Tier 2 Vapor Intrusion Work Plan – Combined Sampling and Analysis Plan (SAP) / Quality Assurance Project Plan (QAPP)

Interim Phase 3 Remedial Investigation Activities

Simplot Grower Solutions
South 300 1st Street

Sunnyside, WA
April 22, 2022

Tier 2 Vapor Intrusion Work Plan – Combined Sampling and Analysis Plan (SAP) / Quality Assurance Project Plan (QAPP) for Interim Phase 3 Remedial Investigation Activities

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Acronyms

AO	agreed order
CLARC	Cleanup levels and risk calculation
COPC	contaminant of potential concern
Ecology	Washington State Department of Ecology
EIM	Ecology Environmental Information Management
EPA	U.S. Environmental Protection Agency
HDR	HDR Engineering, Inc.
HSP	health and safety plan
Phase I RI Report	*Phase 1 Remedial Investigation Report*
Phase I SAP	*Phase 1 Remediation Investigation Sampling and Analysis Plan*
Phase 2 SAP	*Phase 2 Remediation Investigation Sampling and Analysis Plan*
PID	photo-ionization detector
QA/QC	quality assurance/quality control
QAPP	*Quality Assurance Project Plan*
RI/FS	remedial investigation/feasibility study
RI Work Plan	*Remedial Investigation Work Plan*
SAP	sampling and analysis plan
SGS	Simplot Grower Solutions
Simplot	J.R. Simplot Company
SOP	standard operating procedure
WAC	Washington Administrative Code

1 Introduction

This Tier 2 Vapor Intrusion Work Plan – is a combined Sampling and Analysis Plan (SAP) / Quality Assurance Project Plan (QAPP) describes field sampling procedures and laboratory analysis to support ongoing remedial investigation (RI) activities. The RI is part of a remedial investigation and feasibility study (RI/FS) being conducted by the J.R. Simplot Company (Simplot) at the Simplot Grower Solutions (SGS) facility at South 300 1st Street, Sunnyside, Washington. An RI/FS is part of Agreed Order (AO) number 16446 between Simplot and the Washington State Department of Ecology (Ecology).

As described in the *Remedial Investigation Work Plan* (RI Work Plan; HDR 2019a), RI activities will be conducted in phases, where information from the current phase will inform the need for additional information and field activities (future phases). Specifics for each phase, such as location and number of samples, are addressed in a SAP that is developed for each phase. Phase 2.5 RI activities were conducted in the fall of 2021 in accordance with the *Phase 2.5 Sampling and Analysis Plan* (Phase I SAP; HDR 2020) and the Quality Assurance Project Plan (QAPP; HDR 2021). Findings of the Phase 2.5 RI activities are summarized in the document *Phase 2.5 Remediation Investigation Repor*t dated April 2022 (Phase 2.5 RI Report; HDR 2022). In the Phase 2.5 RI report, HDR concluded that a source area geophysical survey, source area soil sampling activities and an on-site Tier 2 soil vapor evaluation are warranted to begin a remedial action workplan.

This Tier 2 Vapor Intrusion Work Plan is limited to addressing scope of work items associated with an on-site Tier 2 soil vapor evaluation and is meant as a supplement to the existing SAP and QAPP documents for the project (HDR 2021). Tier 2 vapor intrusion investigations typically include sampling events designed to represent more conservative (worst-case) sampling conditions i.e. late winter/early spring sampling where anticipated indoor temperature differentials are at minimum 30 degrees Fahrenheit higher than the anticipated outdoor temperatures. At the issuance of this document, temperature differentials at the site would still allow for a cold weather sampling event; however, time is of the essence.

An updated Phase 3 SAP that includes source area geophysical survey and source area soil sampling activities (i.e. activities that do not have seasonal temperature dependent constraints) is being prepared concurrently and will be provided separately. This document details the field activities necessary to accomplish this a Tier 2 Vapor evaluation.

1.1 Purpose and Objectives

The objective of the RI/FS is to meet the requirements of the AO by completing an RI/FS as described in the Model Toxics Control Act (MTCA) Cleanup Regulation (Washington Administrative Code [WAC] 173-340). The RI is designed to characterize site conditions in order to complete a FS and select a cleanup action as described in WAC 173-340-360 through 173-340-390, because of the presence/discovery of several COPCs in soils and groundwater at the SGS facility.

This Tier 2 Vapor Intrusion Work Plan –combined SAP / QAPP SAP presents the field operation and investigation requirements and procedures for carrying out vapor intrusion assessment activities associated with Phase 3 RI. This document includes information on site investigation rationale for sample type (e.g., soil gas and indoor air), sample location, sample procedures, and analytical methods. The Tier 2 Vapor Intrusion will be conducted in general accordance with Washington State Department of Ecology Guidance for Evaluating Vapor Intrusion in Washington State (Ecology, 2022).

1.2 Project Organization

Following is a list of personnel involved in carrying out the RI/FS project plan and this SAP:

- Molly Dimick, J.R. Simplot Company, project manager (208) 235-5682
- Stacey Lamer, HDR Engineering, project manager (208) 387-7034
- Tyler Allen, HDR Engineering, senior environmental scientist health / safety officer (208) 387-7018
- Jered Newcomb, HDR EIT, field lead (509) 343-8446
- Analytical Laboratory – Eurofins TestAmerica, Tacoma, Washington

Ecology's project coordinator is overseeing the RI/FS:

- Frank Winslow, Washington Department of Ecology, project manager (509) 454-7835

1.3 Project Schedule

For Tier 2 Vapor Intrusion sampling, field activities will be initiated before May 15, 2022. The sampling event(s) will be weather dependent, and the sampling event will target a date when forecasted anticipated indoor temperature differentials are at minimum 30 degrees Fahrenheit higher than the anticipated outdoor temperatures.

1.4 Site Location

This document is prepared for the SGS facility at South 300 1st Street, Sunnyside, Washington **(Figures 1** and **2** in Appendix B).

2 Tier 2 Vapor Intrusion Field Activities to Support the Remedial Investigation

Field investigation activities are designed to meet investigation objectives described in the AO and the RI Work Plan (HDR 2019a). The sampling strategy and rationale are described in this section. The Tier 2 investigation described herein will be conducted in general accordance with Washington State Department of Ecology Guidance for Evaluating Vapor Intrusion in Washington State (Ecology, 2022).

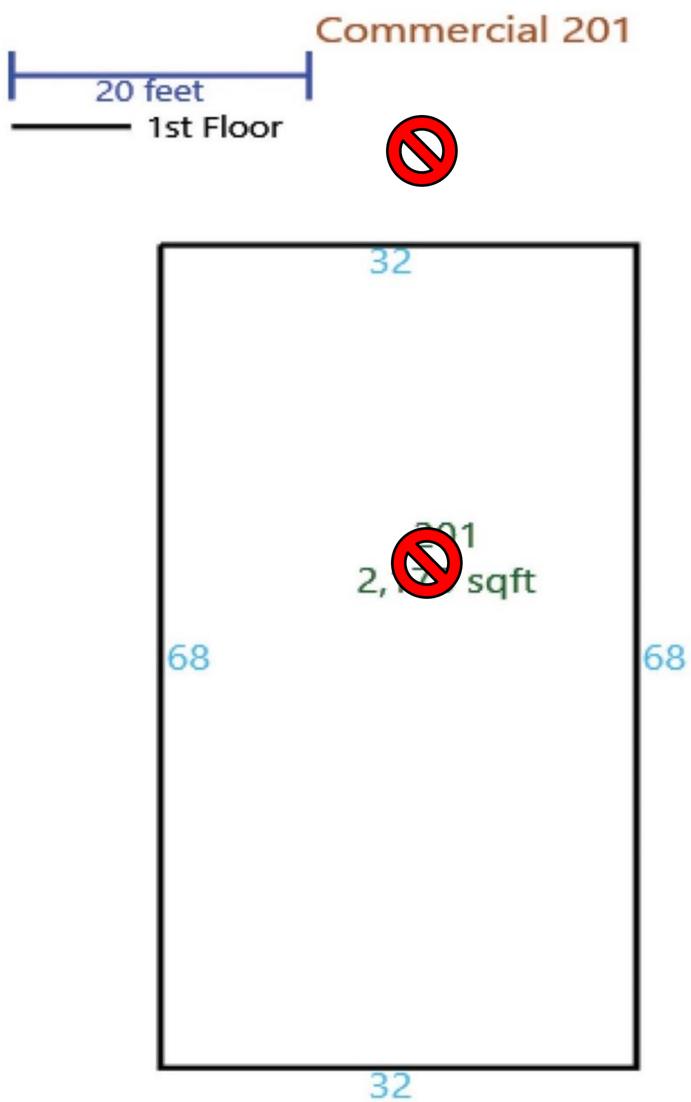
The RI is following a phased investigative approach, where findings of the current phase will inform the need and approach of the next phase.

Tier 2 Vapor Intrusion activities will be conducted within the on-site buildings as an interim component of the overall Phase 3 RI:

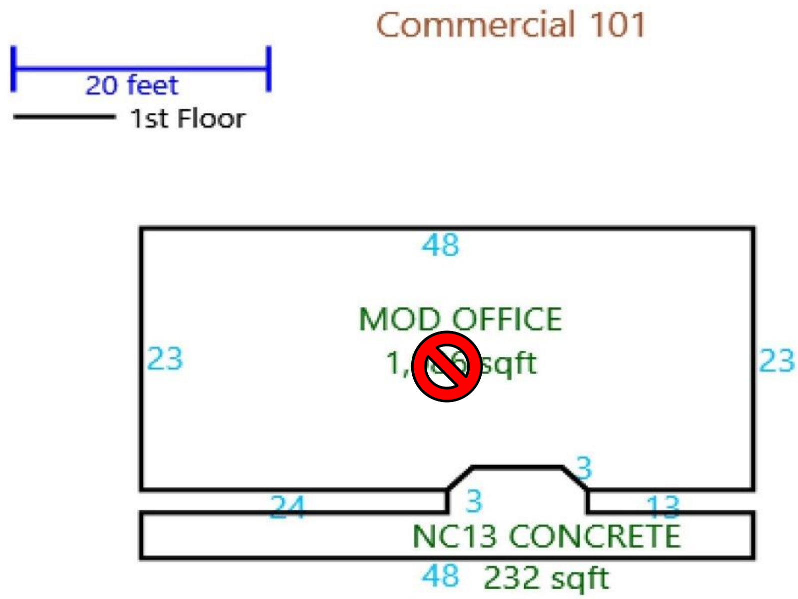
Source area geophysical survey and source area soil sampling activities will be conducted at a later date, the results of which will be summarized and be combined with the results of the Tier 2 vapor intrusion assessment and are expected to be the final RI phase. The information gathered in this phase will be used to inform the remedial design.

2.1 Tier 2 Vapor Intrusion Investigation

The Phase 2.5 RI off-site Tier 1 vapor intrusion investigation did not indicate the presence of site-related contaminants in soil vapor downgradient of the site. Because of the on-site elevated PID readings, the proximity of buildings (less than 100 ft. from the high PID readings), onsite conditions will likely require Tier 2 vapor intrusion investigation. Tier 2 vapor intrusion investigations are typically required to include sampling event efforts to represent more conservative (worst-case) sampling conditions i.e. late winter/early spring sampling where anticipated indoor temperature differentials are at minimum 30 degrees Fahrenheit higher than the anticipated outdoor temperatures. We propose a Tier 2 vapor intrusion investigation on-site.



Warehouse building from Yakima County WA, Property Record Card. Proposed sub-slab vapor and co-located indoor air sample locations shown in red.



Modular office building from Yakima County WA, Property Record Card. Proposed sub-slab vapor and co-located indoor air sample locations shown in red.

A pre-investigation product inventory survey will be conducted one week prior to the VI investigation inside each building to identify potential sources of VOCs that could interfere with the investigation results. Any chemicals in any amount, including those used for housekeeping, will be inventoried, the contents listed, and if necessary, Safety Data Sheets (SDS) from the manufacturer reviewed to confirm contents. If possible, these chemicals will be temporarily removed from inside the buildings at the conclusion of the product inventory survey. A PID will also accompany the product inventory survey crew to alert if there are measurable PID readings at interior locations proposed for sampling. Should this occur, an attempt will be made to locate the source of the PID readings and eliminate it, at least temporarily during the VI investigation. The heating systems will be active, and the windows closed throughout sampling. Barometric pressure data will be recorded and documented.

Sub-slab soil vapor, crawl space, indoor air, and outdoor air samples will be collected. Sub-slab vapor samples will be collected to characterize the nature and extent of soil vapor contamination immediately beneath the concrete foundation slab of the warehouse-type structure. The office building is a modular structure. The area below the structure may be similar to slab on grade or to a crawl space. If not similar to a slab on grade foundation, soil gas collection will be performed by inserting the probe rod or sampling tube horizontally through an opening or other accessible exterior area at the building foundation wall or vertically through the overlying structure.

Co-located indoor air samples will be collected concurrently with slab-slab or crawl space sampling to characterize indoor air quality and identify any current exposures within the buildings. One outdoor ambient air sample will be collected up wind of and between the two buildings to characterize site-specific background outdoor air conditions.

A total of two sub-slab soil gas sampling points will be installed through the interior slab on grade concrete floor in the existing slab on grade site building. Following installation, the points will be allowed to equilibrate for approximately 24-hours prior to sampling. Following the manufacturer's standard operating procedures, a Vapor Pin™ sub-slab soil-gas sampling device will be installed in each of the holes. Water dams or equivalent will be used to prevent the breakthrough of vapors from the building interior into the sub-slab vapor samples. In addition, a shroud will be placed over the sampling equipment and a leak detection gas (helium) will be utilized to detect leakage in the sampling train.

Vapor samples will be collected using one- or six-liter Summa canisters (size depending on laboratory requirements and recommendation) and analyzed for the compounds on the EPA TO-15 list of analytes. The samples will be analyzed by Eurofins Air Toxics LLC, Folsom, California. The laboratory will provide flow regulators, PTFE tubing, and stainless steel "T" connectors for collecting duplicate samples and will set the flow regulators to collect sub-slab soil gas samples at intake flow rates of 2 L/min or less. Indoor air samples will be collected using a dedicated flow controller set to collect the sample over an approximate 8-hour time interval; however, the gauge will be monitored closely to ensure that before the vacuum in the canisters drops to zero, minimum negative pressure is remaining on the dedicated gauge at the time the Summa canister is closed, secured, and appropriately labeled with pertinent sample information.. Depending on the results of the VI investigation and exterior soil sampling, two additional VI sampling events may be conducted during the following heating season.

The locations of the proposed soil vapor implants, the co-located indoor air sampling locations, and the outdoor air sampling location are displayed on the figures in this section.

2.2 Proposed Sample Analyses

- Soil vapor, indoor air and ambient air samples will be analyzed for volatile organic compounds (VOCs) by EPA Method TO-15.

The following will be collected for quality assurance/quality control (QA/QC) purposes (HDR 2019c):

- Duplicate samples:
    - One duplicate soil vapor sample
    - One duplicate indoor air sample

In all, nine samples will be collected and analyzed for the Phase 3 RI activities.

- Three interior sub-slab or crawl space soil vapor samples
- Three indoor air samples
- One outdoor ambient air sample
- Two QA/QC samples

2.3 Sample Identification Protocol

Air samples will be identified starting with the following abbreviations:

- AMB – outdoor ambient air
- CS – crawl space soil vapor
- IA – indoor air
- SS – sub-slab soil vapor

Eurofins Air Toxics LLC, Folsom, California, followed appropriate laboratory QA/QC procedures as dictated by the USEPA method and the laboratory's SOPs.

2.4 Results Comparison Criteria

Tier 2 vapor investigation results will be compared to CLARC VI Method C Screening/Cleanup levels – the lower of cancer or non-cancer:

- Indoor Air Cleanup Level Method C Cancer or Non-Cancer
- Sub-Slab Soil Gas Screening Level Method C Cancer or Non-Cancer

On-site soil sample results will be compared to CLARC Industrial Land Use – Method C – lowest of cancer or non-cancer.

2.5 Data Validation and Evaluation

Data validation and evaluation is summarized in the project's QAPP (HDR 2021). Data management and documentation will include checking all QA/QC parameters, including holding times, method blanks, surrogate recoveries, spike recoveries, field and laboratory duplicates, completeness, detection limits, laboratory control samples, and chain-of-custody forms. After the data has been checked, it will be entered into the project database with any assigned data qualifiers.

The project electronic database will be in a format compatible with the Ecology Environmental Information Management (EIM) system, and all analytical data will be entered into the EIM system. Results of the sampling and laboratory testing will be summarized in a spreadsheet, plotted on a site map, and the data compared to established site cleanup levels. A report will describe any significant field sampling issues, laboratory QA/QC testing, water level monitoring data and water quality testing results.

3 Field Sampling and Laboratory Testing

Tier 2 Vapor Intrusion sampling activities focus on sub-slab, indoor air, and ambient air sampling. The Tier 2 Vapor Intrusion sampling includes the following activities:

- Installation and sampling sub-slab soil gas via temporary sub-slab soil gas sampling points.
- Indoor air sampling
- Ambient air sampling.

This SAP will be updated as needed to support additional field investigation activities not covered under the bulleted activities above (e.g. future SAPs could include soil sampling, monitoring well construction, etc.).

3.1.1 Quality Control Samples

The QAPP, provided under separate cover (HDR 2021), includes details on data validation and describes QA/QC requirements for the analytical analysis. As noted in Section The following will be collected for quality assurance/quality control (QA/QC) purposes (HDR 2021):

- Duplicate samples:

- One duplicate soil vapor sample
- One duplicate indoor air sample

3.2 Laboratory Analyses

Soil gas and Air samples will be sent to Eurofins TestAmerica, Tacoma, Washington. Eurofins is certified in the State of Washington for air, drinking water, non-potable water, and solid and chemical materials. Investigation and sample collection procedures will be conducted in accordance with local industry standard practices. Soil gas and air samples will be analyzed for volatile organic compounds (VOCs) via EPA Method TO-15.

3.3 Quality Assurance and Quality Control

The QAPP (HDR 2021), presented under separate cover, addresses general field QA/QC methods laboratory QA/QC, and data validation procedures.

3.4 Health and Safety Plan

HDR personnel conducting this field program are required to follow the health and safety protocol presented in the HDR site-specific health and safety plan (HSP). Subcontractors and other authorized visitors to the site are responsible for their own health and safety. The HSP will be made available to subcontractors and other site visitors who request it. HDR personnel will communicate health and safety precautions to subcontractors during site safety briefings at the beginning of each field day (subcontractors are responsible for their own health and safety). To acknowledge review and comprehension of this plan, HDR personnel must sign the appropriate section included in the back of the document. The HSP is a separate document and is available upon request.

4 References

HDR Engineering, Inc.

2022. Phase 2.5, Remedial Investigation Report, Simplot Grower Solutions, Sunnyside, WA.

2021. Draft Quality Assurance Project Plan, Revision 1, Simplot Grower Solutions, Sunnyside, WA.

2020. Phase 1 Remedial Investigation Report, Simplot Grower Solutions, Sunnyside, WA.

2019a. Remedial Investigation Work Plan. Simplot Grower Solutions. Sunnyside, WA.

2019b. Phase 1 Remediation Investigation Sampling and Analysis Plan. Simplot Grower Solutions. Sunnyside, WA.

2019c. Quality Assurance Project Plan (QAPP). Simplot Grower Solutions. Sunnyside, WA.

Washington State Department of Ecology

2022. Guidance for Evaluating Vapor Intrusion in Washington State, Publication No. 09-09-047.

A

Standard Operating Procedures

SOP-1: Project Custody Documentation

SOP-2: Subslab Soil Gas Sampling

SOP-3: Indoor Air Sampling

SOP-1
STANDARD OPERATING PROCEDURE
PROJECT CUSTODY DOCUMENTATION

Updated October 9, 2019

PURPOSE

The purpose of this procedure is to describe the requirements for completing a chain-of-custody record in order to ensure that there is an accurate and complete record of the custody and transfer of custody for samples collected that require custody documentation.

APPLICABILITY

This procedure is applicable to those project activities involving the acquisition of samples for laboratory analysis. The scope of activities identified by this procedure is limited to work conducted under the authorization of a project manager. These are standard (i.e., typically applicable) operation procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. The actual procedures used should be documented and described in an appropriate site report.

REFERENCES

- Quality Assurance Project Plan

DEFINITIONS

Chain-of-Custody Record: The Chain-of-Custody Record is a form designed to identify samples, sample location, sample type, sample analysis, samplers and to document the transfer of samples from the field to the laboratory. As such, the form is designed to summarize the contents of the shipment, the dates and time of any custody transfer, and signatures of parties relinquishing and receiving the samples.

PROCEDURES

Legal Considerations

Samples collected and personal observations made during the performance of client services may ultimately end up in a court of law as evidence. Evidence may consist simply of a person's impressions and opinions formed while at the scene. It also may consist of tangible objects. A person conveys impressions and opinions by testifying as a witness in a hearing. Tangible objects are displayed for the judge, jury, or hearing officer, who forms impressions and opinions about the objects. Tangible objects are either self-displaying (i.e., samples) or are recording (i.e., photographs, tape recordings, computer records, documents or chain-of-custody records). In addition, evidence may be facts judicially or officially noticed, such as scientific principles or geographical landmarks.

Chain-of-Custody Procedures

As in any other activity that may be used to support litigation, the sampler must be able to provide the chain of possession and custody of any samples which are offered for evidence or which form the basis of analytical test results introduced as evidence. Written procedures must be available and followed whenever evidence samples are collected, transferred, stored, analyzed, or destroyed. The primary objective of this procedure is to create an accurate written record which can be used to trace the possession and handling of the sample from the moment of its collection through analysis and its introduction as evidence. In addition, other information such as sample holding times from the field to the laboratory can be verified.

It is necessary to demonstrate that a sample is the same sample that was taken at the site and that it has not been changed or altered (except for the portion that has been analyzed) since the time of sampling. A written record is kept for this purpose. This record, a trail, unambiguously shows that the sample was in custody every step of the way. A sample is in someone's custody if:

- It is in a person's actual physical possession; or
- It is in a person's view, after being in a person's physical possession; or
- It is in a person's physical possession and then locked up so that no one can tamper with it; or
- It is kept in a secured area, restricted to authorized personnel only.

The custody record must be signed twice: when a sample is created and when a sample is surrendered.

Custody Transfer Record Requirements

1. A chain-of-custody form shall be initiated and completed during collection of the sample. (Refer to attached example.)
2. Possession of every sample shall be recorded from the time of collection until the analytical results are fully documented by the laboratory.
3. The field manager shall be responsible for proper completion of the chain-of-custody form.
4. A copy of the completed chain-of-custody form shall be retained by the field manager following shipment/delivery of samples to the laboratory and given to the project manager upon returning to the office or within several days of collecting the sample, whichever is sooner.

Completing the Chain-of-Custody Form

1. Use a ball point pen. Press firmly; form may have multiple pages.
2. Record the appropriate project number in the space designated for "Project No." Samples from only one site may be recorded on each chain-of-custody.
3. Record the project name in the space designated for "Project Name."
4. Record analytical laboratory name and address the samples that are being shipped for analysis in the space designated for "Lab Address."
5. Complete field sample identification code (Reference) in the block labeled "Field Sample Number". List each sample once and only once. Be especially careful when more than one bottle is required to meet analytical requirements. Distinguish the number zero from the letter O by drawing a slash through the number zero.
6. Field replicate samples are assigned unique sample identification numbers and are considered separate samples, therefore, record each field replicate sample on a separate line.

7. Record the collection date for each sample.

8. Record the number of sample containers for "No. of Containers."

9. Determine if sample is a composite or grab sample and mark appropriate box with an "X."

10. Record the preservation methods under the heading "Notes/Comments." This includes the addition of ice to coolers (e.g., 6° C).

11. List parameters on the chain-of-custody form that the samples are being analyzed for under the “Analysis Requested” section. Use a separate column for each analysis. If extra space is needed, use an asterisk and describe the analysis under the heading "Remarks/Special Instructions."

12. Use a check to designate the analyses requested for each sample. A separate check is required for each sample; do not use arrows to identify the analysis requested.

Documenting Changes and Errors Prior to Custody Transfer

1. Cross out and initial any information incorrectly entered on the chain-of-custody form, such as for samples that have not actually been collected or, will not be included in this particular shipment.

2. Cross out and initial any entries which have errors or are illegible. Legibility is very important. Rewrite correct and legible entry on a separate line.

3. Verify numbers prior to custody transfer.

Quality Review in the Field

1. Cross check the sample identification numbers on the chain-of-custody form with those on the labels of the sample containers.

2. The field manager shall conduct a detailed review of the completed chain-of-custody form.

3. Verify the legibility of the bottom page of the chain-of-custody form.

Documenting Transfer of Sample Custody

1. In the case of more than one cooler per shipment, the coolers to be prepared for shipment shall be numbered on the outside of the coolers and recorded in the field logbook. ** NOTE: Samples from only one project site shall be in each cooler.

2. The chain-of-custody form shall accompany the samples while the samples are in transit.

3. Individuals relinquishing and receiving samples shall sign, date, and indicate the time in the lower portion of the chain-of-custody form. ** NOTE: For remote field sites where complex logistics are required to ship coolers, the field manager will generally seal the chain-of-custody form into the coolers, and document the mode of cooler transportation (e.g., field staff, courier service, FedEx) in the field notes. In these cases, the chain-of-custody form is only signed again before its receipt at the laboratory if the coolers are opened (e.g., repacked with fresh ice).

4. The field manager shall maintain a copy (photocopy or scan) of the chain-of-custody form as a record of field custody transfer.

Custody Transfer in the Laboratory

1. The sample custodian shall receive the samples at the laboratory. The individual relinquishing the samples will sign and date the release, and the sample custodian shall sign the chain-of-custody form, indicating acceptance of the samples.
2. The chain-of-custody form shall accompany samples sent to subcontracting laboratories for analysis. Sample custody shall be documented by individuals relinquishing and receiving samples.
3. The original copy of the completed chain-of-custody form shall be maintained at the laboratory until submittal of analytical results, at which time the original copy, or a photocopy if other laboratories are involved, is remitted with the analytical results. A copy of the completed chain-of-custody shall be maintained by the project.

Documenting Changes after Custody Transfer

1. Errors on the chain-of-custody, discovered after custody transfer, can be corrected by contacting project manager/field manager and notifying the laboratory immediately. Any corrections to the chain-of-custody form once original field custody has been relinquished must be documented in project records: emails, phone records, and the case narrative from the lab if applicable. Corrections shall be documented with organizations with whom the data will be submitted.

QA RECORDS

- Field log books
- Field data sheets and records

SOP-2
STANDARD OPERATING PROCEDURE
Subslab Soil Gas Sampling

Updated April 15, 2022

PURPOSE

During a Tier 2 evaluation, sub-slab soil gas is routinely collected in conjunction with indoor and ambient air samples. The purpose of sampling sub-slab soil gas during the Tier 2 evaluation is to help determine the contribution VI is potentially making to the measured indoor air concentrations.

"Sub-slab sampling" generally means sampling soil gas immediately below the building's lowest floor. While it is possible to collect soil gas at depth (that is, to collect soil gas samples several feet or more below the slab), this Appendix assumes that sample collection occurs just below the building slab. Since sub-slab gas sampling requires drilling holes through the building's slab, it won't always be possible to complete it because some building owners may not give permission to drill.

In most cases, however, drilling will be allowed so sub-slab sampling data will supplement the Tier 2 indoor air sampling event. Soil gas concentrations from directly below the building will help determine if VOC levels measured indoors are due to VI or from other sources. The relative levels of VOCs in sub-slab soil gas sampling results can also be compared to indoor measurements. For example, if two compounds are found in sub-slab soil gas at a concentration ratio of 10:1, a similar ratio would be expected in the indoor measurement, provided there are not contributions from other sources.

APPLICABILITY

The requirements of this procedure are applicable to project activities involving soil gas sample collection.

The extent of project activities identified by this procedure is controlled at the direction of the project manager.

These are standard (i.e., typically applicable) operation procedures that may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the actual procedures used should be documented and described in an appropriate site report.

REFERENCES

- Project Health and Safety Plan
- Remedial Investigation Work Plan (RI Work Plan)
- Guidance for Evaluating Vapor Intrusion in Washington State, Publication No. 09-09-047

PROCEDURES

Site Mobilization and Set-Up

Sub-slab samples are often collected the day immediately after the indoor sampling event in order to minimize potential impacts to indoor air quality. Before drilling holes in the slab, contact local utility companies to identify and mark utilities coming into the building from the outside (e.g., gas, water, sewer, electrical, and other utilities). Electricians, plumbers, or others may also need to be consulted to identify the location of utilities inside the building.

Subslab Soil Gas Sampling Using Vapor Pin

Cox-Colvin & Associates, Inc.'s Vapor Pin™ technology (Homepage - Vapor Pin®Vapor Pin®) are pre-assembled sub-slab probes offered in stainless-steel and brass, and include silicon sleeves that create a seal between the probe and the hole drilled in the concrete. They are easier to install and extract than conventional sub-slab probes and eliminate the need for grouting. Product details, installation procedures, and an installation video are located on the above-listed website. If Vapor PinsTM are utilized, leak detection using a tracer gas is recommended. Utilize the following protocol as a guide for subslab soil gas sampling installation using Vapor PinsTM. Refer to Cox-Colvin & Associates, Inc.'s Standard Operating procedure for Installation and Extraction of the Vapor Pin is included as part of this SOP.

Subslab Soil Gas Sample Collection

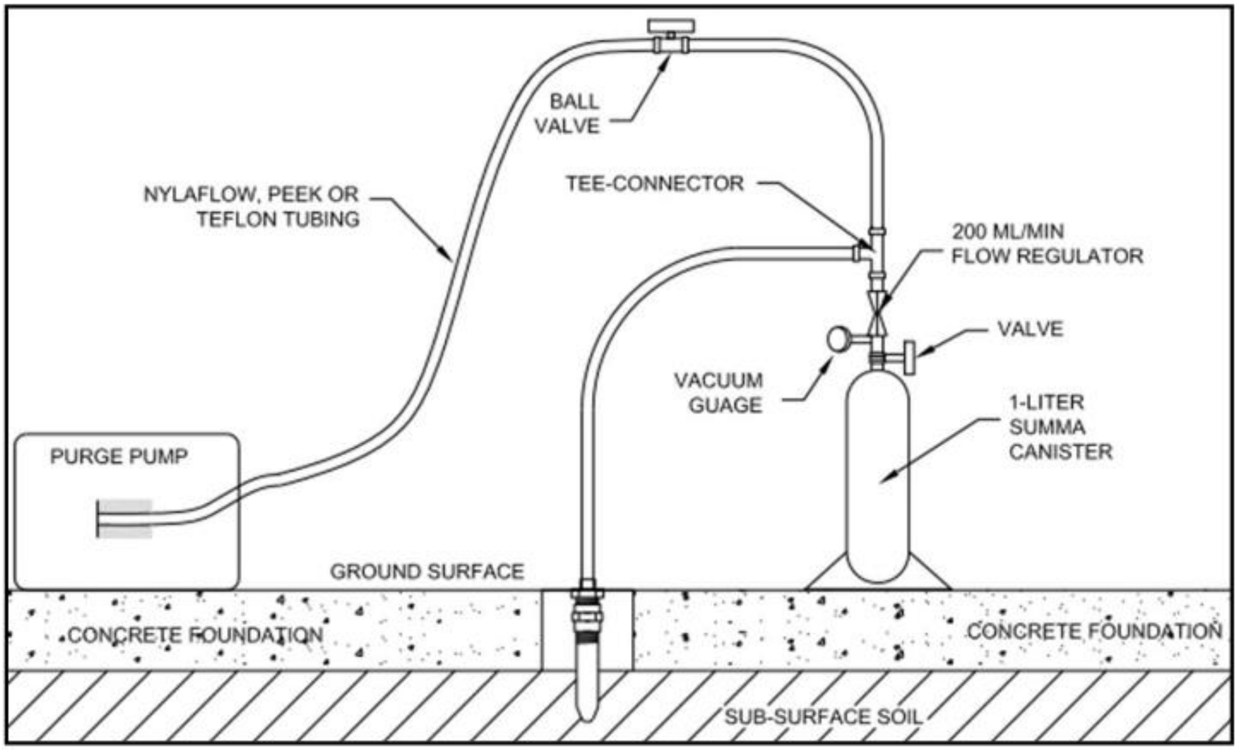
Step 1 Setting up the Sampling Train

Sampling trains can be setup in various ways but generally include the following items:

- Sample tubing (Teflon®, Teflon®-lined, PEEK, or Nylaflow® are recommended);
- Ball valves, fittings, and T-connectors;
- Purge pump (e.g., air sampling pump or peristaltic pump);
- PID to measure total VOCs; and
- Summa canister with dedicated low-flow (<200 ml/min) regulator.

The exact setup is up to the user, but it should utilize one or more of the recommended tubing options mentioned above and the tubing and fitting connections should be air-tight. The tubing and fittings utilized should also be dedicated and not re-used from one sample location to the other. If brass or machined fittings or valves are utilized, be aware that residual cutting oils from the manufacturing of these items may provide a source of cross contamination. If such fittings or valves are utilized, they should be properly decontaminated prior to use.

T-connectors and ball valves are commonly utilized to allow access to the purge pump and/or PID meter during sample purging. These valves are then closed to isolate these instruments from the sampling train before opening the Summa canister and collecting the sample.



Example Sample Train and Subslab Probe

Step 2: Sample Purging

Prior to sample collection, the soil gas sampling point and sampling train should be purged to remove "dead air" and ensure a representative soil gas sample is collected. This purging can be done with a standard air sampling pump, peristaltic pump, or PID meter. The purging should be conducted at a low-flow rate (<200 ml/min) and the vacuum applied should not exceed 100 inches of water. As a general rule of thumb, three sample train or system volumes (i.e., dead volumes) should be purged prior to sample collection. The dead volume equals the aggregate volume of all tubing, fittings, ports, and sanded and dry granular bentonite subsurface zones surrounding soil gas implants at a given location. If utilizing a PID to purge, check the flow rate of the model to ensure that it is <200ml/min or utilize a flow regulator to adjust to a low-flow rate. For sensitive sites or where a higher degree of certainty is desired it is recommended to conduct a purge test (until vacuum, flow rate, and PID readings stabilize) on a representative sampling point in order to determine the optimal purge volume for the location. Purge tests should be conducted for each general soil type at the site. The resulting purge volume should then be applied consistently for all samples collected from the respective soil type in the study area. During the purge test, the vacuum and flow rate should be limited as noted above. This should limit the potential for ambient air being drawn into the sample from the ground surface and it should limit desorbing of vapors from contaminated soils. Care should be taken to only purge the amount of soil gas necessary to appropriately remove the dead volume and obtain a representative sample when exterior shallow soil gas samples are being collected. Large purge volumes could result in atmospheric air being drawn into the vadose zone and diluting the soil gas sample. Low permeability soils can pose challenges due to the restriction of adequate soil gas flow during purging and sample collection. Measures to aid in sample collection for low permeability soils can include reducing flow rates for sample collection, increasing sample collection times, and/or increasing the size of the sand pack surrounding the sampling tip. Refer to Appendix D of the California EPA Advisory – Active Soil Gas Investigations, dated April 2012, for alternative methods for low permeability soils.

Step 3: Sample Collection

It is recommended that subslab soil gas probes be allowed to equilibrate for 24 hours prior to sample collection. If the project schedule does not allow a 24-hour equilibration time, the probes should be purged at a low-flow rate to promote collection of representative samples. For sites with elevated VOCs in the subslab, a PID can also be utilized during purging to evaluate equilibration for representative sample collection.

After purging of three system/sampling train dead volumes or the optimal purge volume derived from the purge test, the valves leading to the pump and/or PID should be closed and the pump or PID turned off. After this, sample collection is simply initiated by opening the Summa canister already connected to the sampling train that is filled with representative soil gas. The Summa canister should be equipped with a laboratory-supplied, dedicated flow regulator set to a flow of <200 ml/min.

It is important that the canister vacuum is recorded: 1) immediately upon opening the canister and initiating sample collection; 2) at the end of sample collection prior to closing the canister; and 3) by the laboratory upon receipt of the sample at the laboratory and prior to sample analysis. Sample collection is complete when the vacuum on the summa canister reaches near zero. It is preferred to leave some vacuum (e.g., 2 to 3 inches Hg or other as indicated by laboratory) in the Summa canister after sample collection so that a comparison with the vacuum measured prior to analysis at the laboratory can identify possible canister leaks during sample shipment. Then, the Summa canister valve should be closed prior to disassembling the sample train. If the site geology and/or time allowed for the investigation does not allow for complete filling of the Summa canister (i.e., vacuum reading near zero), contact the laboratory and report the observed vacuum reading prior to closing the Summa canister to see if they will have sufficient volume to reach the desired reporting limits to compare to applicable standards or screening values. If the reporting limits will not meet the needs of the project, consult the laboratory and APR for options on evaluating the resulting qualified data. Recording the sampling duration time is also useful in that it can be evaluated against the regulator flow rate to approximate the sample volume collected.

As previously mentioned, Summa canisters not exhibiting full vacuum when they are first opened should not be utilized since ambient air may have entered the canister during shipment. Differences in canister vacuum can also result from the shipping of canisters between locations with different elevations. If you have questions or concerns about the initial vacuum in your summa canister, contact the laboratory to discuss the vacuum that was recorded at the lab prior to canister shipment and to evaluate any discrepancies in vacuum.

Step 4: Sample Packaging/Shipment:

Soil gas samples are shipped back to the laboratory in closed Summa canisters in the originally-supplied box and packaging along with a properly-completed chain-of-custody. Soil gas samples should not be chilled or shipped in a cooler. Although sample collection in Tedlar® bags is discouraged by this guidance, if Tedlar® bags are utilized, they should be stored and shipped in a manner avoiding contact with direct sunlight.

Data Collection

There are various data that need to be recorded during soil gas sample collection. Refer to the field data forms in Appendices A through C for templates outlining the various data and parameters that should be collected in connection with the investigation methods discussed in this SOP.

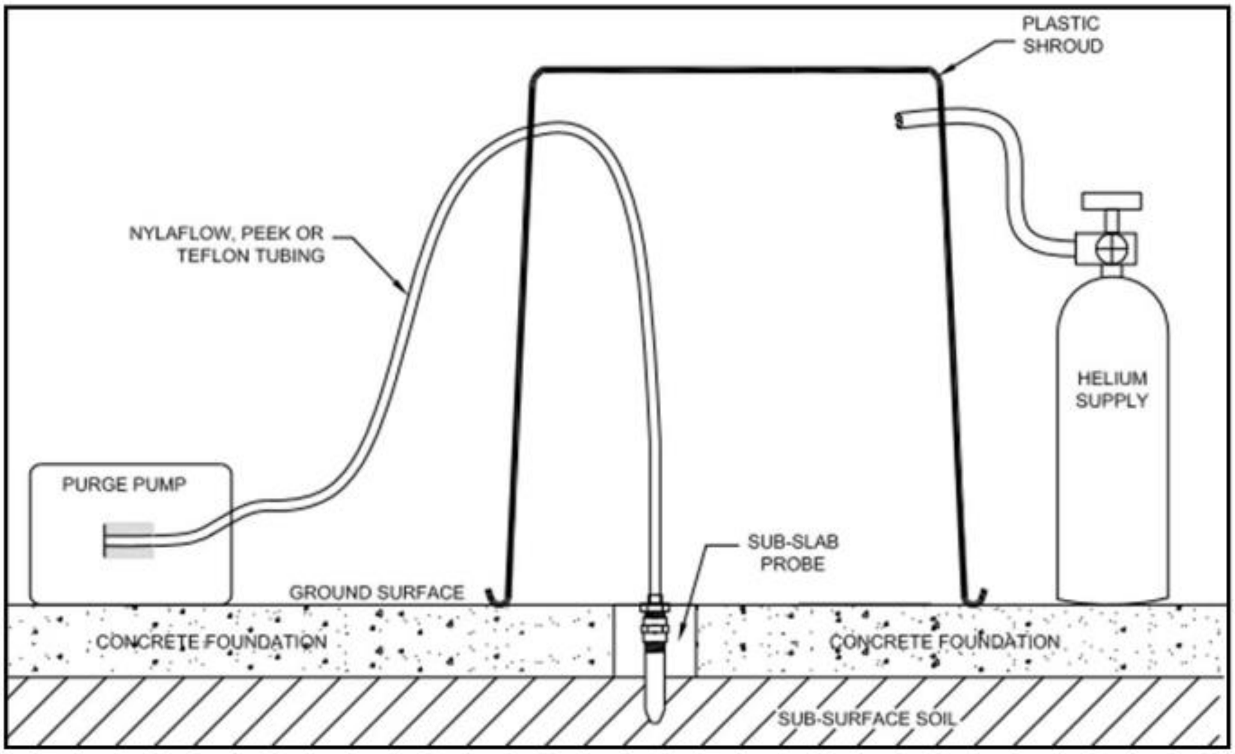
LEAK DETECTION and QA/QC

The following section discusses leak-detection options for soil gas sampling. It is recommended that some form of leak detection be employed during Terracon soil gas investigations. The degree of leak detection will depend on the project objectives, jurisdiction where the sampling is conducted, and sensitivity of the project. The collection of field and materials blanks is also discussed in this section.

Tracer Testing of Sampling Probe

Tracer tests of the sampling probe are performed to document that the seal(s) between the surface and the soil gas sampling location or the sampling apparatus are not allowing ambient air into the sample. A variety of materials can be used as a tracer. Two of the most common are isopropyl alcohol and helium gas. Note that some states require the use of laboratory-grade helium, which can be difficult to acquire.

A common apparatus for performing a gas tracer test consists of a 5-gallon bucket or similar plastic container placed over the probe-rod assembly or sample port to control wind drift and concentrate the tracer gas. The tracer gas is then introduced into the bucket or container via a bottle of compressed gas resulting in a shroud concentration of approximately two orders of magnitude higher than the reporting limit of the field monitoring meter or analytical method used to analyze the sample. It is recommended that the tracer gas within the shroud be kept within ± 10% of its target value. The tracer gas concentration is measured both in the shroud and in the soil gas removed during sampling train purging using a field monitoring meter. The field monitoring meter or analytical method (if samples are submitted for laboratory analysis) should be capable of measuring the tracer compound in air to an accuracy of 0.1 percent. For helium tracer gas, the MGD-2002 leak detector or equivalent is recommended. The concentration of tracer gas measured from the sampling train should read less than 5% of the minimum shroud concentration. If the tracer gas measurement is greater than 5% of the minimum shroud concentration, the sample train should be inspected for leaks and re-tested. In addition to measuring tracer gas using a field monitor, the tracer gas concentration in the collected air samples can be analyzed by the lab to see if elevated levels of tracer gas entered the samples. Some jurisdictions may require analytical testing of tracer gas; refer to your state-specific guidance. It should be noted that this simple tracer gas method for the sampling probe does not account for potential leaks associated with tubing and connections of the sampling train.



Simple Tracer Shroud

Tracer Testing of Sampling Probe and Sampling Train

One option for tracer testing for leak detection is the use a shroud covering both the soil gas sampling probe and the entire sampling train (i.e., Summa canister, associated gauges and regulators, tubing connections, and valves). An example setup is shown in Figure 14. This method is the most-complete tracer testing method in that all potential sources of leaks in the sampling train and the sampling probe are accounted for. The most common tracer gas is helium based on its availability and ease of monitoring in the field with readily-available field monitors.

Tracer gas is introduced into the shroud (clear plastic container works best so the sampling train can be viewed) and maintained at a concentration of ± 10% of its target value. The sampling train and probe are then purged using a peristaltic pump or other pump and the tracer gas concentration of the purged soil gas is monitored using the field monitoring meter. The monitoring consists of filling a 1-L Tedlar® bag with the purged soil gas and measuring for tracer gas using the field monitor. This process is repeated two additional times to yield three consecutive tests (3 liters total purge volume) for tracer gas.

If the detected tracer gas concentration in the purged soil gas is 5% or less of the minimum tracer gas concentration in the shroud during three consecutive tests, sampling may proceed. If tracer gas is detected in the purged soil gas at concentrations greater than 5% of the minimum tracer gas concentration detected in the shroud, the probe and sampling train should be examined for potential leaks and the tracer test re-conducted.

Vacuum Shut In-Testing

Shut-in testing is a simple technique used in the field to evaluate the integrity of the sample train. A typical shut-in test involves closing the valve to the vapor probe and evacuating the sample train (all associated tubing hooked up to the Summa canister) to a measured vacuum. The vacuum should be a minimum of approximately 100 inches of water. Then, the vacuum is shut in by closing the valve at the opposite end of the sampling train near the pump pulling the vacuum. This vacuum is monitored using an in-line vacuum gauge. The initial measured vacuum should be maintained for 30 seconds for a positive shut-in test. If the vacuum dissipates from the sample train, the shut-in test has failed, and all connections should be inspected for leaks prior to proceeding with sampling. It should be noted that the major limitation of the vacuum shut-in test is that it does not allow leak testing of the soil gas probe.

FIELD DATA FORM: SOIL GAS IMPLANT METHOD

PROJECT NAME: ____________________ Sample ID: ____________

PROJECT NO.: ____________________ Sample Date: ____________

Temperature: ________ °F / °C Barometric Pressure: ________ "Hg*

Has there been significant rain or snow recent to the sampling event? Yes No

If Yes to above question; Date(s) ________ Amount * ________ in. *(www.localconditions.com)

Location Description: ________ Surface Cover: ________

Subsurface Utilities and distance from probe: ____________

Potential VOC sources in the vicinity? ________ Distance from probe: ________ ft.

Gas Probe / Implant Details

Soil Gas Probe / Implant Installation Method: ____________

Sample Zone Soil Type: (circle one): clay silt sand gravel other: ________

Apparent Moisture Content of Sampling Zone (circle one): dry moist wet (do not sample if saturated)

Borehole Diameter (in.) ________ Borehole Depth (ft.) ________

Implant Depth (ft.) ________ Note: For nested points, add probe details in Comments section, below.

Sand Interval: ________ to ________ ft. Bentonite/Grout: ________ to ________ ft.

Water Source for bentonite hydration: ________ Deionized? yes no

Surface Completion / Protection: ____________

Sample Purging

Equlibration time between probe installation and purging: ________ hours/days (48 hours recommended)

Sandpack/Granular Bentonite Pore Volume: ________ ml

Tubing Type: ________ Tubing Length: ________ ft. Tubing Diameter: ________ inch

Purging Method: ________ Pump Rate: ________ ml / min. Purging Duration: ________ min.

Volume Purged: ________ ml (Refer to Table 2 on page 13 of guidance for assistance with calculating volume purged)

PID / FID at Initial Purge: ________ ppm PID / FID at Sample Collection: ________ ppm

Leak Test Prior to Sample Collection? Yes No Method ____________

Helium Tracer Test Tracer Compound: ________ Instrument: ________

Tracer Concentration, Test 1 Shroud ________ ppm/% Probe ________ ppm/%

Tracer Concentration, Test 2 Shroud ________ ppm/% Probe ________ ppm/%

Tracer Concentration, Test 3 Shroud ________ ppm/% Probe ________ ppm/%

Vacuum Shut-in Test

Start Time:__________ Vacuum: ________ "Hg Stop Time:________ Vacuum: ________ "Hg

Sample Collection

Sample Container (circle one): 1L 6L Other: ________

Flow Controller (circle one): 100 ml/min 200 ml/min Other: ________

Start Time:__________ Vacuum: ________ "Hg Stop Time:________ Vacuum: ________ "Hg

Split Sample? Yes No Describe Split Method: ____________

Comments: ____________

Form Completed By: ____________ Date: ________

Standard Operating Procedure Installation and Extraction of the Vapor Pin®

Updated September 9, 2016

Scope:

This standard operating procedure describes the installation and extraction of the VAPOR PIN® for use in sub-slab soil-gas sampling.

Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the VAPOR PIN® for the collection of sub-slab soil-gas samples or pressure readings.

Equipment Needed:

- Assembled VAPOR PIN® [VAPOR PIN® and silicone sleeve(Figure 1)]; Because of sharp edges, gloves are recommended for sleeve installation;
- Hammer drill;
- 5/8-inch (16mm) diameter hammer bit (hole **must** be 5/8-inch (16mm) diameter to ensure seal. It is recommended that you use the drill guide). (Hilti™ TE-YX 5/8" x 22" (400 mm) #00206514 or equivalent);
- 1½-inch (38mm) diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch (19mm) diameter bottle brush;
- Wet/Dry vacuum with HEPA filter (optional);
- VAPOR PIN® installation/extraction tool;
- Dead blow hammer;
- VAPOR PIN® flush mount cover, if desired;
- VAPOR PIN® drilling guide, if desired;
- VAPOR PIN® protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel for repairing the hole following the extraction of the VAPOR PIN®.

Figure 1. Assembled VAPOR PIN®

Installation Procedure:

1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.

2) Set up wet/dry vacuum to collect drill cuttings.

3) If a flush mount installation is required, drill a 1½-inch (38mm) diameter hole at least 1¾-inches (45mm) into the slab. Use of a VAPOR PIN® drilling guide is recommended.

4) Drill a 5/8-inch (16mm) diameter hole through the slab and approximately 1-inch (25mm) into the underlying soil to form a void. Hole **must** be 5/8-inch (16mm) in diameter to ensure seal. It is recommended that you use the drill guide.

5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.

6) Place the lower end of VAPOR PIN® assembly into the drilled hole. Place the small hole located in the handle of the installation/extraction tool over the vapor pin to protect the barb fitting, and tap the vapor pin into place using a dead blow hammer (Figure 2). Make sure the installation/extraction tool is aligned parallel to the vapor pin to avoid damaging the barb fitting.

Figure 2. Installing the VAPOR PIN®

During installation, the silicone sleeve will form a slight bulge between the slab and the VAPOR PIN® shoulder. Place the protective cap on VAPOR PIN® to prevent vapor loss prior to sampling (Figure 3).

Figure 3. Installed VAPOR PIN®

7) For flush mount installations, cover the vapor pin with a flush mount cover, using either the plastic cover or the optional stainless-steel Secure Cover (Figure 4).

Figure 4. Secure Cover Installed

8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to re-equilibrate prior to sampling.

9) Remove protective cap and connect sample tubing to the barb fitting of the VAPOR PIN®. This connection can be made using a short piece of Tygon™ tubing to join the VAPOR PIN® with the Nylaflow tubing (Figure 5). Put the

Nylaflow tubing as close to the VAPOR PIN® as possible to minimize contact between soil gas and Tygon™ tubing.

Figure 5. VAPOR PIN® sample connection

10) Conduct leak tests in accordance with applicable guidance. If the method of leak testing is not specified, an alternative can be the use of a water dam and vacuum pump, as described in SOP Leak Testing the VAPOR PIN® via Mechanical Means (Figure 6). For flush-mount installations, distilled water can be poured directly into the 1 1/2 inch (38mm) hole.

Figure 6. Water dam used for leak detection

11) Collect sub-slab soil gas sample or pressure reading. When finished, replace the protective cap and flush mount cover until the next event. If the sampling is complete, extract the VAPOR PIN®.

Extraction Procedure:

1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the VAPOR PIN® (Figure 7). Turn the tool clockwise continuously, don't stop turning, the VAPOR PIN® will feed into the bottom of the installation/extraction tool and will extract from the hole like a wine cork, DO NOT PULL.

2) Fill the void with hydraulic cement and smooth with a trowel or putty knife.

Figure 7. Removing the VAPOR PIN®

- Prior to reuse, remove the silicone sleeve and protective cap and discard. Decontaminate the VAPOR PIN® in a hot water and Alconox® wash, then heat in an oven to a temperature of 265° F (130° C) for 15 to 30 minutes. For both steps, **STAINLESS – ½ hour, BRASS 8 minutes**

3) Replacement parts and supplies are available online.

SOP-3
STANDARD OPERATING PROCEDURE
Indoor Air Sampling

Updated: April 15, 2022

PURPOSE

Indoor air samples investigate air quality within buildings for possible vapor intrusion of volatile organic compounds (VOCs) and other volatile chemicals. Samples are collected from locations within buildings and structures that are occupied on a regular and on-going basis to evaluate potential exposure to VOCs. Analysis of the air samples are typically performed using U.S. EPA Method TO-15. Indoor air sampling data should be compared to applicable cleanup levels in CLARC. The analyte list should include those VOCs detected in the subsurface that would most likely be expected to impact the building(s) being evaluated. The indoor air results should represent:

• Only the VI contribution to the measured concentrations,

• Those parts of the building where occupants spend a significant amount of time, and

• The average concentration caused by VI over an extended period of time.

There are multiple options for obtaining indoor air measurements. The methods may serve different purposes and are sometimes combined to meet the overall needs of the VI evaluation. This SOP is brief summary of the most common methods. Training is necessary to obtain high quality results.

APPLICABILITY

The requirements of this procedure are applicable to project activities involving indoor air gas sample collection.

The extent of project activities identified by this procedure is controlled at the direction of the project manager.

These are standard (i.e., typically applicable) operation procedures that may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the actual procedures used should be documented and described in an appropriate site report.

REFERENCES

- Project Health and Safety Plan
- Remedial Investigation Work Plan (RI Work Plan)
- Guidance for Evaluating Vapor Intrusion in Washington State, Publication No. 09-09-047
- Procedures for Collection of Indoor Air – FSOP 2.4.3 (March 9, 2017). Ohio EPA Division of Environmental Response and Revitalization

PROCEDURES

Sample Location Determination

Conduct a building/structure survey using the Indoor Air Building Survey and Sampling Form to determine potential target receptors and identify potential interferences to sample collection. PID screening may also help to identify VOC sampling interferences. In addition, provide the Instructions for Building Occupants Prior to Indoor Air Sampling Form to the building residents or worker for completion at this time. Potential sampling interferences need to be recognized and eliminated before sample collection begins. This should be completed at least 48 to 72 hours prior to sample collection.

- Select indoor air sampling locations that are in inhabited or frequently used.
- Do not place sample canisters in locations near primary-use doors or open windows.
- Do not place sample canisters in the pathway of indoor fans.
- If ceiling fans are in use, request that they be turned off for the duration of the sample period.
- Note any obvious odors from scented candles, mothballs, cleaning products, gas or oils.

Sample Set-up

Place the sampling canisters at breathing-zone height. Remove the brass plug from the canister and connect the flow regulator (with in-line particulate filter and vacuum gauge, if needed) to the canister. Gently tighten the connection between the flow regulator and the canister using the open-end 9/16" wrenches. Do not over-tighten this connection. Before continuing, record the canister number and the associated flow regulator number on the "Vapor Sampling Data Sheet". The canister number can be used for sample identification on the COC form. Open the canister/regulator valve. Record the sample start time and the canister pressure. Photograph the canister and the surrounding area.

Termination of Sample Collection

Return to the sample collection site a minimum of 15 minutes before the end of the sample collection interval. Examine the flow regulator to ensure that some vacuum is left on the gauge (preferably 2" to 10" of mercury on the regulator flow dial). Record the vacuum pressure and stop sample collection by closing the flow regulator. Remove the flow regulator from the canister using the 9/16" open-end Wrenches. Re-install the brass plug on the canister fitting, and tighten it with an open-ended wrench. Package the canister and the flow regulator into the shipping container provided by the lab. Note: the canister does not require preservation. Complete the appropriate forms and sample labels as directed by the laboratory. Use the sample start time when completing the laboratory chain of custody and double check canister identification numbers for accuracy. Ship the canisters to the laboratory for analysis following SOP-1 for project documentation.

INDOOR AIR BUILDING SURVEY and SAMPLING FORM

Preparer's name: ____________________________________ Date: __________________________

Preparer's affiliation: ________________________________ Phone #: _______________________

Site Name: ____ Case #: ________________________

Part I - Occupants

Building Address: ____

Property Contact: _________________________ Owner / Renter / other: ________________________

Contact's Phone: home ( )__________ work ( )______________ cell ( )____________

# of Building occupants: Children under age 13 _____ Children age 13-18 ______ Adults _____

Part II – Building Characteristics

Building type: residential / multi-family residential / office / strip mall / commercial / industrial

Describe building: ____ Year constructed: _________

Sensitive population: day care / nursing home / hospital / school / other (specify): _______________

Number of floors below grade: ______ (full basement / crawl space / slab on grade)

Number of floors at or above grade: ______

Depth of basement below grade surface: ______ ft. Basement size: _______ ft^2

Basement floor construction: concrete / dirt / floating / stone / other (specify): ________________

Foundation walls: poured concrete / cinder blocks / stone / other (specify) ________________

Basement sump present? *Yes / No* Sump pump? *Yes / No* Water in sump? *Yes / No*

Type of heating system (circle all that apply):

hot air circulation	hot air radiation	wood	steam radiation
heat pump	hot water radiation	kerosene heater	electric baseboard

other (specify): _________________________

Type of ventilation system (circle all that apply):

central air conditioning   mechanical fans   bathroom ventilation fans individual air conditioning units   kitchen range hood fan   outside air intake
other (specify): ___________________

Type of fuel utilized (circle all that apply):
Natural gas / electric / fuel oil / wood / coal / solar / kerosene

Are the basement walls or floor sealed with waterproof paint or epoxy coatings? *Yes / No*

Is there a whole house fan? *Yes / No*

Septic system? *Yes / Yes (but not used) / No*

Irrigation/private well? *Yes / Yes (but not used) / No*

Type of ground cover outside of building: grass / concrete / asphalt / other (specify) ______________

Existing subsurface depressurization (radon) system in place? *Yes / No* *active / passive*

Sub-slab vapor/moisture barrier in place? *Yes / No*
Type of barrier: ______________________________

Part III - Outside Contaminant Sources

Potential contaminated site (1000-ft. radius): ____

Other stationary sources nearby (gas stations, emission stacks, etc.): _______________________________

Heavy vehicular traffic nearby (or other mobile sources): ____

Part IV – Indoor Contaminant Sources

Identify all potential indoor sources found in the building (including attached garages), the location of the source (floor and room), and whether the item was removed from the building 48 hours prior to indoor air sampling event. Any ventilation implemented after removal of the items should be completed at least 24 hours prior to the commencement of the indoor air sampling event.

Potential Sources	**Location(s)**	**Removed** **(Yes / No / NA)**
Gasoline storage cans		
Gas-powered equipment		
Kerosene storage cans		
Paints / thinners / strippers		
Cleaning solvents		
Oven cleaners		
Carpet / upholstery cleaners		
Other house cleaning products		
Moth balls		
Polishes / waxes		
Insecticides		
Furniture / floor polish		
Nail polish / polish remover		
Hairspray		
Cologne / perfume		
Air fresheners		
Fuel tank (inside building)		NA

Wood stove or fireplace		NA
New furniture / upholstery		
New carpeting / flooring		NA
Hobbies - glues, paints, etc.		

Part V – Miscellaneous Items

Do any occupants of the building smoke? *Yes / No* How often? ______________

Last time someone smoked in the building? ____________ hours */ days ago*

Does the building have an attached garage directly connected to living space? *Yes / No*

If so, is a car usually parked in the garage? *Yes / No*

Are gas-powered equipment or cans of gasoline/fuels stored in the garage? *Yes / No*

Do the occupants of the building have their clothes dry cleaned? *Yes / No*

If yes, how often? weekly / monthly / 3-4 times a year

Do any of the occupants use solvents in work? *Yes / No*

If yes, what types of solvents are used? ____

If yes, are their clothes washed at work? *Yes / No*

Have any pesticides/herbicides been applied around the building or in the yard? *Yes* / No

If so, when and which chemicals? ____

Has there ever been a fire in the building? *Yes / No* If yes, when? _____________

Has painting or staining been done in the building in the last 6 months? *Yes / No*

If yes, when __________________ and where? _____________________________

Has there been any remodeling done (flooring/carpeting) in the building in the last 6 months? *Yes / No*

If yes, when __________________ and where? _____________________________

Part VI – Sampling Information

Sample Technician: _____________________________ Phone number: ( ) _______ - __________

Sample Source: Indoor Air / Sub-Slab / Near Slab Soil Gas / Exterior Soil Gas

Sampler Type: Tedlar bag / Sorbent / Stainless Steel Canister / Other (specify): _________________

Analytical Method: TO-15 / TO-17 / other: _________ Cert. Laboratory: _________________

Sample locations (floor, room):

Field ID # _____ - _________________________ Field ID # _____ - ___________________________

Field ID # _____ - _________________________ Field ID # _____ - ___________________________

Were “Instructions for Occupants” followed? Y*es* / *No*

If not, describe modifications: ____

Additional Comments:

Provide Drawing of Sample Location(s) in Building

Part VII - Meteorological Conditions

Was there significant precipitation within 12 hours prior to (or during) the sampling event? *Yes / No*

Describe the general weather conditions: ____

____

Part VIII – General Observations

Provide any information that may be pertinent to the sampling event and may assist in the data interpretation process.

____

____

____

(NJDEP 1997; NHDES 1998; VDOH 1993; MassDEP 2002; NYSDOH 2005; CalEPA 2005; OhioEPA 2015)

Instructions for Building Occupants Prior to Indoor Air Sampling

This form should be reviewed by building occupant personnel. Representatives will be collecting one or more indoor air samples from your building on _________ - beginning @ _________ and ending @ ________. Your assistance is requested during the sampling program in order to collect an indoor air sample that is both representative of indoor conditions and avoids the common background indoor air sources associated with occupant activities and consumer products.

Please follow the instructions below starting at least 48 hours (2 days) prior to and during the indoor air sampling event:

- ❑ Do operate your furnace and whole house air conditioner as appropriate for the current weather conditions
- ❑ Do not use wood stoves, fireplaces or auxiliary heating equipment
- ❑ Do not use window air conditioners, fans or vents
- ❑ Do not use paints or varnishes (up to a week in advance, if possible)
- ❑ Do not use cleaning products (e.g., bathroom cleaners, furniture polish, appliance cleaners, all-purpose cleaners, floor cleaners)
- ❑ Do not use hair spray, nail polish remover, perfume, etc.
- ❑ Do not store containers of gasoline, oil or solvents within an attached garage.
- ❑ Do not operate or store automobiles within an attached garage
- ❑ Do not open windows or keep doors open
- ❑ Do not smoke in the building
- ❑ Do not apply pesticides
- ❑ Do not use air fresheners or odor eliminators
- ❑ Do not engage in indoor hobbies that use solvents (e.g. gun cleaning)
- ❑ Do not operate gasoline powered equipment within the building, attached garage or around the immediate perimeter of the building
- ❑ Do not bring freshly dry cleaned clothes into the building

You will be asked a series of questions about the structure, consumer products you store in your building, and occupant activities typically occurring in the building. These questions are designed to identify "background" sources of indoor air contamination. While this investigation is looking for a select number of chemicals related to the known or suspected subsurface contamination, the laboratory will be analyzing the indoor air samples for a wide variety of chemicals. As a result, chemicals such as tetrachloroethene that is commonly used in dry cleaning or acetone, which is found in nail polish remover might be detected in your sample results.

Your cooperation is greatly appreciated. If you have any questions about these instructions, please feel free to

contact ____ at _________________________________.

VAPOR SAMPLING DATA SHEET
SUB-SLAB AND INDOOR AIR

General Information

Site Name / Address: ____

Sampling Location / Address: ____
(if other than site address)

Contact Name: ________________________________ **Phone:** _____________________________

Laboratory & Analytical Method: _________________ **Method of Delivery:** __________
(Courier, UPS, delivered by sampler, etc.)

Sampling Team Members: ____

Met with resident/business on (date) ___________ **to provide information on VOC inventory and sampling cross-contamination concerns. If not, explain why:**____
____
____

Indoor Air Samples

Sample ID #: __________________ **Canister ID #:**_________________ **Regulator ID #**_________________

Start: Date: __________________ **Time:** __________ **Initial canister vacuum:** ________ **mm Hg**

End: Date: __________________ **Time:** __________ **Final canister vacuum:** _________ **mm Hg**

Regulator Calibrated for: 8 hr _____ **24 hr** _____ **grab (no regulator)**______

Canister/ Regulator Leak Checked: Yes ______ **No**______

Sub-Slab Samples

Sample ID #: ________________ **Canister ID #:**_______________ **Regulator ID #**_______________

Size of canister: __________ **Thickness of sub-slab (inches)** _________ **Port install time:** __________

Sampling Start: Date: ________________ **Time:** __________ **Initial canister vacuum:** ________ **mm Hg**

Sampling End: Date: ________________ **Time:** __________ **Final canister vacuum:** _________ **mm Hg**

Regulator Calibrated for: 8 hr _____ **24 hr** _____ **grab (no regulator)** ______

Canister/ Regulator Leak Checked: Yes No **Sub-Slab Port Leak Checked: Yes No**

Type of sub-slab port: Swagelok __________ **Vapor Pin:** __________

Sub-Slab Port Installed by: _________________________ **Sub-Slab Port Sealed: Yes No**

PID Reading: VOC ppb___________ **% 02**_____________ **PID ID#:** __________________

NOTES: (sampler/canister problems, other significant sampling details, or FSOP deviations)

Note: If a diagram of the sample location(s) is sketched on the back of this data sheet, check here ☐

Revised: 05.2018

B

Figures

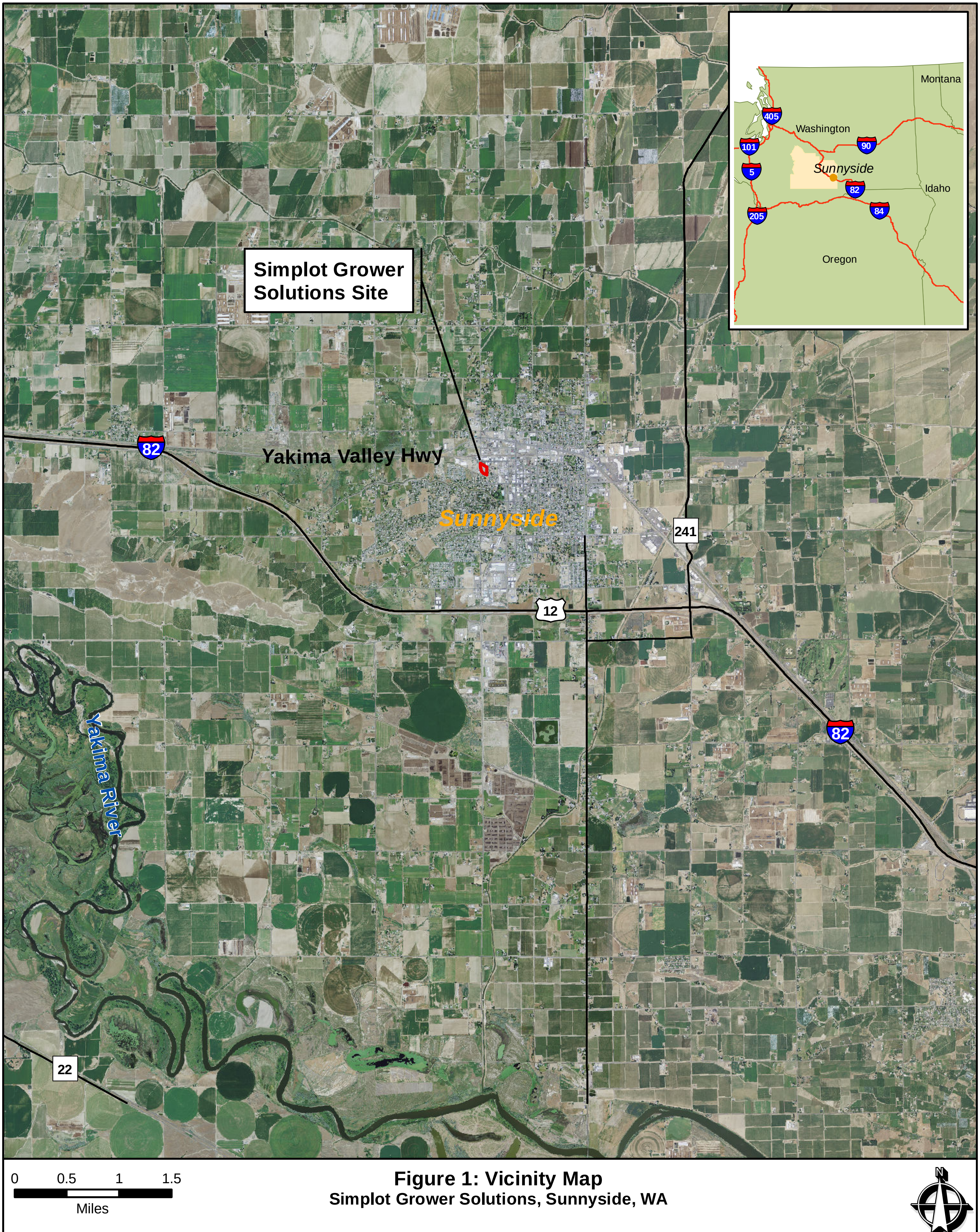


Figure 1: Vicinity Map
Simplot Grower Solutions, Sunnyside, WA

Imagery: 2009 NAIP 1 meter resolution
Source: NRCS/USDA Digitial Gateway

Map Date: Friday, May 18, 2012
Q:\Simplot\Sunnyside\map_docs\SiteMap.mxd

HDR ONE COMPANY Many Solutions℠

Figure 2: Site Map
Simplot Grower Solutions, Sunnyside, WA

Imagery: ESRI World Imagery Map Service, Image Date 10/18/2018
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Date: Monday, August 5, 2019
Q:\Simplot\Sunnyside\map_docs\SiteMap.mxd