermediate zone with a relatively higher degree of fracturing, and a deep zone that is relatively more competent. The bedrock of the Cuyahoga Group is comprised of interbedded shales, sandstones, and siltstones (Weston Solutions, Inc. [Weston] 2008). Three water bearing zones have been identified at the site. The uppermost water bearing zone is considered perched groundwater in the unconsolidated glacial materials and is part of OU1. An intermediate water bearing zone exists in the relatively more fractured bedrock zone, and a deep water bearing zone exists in the relatively more competent bedrock zone (Weston 2008). The predominant groundwater flow direction in all three water bearing zones is to the east-southeast, and the intermediate and deep groundwater zones are characterized as semiconfined or confined aquifers (Weston 2008). The intermediate and deep bedrock groundwater zones are both included in OU2.

2.1 SITE HISTORY

Prior to development in the late 1950s, the Copley Square Plaza property (Property) was an operating cattle farm. Property cards state that 2777 Copley Road was built in 1963, and 2799 Copley Road was built in 1965. One of the buildings housed a dry cleaning business from the 1960s until August 1994 under a number of owners, most recently Danton Dry Cleaners (DDC). Initial identification of the Site occurred in April 1990 when a complaint of a water odor at the Site was submitted to the Ohio Environmental Protection Agency (Ohio EPA) (Weston 2009).

In response to the April 1990 water odor complaint at the Site, Ohio EPA initiated sampling of two private groundwater production wells immediately east of the dry cleaning building. Sample results from the private wells indicated the presence of VOCs, specifically tetrachloroethene (PCE), trichloroethene (TCE), *cis*-1,2-dichloroethene (DCE) , and vinyl chloride (VC) above the Safe Drinking Water Act Maximum Contaminant Levels (MCL). As a result, Ohio EPA directed the tenants of the affected building to cease use of the private wells, which were subsequently taken out of service. Following decommission of the affected wells, Ohio EPA continued investigations of surrounding wells from 1991 to 1993, with sample results indicating no contamination attributable to the Site.

Further investigation of the Site by Ohio EPA in April 1994 revealed wastewater that contained VOCs in concrete pits beneath the floor of the building, with a resulting dye test showing migration of that wastewater to surface water and groundwater. Subsequently, Ohio EPA sampled nearby residential and private groundwater wells, with results indicating nine wells with VOC concentrations above MCLs. Ohio EPA then requested removal action assistance from EPA.

In August 1994, following a request from Ohio EPA, EPA initiated a removal action designed to address the immediate threats posed to local residents by the contamination. This work resulted in installation of point entry household water treatment systems designed to remove the contaminants from the well water supplied to affected homes, closure of the eight wastewater tanks at the dry cleaning facility at Copley Square Plaza, and installation of a shallow groundwater recovery trench and sump system at the dry cleaning building by EPA. Since June 1995, Ohio EPA has managed the operation, maintenance, and testing of household water treatment, and the groundwater recovery system at the Site.

On January 23, 2002, Ohio EPA recommended that the Site be brought back into the federal system and that a Site Inspection (SI) be completed to determine if an ongoing release of contamination to groundwater was occurring. The SI was completed by the Ohio EPA in September 2002, and an Expanded Site Inspection (ESI) was completed by Ohio EPA in August 2003. The Site was listed on the National Priorities List (NPL) in April 2005.

Since listing the Site on the NPL, EPA has divided the site into two OUs. OU1 includes soil, shallow groundwater, and vapor intrusion issues associated with the groundwater contaminant plume. OU2 includes the deeper (bedrock) groundwater contamination. On October 13, 2009, EPA issued a ROD for OU1. The selected remedy for OU1 consists of treating the soil and shallow groundwater using reducing compounds, supplying local residents with public water, and installing vapor intrusion mitigation systems

in local residences. RI/FS work for OU2 is being conducted under a separate WA; therefore, activities associated with OU2 are not discussed in this FSP.

2.2 PREVIOUS SITE INVESTIGATIONS

Previous investigations and evaluations at the Site are discussed below in chronological order. The sections below (Sections 2.2.1 through 2.2.7) were originally compiled from Weston in a FS report (Weston 2009).

2.2.1 Site Discovery and Initial Characterization (1990)

In response to the April 1990 water odor complaint at the Property, Ohio EPA initiated sampling of two private groundwater production wells located adjacent to and immediately east of the dry cleaning building on the Site. These two wells, the North and South Production Wells, provided both drinking water and industrial process water to the two buildings at the Site. Sampling results indicated the presence of VOCs at concentrations above MCLs: PCE and TCE at levels exceeding the MCL of 5 micrograms per liter (µg/L); *cis*-1,2- DCE exceeding the MCL of 70 µg/L; and VC exceeding the MCL of 2 µg/L. Based on these results, Ohio EPA directed the tenants of the two buildings to cease use of the groundwater wells, after which both wells were taken out of service.

2.2.2 Ohio EPA Groundwater Monitoring (1991 through 1993)

After the initial characterization that identified VOC contamination at the Copley Square Plaza property, Ohio EPA continued collecting groundwater samples from both public and private wells around the property to ensure that additional drinking water supplies were not being contaminated by VOCs. Ohio EPA conducted groundwater sampling activities in April 1991, April and November 1992, and March and August 1993. During this period, no contamination attributable to the VOC contamination at the property was detected in the private wells beyond the property boundaries.

2.2.3 Ohio EPA Site Investigation (1994)

Ohio EPA initiated a site investigation in January 1994 to evaluate the extent of groundwater contamination at the Site and to characterize the Site hydrogeology (Earth Tech 1995). During the investigation, eight concrete wastewater pits were discovered beneath the floor of the DDC rental space. The eight concrete pits were sampled between February 1 and March 16, 1994. Results revealed that the pits contained PCE, *cis*-l,2-DCE, and TCE (Earth Tech 1995).

Earth Tech conducted a tracer dye test on April 19, 1994, to determine if the wastewater in the concrete pits was contributing to surface water and groundwater contamination. Test results confirmed that wastewater in the concrete pits was migrating to shallow groundwater beneath the building. In addition, two floor drains located on the east wall of the DDC rental space were also tested using tracer dye. The results indicated that both floor drains were connected to the storm water system and ultimately discharged to surface water on a neighboring property. Based on these results, surface water was sampled in a cistern located adjacent to and east of the building and in a small pond located approximately 120 feet east of the building. Sampling results indicated the presence of VOCs in the surface water (Earth Tech 1995).

Groundwater monitoring wells were installed in four clusters to monitor three different geological aquifer zones underlying the Site: the shallow sands, intermediate bedrock, and deep bedrock aquifer zones. Four shallow monitoring wells, three intermediate monitoring wells, and four deep monitoring wells were installed. A series of residential and private groundwater well sampling events was also conducted in the vicinity of the Property. Between May 25 and August 27, 1994, approximately 55 residential and private groundwater wells were sampled. Groundwater from nine of the residential wells contained detectable VOC concentrations (Earth Tech 1995).

2.2.4 EPA Removal Action (1994)

As a result of the Ohio EPA investigation, Ohio EPA contacted EPA on July 22, 1994, to request assistance in stabilizing conditions at the Site. The EPA Emergency Response Branch conducted an emergency removal action at the Site beginning on August 22, 1994. Ohio EPA had identified nine residences with private wells containing VOCs at concentrations exceeding MCLs. Prior to initiating the emergency removal action, EPA conducted residential well sampling at three of the residences to confirm the sampling results obtained by Ohio EPA and to further document the threat to public health. Laboratory analysis of the three residential well samples confirmed the presence of VOCs at concentrations exceeding the removal action levels established by EPA. Based on the sampling results, EPA conducted an emergency removal action, which is documented in the On-Scene Coordinator's (OSC) report (EPA 1996). This response action included five main activities summarized below (EPA 1996):

- Bottled water was temporarily supplied to select residences.
- Water treatment systems capable of treating VOC-contaminated groundwater were evaluated, designed, and installed in select residences.

- VOC-contaminated liquids in the wastewater pits located in the Building were stabilized and disposed of.
- An on-site groundwater interception trench was evaluated, designed, and implemented.
- A study to define the extent of groundwater contamination was performed.

2.2.5 Investigation of the Former O'Shux Golf Course Property (1999)

In 1999, Partners Environmental Consulting conducted a site investigation for the proposed Meadows of Copley residential development located on the former O'Shux Golf Course property, which is located immediately east of the Property. During the site investigation, 15 groundwater monitoring wells previously installed at the Site, in clusters identified as MW-1 through MW-6, were sampled. Additionally, three surface water and three sediment samples were collected along the drainage ditch located in the central portion of the Site. Seven boreholes were advanced in conjunction with the installation, sampling, and hydraulic conductivity testing of six of the monitoring wells. A limited risk assessment and an ecological evaluation were also conducted. Results are documented in the Site Investigation report (Partners Environmental Consulting [Partners] 1999).

2.2.6 Ohio EPA Site Inspection (2002)

In 2002, Ohio EPA conducted an inspection at the Site (Ohio EPA 2002) to determine if an ongoing release of contamination from the building was occurring. During this inspection, Ohio EPA collected eight soil samples, three Geoprobe® groundwater samples, 11 groundwater monitoring well samples, and 27 residential well samples. Samples were analyzed for target compound list (TCL) VOCs, semivolatile organic compounds (SVOC), pesticides, polychlorinated biphenyls (PCB), and target analyte list (TAL) metals. The SI report concluded that an ongoing release of VOCs to groundwater was occurring. The source was not identified.

2.2.7 Ohio EPA Expanded Site Inspection (2003)

In 2003, based on the release of VOC contamination to the groundwater documented in the Site Inspection Report (Ohio EPA 2002), Ohio EPA conducted an ESI to provide current data documenting the release. As part of the ESI, Ohio EPA collected nine soil samples from eight locations, two Geoprobe® groundwater samples, 17 monitoring well samples, and 23 residential well samples for VOC analysis. The sampling results confirmed that an ongoing release was occurring, and the ESI report evaluated the impact of site-related contaminants on various migration pathways (Ohio EPA 2003).

2.3 HISTORICAL DATA EVALUATION REPORT (2006)

In 2006, Weston prepared a historical data evaluation report (HDER) that reviewed in detail historical site investigations conducted at the Site between 1990 and 2004. The objectives of the evaluation were to (1) identify data gaps and uncertainties associated with available historical data, (2) make recommendations for future investigation activities, and (3) serve as the foundation for future RI/FS activities. The HDER concluded that, although the primary source had been adequately characterized, a residual source beneath and in the immediate vicinity of the building may be present (Weston 2006).

2.4 REMEDIAL INVESTIGATION (2006)

Beginning in February 2006 and concluding in late October 2006, Weston conducted a RI that included four quarterly sampling events. The first quarter RI-related field activities were conducted from February 10 through March 21, 2006. The second and third quarter sampling events were conducted from April 13 through 24 and from July 31 through August 8, 2006, respectively. The fourth quarter sampling event was conducted from October 16 through 20, 2006. The first quarter field activities consisted of the following:

- Membrane interface probe (MIP)/electrical conductivity (EC) investigation
- Soil sampling
- Shallow groundwater sampling
- Surface water sampling
- Monitoring well installation, development, and sampling
- Residential well sampling
- Soil vapor probe installation
- Soil gas and indoor air sampling.

During the first quarter field activities, soil screening and sampling were conducted using dynamic work procedures (that is, soil and shallow groundwater sampling locations were adjusted in the field based on field observations and screening data within the study area). Disposal of investigation-derived wastes (IDW) was conducted upon completion of the field activities. Field activities during the second, third, and fourth quarters were limited to groundwater, surface water, indoor air, and soil gas sampling. Results and conclusions of the RI were presented to EPA in the RI report prepared by Weston (Weston 2008). Analytical results for shallow soil gas can be found in Appendix A.

EPA determined that the RI field work, RI report, baseline ecological risk assessment, and baseline human health risk assessment had been completed for OU1. As a result, Weston prepared a FS report evaluating remedial alternatives for OU1 (Weston 2009). EPA subsequently selected a remedy based on the FS report and issued a ROD for OU1. The selected remedy for OU1 consists of treating the soil and shallow groundwater using reducing compounds, supplying local residents with public water, and installing vapor intrusion mitigation systems in local residences. EPA also determined that further investigation of OU2 was warranted, leading to RI activities described in the OU2 FSP (Attachment A).

3.0 PROJECT OBJECTIVE

The purpose of the WA is to prepare an RD of the selected remedy for OU1 as defined in the ROD. The RD will provide the design, plans, and specifications for the selected remedy to addresses soil, shallow (unconsolidated aquifer) groundwater, and vapor intrusion associated with the groundwater contaminant plume in OU1. Field sampling is required to support the RD. Specifically, the RD field sampling activities involve acquisition of updated surface water quality data, and acquisition of indoor air, sub-slab soil vapor, and soil gas data to support preparation of the RD.

In addition, obtaining groundwater data for the shallow aquifer will be required to support the RD. Groundwater sampling activities for the RD for OU1 will occur concurrently with the groundwater sampling activities for the RI for OU2, and have been documented in the OU2 FSP (Attachment A). For this reason, the project approach has been designed to maximize efficiency by sharing planning and data acquisition activities for both efforts wherever practical. Following this approach, one QAPP has been prepared for RD work at OU1 and RI/FS work at OU2; however, separate FSPs have been prepared for each OU. All SulTRAC field sampling activities will be conducted in accordance with the EPA-approved, site-specific QAPP (Attachment C) and SulTRAC standard operating procedures (SOP) included at the end of this FSP. Where the FSP differs from the SOPs, the FSP's site-specific procedures will take precedence.

4.0 FIELD SAMPLING ACTIVITIES

Field sampling activities discussed in this section pertain to the Site OU1, and will focus on evaluating the current extent of contamination of surface water, indoor air, soil gas, and sub-slab soil gas vapor by collecting samples of these media near and within structures located at the Site.

As discussed with the EPA and as outlined in the Site work plan (SulTRAC 2010a), SulTRAC will conduct the field sampling activities described in the following sections.

4.1 HYDROLOGIC INVESTIGATION

A hydrologic investigation will be conducted to collect three surface water samples from a ditch located east of the former dry cleaner's building. SulTRAC will collect three surface water samples (Figure 4) and one QC sample. A total of four surface water samples will be analyzed for VOCs by a CLP laboratory. Table 1 lists all surface water samples to be collected, the number of locations, and specific information on sample collection. A detailed discussion of sample collection procedures is included in Section 5.0.

4.2 SOIL GAS INVESTIGATION

A soil gas investigation will be performed at the site to collect indoor air, sub-slab vapor, and soil gas samples from up to 105 locations. The sampling area is defined by the shallow groundwater plume developed in the feasibility study (Weston 2009) plus a 300-foot buffer zone. The sampling area is also extended to the southeast to include the nine residences along Copley Road, Plainview Drive, and Appletree Road that were involved in the 1995 removal action conducted by EPA. The actual sampling locations within the focus area will also be determined by the permissions received from home owners located within the sampling area. Up to 160 indoor air and sub-slab soil vapor samples, not including QC samples, will be collected in up to 80 structures using 6-liter stainless steel Summa canisters for a 24-hour period. In addition, up to 25 soil gas samples, not including QC samples, will be collected near selected structures using 6-liter Summa canisters for a 24-hour period to aid in the design of a SSD system (Figure 3). Therefore, SulTRAC will collect a total of up to 185 air samples, plus up to 24 additional QC samples, to be analyzed for VOCs by a subcontracted laboratory. Table 1 lists all samples to be collected, the number of locations, and specific information on collection. A detailed discussion of sample collection procedures is included in Section 5.0.

TABLE 1

SUMMARY SAMPLE INFORMATION FOR COPLEY SQUARE PLAZA SITE

Number of Sampling Locations	Matrix	Depth
3 locations	Surface water	Surface[1]
Up to 80 locations [2]	Indoor air	NA[3]
Up to 80 locations [2]	Sub-slab soil vapor	3–6 inches
Up to 25 locations [2]	Soil gas	Varies[4]

Notes:

[1] Surface water samples will be collected from a ditch located east of the former dry cleaner's building.

[2] The sampling area is defined by the shallow groundwater plume developed in the feasibility study (Weston 2009) plus a 300-foot buffer zone. The sampling area also extends to the southeast to include the nine residences along Copley Road, Plainview Drive, and Appletree Road that were involved in the 1995 removal action conducted by EPA. The actual sampling locations within the focus area will also be based on the permissions received from home owners located within the sampling area.

[3] Depth of sampling is not applicable for indoor air sampling. Indoor air sampling is collected about 3 feet above the floor elevation to reflect appropriate breathing zone heights.

[4] Existing soil gas probes have an average depth of 15 feet. New soil gas samples will be collected at least 5 feet below ground surface but above the groundwater table (groundwater is estimated at 15 feet deep on average).

5.0 FIELD SAMPLING PROCEDURES

This section describes procedures to collect the types of samples described in Section 4.0. Specifically, this section details the procedures and methods to collect surface water, indoor air, soil gas, and sub-slab soil vapor samples. Additional details regarding sample collection, and analytical and data management procedures, are provided in SulTRAC's project QAPP and Data Management Plan (SulTRAC 2011a, b). Information in this section is based on procedures and methods specified in standard EPA guidance (EPA 1999, 2002, 2004a, 2004b, 2005a, 2006).

5.1 Surface Water Sampling

Surface water samples, including QC samples, will be analyzed for target compound list (TCL) VOCs by EPA's CLP using analytical method CLP SOW SOMO1.2. For a complete list of analytes, refer to the QAPP in Attachment C.

SulTRAC expects to collect three surface water samples from a ditch located east of the former dry cleaner's building to evaluate the current extent of hazardous substances, pollutants, or contaminants in surface water. The proposed sampling includes collecting QC samples consisting of a duplicate and a matrix spike for a total of four surface water samples. Surface water samples will be collected in accordance with Tetra Tech SOP 009.

Before sampling, a YSI or equivalent water quality meter will be submerged in the ditch to obtain water quality parameters including dissolved oxygen (DO), temperature, pH, and specific conductance (see SOP 061). Water quality parameter measurements for surface water will be conducted the same as downhole measurements (see SOP 061, Section 2.2.3) and general procedures (see SOP 061, Section 2.2.4) with care taken to not touch bottom sediment. Surface water samples will be collected from the ditch by the transfer method. A clean transfer bottle (glass or high-density polyethylene container) will be submerged into the ditch to allow the container to fill slowly. The surface water sample will then be slowly transferred to the appropriate pre-preserved sample bottle (see Table 3) in order to minimize potential loss of VOCs during sampling. The sample containers will be sealed with the laboratory-provided lids. For each location, a new transfer bottle will be used.

All field measurements will be documented in the field logbook. Samples will be immediately placed in an iced cooler and maintained at a temperature of 4 ± 2 °C without freezing until delivered to the laboratory under standard chain-of-custody (COC) protocol.

All samples will be submitted to the designated EPA CLP laboratory for analysis. All surface water samples will be analyzed using CLP SOW SOM01.2, for TCL VOCs. A hand-held global positioning system (GPS) unit will be used to record each set of sampling location coordinates, and each sampling location will be photographed to ensure that the sampling location may be re-located if necessary.

5.2 Indoor Air, Sub-Slab Soil Vapor, and Soil Gas Sampling

To determine the extent of air contamination, SulTRAC will conduct indoor air and sub-slab soil vapor monitoring in up to 80 homes/structures and soil gas monitoring in up to 25 locations to assess the potential vapor intrusion exposure pathway.

To prevent any cross contamination, indoor air monitoring will be conducted prior to sub-slab vapor monitoring in each structure. The sequence of the indoor air and sub-slab sampling will be (1) perform a survey of the residence to be sampled, (2) collect the indoor air sample, (3) install the sub-slab sampling port, (4) wait a period of about 48 hours after sub-slab installation, and (5) collect the sub-slab sample. The indoor air and sub-slab soil vapor sampling will be conducted during the winter months in 2011 because past investigations have shown January and February to be the months when contamination is highest. Air investigations will be completed within a single mobilization. The indoor air and sub-slab soil vapor sampling program will be sequential, with a two-person field sampling team working separately in nearby structures setting up and collecting samples. In addition to indoor air and sub-slab soil vapor sampling, SulTRAC will also collect soil gas samples at up to 25 locations outside of the homes/structures where indoor air and sub-slab vapor soil samples will be collected. The soil gas sampling will be conducted during the winter of 2011 as well.

When planning and conducting the vapor intrusion component of the air investigations, SulTRAC will follow methods specified in EPA and Interstate Technology Regulatory Council (ITRC) guidance (EPA 2002, 2005b; ITRC 2007a, 2007b) as well as Ohio Environmental Protection Agency vapor intrusion monitoring guidance (Ohio EPA 2010a). The preliminary area identified for indoor air and sub-slab soil vapor monitoring is shown on Figure 2. The preliminary area for soil gas sampling is shown on Figure 3. The indoor air, sub-slab soil vapor, and soil gas sampling locations are defined by the shallow

groundwater plume plus a 300-foot buffer zone surrounding the shallow plume. In addition, the focus area also extends to the southeast to include an area where nine residences along Copley Road, Plainview Drive, and Appletree Road were involved in the 1995 removal action conducted by EPA. The actual sampling locations within the focus area will also be based on the permissions received from home owners located within this area. The objective of the indoor air and sub-slab monitoring will be to include locations that appear to have the most significant potential for VOCs in indoor air based on proximity to areas of significant soil and groundwater contamination. Once the general areas of interest are determined, SulTRAC will work with EPA to gain access to private properties to conduct the monitoring activities. SulTRAC assumes EPA will obtain all necessary agreements to access private properties in the areas of interest.

5.2.1 Indoor Air Sampling

Indoor air samples will be collected from up to 80 locations using certified 6-liter stainless steel Summa canisters, equipped with a certified 24-hour critical orifice flow controller. QC samples including field duplicates (collected at a rate of one per 10 investigative samples) will also be collected. In addition, one per 20 samples will be designated as matrix spike/matrix spike duplicate (MS/MSD) samples. QC samples are listed on Worksheet #20 of the QAPP (SulTRAC 2011a).

All indoor air samples will be analyzed by a subcontracted laboratory. The indoor air sample analysis will include the target VOCs listed in Worksheet #15 of the QAPP (SulTRAC 2011a). EPA Method TO-15 – selective ion monitoring (SIM) will be used for analysis (EPA 1999) for target chlorinated VOCs. Target chlorinated VOCs are based on the constituents of concern (COC) identified in the Record of Decision (ROD) issued in 2009. SulTRAC's QAPP specifies the residential screening levels that will apply for investigating the chlorinated VOC compounds anticipated to be present at the site.

Prior to sampling indoor air, a visual inspection of the area to be sampled will be conducted. If warranted, residents will be asked to remove items such as paints, craft glue, dry cleaning, cleaning materials, etc, that may cause interference with sampling results. Residents will be notified to remove these items when final notification of the date and time of the sampling event has been given to the residents. Items should be removed at least 48 to 72 hours prior to sampling. Residents will also be instructed to not conduct any activities that will potentially interfere with indoor air sampling while the samples are being collected.

Indoor air samples will be collected through a SIM certified stainless steel Summa canister VOC sampler and SIM certified 24-hour flow controller. The Summa canister will be placed near the expected source of contamination and in the breathing zone, approximately 3 feet from the floor. Once the Summa canister is in the appropriate sampling location, a SIM certified 24-hour flow controller will be affixed to the canister. When the flow controller is affixed, the canister valve will be opened, and the initial vacuum pressure and start time will be recorded on the air sampling data form.

After 24 hours, the canister valve will be closed, and the end time and ending vacuum pressure will be recorded on the air sampling data form. Following COC procedures, the canister and flow controller then will be shipped to the subcontracted laboratory for analysis and cleaning.

Ambient (outdoor) air samples will be collected during the indoor air sampling period. The ambient air sample locations will be upwind of the sample locations with a minimum of one sample per day. The location and number of ambient air samples will be determined by the location of the actual indoor air samples collected.

5.2.2 Sub-Slab Soil Vapor Sampling

Sub-slab soil vapor samples will be collected from up to 80 locations using certified 6-liter stainless Summa canisters, equipped with a certified 24-hour critical orifice flow controller. QC samples including field duplicates (collected at a rate of one per 10 investigative samples) will also be collected. In addition, one per 20 samples will be designated as MS/MSD samples. QC samples are listed on Worksheet #20 of the QAPP (SulTRAC 2011a).

All sub-slab soil vapor samples will be analyzed by a subcontracted laboratory. Sub-slab soil vapor sample analysis will include the target VOCs listed in Worksheet #15 of the QAPP (SulTRAC 2011a). Sub-slab vapor samples will be collected in specially prepared canisters and analyzed by gas chromatography (GC) and mass spectrometry (mass spec) using EPA Compendium Method TO-15 SIM – Determination of Toxic Organic Compounds in Ambient Air (EPA 1999), for targeted chlorinated VOCs. Target chlorinated VOCs are based on the COC identified in the ROD issued in 2009. Sub-slab soil gas samples will be collected through a SIM-certified stainless steel Summa canister VOC sampler and SIM-certified 24-hour flow controller. SulTRAC's QAPP specifies the residential screening levels that will apply for investigating the chlorinated VOC compounds anticipated to be present at the site (SulTRAC 2011a).

To prevent any cross contamination, indoor air monitoring will be conducted prior to sub-slab vapor monitoring in each structure. Residents will continue to be asked to keep items that may cause interference away from the sampling area. Once indoor air monitoring has been completed, sub-slab soil vapor probe installation will commence. Sub-slab vapor probes will be installed in buildings having basements with concrete slab floors. For the basement samples, probes will be placed 4 feet or more from the side walls. If monitoring occurs in structures without concrete slab floors, the proposed sampling methodology may be modified. Prior to probe installation, the locations of sewer lines or other utilities will be confirmed with the property owner, and a visual inspection and consultation with utility location services may occur, as needed.

When planning and conducting the vapor intrusion component of the air investigations, SulTRAC will follow the Ohio EPA vapor intrusion guidance SOP 2.5.2 – Construction and Installation of Permanent Sub-slab Soil Gas Ports (Ohio EPA 2010b). By use of an electric hammer drill or rotary hammer, an inner or pilot hole will be drilled into the concrete slab to a depth of approximately 2 inches with the ⅜-inch-diameter drill bit. Using the pilot hole as the center, an outer hole will be drilled to an approximate depth of 1⅜ inches using the 1-inch-diameter drill bit. The 1-inch-diameter drill bit will then be replaced with the ⅜-inch-diameter drill bit, and the pilot hole will be drilled through the slab and 3 to 6 inches into the sub-slab material. Once drilling is completed, a stainless steel probe will be assembled and inserted into the pre-drilled hole. A length of Teflon tubing will be connected from the stainless steel probe assembly to the permanent sample port. A coarse sand pack will be added to cover the probe and establish a sampling zone. Then bentonite pellets or a sealing grout mixture will be placed above the sampling zone to seal the borehole above the sand pack to just below the surface.

The sampling port will be installed in the surrounding slab and will look like a nut imbedded into the concrete. To seal off the sampling port, the surrounding area around the nut will be cemented and a socket head screw will be inserted into the nut to seal off the sub-slab air from the ambient air. All components of the sampling port will be installed flush with the surrounding concrete so it will not interfere with pedestrian traffic.

The following information will be included on the logging form for each location: site location and address, owner name, location number, boring diameter, date started, sampler's initials, subcontractor name, and location sketch (with distances measured from the structure walls) with a north directional arrow. Organic vapor measurements collected by photoionization detector (PID) will be recorded during installation. Photographs depicting sub-slab soil gas probe installation will be archived. Purging of the

filter pack is required if sampling occurs within 24 hours of installation. If purging is required, at least three volumes will be removed.

Sub-slab soil gas samples will be collected through a SIM-certified stainless steel Summa canister VOC sampler and SIM-certified 24-hour flow controller. Leak testing will be done during sampling by applying butane to the joints and fittings of the sampling systems and instructing the laboratory to analyze samples for butane in addition to the target chlorinated VOCs.

5.2.3 Soil Gas Monitoring

SulTRAC will collect soil gas samples from up to 25 soil gas probes. QC samples including field duplicates (collected at a rate of one per 10 investigative samples) will also be collected. In addition, one per 20 samples will be designated as MS/MSD samples. QC samples are listed on Worksheet #20 of the QAPP (SulTRAC 2011a).

All soil gas samples will be analyzed by a subcontracted laboratory. The soil gas sample analysis will include the target VOCs listed in Worksheet #15 of the QAPP (SulTRAC 2011a). Soil gas samples will be collected in specially prepared canisters and analyzed by GC/mass spec for targeted chlorinated VOCs using EPA Method TO-15 – Determination of Toxic Organic Compounds in Ambient Air (EPA 1999). Target chlorinated VOCs are based on the COC identified in the ROD issued in 2009. SulTRAC's QAPP specifies the screening levels that will apply for investigating the chlorinated VOC compounds anticipated to be present at the site (SulTRAC 2011a).

According to previous investigation reports, 15 soil gas monitoring probes have already been installed at the site; thus, only 10 new soil gas probes will be installed. Soil gas samples will be collected from the existing and new probes utilizing 6-liter Summa canisters equipped with a certified 24-hour critical orifice flow controller. These locations will be permanent sampling installations with sampling tube, screen, coarse sand pack, and grout seal.

The 10 new soil gas probes will be installed at the Site with direct push methods (see SOP 074) so that soil cores can be obtained to characterize the subsurface conditions. Additionally, soil gas probe installation will be conducted in accordance with Ohio EPA guidance (Ohio EPA 2010a). A Teflon or stainless steel sampling probe will be placed to the desired depth in the borehole. A coarse sand pack will be added to cover the probe and establish a sampling zone. Then bentonite pellets or a sealing grout

mixture will be placed above the sampling zone to seal the borehole above the sand pack to the surface. At the surface, a permanent sampling port will be installed and completed with a flush-mount cover.

Soil gas samples will be collected using 6-liter stainless steel Summa canisters over a 24-hour sampling period. Sampling with Summa canisters will be achieved by soil gas equilibration with the evacuated Summa canister. The Summa canisters used for soil gas sampling will have a 6-liter sample capacity and will be certified clean by the laboratory before use in the field. Leak testing will be done during sampling by applying butane to the joints and fittings of the sampling systems and instructing the laboratory to analyze samples for butane in addition to the target chlorinated VOCs. After sampling is completed, following COC procedures, the canisters will be stored and shipped to the subcontracted laboratory for analysis.

5.2.4 Sampling Procedure and Analysis

Sampling equipment should ideally have the smallest possible internal volume to reduce the need for purging and the risk of inducing air flow from outside. All connections or fittings in the sampling equipment will be tight to avoid leakage from the sample collection container. Leak testing will be done by placing a hood or shroud over the sampling systems and introducing helium as the leak test agent. Leak test samples will be collected in tedlar bags and tested in the field using a portable helium detector to test whether leaks are present in the joints and fittings of the sampling systems. If helium is detected in the tedlar bags, the joints and fittings will be tightened and tested again. After leak testing is complete, the samples will be collected as described below. Leak testing will be conducted at about 10 percent of the soil gas and sub-slab sampling locations. Leak testing is not required for indoor air sampling.

For the Copley Square Plaza site, all samples will be collected using certified, pre-cleaned, laboratory-supplied 6-liter stainless steel Summa canisters. The Summa canisters will be fitted with certified orifice flow regulators to allow for sample collection over a 24-hour period. The Summa canisters will be connected to the vapor probes with Teflon tubing. The following discussion pertains to sample collection using Summa canisters.

SulTRAC will use 6-liter, stainless steel Summa canisters for indoor air, sub-slab soil vapor, and soil gas sample collection. SulTRAC will inform the subcontracted laboratory of the desired sample collection period (24-hour time period), and the laboratory will provide certified regulators set to achieve 24-hour sample collection. As a field check, SulTRAC will periodically monitor the regulators to ensure that

Summa canisters are not completely filled within a significantly shorter time period. SulTRAC will record sample collection rate and vacuum readings for each indoor air and sub-slab sample collected.

The following actions will be taken during indoor air, sub-slab soil vapor, and soil gas sampling:

- The Summa canister's initial pressure reading, ambient air temperature, and ambient air pressure will be measured and recorded in the field logbook before the sample is collected.
- The sampling port will be attached to the Summa canister using new tubing for each sample. The shortest length of tubing possible will be used to connect the Summa canisters to the sampling ports.
- The tubing will be flushed out by connecting it to the sampling port, opening the sampling port valve to allow air flow, and then connecting it, under system pressure, to the Summa canister. Opening the canister pressure valve will allow the evacuated canister to draw in ambient air and soil gas until the canister reaches ambient pressure. When the sampling valve on the canister shows that ambient pressure has been reached, the sampling valve will be closed and the canister removed from the sampling line. Only individually certified Summa canisters will be used for sampling.
- The post-sampling pressure reading on the canister pressure valve will be measured and recorded.
- The canister and its corresponding field data sheet will be labeled with the sample number.
- The laboratory will report the vacuum for each canister as shipped, and the vacuum will be field verified using a vacuum pump gauge before each sample is collected. For proper sample collection, initial vacuum should be greater than or equal to 28 inches of mercury. Canisters exhibiting vacuum readings less than 28 inches of mercury will be removed from use.

A Y-branched sampling hose will be connected to the vacuum chamber or pump to collect duplicate samples. Two Summa canisters will be attached, one to each end of the Y-branched hose. Sample collection will proceed as described above. After the samples are collected, the samples will be labeled identically to provide a blind duplicate to the laboratory.

The sub-slab screening levels are based on a factor of 10 times the action levels for indoor air, consistent with the methodology in EPA's draft vapor intrusion guidance document of November 2002 (EPA 2002). The acceptable reporting limits depend on the exposure duration for chlorinated sites. Target indoor air concentrations are specified in the ROD dated 13 October 2009. The target sub-slab concentrations are 10 times higher.

6.0 LABORATORY ANALYTICAL METHODS

Table 2 presents the laboratory methods that will be used to analyze the samples collected by SulTRAC. The CLP laboratory will analyze the surface water samples, and a subcontracted laboratory will analyze the air samples.

TABLE 2
ANALYTICAL METHODS SUMMARY

Parameter	Analytical Method
SURFACE WATER	
TCL VOCs	CLP SOW SOM01.2
SOIL GAS	
Target VOCs	Subcontracted laboratory – TO-15
SUB-SLAB AND INDOOR AIR	
Target VOCs	Subcontracted laboratory – TO-15 SIM

Notes:

CLP Contract Laboratory Program
SIM Selective ion monitoring
SOW Statement of work
TCL Target compound list
VOC Volatile organic compound

7.0 DECONTAMINATION PROCEDURES

During sampling, SulTRAC will follow decontamination procedures for soil gas sampling and surface water sampling as outlined below. Use of potable water obtained from the Akron public water system will be used for decontaminating equipment.

Down-hole equipment used for soil gas sampling will be steam cleaned before work begins and following sampling at each sampling location. Dedicated disposal equipment, such as tubing for the soil gas sampling, will be used whenever possible. To prevent cross contamination, non-dedicated measuring and sampling equipment will be decontaminated before sample collection begins and following sampling at each sampling location. During sampling operations, sampling equipment will be cleaned using a non-phosphate detergent (such as Alconox or Liquinox) wash, a potable water rinse, and a final distilled water rinse. The equipment will be decontaminated following the general practices in SOP 002. A portable steam cleaner and an on-site source of potable water will be used for decontamination. All water derived from decontamination will be collected and temporarily stored in DOT-approved 55-gallon drums or polyethylene tanks on site for characterization. Disposable sampling equipment will be used to collect individual samples only. Except for the detergent that will be used for the initial cleaning, the solutions used to decontaminate the field equipment will not be reused.

Stainless steel Summa Canisters will be shipped back to the subcontracted laboratory for analysis. When possible, dedicated orifice flow controllers will be used to regulate the amount of air into the Summa Canister. If flow controllers and Summa Canisters are to be used at more than one sampling location, they will be shipped back to the subcontracted laboratory for decontamination and “clean” certification.

8.0 SAMPLE HANDLING PROCEDURES

SulTRAC will collect indoor air, sub-slab, soil gas, and surface water samples; prepare the samples for shipment; complete all necessary documentation; and decontaminate nondisposable equipment. Sample containers, preservatives, holding times, identification, documentation, COC, packaging, and shipping are discussed in this section. The SulTRAC QAPP and Data Management Plan (SulTRAC 2011a, b) provide detailed information regarding sample and data management procedures that will be followed for field investigation activities during the RD.

8.1 Sample Container, Preservation, and Holding Times

SulTRAC anticipates collecting indoor air, sub-slab, soil gas, and surface water samples. Sample handling procedures are different for each type of chemical group, analysis, and matrix type. The types of sample containers, preservation requirements, and holding times for each type of sample are summarized in Table 3.

8.2 Sample Identification

All samples will be identified by a unique sample identification (ID) number composed of the following information:

- Sampling matrix
- Sample location
- Site number
- Sample date and sample time
- Sample collection depth
- Sample type (field, field duplicate, or QA/QC).

For surface water samples, each sample sent to the CLP laboratory will also be assigned an identifying number by CLP Forms-II Lite software. CLP Forms-II Lite was developed to expedite sample documentation, track samples from the field to the laboratory, and reduce the most common documentation issues associated with sampling. The user will enter information on the site, project, sampling team, analysis, location, matrix, and collection time and date before or during the sample event. SulTRAC will identify specific sample names after the start of the field campaign, but before intrusive

field activities begin, because preliminary activities to be completed before the sampling event may alter sample locations.

For all air samples to be analyzed by a subcontracted laboratory, standard EPA methods will be used, and data packages will be prepared in accordance with the requirements specified in the QAPP. These samples will be identified using the nomenclature described in Table 4. However, the CLP Forms-II Lite requirements will not apply to these samples because these samples will not be analyzed by the EPA CLP.

TABLE 3

SAMPLE CONTAINER, PRESERVATION, AND HOLDING TIMES

Matrix	Analyte	Sample Container	Preservation Requirements	Maximum Holding Time (preparation/ analysis)[1]
Water	VOCs	Three 40-mL glass vials with Teflon®-lined septa and open-top screw caps	No headspace; cool to 4±2°C; adjust pH to less than 2 with HCl	7 days/14 days[2]
Indoor Air	VOCs	6-Liter stainless steel Summa canisters[4]	NA	30 days[3]
Sub-Slab Soil Gas Vapor	VOCs	6-Liter stainless steel Summa canisters[4]	NA	30 Days[3]

Notes:

[1] Holding time is measured from time of sample collection to the time of sample extraction and analysis (EPA 2004b).

[2] Preserved samples have a 2-week holding time, whereas unpreserved samples have only a 7-day holding time.

[3] Specific chemicals of concern may have holding times of less than 30 days. Refer to the QAPP for specific holding times and specific chemicals of concern.

[4] Assumes use of 6-liter stainless steel Summa canisters. The actual size of the Summa canister will be determined based on the subcontracted laboratory's SOP.

EPA U.S. Environmental Protection Agency
HCl Hydrochloric acid
mL Milliliter
NA Not applicable
QAPP Quality assurance project plan
SOP Standard operating procedure
VOC Volatile organic compound

TABLE 4
GENERALIZED SAMPLE IDENTIFICATION SCHEME

Investigation Area	Matrix	Sample Number	Example Identification
OU1	Surface Water – SW	Surface water identifier such as SW-1, etc.	OU1-SW-1-xxxx*
	Indoor Air – IA	Indoor air identifier such as IA-01, etc.	OU1-IA-01-xxxx*
	Sub-slab Soil Vapor – SS	Sub-slab soil vapor identifier such as SS-01, etc.	OU1-SS-01-xxxx*
	Soil Gas – SG	Soil gas identifier such as SG-01, etc.	OU1-SG-01-xxxx*

Notes:

* Month/year format
OU Operable Unit
SW Surface water
IA Indoor air
SS Sub-slab soil vapor
SG Soil gas

8.3 Sample Labels

Each sample collected will have a label affixed immediately following sample collection. If more than one container is collected for each location, each container from that sample location will have identical information on the sample labels plus information regarding the time that each sample is collected. Each sample label will contain the following information:

- Project number
- CLP case number
- CLP sample number
- Sample station name
- Sample collection date and time
- Preservative
- Sample collector's initials
- Analysis requested

Samples analyzed by a subcontracted laboratory will be identified using the nomenclature described in Table 4. However, the CLP Forms-II Lite requirements will not apply to these samples because these samples will not be analyzed by the EPA CLP. The label for these samples will be completed with the following information:

- Project number
- Sample ID
- Sample collection date and time
- Preservative
- Sample collector's initials
- Analysis

Sample Documentation

Sampling will be documented in a bound logbook using indelible ink. The header of each page will include the site location name, date, and project number. At the start of each day, the weather, site condition, field staff present, subcontractors present, and any safety meeting or other meeting conducted will be noted. The collection time, sample identification number, sample depth (if appropriate), sample location, sample description, sampling deviations, field observations, sampler's name, and time of sample collection will be recorded on field data sheets for each and every sample. Every MS/MSD sample and duplicate sample should be clearly designated in the field data sheet. Collection of rinsate samples and preparation of trip blanks will be documented with applicable parameters in the same manner as described above. The sample identification, location, and time will be recorded in the field log book.

Each page of the logbook will be dated, numbered (if appropriate), and signed at the bottom by SulTRAC personnel. Any residual space on the last page of each day's log book will be crossed out with a single line. Each new sampling day will begin on a new page in the log book. Any corrections made during the same day of sampling should be crossed out with one single line.

The field team leader ensures that all documentation in the logbook is done appropriately and accordingly, and should check it daily. Any corrections or additions can be made on a subsequent page with appropriate documentation; however, this procedure is not recommended as corrections or additions are best made on the same day as sampling.

All field logbooks must be kept secure at all times by the field team leader while conducting field work. As possible, all field log books shall be scanned electronically and all completed field books and any hard copies will be stored with the project manager. Field data records will be maintained in accordance with EPA's Multi-Media Investigation Manual (EPA 1992) and SulTRAC's QAPP.

8.5 Chain of Custody

COC documentation is used to maintain a record of sample collection, transfer of samples between personnel, sample shipping, and receipt by the laboratory. Sample information is entered on the COC documents at the time of sample collection. If any transfer of samples occurs prior to shipment, the COC will reflect the change of possession.

SulTRAC will use standard sample custody procedures to maintain and document sample integrity, including QA/QC samples, during collection, transportation, storage, and analysis in accordance with the SulTRAC QAPP. The COC form will be signed, dated, and timed by the relinquishing and receiving parties each time sample possession is transferred. Transfer of sample custody will be kept to a minimum to simplify the COC record.

A sample will be considered in custody if one or more of the following criteria are met:

- The sample is in a person's physical possession or view.
- The sample is in the sampler's view after being in possession.
- The sample is in a secure area with restricted access.
- The sample is placed in a container and secured with an official seal such that the sample cannot be reached without breaking the seal.

The CLP/Central Regional Laboratory (CRL) generates and prints COC forms, called traffic reports, in Forms II Lite (a laboratory copy and a region copy). The laboratory copy will be sealed inside the lid of the cooler. COC procedures provide an accurate written record that traces possession of individual samples from the time of collection in the field to the time of acceptance at the laboratory. One COC record will be generated for each cooler shipped. The COC record also will be used to document all samples collected and the analyses requested. The following information will be documented on the COC form:

- Project name and number (region copy only)

- CLP case number
- CLP sample numbers
- Sampling location
- Name and signature of sampler
- Destination of samples (laboratory name)
- Sample ID number
- Date and time of collection
- Number and type of containers filled
- Analysis requested
- Preservatives used (if applicable)
- Sample designation (grab or composite)
- Special instructions (e.g., laboratory need to subsample oversized material or perform additional homogenization)
- Signatures of all samplers
- Signatures of individuals involved in custody transfer, including the date and time of transfer
- Air bill number (if applicable)
- Project contact and phone number
- Custody seal number

Samples not analyzed by the EPA CLP will not require CLP Forms-II Lite. For non-CLP samples, SulTRAC will use laboratory-provided COC forms that require the same level of information as the EPA Forms-II Lite-generated COC forms, with the exception of the CLP-specific information (CLP case number, CLP sample numbers, and sample tag numbers).

SulTRAC will appoint one of its field technical staff members to serve as the sample custodian. When all required documents have been completed, the sample custodian will sign and date the document and list the time of the sample collection. The custodian will also confirm that all descriptive information is complete on the COC forms, which will be included with each shipping container. Two custody seals will be used: one custody seal will be placed across the latch of the container, and the other affixed on the opposite side of the container lid. The lid will be securely taped shut for shipment. For samples shipped to a CLP laboratory, the field sample custodian will send the original copies of the COC region copy to the project manager, who in turn will submit these forms to the Region 5 Sample Management Office (SMO), care of Warren Layne, within 5 working days. The sample custodian will also retain and scan all copies of all COCs (laboratory and region) for the project files.

Corrections to Documentation

Any corrections to field documentation, either in the field or during review, will be made by a single strike-through; the correct information will be recorded adjacent to the corrected information; and the person making the correction will initial and date next to the correction. The person who made the initial entry will make the corrections.

8.7 Sample Packing and Shipping

Samples will be shipped to the CLP laboratory or to the subcontracted analytical laboratory for analyses for constituents of concern. Samples will be shipped to the designated analytical laboratory within 24 hours of collection and within the specified holding times for each analysis following appropriate COC procedures as described above. All shipping containers will be labeled as required by the DOT. After packaging, the surface water samples will be shipped to the CLP laboratory specified by the EPA Regional Sample Control Coordinator, and the air samples will be shipped to the subcontracted laboratory.

The following procedures will be implemented when surface water samples collected during this project are shipped:

- Ice will be double bagged in large Ziploc-type bags and placed at the bottom of the cooler. If the cooler has a drain, it will be taped shut both inside and outside of the cooler.
- The cooler will be lined with bubble wrap or other packing material, and all individually packaged samples will be placed into one large plastic bag and tied after all sample jars have been put in. Sufficient packing material will be used to prevent sample containers from breaking during shipment.
- Additional ice, double bagged, will be added on top of the tied plastic bag full of samples. Enough ice will be added to maintain a sample temperature of 4 ± 2 °C. SulTRAC will prepare, label, and place a temperature blank in each cooler.
- The laboratory should be notified if a sampler suspects that any sample contains anomalously high or low concentrations (handwrite this anomaly directly on the laboratory copy of the COC), or if a sampled substance may require laboratory personnel to take safety precautions.
- The COC specific to each cooler will be sealed inside a plastic bag and taped to the inside of the cooler lid. Ensure that the COC is signed by all samplers and the custody seal numbers are included on the COC. Include with the COC a return pre-paid air bill so the cooler may be returned to SulTRAC.
- The cooler will be closed and taped shut with strapping tape around both ends.

- Signed and dated custody seals will be placed on the front and side of each cooler. Wide clear tape will be placed over the seals to prevent accidental tearing.
- The air bill, if required, will be completed before the samples are relinquished to the carrier.
- The COC will be transported within the taped sealed cooler. When the cooler is received at the analytical laboratory, laboratory personnel will open the cooler and sign the COCs to document transfer of samples.

The following procedures will be implemented when Summa air samples collected during this project are shipped:

- Return all components to the original shipping containers and package them as received.
- Complete the appropriate COC as supplied by the laboratory and place inside one of the packages. Ensure that the COC is signed by all samplers.
- Seal each of the packages and apply a COC seal as necessary.
- The air bill, if required, will be completed before the samples are relinquished to the carrier.
- The COC will be transported within the original shipping container. When the container is received at the analytical laboratory, laboratory personnel will open the container and sign the COCs to document transfer of samples.

9.0 DISPOSAL OF INVESTIGATION-DERIVED WASTE

Investigation-derived waste (IDW) is waste generated from an activity related to determining the nature and extent of contamination at the Site. It includes any hazardous waste media and debris that contains "listed" hazardous waste or that exhibits a characteristic of a hazardous waste. It also includes media and debris that are not hazardous, but are contaminated with hazardous constituents.

IDW generated during the field sampling activities at the Site will include purge water from decontamination of surface water and soil gas vapor equipment and rinsate procedures. All IDW will be removed from specific work sites and managed at a central, secure location, on property owned and controlled by Summit County.

Water from purging and decontamination activities will be contained in portable tanks or drums. If amenable to Summit County and if analytical data do not indicate the presence of significant contamination, water generated from purging and decontamination may be disposed of at the local publicity owned treatment facility, contingent on approval by EPA and Ohio EPA.

Waste water that appear to have a high potential to contain significant contamination based on source location, odors, staining, or other observations will be drummed and stored separately to minimize the amount of material potentially requiring management as a hazardous waste.

Drummed materials will be clearly marked to indicate the date(s) of collection, its waste contents, and other generator information. A completed "WASTE MATERIAL" label will be affixed to the exterior side of each drum, before U.S. Department of Transportation (DOT) classification. This label will include site, address, contents, operation, accumulation date, and consultant phone number information. All information must and will be completed for each drum. Before off-site disposal, the drums will be relabeled with appropriate DOT identification and classification information.

All IDW will be disposed of as required by state and local regulations after results have been received for IDW water analyses. Additional IDW generated as a result of sampling will include disposable personal protective equipment (PPE) and sampling equipment. Disposable PPE and sampling equipment will be managed according to the level of contamination encountered during field activities. In general, PPE will be managed as nonhazardous solid waste, particularly if little contact occurs with the sampling medium and low levels of contaminants are involved. Therefore, this waste will be double bagged and disposed of with municipal trash.

10.0 HEALTH AND SAFETY PROCEDURES

SulTRAC will prepare a site-specific health and safety plan (HASP) which specifies employee training, protective equipment, medical surveillance requirements, SOPs, and a contingency plan in accordance with 29 *Code of Federal Regulations* (CFR) 1910.120 1(1) and (1)(2). All field activities will be conducted in accordance with the HASP (SulTRAC 2010b). Before field activities begin, all SulTRAC field personnel and subcontractors will read and sign the HASP, indicating that they understand the plan and agree to operate in accordance with its requirements. Daily tailgate meetings will be conducted to review daily activities and task-specific hazards. All SulTRAC personnel and subcontractors must have 40-hour hazardous waste and emergency response training, and proof of certification must be filed with the signed HASP. A complete copy of site-specific plans, including any updated HASP, will be maintained by the field sampling team.

11.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

All QC activities will be conducted in accordance with the SAP. A copy of the SAP will be maintained by the field sampling team for immediate use in resolving any QA issues that might arise during field activities.

QC samples will include surface water samples, indoor air samples, soil gas, and sub-slab vapor samples. For all samples sent to the CLP or the subcontracted laboratory, QC samples will be collected at the following frequencies:

- Field Duplicate: One per 10 environmental samples will be collected, with a minimum of one per sample matrix.
- Trip Blank Samples: One trip blank will be included in each cooler containing samples for analysis for VOCs. This applies to surface water only.
- MS/MSD Samples: One per 20 environmental samples per matrix will be designated as a MS/MSD sample.

Field duplicate samples consist of two separate samples collected from the same sampling location and depth, using the same equipment and sampling procedures, and analyzed independently. A trip blank is a sample composed of contaminant-free media, representative of each particular sampling event, which is carried to the sampling site and transported to the laboratory for analysis without having been exposed to sampling procedures. The trip blank will be analyzed as normal field samples, using the same preparation and analytical procedures.

A MS/MSD is an environmental sample divided into two separate aliquots, each of which is spiked with known concentrations of target aliquots. The two spiked aliquots, in addition to an un-spiked sample aliquot, are analyzed separately, and the results are compared to determine the effects of the matrix on the precision and accuracy of the analysis. All MS/MSD samples should be clearly identified for the CLP laboratory.

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