NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road, Avon, NY 14414-9516
P: (585) 226-5353 I F: (585) 226-8139
www.dec.ny.gov

January 25, 2023

Kathryn E. Hinckley
EHS Director, Environmental Affairs
Stanley Black & Decker, Inc.
700 Stanley Drive
New Britain, Connecticut 06053

Re: Soil Vapor Intrusion Work Plan
24 Seneca Avenue
Site No: 828132
Rochester (C), Monroe

Dear Ms. Hinckley:

The New York State Department of Environmental Conservation (NYSDEC) in conjunction with the New York State Department of Health (NYSDOH), collectively known as the State, have completed their review of the November 11, 2022 Chlorinated Volatile Organic Compound Vapor Intrusion Work Plan (Work Plan) for the 24 Seneca Avenue site (Site) located at 24 Seneca Avenue in the City of Rochester, Monroe County. Based on the information presented in the Work Plan, the Work Plan is conditionally approved with the following modifications and clarifications.

1. Please note that all future submittals to the Department need to reference the site by the Department's site name as indicated in the executed Order on Consent – 24 Seneca Avenue.

2. The Department understands that the Site's building is slab on grade construction.

3. The Department understands that the Site's building heating system will be operating for a minimum of 24 hours and will have normal indoor air temperatures (65-75°F) prior to the sampling event.

4. The Department understands that the pre-sampling building inventory will thoroughly document the product inventory of the building(s) – 24 and 76 Seneca Avenue.

5. Sub-slab Vapor Sampling, Page 3 of 6: In accordance with the State's Guidance for Evaluating Soil Vapor Intrusion (NYSDOH, 2006), tracer gas needs to be used when confirming the integrity of the proposed sub-slab soil vapor probe seals. Tracer gas readings will be collected before sampling begins, as well as at the end of the sampling to ensure the soil vapor probe seals were maintained for the entire sampling duration. Tracer gas readings will be documented on the field sampling forms and included in the report submittal to the State. Please update this procedure in the Quality Assurance Project Plan included as Attachment A of this Work Plan for all future submittals regarding soil vapor sampling.

6. The Department understands that a concurrent indoor air sample will be collected in the basement of 76 Seneca Avenue.

7. The Department understands that all sub-slab and indoor air samples will be co-located in the building(s) – 24 and 76 Seneca Avenue.

8. The State is requesting that additional sub-slab and indoor air samples are collected in the areas highlighted with orange and green – see attached figure.

   Green Area - it is indicated on the Figure 1 that the 2nd floor is occupied. To determine if exposures are occurring and if a mitigation system is needed additional SVI sampling will need to be completed. The State requests that at a minimum a sub-slab, 1st floor indoor air, and 2nd floor indoor air sample are collected.

   Purple Area - If the most eastern portion of that area (highlighted with purple) is occupied, additional SVI samples are needed, and the number of samples will be contingent upon the number of floors.

   Orange Area – the concentration of TCE in groundwater in this area of the Site has been detected at part per million levels. The two (2) proposed sub-slab and indoor air samples in this area is not sufficient to determine if exposures are occurring and if mitigation is needed. The State requests at a minimum 2 more collocated/concurrent sub-slab and indoor air samples are collected in this area.

9. The Department understands that all field documentation associated with the vapor sampling event will be in accordance with NYSDEC and NYSDOH guidance.

10. The Department understands that the laboratory conducting the analysis will have appropriate ELAP certification for Method TO-15.

11. The Department understands that the laboratory data package will be a Cat B deliverable and a data usability summary report (DUSR) will be prepared.

12. The Department understands that the vapor intrusion report generated will be a construction completion report [CCR] (see DER-10 Section 5.8) and will include all supporting documentation and certifications.

Within fifteen (15) days of the date of this letter and prior to any fieldwork activities associated with the Chlorinated Volatile Organic Compound Vapor Intrusion Work Plan, the Remedial Party must elect in writing (electronic notification is acceptable) one of the following options:

- Option A: Accept the modified work plan; or
- Option B: Invoke dispute resolution as set forth in 6 NYCRR Part 35-1.5(b)(2).

If the Remedial Party chooses to accept Option A then this letter becomes part of the approved Chlorinated Volatile Organic Compound Vapor Intrusion Work Plan. Also, if Option A is chosen then a copy of the approved Chlorinated Volatile Organic Compound Vapor Intrusion Work Plan along with this letter attached must be placed in the document repository within 1 week of accepting Option A and prior to all fieldwork activities associated with the approved Chlorinated Volatile Organic Compound Vapor Intrusion Work Plan. Please provide notification to the Department that the approved Chlorinated Volatile Organic Compound Vapor Intrusion Work Plan and a copy of this letter have been placed in the document repository (electronic notification is acceptable).

State seeks to resolve any outstanding differences in a mutually agreeable manner which addresses the requirements of the Order on Consent and associated work plans. If you have any questions or concerns regarding this letter, the State Superfund requirements, or need further assistance with the Site, please feel free to contact me at 585-226-5354 or via e-mail at charlotte.theobald@dec.ny.gov.

Sincerely,

Charlotte B. Theobald
Assistant Engineer

ec:
John Simon (GNARUS LLC)
Amanda Gonzalez (Stanley Black & Decker)
Andrew Kolesar (Thompson Hine)
Anton Heitger (EHS Support LLC)
Kristin VanLandingham (EHS Support LLC)
Justin Deming (NYSDOH)
Mark Sergott, (NYSDOH)
Dudley Loew (NYSDEC)
David Pratt (NYSDEC)

NOTE:
All sub-slab and indoor air samples co-located unless otherwise noted.

Additional SS & IA samples need to be collected.

Bremen St

Former Seneca Machine

Unoccupied

Gravel

Transformer Room

Ambient Air

OA-01

AA-1

SUB-SG-03/IA-SG-03

SUB-SG-05/IA-SG-05

SSV-DUP

IA-1

SSV-1

IA-2

SSV-2

Church

Paved

Central Warehouse

1st Floor (Storage) Unoccupied

Norton St

Vault/ Cistern (Approx)

SUB-SG-01/IA-SG-01

SUB-SG-04/IA-SG-04

SUB-SG-06/IA-SG-06

Gravel

Van Hook

Loading Dock

Former Ink Room

2nd Floor Used For Offices Only

Subslab Only in Basement

SUB-VH-01

SSV-4A

SUB-SG-02/IA-SG-02

Additional SS & IA samples need to collected.

IA-VH-01

IA-4

IA-DUP

Paved

Indoor Air Only on 1st Floor

Grass

Paved

Grass

Grass

Seneca Ave

SSV-3

IA-3

12

100 50 0 100

Scale In Feet

Legend

- 2022 Proposed VI Sampling Locations
- 2010 Ambient Air Sampling Point
- 2010 Indoor Air Sampling Point
- 2010 Sub-Slab Vapor Intrusion Sampling Point
- Approximate Location Of Interior Walls
- Approximate Property Boundary

Sample Locations
VI Work Plan

FORMER SARGENT AND GREENLEAF SITE
24 SENECA AVENUE
ROCHESTER, NY

EHS Support

FIGURE 1

Reviewed By:

J:\EHSS_GIS\C02727_Rochester01_ANALYSIS\20221110_VI_WorkPlanSampleLocations.mxd

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TECHNICAL MEMORANDUM WORK PLAN

To: Charlotte B. Theobald, NYSDEC
Justin Deming, NYSDOH

Cc: David Pratt, NYSDEC
Dudley Loew, NYSDEC
Amanda Gonzalez, Stanley Black and Decker
Andrew Kolesar, Thompson Hine LLP
Kristin VanLandingham, EHS Support LLC

From: Anton Heitger, EHS Support LLC
John Simon, Gnarus Advisors LLC

Date: November 11, 2022

Re: **Chlorinated Volatile Organic Compound Vapor Intrusion Investigation Work Plan, 24 Seneca Ave, Site No. 828132, Rochester, New York**

EHS Support LLC ("EHS Support"), in cooperation with Gnarus Advisors LLC ("Gnarus"), has prepared this *Chlorinated Volatile Organic Compound Vapor Intrusion Investigation Work Plan* ("Work Plan") on behalf of Stanley Black & Decker, Inc. ("Stanley Black & Decker") for the former Sargent & Greenleaf Site at 24 Seneca Avenue in Rochester, New York ("the Site"). The purpose of this memorandum is to outline the activities associated with the planned vapor intrusion (VI) monitoring event during the 2022-2023 heating season. This Work Plan has been developed based on the scope of work discussed during a conference call between the New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), Thompson Hine LLP, Gnarus, and EHS Support on October 12, 2022.

The objective of the VI investigation is to determine the potential risk of VI from the chlorinated volatile organic compound (CVOC) source area in the former Sargent & Greenleaf building (**Figure 1**), currently operated as Surplus Select and Dock Hardware by a building tenant, and the building to the north operating as Van Hook Services Co. Inc. ("Van Hook") at 76 Seneca Avenue. The warehouse portion of the building was identified and investigated as part of the pre-design investigation (PDI) for CVOC remediation (EHS Support and Gnarus, 2022).

This Work Plan summarizes the sampling procedures for the former Sargent & Greenleaf and the Van Hook buildings. The sampling at the Van Hook building is contingent on Stanley Black & Decker obtaining an access agreement with the property owner of the Van Hook building and, if the property owner and occupant are separate entities, the tenant.

This Work Plan was prepared in accordance with the guidance provided in *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, dated October 2006 (the "2006 VI Guidance"; NYSDOH, 2006),

and *DER-10 / Technical Guidance for Site Investigation and Remediation*, dated May 3, 2010 (NYSDEC, 2010), specifically Chapter 3, Section 3.3 of DER-10 which specifies the requirements for investigation work plans. In addition, this Work Plan and the associated Quality Assurance Project Plan (QAPP; **Attachment A**) includes the quality assurance/quality control (QA/QC) requirements set forth in Section 2.3 of DER-10 (NYSDEC, 2010).

Pre-Sampling Inspections

EHS Support will complete a pre-sampling building inspection in each building in accordance with the 2006 VI Guidance, Section 2.11 (*Survey and pre-sampling building preparation*) (NYSDOH, 2006). This will include completing the NYSDOH Indoor Air Quality Questionnaire and Building Inventory form (Appendix B [NYSDOH, 2006]). EHS Support will also conduct a product inventory, perform background screening, and prepare sampling locations to minimize impacts on indoor air samples by common household items and industrial materials stored at the Site. It is important to consider that indoor air samples collected from the main structure of the Site are subject to interference/cross contamination from the plethora of materials stored, as noted in the NYSDEC's Record of Decision (NYSDEC, 2016) for the Site as follows:

> "Within the main structure on-site, the storage of materials inside the structure compromised the sampling for soil vapor intrusion such that sub-slab and indoor air samples were not collected during the investigation. The occupation of the structure is minimal, and the Department will evaluate vapor intrusion within the site structures should the use of the on-site building change, when site-related chemicals of concern are no longer present or in use and/or areas inside the building are more easily accessible, and for any future building(s) developed on the site." (Exhibit A, P. 6)

EHS Support and Gnarus are not suggesting that the main structure be excluded from the VI investigation but maintain that the results of the indoor air samples will need to be evaluated for possible interference from indoor air sources.

Sampling Locations

A total of seven sub-slab vapor and seven indoor air locations will be sampled along with an outdoor ambient air and two duplicate samples for QA/QC purposes (one sub-slab vapor duplicate sample and one indoor air duplicate sample).

Sub-Slab Vapor Sampling Locations

Sub-slab vapor samples will be collected at six locations in the former Sargent & Greenleaf building and at one location in the basement of the Van Hook building. The sub-slab vapor sample locations in the warehouse portion of the building are positioned radially where elevated concentrations of CVOCs were detected in shallow soil and groundwater samples. The sample locations are shown on **Figure 1**. Sample locations will be located at least 10 feet from the outside building walls and footers. Sample locations may be adjusted based on access and the volume of foot and forklift traffic. The sub-slab vapor duplicate sample location will be determined at the time of sampling.

Indoor Air Sampling Locations

Indoor air samples will be collected at six locations in the former Sargent & Greenleaf building and at one location on the first floor of the Van Hook building. The six indoor air sample locations will be co-

located with the six sub-slab vapor locations in the former Sargent & Greenleaf building. The sample locations are shown on **Figure 1**. The indoor air duplicate sample location will also be determined at the time of sampling.

An outdoor ambient air sample will be collected to assist in the evaluation of potential background sources at the Site. The ambient air sample will be collected upwind (example shown as north of the Site buildings on **Figure 1**) on the same day VI sampling is conducted.

Site features and conditions may require altering the number of samples or revising sample locations. Significant deviations to the sample locations and procedures outlined in this Work Plan will be communicated to NYSDEC and NYSDOH prior to collecting the samples.

Sampling Procedures

Sub-slab sampling procedures will be conducted consistent with the 2006 VI Guidance (NYSDOH, 2006) and DER-10 (NYSDEC, 2010), specifically Section 3.6, Soil Vapor.

Sub-Slab Vapor Sampling

Sub-slab vapor samples will be collected using stainless-steel sub-slab sampling ports (VAPOR PIN®) installed through the building slab.

Following the inspection of each sampling location and performing utility clearance, a hole will be drilled through the concrete slab of the building into the underlying sub-slab material using a 5/8-inch diameter hammer drill. Once the hole is created, the concrete slab thickness will be recorded and a stainless-steel VAPOR PIN for vapor sampling will be inserted through the hole. Detailed VAPOR PIN installation instructions are included as part of the QAPP in **Attachment A**. Once installed, the VAPOR PIN will be immediately capped to minimize the potential for cross-slab air movement. The hole will be allowed to stabilize overnight before sampling. Sub-slab vapor sampling will be conducted the day following installation of the VAPOR PINs.

Following stabilization, Tygon™ or silicone tubing will be connected to the VAPOR PIN barb and a vacuum leak check will be performed on all the canisters and fittings prior to sample collection. A water dam and vacuum pump, as described in the *Standard Operating Procedure: Leak Testing the VAPOR PIN® via Mechanical Means* included in the QAPP, will be used.

The sample point will then be purged of at least three tubing volumes of air at a rate of less than 200 milliliters per minute (mL/min). Immediately after purging is completed, the sub-slab vapor probe will be evaluated with a photoionization detector (PID).

After screening, the tubing will be connected to a 6-liter Summa® canister with a regulator calibrated with an 8-hour flow controller metered to an approximate sample flow rate of 12.5 mL/min. Batch-certified clean 6-liter pre-evacuated Summa canisters will be supplied by the laboratory. Once all connections are in place and a shut-in test is completed for at least 10 minutes, each sample will be collected. The Summa canister will be monitored frequently during the first 30 to 60 minutes to ensure the sample gauge and assembly are working properly. If the vacuum pressure is lost instantaneously, the valve will be immediately closed and all in-line connections will be tightened. Sampling will be conducted over 8 hours but the vacuum in each Summa canister will not be allowed to fall under 5 inches of mercury to retain the vapor sample.

Sample identification, vacuum readings, flow controller identification numbers, any precipitation, and other relevant information will be recorded on field forms.

After the sub-slab vapor sampling is completed, the VAPOR PIN sampling device will be capped and covered with a stainless-steel flush-mount fitting supplied by the vendor.

Indoor Air Sampling

A section of Tygon or silicone tubing will be attached to each 6-liter Summa canister and positioned at a height of approximately 5 feet above the floor with the tubing opening pointing toward the floor where most occupants are standing. The indoor air samples collected in any office areas will be collected 3 feet above the floor, which represents the height at which occupants are normally seated (NYSDOH, 2006).

The indoor air samples will be collected over an 8-hour period simultaneously with the sub-slab vapor samples. The indoor air samples will be collected by the same method as the sub-slab vapor samples.

Sample identification, vacuum readings, flow controller identification numbers, and other relevant information will be recorded on field forms.

Ambient Air

An outdoor (ambient) air sample will be collected the same day as sub-slab vapor and indoor air sampling. Outdoor air samples will be collected by the same method as the sub-slab vapor and indoor air samples. A 6-liter Summa canister will be used for outdoor air. The duration of the outdoor air samples will be consistent with the buildings being monitored.

Sample identification, vacuum readings, flow controller identification numbers, any precipitation, and other relevant information will be recorded on field forms.

Field Quality Assurance/Quality Control Samples

QA/QC procedures will be performed to ensure that the data collected is both valid and representative of the Site conditions. One field duplicate sample will be collected for the sub-slab vapor samples and one field duplicate sample will be collected for the indoor air samples. The configuration for collecting a field duplicate will include Tygon or silicone tubing connected to a “T” fitting. To maintain the collection flow rate from the sample port, the duplicate sampling T will be connected to the canisters and the flow controller will then be connected to the inlet of the sampling T.

In the laboratory, laboratory method blanks will be analyzed along with the samples to monitor potential contamination coming from the analytical process. In addition, laboratory control samples will be prepared and analyzed along with the samples to monitor laboratory performance.

Health and Safety

A health and safety plan (HASP) was prepared in accordance with 29 Code of Federal Regulations (CFR) 1910.120 and is included as **Attachment B**. The HASP will be reviewed by all on-site personnel and will be maintained on-site while the VI investigation activities are conducted.

Sample Analysis and Screening Criteria

All samples will be submitted for laboratory analysis of volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method TO-15. Sample analysis will be conducted by ALS Environmental of Simi Valley, California which is a New York-certified laboratory.

Sub-slab vapor and indoor air results will be compared to the NYSDOH's *Soil Vapor/Indoor Air Decision Matrices*, dated May 2017 (NYSDOH, 2017).

Schedule

VI sampling is anticipated to be completed during the 2022-2023 winter heating season. NYSDEC will be notified at least seven calendar days before beginning field work. The following field schedule is anticipated to occur over two days:

Day 1

- Conduct pre-sampling building inspection.
- Conduct utility clearance.
- Drill concrete floor slabs and install VAPOR PINs.
- Conduct VAPOR PIN Leak Testing via water dam (see *Standard Operating Procedure: Installation and Extraction of the VAPOR PIN®* in Attachment A of the QAPP).
- Conduct shut-in tests on all 6-liter Summa canisters and 8-hour flow controllers.
- Install tubing and build sample trains for sub-slab and indoor air sampling.

Day 2

- Start ambient air sampling outside with one 6-liter Summa canister and 8-hour flow controller.
- Place all 6-liter Summa canisters and conduct VAPOR PIN leak testing via mechanical means (see *Standard Operating Procedure: Leak Testing the VAPOR PIN® via Mechanical Means* in Attachment B of the QAPP).
- Conduct sub-slab vapor and indoor air sampling using 6-liter Summa canisters and 8-hour flow controllers from all VAPOR PIN locations.
- After sub-slab vapor and indoor air sampling collection, transport all Summa canisters and flow controllers to the laboratory for analysis.

VI Investigation Report

Following the receipt of the laboratory analytical results, a VI Investigation Report will be prepared detailing the VI investigation results. It is anticipated that the VI results will be used to inform the design of a vapor mitigation system at the Site. At a minimum, the VI Investigation report will include the following:

- Description of VI investigation activities, including any deviations from this Work Plan
- Tabulated summary of the laboratory data with a comparison to the NYSDOH *Soil Vapor/Indoor Air Decision Matrices* (NYSDOH, 2017)
- Discussion of the results as compared to the NYSDOH *Soil Vapor/Indoor Air Decision Matrices* (NYSDOH, 2017)
- Conclusions and recommendations that summarize the extent of the areas of concern

- Scaled figures showing the sampling locations and the VI investigation laboratory results
- Complete laboratory deliverable package, including a data usability report discussing the data validity that will be prepared by a QA chemist
- Daily field activity logs, field sampling sheets, and notes
- Daily precipitation totals before and during sampling

Data generated during the VI investigation will be uploaded to the NYSDEC's Environmental Information Management System in accordance with the NYSDEC *Electronic Data Deliverable Manual, V. 4*, dated November 2018 (NYSDEC, 2018).

References

EHS Support and Gnarus. 2022. Chlorinated Volatile Organic Compound Pre-Design Investigation Report and Remedy Evaluation, 24 Seneca Avenue, Site No. 828132, Rochester, NY. February.

NYSDEC. 2016. Record of Decision, 24 Seneca Avenue, Environmental Restoration Project. March 10.

NYSDEC. 2010. DER-10 / Technical Guidance for Site Investigation and Remediation. May 3.

NYSDEC. 2018. Electronic Data Deliverable Manual, V. 4., November.

NYSDOH. 2006. FINAL Guidance for Evaluating Soil Vapor Intrusion in the State of New York. New York State Department of Health. October.

NYSDOH. 2017. Soil Vapor/Indoor Air Decision Matrices. May.

Figure

NOTE:
All sub-slab and indoor air samples co-located unless otherwise noted.

Legend

- 2022 Proposed VI Sampling Locations
- 2010 Ambient Air Sampling Point
- 2010 Indoor Air Sampling Point
- 2010 Sub-Slab Vapor Intrusion Sampling Point
- Approximate Location Of Interior Walls
- Approximate Property Boundary

Bremen St

Seneca Ave

Norton St

Gravel

Transformer Room

Former Seneca Machine

Unoccupied

IA-2

SSV-DUP

IA-1

SSV-2

SSV-1

Church

Ambient Air

OA-01

AA-1

SUB-SG-03/IA-SG-03

SUB-SG-05/IA-SG-05

Paved

Central Warehouse

1st Floor (Storage) Unoccupied

Vault/ Cistern (Approx)

SUB-SG-01/IA-SG-01

SUB-SG-04/IA-SG-04

SUB-SG-06/IA-SG-06

Gravel

Van Hook

Loading Dock

Former Ink Room

2nd Floor Used For Offices Only

Subslab Only in Basement

SUB-VH-01

SSV-4A

SUB-SG-02/IA-SG-02

Paved

IA-VH-01

IA-4

IA-DUP

Indoor Air Only on 1st Floor

Grass

Paved

Grass

Grass

SSV-3

IA-3

100 50 0 100

Scale In Feet

Reviewed By:

Sample Locations
VI Work Plan

FORMER SARGENT AND GREENLEAF SITE
24 SENECA AVENUE
ROCHESTER, NY

EHS Support

FIGURE 1

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Attachment A Quality Assurance Project Plan

Quality Assurance Project Plan Chlorinated Volatile Organic Compound Vapor Intrusion Investigation

24 Seneca Avenue, Site No. 828132
Rochester, New York

Prepared for:
Stanley Black & Decker

Prepared by:
EHS Support
GNARUS ADVISORS LLC

November 2022

Table of Contents

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Acronyms

CFR	Code of Federal Regulations
CVOC	chlorinated volatile organic compound
DUSR	data usability summary report
EDD	electronic data deliverable
ELAP	Environmental Laboratory Accreditation Program
EQuIS	Environmental Quality Information System
GC	gas chromatography
GPS	global positioning system
HASP	health and safety plan
LDPE	low-density polyethylene
LIMS	laboratory information management system
mL/min	milliliters per minute
MS	mass spectrometry
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PID	photoionization detector
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RPD	relative percent difference
USEPA	United States Environmental Protection Agency
VI	vapor intrusion
VOC	Volatile Organic Compound

1 Introduction

EHS Support LLC ("EHS Support"), in cooperation with Gnarus Advisors LLC ("Gnarus"), on behalf of Stanley Black & Decker, Inc. ("Stanley Black & Decker"), plans to implement the *Chlorinated Volatile Organic Compound Vapor Intrusion Investigation Work Plan* ("Work Plan") at the former Sargent & Greenleaf building located at 24 Seneca Avenue in Rochester, New York ("Site"). A Site location map is provided in Figure 1 of the Work Plan. This Quality Assurance Project Plan (QAPP) is being provided as an attachment to that Work Plan and has been prepared for the implementation of the vapor intrusion (VI) investigation in accordance with the Work Plan. The VI investigation will involve collecting indoor air and sub-slab samples to be analyzed by an off-site laboratory to evaluate the potential risk for VI in the former Sargent & Greenleaf building and the building to the north.

In general, the project will involve the following activities:

- Install sub-slab vapor points (VAPOR PIN®) in the concrete slab of two buildings.
- Collect sub-slab vapor samples from the VAPOR PINs.
- Collect indoor air and ambient outdoor air samples concurrently with the sub-slab vapor samples.
- Analyze sub-slab vapor, indoor air, and ambient air samples for volatile organic compounds (VOCs).

These activities are described in the Work Plan and will be conducted in accordance with applicable New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) guidance and regulations.

This QAPP sets forth the quality assurance/quality control (QA/QC) procedures to be followed during the execution of the VI investigation, including procedures for sampling, chain of custody, laboratory analysis, data reduction and reporting, internal quality control, preventive maintenance, and corrective action. The purpose of the QAPP is to ensure the generation of valid data or, if the data are not valid, to identify the validity issues and determine appropriate corrective actions.

2 Project Organization

A flowchart depicting the project organization, including the flow of information from the client, project management team, field team, and laboratory, is provided in **Figure 1**.

Project Participants

The personnel responsible for the quality assurance of the field sampling and analysis portion of the project are as follows:

- Stanley Black & Decker Project Representative – Amanda Gonzalez
- Project Director/Manager – John Simon, Gnarus Advisors LLC
- Project Hydrogeologist and Site-Specific Health and Safety Officer – Anton Heitger, EHS Support
- Project Health and Safety Director – Gregg Hicks, EHS Support
- Project Engineer – Kristin A. VanLandingham, P.E., EHS Support
- Sampling Personnel – Anton Heitger and or designee, EHS Support
- Quality Assurance Chemist – Christina Rink or designee, Laboratory Data Consultants, Inc.
- Laboratory Project Manager – Sue Anderson, ALS Global
- Laboratory Custodian – Al David or designee, ALS Global

2.1 Participant Responsibilities

This section describes the relationships among the project participants.

Stanley Black & Decker Project Representative

Amanda Gonzalez is the Stanley Black & Decker Project Representative for the VI investigation activities. Ms. Gonzalez will review documents and provide comments to the project team. She is also responsible for coordinating the field activities with the project director and ensuring that the work area is available for the necessary field activities.

Project Director/Manager

John Simon will serve as the Project Director/Manager and, as such, will work with the project team to develop the overall project strategy. Mr. Simon will also serve as the primary point of contact with the client. He will be responsible for ensuring the field activities are conducted in accordance with the Work Plan and that the appropriate personnel are assigned to complete the project tasks. Mr. Simon will be responsible for the quality of documents submitted to the NYSDEC.

Project Hydrogeologist and Site-Specific Health and Safety Officer

Anton Heitger will be responsible for managing the contractors to ensure that the field work is performed in accordance with the Work Plan and QAPP. Mr. Heitger or his designee will be responsible for the following activities:

- VI investigation sampling tasks
- Coordinating and supervising the VAPOR PIN® installation and sampling activities
- Coordinating with the laboratory project manager before shipping sample containers from and to the laboratory

- Either directly collecting or overseeing the collection of the sub-slab, indoor air, and ambient outdoor air samples
- Supervising or serving as the field sample custodian
- Ensuring that field measurements and sample collection follow the VI Investigation Work Plan and this QAPP
- Identifying and resolving problems occurring during the field work

As the Site-specific Health and Safety Officer, Mr. Heitger is responsible for ensuring that the Site-specific health and safety plan (HASP) is adhered to by all field personnel under his direction. In addition, Mr. Heitger is responsible for overall compliance with the Occupational Safety and Health Administration (OSHA) Hazardous Site Worker Regulations (40 Code of Federal Regulations [CFR] 1910.126) and other applicable regulations.

Each day of field activities must begin with a "tailgate" meeting to discuss the planned activities, the job safety risks involved, and precautions to be taken. The Site-specific Health and Safety Officer or an appropriate designee must record the time of the tailgate meeting and attendees in the field notebook.

Project Health and Safety Director

Gregg Hicks will serve as the project health and safety director and will be responsible for developing the HASP and directing EHS Support's health and safety program.

Project Engineer

Kristin A. VanLandingham, P.E., is a registered professional engineer in the state of New York and will serve as the project engineer. Ms. VanLandingham will be responsible for ensuring that the project design and implementation are performed in accordance with accepted engineering practices and New York State laws, regulations, and guidance.

Sampling Personnel

Experienced engineers, geologists, hydrogeologists, environmental scientists, and/or environmental technicians employed by EHS Support will conduct the VI investigation sampling tasks set forth in the Work Plan and this QAPP. Their responsibilities will include following sample collection, documentation, shipment, chain of custody, and health and safety procedures during all aspects of the field activities. The sampling personnel will report to the Project Hydrogeologist.

Quality Assurance Chemist

Christina Rink of Laboratory Data Consultants, will serve as an independent third-party consultant, specializing in evaluating the quality of laboratory data, and will be retained to review the data packages produced by the laboratory and validate the data. Laboratory Data Consultants will prepare a validation report discussing the usability of the data, identify any concerns or issues, and, if warranted, corrective measures.

Laboratory Project Manager

Sue Anderson of ALS Global Laboratory (Simi Valley, California), will serve as the laboratory project manager. Ms. Anderson will be responsible for the laboratory's adherence to this QAPP (which will be provided to the laboratory). She will coordinate the shipment, acceptance, and laboratory analyses with Mr. Heitger. The laboratory project manager or her designee will be responsible for ensuring the laboratory assesses the data and prepares the required analytical data package.

Laboratory Custodian

Al David of ALS Global Laboratory (Simi Valley, California), will designate an individual to be responsible for properly logging and handling the samples delivered to ALS Global Laboratory.

The intent is that ALS Global Laboratory will provide analytical services. If technical or logistical issues necessitate the use of other laboratories, appropriate laboratories will be selected, and relevant certifications will be provided in subsequent submissions.

Data will be reported by via an electronic data deliverable (EDD) that is compatible with EHS Support's Environmental Quality Information System (EQuIS) database. A full data package, including raw data, will also be provided by the laboratory in electronic PDF format. Summary tables of data results accompanied by the PDF data reports will be provided to NYSDEC in applicable reports.

3 Data Quality Objectives

The data quality objectives and data assessment techniques will follow relevant United States Environmental Protection Agency (USEPA) guidance titled *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)* (USEPA, 2005). This guidance outlines seven steps for developing data quality objectives. Each step is provided below with a description of how the step will be applied to the VI investigation.

1. State the Problem – Soil and groundwater in certain locations of the Site contain chlorinated volatile organic compounds (CVOCs) at concentrations above the NYSDEC Commercial soil cleanup objectives and the groundwater standards and guidance values (NYSDEC and NYSDOH, 2006). Sub-slab vapor and indoor air in at the Site may contain CVOCS above unacceptable levels.
2. Identify the Goal of the Study (Project) – Investigate and identify the concentrations of CVOCs in sub-slab vapor and indoor air that may warrant monitoring or mitigation. In addition, collect baseline data prior to *in situ* thermal treatment for the CVOC source and inform the project design.
3. Identify Information Inputs – The Work Plan scope prescribes an appropriate number of samples to provide an evaluation and is intended to provide the information necessary to determine the next steps based on the *Soil Vapor/Indoor Air Matrices* (NYSDOH, 2017).
4. Define the Boundaries of the Study (Project) – The project boundaries extend from the southern portion of the main Site building along the northern portion of the southern parking lot to approximately 60 feet north into the neighboring building (Van Hook Services Co. Inc. at 76 Seneca Avenue). However, the project boundaries are subject to adjustment based on the VI investigation findings.
5. Develop the Analytical Approach – Samples will be collected in accordance with industry guidance, as described in this QAPP, and will be analyzed by an Environmental Laboratory Accreditation Program (ELAP)-certified laboratory for VOCs.
6. Specify Performance or Acceptance Criteria – Acceptance criteria will be satisfied by the development of valid data that can be used to compare to the *Soil Vapor/Indoor Air Matrices* (NYSDOH, 2017) to evaluate the extent of monitoring or mitigation warranted within the study boundaries.
7. Develop Plan for Obtaining Data – The procedures for field sampling, sample management, laboratory analysis, documenting field activities, and reporting, consistent with NYSDEC and NYSDOH guidance, are specified in this QAPP.

4 Sub-Slab Vapor Point Installation and Indoor Air and Sub-slab Sampling Procedures

To collect sub-slab vapor samples, the sampling personnel will install stainless-steel VAPOR PINs and co-locate samples with an indoor air sample with the inlet set to the typical breathing height of the workers in the area. This section describes the installation and sampling of the sub-slab vapor points and indoor air sampling. The Project Hydrogeologist or Sampling Personnel will collect the sub-slab vapor, indoor air, and outdoor ambient air samples for analyses of VOCs by USEPA Method TO-15 (**Table 1**).

4.1 Sampling Locations

Sub-slab vapor samples will be collected in the former Sargent & Greenleaf building and the basement of the Van Hook building. Sample locations will be located at least 10 feet from the outside building walls and footers. Sample locations may be adjusted based on access and the volume of foot and forklift traffic. Indoor air samples will be collected in the former Sargent & Greenleaf building and on the first floor of the Van Hook building. The sample locations are shown on Figure 1 of the Work Plan. The sub-slab and indoor air duplicate sample locations will be determined at the time of sampling.

An outdoor ambient air sample will be collected to assist in the evaluation of potential background sources at the Site. The ambient air sample will be collected upwind of the Site buildings the same day VI sampling is conducted.

4.2 Sub-Slab Vapor Sampling

Sub-slab vapor samples will be collected using stainless-steel sub-slab sampling ports (VAPOR PIN) installed through the building slab. At each sub-slab sampling location, an SDS-Max or SDS-Plus rotary hammer drill will be used to drill a 1½-inch hole for the flush-mounted cover to a depth of 1½-inches. A 5/8-inch drill bit will be used to drill the remaining depth of the concrete slab.

Following drilling, the concrete slab thickness will be recorded, and the concrete borehole will be cleaned with a brush supplied with the VAPOR PIN kit and a wet/dry vacuum to remove concrete dust. A stainless-steel VAPOR PIN and silicone sleeve for vapor sampling will be inserted through the hole. Once installed, the VAPOR PIN will be immediately capped to minimize the potential for cross-slab air movement. A water dam leak test will be conducted, as described in the *Standard Operating Procedure: Installation and Extraction of the VAPOR PIN®* (**Appendix A**). Following a successful water dam leak test, the VAPOR PIN will be allowed to stabilize overnight before sampling.

Following stabilization, Tygon® or silicone tubing will be connected to the VAPOR PIN barb and a vacuum leak check will be performed on all the canisters and fittings prior to sample collection. A vacuum pump, as described in the *Standard Operating Procedure: Leak Testing the VAPOR PIN® via Mechanical Means* (**Appendix B**), will be used.

The sample point will then be purged of at least three tubing volumes of air at a rate of less than 200 milliliters per minute (mL/min). Immediately after purging is completed, the sub-slab vapor probe will be evaluated with a photoionization detector (PID).

After screening, the tubing will be connected to a 6-liter Summa® canister with a regulator calibrated with an 8-hour flow controller metered to an approximate sample flow rate of 12.5 mL/min. Batch-certified clean 6-liter pre-evacuated Summa canisters will be supplied by the laboratory. Once all connections are in place and a shut-in test is completed for at least 10 minutes, each sample will be collected. The Summa canister will be monitored frequently during the first 30 to 60 minutes to ensure the sample gauge and assembly are working properly. If the vacuum pressure is lost instantaneously, immediately close the valve and tighten all in-line connections. Sampling will be conducted over 8 hours but the vacuum in each Summa canister will not be allowed to fall under 5 inches of mercury to retain the vapor sample.

After the sub-slab vapor sampling is completed, the VAPOR PIN sampling device will be capped and covered with a stainless-steel, flush-mount fitting supplied by the vendor.

The horizontal location of each sub-slab vapor sampling location will be measured using a tape measure from two fixed points or with a hand-held device equipped with a global positioning system (GPS). The location will be recorded in the field notebook.

4.3 Indoor Air and Outdoor Ambient Air Sampling

A section of clean 1⁄4-inch nominal diameter low-density polyethylene (LDPE) tubing with Tygon or silicone tubing will be attached to each 6-liter Summa canister and positioned at a height of approximately 5 feet above the floor with the tubing opening pointing toward the floor where most occupants are standing. The indoor air samples collected in any office area will be collected 3 feet above the floor, which represents the height at which occupants are normally seated (NYSDOH, 2006).

The Indoor air samples will be collected over an 8-hour period simultaneously with the sub-slab vapor samples. The indoor air samples will be collected by the same method as the sub-slab vapor samples.

An outdoor (ambient) air sample will be collected on the same day as the sub-slab vapor and indoor air sampling. Outdoor air samples will be collected by the same method and duration as the indoor air samples. A 6-liter Summa canister will be used for ambient outdoor air.

The horizontal location of each indoor air sampling location and the outdoor ambient air sampling location will be measured using a tape measure from two fixed points or with a hand-held device equipped with a GPS. The location will be recorded in the field notebook.

4.4 Sample Identification and Handling

The sub-slab vapor samples will be designated by the letters “SUB”, followed by the building identification (“SG” for Sargent & Greenleaf or “VH” for Van Hook), and then the two-digit sub-slab sample number beginning with 01 (SUB-SG-01 will be the first sub-slab vapor sample location).

The indoor air samples will be designated by the letters “IA”, followed by the building identification (“SG” or “VH”), and then the two-digit air sample number beginning with 01 (IA-SG-01 will be the first indoor air sample location).

The ambient outdoor air sample will be designated by the letters “OA”, followed by a two-digit number beginning with number 01 (OA-01 will be the ambient outdoor air sample location).

The samples will be handled and shipped in accordance with the QA protocol provided in **Section 5** and analyzed for VOCs following the method listed in **Table 1**.

5 Sample Custody and Management

5.1 Sample Containers, Preservation, and Holding Times

The sample containers, preservation methods, and laboratory holdings times for the VI air samples are provided in **Table 1**.

The holding times begin when the 6-liter Summa canister is batch certified by the laboratory.

The laboratory will provide pre-cleaned batch certified 6-liter Summa canisters, 8-hour flow controllers, and inlet tubing to thread into the flow controllers. The laboratory will also provide the boxes and shipping supplies to send the Summa canisters, flow controllers, and inlet tubing back to the laboratory for analysis.

The laboratory will also provide a sample label tag with each Summa canister. Each sample tag will be labeled with the following information:

- Project name
- Sample number (described above)
- Analysis
- Vacuum reading on Summa canister before sampling and after sampling
- Flow controller ID
- Date sampling began and ended
- Time sampling began and ended
- Sampler's name

5.2 Chain-of-Custody Procedures

A person will be deemed to have custody of samples when the samples are in their possession or control. The sampling crew will retain the chain-of-custody forms until the samples are shipped or hand delivered to the laboratory. If a situation arises where the samples will not be within sight of the person, the samples must be stored in a secured area, such as a locked vehicle, to prevent tampering by third parties.

A chain-of-custody form will be completed for each sample shipment. At a minimum, the chain-of-custody form will include the following information in the title block:

- Project name
- Project number
- Contact person and telephone number

In addition, the chain-of-custody form will include the following information:

- Environmental media sampled
- Sample identification number
- Sample time
- Sample date
- Analytical procedure
- Vacuum readings for each Summa canister before and after sampling
- Summa canister IDs and the corresponding flow controller IDs

- Date sampling began and ended
- Time sampling began and ended
- Sampler's name

Entries on the chain-of-custody form must be made in indelible ink and not pencil or other erasable marking. If an incorrect entry is made, the information will be crossed out with a single strike mark with initials and the date next to the marked-out text.

A signature block with the sample custodian's signature, printed name, and date must be included on the form. In addition, the chain-of-custody form will include signature blocks for subsequent custodians.

Before shipping from the project site, a copy of the chain-of-custody form will be made and placed in the project files. Then the original form will be placed in the shipping box. Each box will then be sealed with a chain-of-custody seal, which will be signed and dated. Finally, each shipping box will be taped shut.

The samples will be delivered to the analytical laboratory by hand delivery, ground courier, or overnight shipping service. The receiving party must sign the chain-of-custody form and provide a copy of the signed form with the laboratory report. An example of the ALS Global chain-of-custody form is provided in **Appendix C** .

The Project Hydrogeologist will develop a project-specific database of anticipated sample collection as chain-of-custody forms are prepared at the end of each day in which samples are shipped. The Project Hydrogeologist will communicate with the Laboratory Custodian during the sampling event to verify that each group of samples that are shipped are received at the laboratory. Immediately after sample receipt, the laboratory will provide the Project Hydrogeologist with a summary of the samples received at the laboratory and assigned analytical methods. The Project Hydrogeologist will review the sample receipt documentation to verify that all samples and analytical methods were identified by the laboratory. Missing samples or incorrect information will be conveyed to the Laboratory Custodian by the Project Hydrogeologist.

5.3 Field Documentation

The purpose of field documentation is to record the activities and Site conditions to enable a third party who is not present to understand both the Site conditions, such as weather and other nearby activities, and VI investigation activities that took place on-site. The overall objective of field documentation is to avoid relying on a person's memory to be able to retrospectively understand the field activities.

Each field supervisor or technician will make daily notes in the individual's own field notebook dedicated to the project. Entries must be made in indelible ink and not pencil or other erasable marking. If an incorrect entry is made, the information will be crossed out with a single strike mark with initials and the date next to the marked-out text.

The field notebook must be stored in a secured, locked location when not in use and should be placed in the project files at the end of that stage of the field activities. In addition, electronic copies of each page used should be made and stored in secure, redundant computer files (such as a cloud-based file system or corporate server with an off-site backup).

The cover or the first page of the field notebook should contain the following information:

- Professional's name
- Professional's employer
- Project name
- Project number
- Contact information (in case the field notebook is lost and recovered)

The notes made for each day must begin on a fresh page and must include, but are not limited to, the following information:

- Date
- Outdoor weather conditions (temperature, barometric pressure, cloud cover, humidity, and precipitation)
- Indoor weather conditions (temperature, barometric pressure, humidity)
- Personnel present on-site, including name and affiliation
- Nearby activities (such as construction)
- Time log of the field activities as the day progresses with new entries as locations or activities move from one location or activity to another
- Sample information, including location, sample identification, time, type, field measurements, and concrete slab thickness
- Field duplicate designations
- Equipment used to make field measurements, along with the date and time of calibration, if required
- Information related to sample documentation, including:
    - Dates and method of sample shipments
    - Chain-of-custody record numbers
    - Courier air bill number
    - Other pertinent information and activities

6 Laboratory Analytical Methods

For the chemical analyses, the laboratory will follow the October 2016 NYSDEC Analytical Services Protocol document, including the required method detection limits (NYSDEC, 2016). **Table 1** provides the laboratory method for sub-slab vapor, indoor air, and outdoor air sampling analysis.

If difficulties arise in achieving the specified method detection limits due to a particular sample matrix, the Laboratory Manager must notify the Project Manager. To achieve those detection limits, the laboratory must use all appropriate cleanup procedures in an attempt to retain the project required detection limits. If a sample requires dilution due to high levels of target analytes or interferences, the laboratory must document all initial analyses (if possible) and secondary dilution results. Dilution will be permitted only to bring target analytes within the linear range of calibration.

Analytical methods cited in this QAPP will be used unless future information suggests that other methods may be more beneficial for accomplishing the project goals. Different analytical methods may be evaluated and used in cases such as:

- Lower limits are needed for comparison with screening criteria
- Technical or logistical issues necessitate the use of other methods
- Another method seems like the most technically sound choice in the future
- Other project-specific reasons

If analytical methods not cited in this QAPP are used, pertinent information regarding the reason for the method change will be provided to the NYSDEC, as will relevant laboratory certifications. Note that the method used is included along with the sample name, date, etc. in the analytical records in the database.

Analytical methods cited in this QAPP may also have been updated since the QAPP was prepared. Using a newer, approved version of an existing method (e.g., using Method 8260C rather than Method 8260B) is common. This updated version is **not** considered a new analytical method; therefore, documentation noting the updated method version is not required.

7 Quality Control Requirements

This section outlines the quality control requirements and includes the quality assurance indicators.

7.1 Quality Assurance Indicators

The data quality indicators used to evaluate conformance with the project data quality objectives are generally defined in terms of six parameters: precision, accuracy, representativeness, completeness, comparability, and sensitivity. This section provides a brief overview of these parameters.

Precision

Precision is a measure of the reproducibility of sample results; it is maximized by consistent adherence to sampling and analytical procedures. Precision can be assessed by comparing duplicate matrix spike recoveries, duplicate laboratory control spike recoveries, laboratory replicates, and/or field duplicate sample results.

Checks for field measurement precision will include obtaining duplicate field measurements.

Accuracy

Accuracy is the deviation of a measurement from the true value. Both field and analytical accuracy will be monitored through initial and continuing calibration of instruments. In addition, internal standards, blank spikes, and surrogates (system monitoring compounds) will be used to assess the accuracy of the laboratory analytical data.

Representativeness

Representativeness is the degree to which data accurately represent Site conditions. It is dependent on variability in sampling and analysis, as well as in the environmental media at the site. This QAPP presents the rationale for sample locations and quantities and includes field sampling and laboratory analytical methods. Adherence to the sampling plan and to specified field and laboratory analytical methods is intended to provide representative data. This parameter cannot be directly evaluated during data validation.

Completeness

Completeness is defined as the percentage of valid data in a data set. Completeness of a data set will be calculated by comparing the number of valid sample results generated to the total number of results generated. The measurement performance criterion specified in this QAPP is 90 percent.

Comparability

Comparability is the degree of confidence with which one data set can be compared to another. Comparability will be maintained by consistently using the same sampling methods, analytical methods, and QA/QC procedures as well as by using appropriately trained personnel. This parameter cannot be directly evaluated during data validation.

Sensitivity

Sensitivity refers to the capability of a method and/or instrument to reliably quantitate a given analyte at a given concentration. It is important that this concentration (at which the instrument and/or method is capable of reliable quantitation) not be greater than the applicable standard or guidance value.

8 Field and Laboratory Quality Control Checks

This section outlines the field QC samples and analytical laboratory QC checks.

8.1 Field Quality Control Samples

The field analytical equipment will be calibrated immediately before use each day. The calibration procedures will conform to the manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. The Project Hydrogeologist or Sampling Personnel will maintain records of all instrument calibration in the field notebook.

Calibration procedures for the instruments used for monitoring health and safety hazards (e.g., PID and explosimeter) will be provided in the HASP. More frequent calibration may be needed depending on conditions encountered in the field.

Field Duplicates

A field duplicate will be collected at a minimum frequency of 1 for every 20 samples (5 percent) per type of sample (i.e., 1 duplicate per 20 sub-slab vapor samples and 1 duplicate per 20 indoor air samples). A field duplicate sample will not be collected for the outdoor ambient air sample.

8.2 Analytical Laboratory Quality Control Checks

Internal laboratory QC checks will be used to monitor data integrity. These checks will include method blanks, blank spikes, internal standards, surrogate samples, calibration standards, and reference standards.

Method Blanks

Method blanks will be used to assess potential sources of contamination in the analytical process. The method blank is prepared at the start of the analytical process and includes all phases of the laboratory analysis. One method blank will be analyzed with each associated analytical series with no more than 20 samples.

Surrogate Spikes

A surrogate compound is a chemical that is not naturally occurring (or rarely occurs in nature), but has properties that are similar to the analytes of interest. Surrogates are principally used as an internal check for samples analyzed by gas chromatography/mass spectrometry (GC/MS) and GC methods. The surrogate spike is added to the samples before purging or extraction. The surrogate spike provides information related to the accuracy of an analytical method on a sample-specific basis.

If the laboratory results indicate that the surrogate spike recoveries are outside the specified QC limits, the recoveries will be evaluated to identify the potential sources of the deviation, possibly considering other control information. Surrogate spike compounds will be determined based on the information provided by the USEPA analytical methods for the chemicals specified for analysis.

Laboratory Duplicates

Laboratory duplicates separate aliquots of a sample that are then analyzed as a separate sample.

Calibration Standards

The laboratory will use calibration standards to assess the stability of the instrument and to provide information regarding the ability of the instrument to provide valid quantification results. The laboratory will analyze calibration standards at the beginning and end of each analytical series, as well as throughout a series containing a large number of samples (i.e., over 20 samples).

In general, the need for calibration standards analysis is specified by the analytical method. In analyses where internal standards are used, a calibration check standard will only be analyzed at the beginning of an analytical series. If results of the calibration check standard exceed specified tolerances, then all samples analyzed since the last acceptable calibration check standard will be reanalyzed.

Internal Standards

The laboratory will monitor internal standard areas and retention times for organic analyses performed by GC/MS methods. Method-specified internal standard compounds will be spiked into all field samples, calibration standards, and QC samples after preparation and before analysis.

If internal standard areas in one or more samples exceed the tolerances specified in the analytical method, the cause will be investigated and, if warranted, the instrument will be recalibrated. In this case, all affected samples will be reanalyzed.

Reference Standards

Reference standards are standards of known concentration and independent in origin from the calibration standards. The intent of reference standard analysis is to provide insight into the analytical proficiency within an analytical series. This includes preparation of calibration standards, validity of calibration, sample preparation, instrument set-up, and the premises inherent in quantitation. Reference standards will be analyzed at the frequencies specified within **Section 6**.

9 Data Precision Assessment Procedures

This section includes the procedures for assessing the data precision.

9.1 Field Precision

Field precision is difficult to measure because of temporal variations in field parameters. However, precision will be controlled through the use of experienced field personnel, properly calibrated meters, and duplicate field measurements. Field duplicates will be used to assess the precision for the measurement system.

9.2 Laboratory Precision

Laboratory data precision for organic analyses will be monitored using laboratory duplicates. The precision of data will be measured by calculating the relative percent difference (RPD) by the following equation:

$$RPD = 100*(A-B) /((A+B)/2)$$

Where:

A = Analytical result from one of two duplicate measurements
B = Analytical result from the second measurement

Precision objectives for laboratory duplicate analyses are identified in the NYSDEC Analytical Services Protocol (NYSDEC, 2016).

9.3 Data Accuracy Assessment Procedures

Experienced field personnel, properly calibrated field meters, and adherence to established protocols will control the accuracy of field measurements. The accuracy of field meters will be assessed by reviewing calibration and maintenance logs.

Laboratory accuracy will be assessed via the use of surrogate spikes, internal standards, and reference standards. Where available and appropriate, QA performance standards will be analyzed periodically to assess laboratory accuracy.

Accuracy will be calculated in terms of percent recovery as follows:

$$\% Recovery = 100*(A-X)/B$$

Where:

A = Value measured in spiked sample or standard
B = True value of amount added to sample or true value of standard
X = Value measured in original sample

This formula is derived under the assumption of constant accuracy over the original and spiked measurements. If any accuracy calculated by this formula falls outside the acceptable levels, data will be evaluated to determine whether the deviation represents unacceptable accuracy, or variable, but

acceptable accuracy. Accuracy objectives for surrogate recovery objectives are identified in the NYSDEC Analytical Services Protocol (NYSDEC, 2016).

9.4 Data Completeness Assessment Procedures

The laboratory will calculate the completeness of laboratory data sets by comparing the number of valid sample results generated to the total number of results generated.

Completeness = 100 x (Number valid results/Total number of results generated)

As a general guideline, overall project completeness is expected to be at least 90 percent.

9.5 Corrective Action

The corrective actions typically taken by the laboratory are described below. If the calibration, instrument performance, or blank criteria are not met, the cause of the problem will be investigated and corrected. The analytical system then will be recalibrated. As part of the laboratory's operating protocol, sample analysis does not begin until calibration, instrument performance, and blank criteria are met. If matrix spike, reference standard, or duplicate analyses are found to fall outside the acceptable limits, the cause of the issue must be researched. Then, depending on the results of the overall QC program for the sample set, the data may be accepted, accepted with qualification, or determined to be unusable. If deemed unusable, the samples either must be reanalyzed, or a new set of samples must be collected and analyzed.

9.6 Preventive Maintenance

Preventive maintenance procedures must be performed by the laboratory on all equipment used for the sample analyses. The maintenance activities must be documented in the laboratory's records.

10 Data Reduction, Assessment, and Reporting

This section outlines the data reduction, data quality assessment, data validation and data usability summary report, and data reporting.

10.1 Data Reduction

The laboratory will reduce the data produced in accordance with SW-846 protocols. The criteria used to reduce the data are specified in the analytical methods.

10.2 Data Quality Assessment

The laboratory deliverables will be NYSDEC Analytical Services Protocol Category B (NYSDEC, 2016). Data for this investigation will be evaluated and qualified in accordance with the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA-540-R-20-005 (USEPA, 2020).

The validated analytical results reported by the laboratory and validated by the third-party validator will be assigned one of the following USEPA-defined data usability qualifiers:

- U – Not detected at given value
- UJ – Estimated, not detected at given value (applied by third-party validator)
- J – Estimated value
- R – Result not useable (applied by third-party validator)
- No Flag – Result accepted without qualification

10.3 Data Validation and Data Usability Summary Report

An independent third-party QA chemist will review the laboratory data package and prepare a data validation report. The validation will conform to the USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, 2020).

The analytical data review will be summarized by a third-party validator in a Data Usability Summary Report (DUSR) that will include a review and evaluation of all the analytical results. The DUSR will also present the results of the QC review. Reported results for QC elements will be reviewed to ensure compliance with the analytical method protocols. Not all QC elements are applicable or included for every data set. A quality check will be performed on any of the following that are relevant:

- Initial and continuing calibrations
- Blanks
- Laboratory control standards and matrix spikes
- Surrogate recoveries
- Matrix interference checks
- Field and laboratory duplicates
- Sample data
- Chain-of-custody forms
- Holding times

Any deficiencies identified during the review will be noted and the effect on the generated data will be discussed. If warranted, the DUSR will include recommendations for resampling or reanalysis. The validated data deliverable and the DUSR will be included as appendices to the VI Investigation report.

10.4 Data Reporting

The data package provided by the laboratory will contain all the items discussed in **Section 10.1** through **Section 10.3**. Data quality issues will be discussed in a case narrative included with the data report. A photocopy of the completed chain-of-custody forms accompanying each sample shipment will be included with the data package. The analytical data package will be accompanied by an EDD.

Data generated during the pilot scale study will be uploaded to the NYSDEC's Environmental Information Management System in accordance with the NYSDEC Electronic Data Deliverable Manual, V. 4 (NYSDEC, 2018). To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). The laboratory will perform a QC check on the EDD before delivery. The original data, tabulations, and electronic media must be stored in a secure and retrievable fashion.

Data will be reported by ALS Global to EHS Support and the Gnarus via an EDD that is compatible with EHS Support's EQuIS database. A full data package, including raw data, will also be provided by the laboratory in electronic PDF format. Summary tables of data results accompanied by the PDF data reports will be provided to NYSDEC in applicable reports.

11 References

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NYSDOH. 2006. FINAL Guidance for Evaluating Soil Vapor Intrusion in the State of New York. New York State Department of Health. October 2006.

NYSDOH. 2017. Soil Vapor/Indoor Air Decision Matrices. May 2017.

USEPA. (2005). Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4).

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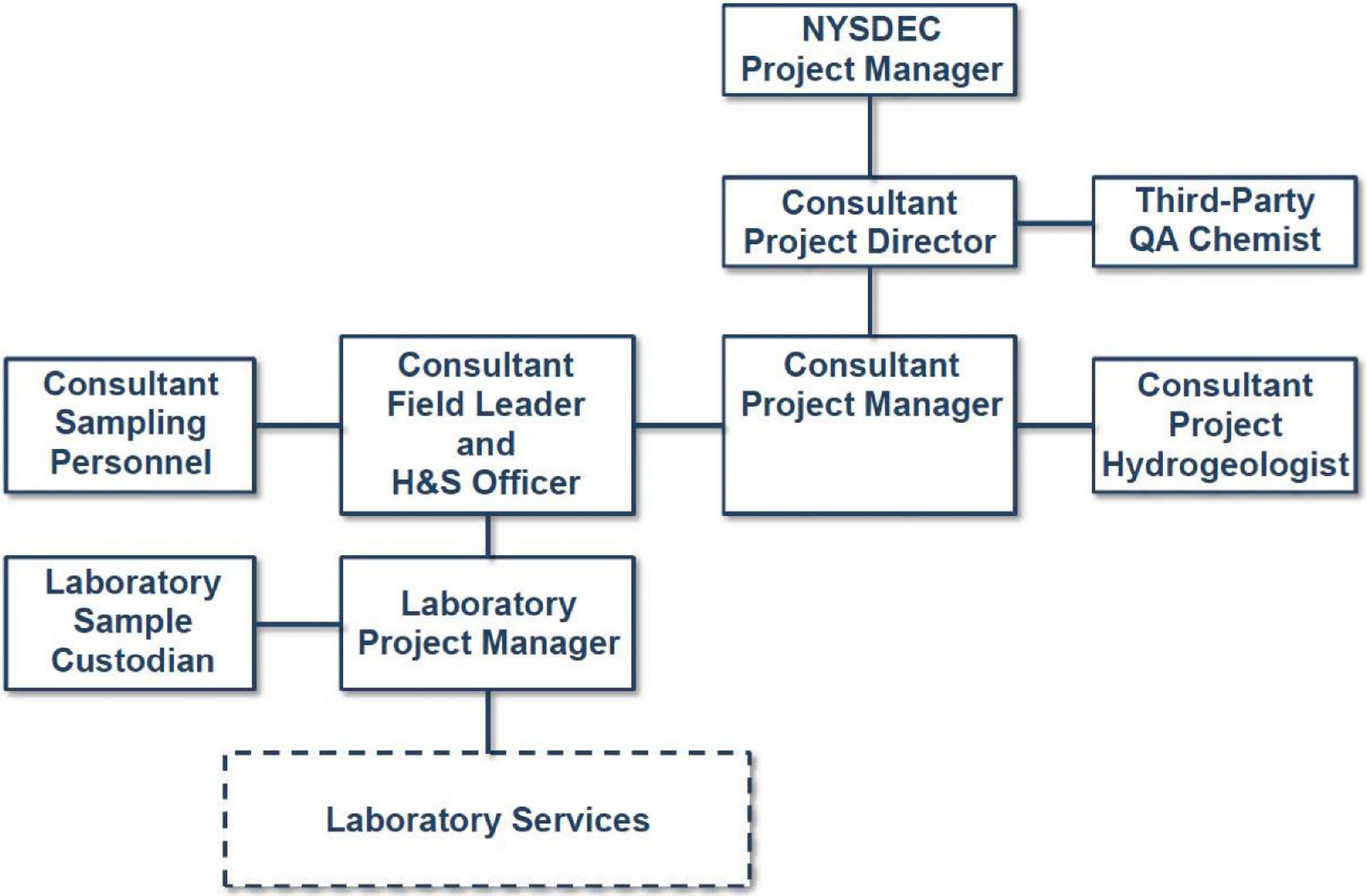
Tables

Table 1
Analytical Methods and Requirements for Containers, Preservation, Volumes, and Holding Times for Indoor Air and Sub-Slab Vapor Samples
Quality Assurance Project Plan Chlorinated Volatile Organic Compound Vapor Intrusion Investigation
Rochester, New York
Stanley Black & Decker

Name	Analytical Methods	Container	Preservation	Minimum Sample Volume or Weight	Maximum Holding Time
Volatile Organic Compounds (VOCs)	TO-15	6-Liter Batch Certified Summa® Canister	None	6 Liters	30 Days

Figures


NYSDEC
Project Manager
Consultant
Project Director
Third-Party
QA Chemist
Consultant
Sampling
Personnel
Consultant
Field Leader
and
H&S Officer
Consultant
Project Manager
Consultant
Project
Hydrogeologist
Laboratory
Sample
Custodian
Laboratory
Project Manager
Laboratory Services

Appendix A Standard Operating Procedure: Leak Testing the VAPOR PIN® Via Mechanical Means

Standard Operating Procedure Installation and Extraction of the Vapor Pin®

Updated March 16, 2018

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.

Appendix B Standard Operating Procedure: Installation and Extraction of the VAPOR PIN®

Standard Operating Procedure
Leak Testing VAPOR PIN®
Via Mechanical Means

Updated March 29, 2016

Scope:

The operating procedure describes the methodology to test a VAPOR PIN® or equivalent sub-slab sampling device and sample train for leakage of indoor air. Mechanical leak testing is generally simpler and less costly than testing with tracer gases such as helium, but relevant state, program, or other guidance documents should be consulted to determine if a specific type of leak test is needed.

Purpose:

The purpose of this procedure is to ensure that indoor air does not leak past the VAPOR PIN® or associated tubing and hardware, and dilute the sub-slab soil gas sample with indoor air.

Equipment Needed:

- VAPOR PIN®;
- 3 stopcocks
- 2 Tee fittings
- Vacuum pump or peristaltic pump
- Photo-Ionization Detector (PID) or other pump for purging soil gas
- Sample container
- Vacuum gauge
- 0.25-inch Outer Diameter sample tubing (Nylaflow LM shown)
- Tubing or fittings to connect sample tubing to equipment (Tygon™ R-3803 tubing shown)
- Distilled Water

For stick-up configuration only:

- Play-Doh or VOC-free modeling clay
- 2-inch diameter plastic pipe couple;

Procedure:

1) Drill a 5/8" diameter hole in the concrete slab and install the VAPOR PIN® as per the Standard Operating Procedure (SOP). For a flush-mount installation, drill the 1-1/2" diameter hole first, and follow the SOP Use of the VAPOR PIN® Drilling Guide and Secure Cover. Testing evacuated ("Summa") canisters and regulators in accordance with ASTM standard D7663-11 or Restek Corporation's A Guide to Whole Air Canister Sampling prior to starting field work eliminates most risk of leakage when sampling with the VAPOR PIN®. Leave the canister closed until leak testing is completed.

2) Install the VAPOR PIN® as described in the SOP Installation and Extraction of the VAPOR PIN®.

3) Clean the slab within a 2-inch radius of the VAPOR PIN® to remove all dust. Avoid wetting the concrete or wait until the concrete is dry before proceeding, and avoid cleaning with VOC-containing substances. A whisk broom or shop vacuum is recommended. Remaining dust can be picked up with a scrap of clay.

4) For a flush-mount installation, water is poured directly into the 1-1/2" depression without the PVC couple or modeling clay-proceed to the next step. For a stick-up installation, roll a 1-inch diameter ball of clay between your palms to form a "snake" approximately 7 inches long and press it against the end of the 2" pipe couple. Push the couple against the slab to form a seal between the pipe and the concrete. Notice that water soluble clays such as Play-Doh may absorb enough water to be unsuitable for tests lasting more than one hour.

5) Assemble the sample train as shown in Figure 1. Notice that the figure shows Photo-Ionization Detector (PID) at the end of the sample train, which should be replaced with the hand-held vacuum pump next to it, or a peristaltic pump, during shut-in testing. The shut-in test is conducted by closing stopcock 1, opening stopcocks 2 and 3, and imposing a vacuum of 15" mercury equivalent (in Hg) with the vacuum pump or peristaltic pump. Close stopcock 3, and observe the vacuum gauge for one to five minutes to verify that pressure in the sample train increases no more than 0.5 in Hg. Tighten or replace leaking components, if needed. The compression fitting connecting sample tubing to the sample canister is a common leak point.

6) Attach the peristaltic pump or PID and pour enough distilled water into the pipe couple or flush-mount depression to immerse the tubing connection to the VAPOR PIN®.

7) Open all stopcocks and purge and sample the sample point as required by the data quality objectives. Water level might drop slightly due to absorption into the concrete, but if there is a sudden drop in water level, the appearance of water in sample tubing, or other indication of water entering the sub-slab, remove the distilled water from the couple or depression, and reposition the VAPOR PIN® to stop the leakage before resuming the leak test and sampling.

8) If long-term sampling is conducted (e.g. 8-hour or 24-hour), the vacuum gauge, stopcock 3, PID and pumps can be removed immediately after closing stopcock 2, for use at subsequent sample locations.

Figure 1. Example of Sub-Slab Sampling and Leak-Test Setup

Appendix C ALS Environmental Chain-of-Custody Forms

Air - Chain of Custody Record & Analytical Service Request

Page _____ of _____

right solutions. right partner.

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

ALS Project No.

ALS Contact:

Company Name & Address (Reporting Information)

Project Name

Project Number

Project Manager

P.O. # / Billing Information

Phone | Fax

Email Address for Result Reporting

Sampler (Print & Sign)

Analysis Method

Comments
e.g. Actual Preservative or specific instructions

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume			

Report Tier Levels - please select

Tier I - Results (Default if not specified) _____
Tier II (Results + QC Summaries) _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Data Validation Package) 10% Surcharge _____

EDD required Yes / No
Type: _____ Units:_____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____°C

Attachment B Health and Safety Plan

Health and Safety Plan

Chlorinated Volatile Organic Compound Vapor Intrusion Investigation

24 Seneca Avenue, Site No. 828132

Rochester, New York

Prepared for:

Stanley Black & Decker

Prepared by:

EHS Support

GNARUS ADVISORS LLC

November 2022

Table of Contents

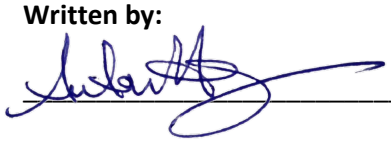
List of Appendices

Health and Safety Plan Approval

This Health and Safety Plan (HASP) was prepared for employees performing work that poses physical and/or chemical exposure risks to EHS Support LLC ("EHS Support") employees and EHS Support subcontractors. It was prepared based on the best available information regarding the hazards known or suspected to be present on the project Site. While it is not possible to identify, evaluate, and protect against all possible hazards in advance of the Site visit, adherence to the requirements of the HASP will significantly reduce the potential for occupational injury. This HASP will be updated as necessary to include new project activities, risks, or changes in organizational structure.

By signing below, I acknowledge that I have reviewed and hereby approve this HASP. This HASP has been written for the exclusive use of EHS Support's employees and direct contractors. The plan is written for specified Site conditions, dates, and personnel, and must be amended if these conditions change. This HASP is only valid for one year after approval.

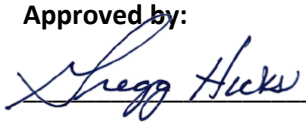
Written by:



11/11/2022

Anton Heitger — Date
EHS Support Project Manager

Approved by:



11/11/2022

Gregg Hicks — Date
EHS Support H&S Specialist

Approved by:

/11/11/2022

Anton Heitger — Date
EHS Support Project Manager

1 Introduction

This Health and Safety Plan (HASP) summarizes health and safety hazard information for EHS Support LLC ("EHS Support") field activities related to work conducted for the Stanley Black & Decker company at the former Sargent & Greenleaf Site located at 24 Seneca Avenue, City of Rochester, Monroe County, New York (Site). The EHS Support HASP delineates procedures that will allow personnel to identify and predict hazards, work safely, and respond quickly and appropriately to Site emergencies. All Site work will be conducted in accordance with the following:

- EHS Support standard operating procedures
- Occupational Safety and Health Administration (OSHA) regulations in the Code of Federal Regulations (CFR), Title 29 Parts 1904, 1910, and 1926 as applicable
- Any applicable state safety regulations

Organizational Structure	
EHS Support has established a chain of command with lines of authority, responsibility, and communication for this project. The Project Manager (PM) has the responsibility and authority to direct all Site operations and is ultimately responsible for the overall management of the project. The field work covered by this HASP will be overseen or managed by a Field Team Leader who is responsible for the proper implementation and execution of the comprehensive work plan. Each field project will have a Site Safety Officer (SSO) who has the responsibility and authority to implement the HASP and verify compliance with the plan. Other personnel needed to conduct the proposed work will be assigned.	
PM	Is responsible for appropriately staffing the project to safely and effectively implement the work plan. They will also ensure that company funds are available for the Field Team Leader to provide appropriate personal protective equipment (PPE) and monitoring equipment.
Field Team Leader	Is responsible for the safe and proper implementation of the work plan. They will have the authority to expend company resources to ensure that PPE and other safety equipment are available and in good working order. They will communicate with the PM regarding implementation of the work plan.
SSO	Is responsible for the implementation of this HASP. They will communicate any issues arising from changing Site conditions, upgrades in PPE, decontamination procedures, and needs for monitoring equipment with the Site PM or Field Team Leader. The SSO will ensure that other workers assigned to the project are following the HASP.
Field Team Members (EHS Support Personnel, Contractors, and Subcontractors)	The field team members are responsible for complying with the HASP, notifying the SSO of hazardous or potentially hazardous conditions, and carrying out assigned tasks during field operations.
Site Visitors and State/Federal Agency Representatives	Any visitor to the project site is responsible for complying with all aspects of this HASP.
Note: It is expected that other employees assigned to the project will follow the HASP and report all potential safety concerns to the SSO.	

1.1 Project Personnel and Emergency Contact Information

Emergency Phone Numbers		
Emergency (fire, police, ambulance)		911
Emergency Facility Specific		
Hospital: Rochester General Hospital	1425 Portland Ave Rochester, NY 14621	585-922-4000
Occupational Clinic / Urgent Care: Occupational Safety On Site, Inc	1600 Lyell Ave, Suite C Rochester, NY 14606	585-723-3891 Open Monday - Friday 8:00am-4:30pm
Site/Client Contacts		
Stanley Black & Decker Project Manager	Amanda Gonzalez	919-480-7198
Gnarus Advisors, LLC Project Manager	John Simon	202-505-1906
Site Contact / Dock Hardware Owner	Gary Rogers	585-737-7000
EHS Support Contacts		
Project Manager	Anton Heitger	603-389-7946
Task/Field Lead	Anton Heitger	603-389-7946
Site Safety Officer	Anton Heitger	603-389-7946
Project Health and Safety	Gregg Hicks	606-922-5585
Field Team Members	Anton Heitger	603-389-7946
	Cal Figliozzi	401-374-2566
H&S Service Line Lead	Monica Meyer	724-762-7951
Human Resources	Lauren Kroll	484-269-6471
Contractors		
Nothnagle Drilling	Steve DiLaura	585-538-2328
Subcontractors		
Utility Locator Company	GPRS	419-767-2328
State/Federal Agency		
NYSDEC	Charlotte Theobald	585-226-5354 (office) 585-420-6558 (cell)

Emergency Phone Numbers	
Incident Notification Process	
Dial 911/Facility or Site Emergency Number as applicable	
Facility contact (if applicable)	Gary Rogers – Dock Hardware
Contact EHS Support PM	Anton Heitger
Contact H&S Service Line Lead	Monica Meyer
Contact Project PM	John Simon
Contact Client PM	Amanda Gonzalez
Client incident reporting number	Amanda: 919-480-7198
Other Emergency Information	
Location of assembly areas	Dock Entrance along Seneca Ave
Location of storm shelter	Main Building Interior
Nearest First Aid Kit/AED (on-site, provided by EHS - Support personnel, or distance to nearest)	EHS Support Vehicle
Nearest Eyewash/Shower (on-site, provided by EHS - Support personnel, or distance to nearest)	EHS Support Vehicle / First Aid Kit

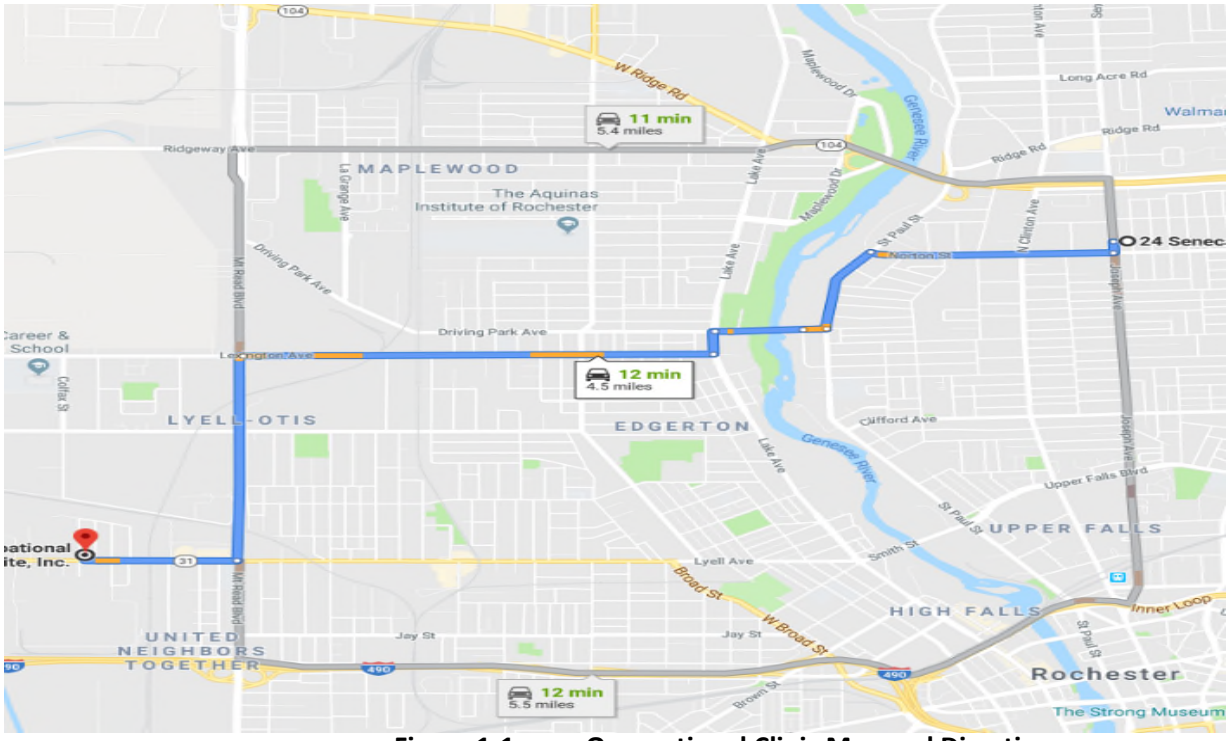


Figure 1-1 Occupational Clinic Map and Directions

24 Seneca Ave
Rochester, NY 14621

Take Norton St, Lexington Ave and Mt Read Blvd to Lyell Ave

12 min (4.0 mi)

1. Head south on Seneca Ave toward Norton St
   282 ft
2. Turn right at the 1st cross street onto Norton St
   0.7 mi
3. Turn left onto St Paul St
   0.4 mi
4. Turn right onto Avenue E
   364 ft
5. Continue onto Driving Park Ave
   0.3 mi
6. Turn left onto Lake Ave
   0.1 mi
7. Turn right onto Lexington Ave
   1.4 mi
8. Turn left onto Mt Read Blvd
   1.0 mi
9. Turn right onto Lyell Ave
   Pass by NAPA Auto Parts - Genuine Parts Company (on the right)
   Destination will be on the right

1 min (0.4 mi)

Occupational Safety On Site, Inc.
1600 Lyell Ave Suite C, Rochester, NY 14606

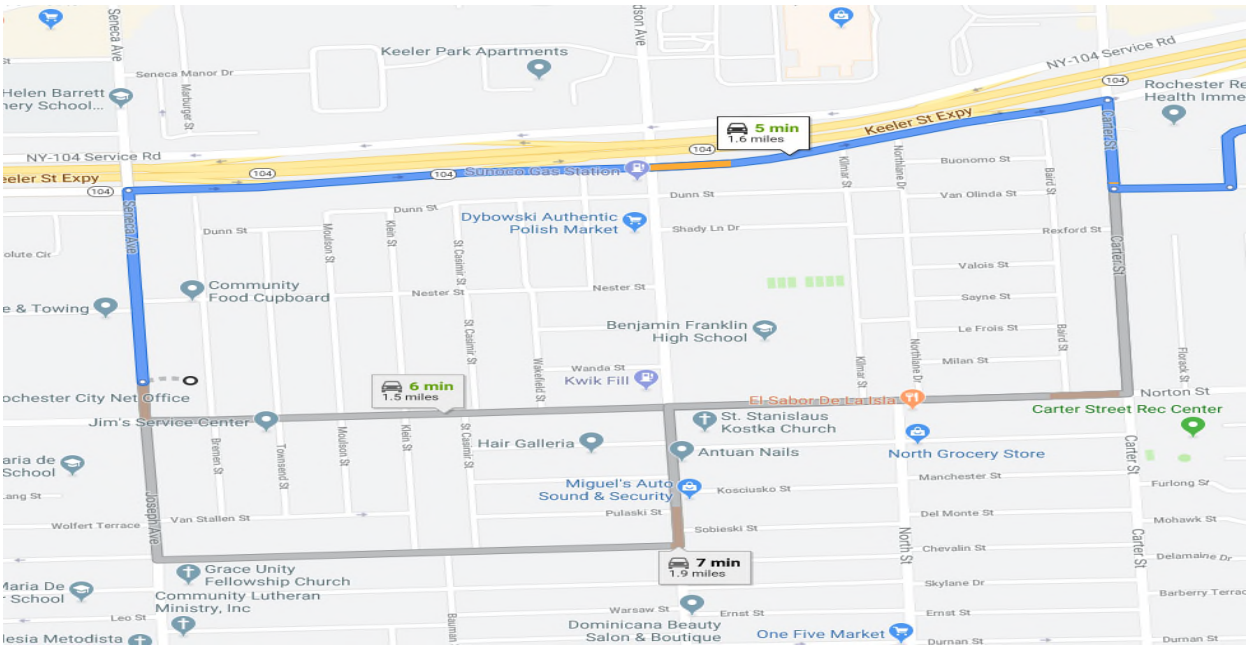


Figure 1-2 Hospital Map and Directions

5 min (1.6 miles)

via NY-104 Service Rd E

Fastest route, the usual traffic

24 Seneca Ave
Rochester, NY 14621

- Head north on Seneca Ave toward Bastian St
  0.3 mi
- Turn right onto NY-104 Service Rd E
  0.8 mi
- Turn right onto Carter St
  0.1 mi
- Turn left onto Rochester General Hospital
  0.1 mi
- Turn left onto Rochester General Hospital Dr
  0.2 mi
- Turn right
  Destination will be on the right
  223 ft

Rochester General Hospital Emergency Room
1425 Portland Ave, Rochester, NY 14621

2 Scope of Work

Project/Task Number	REM_C03887-5	**HASP Preparation Date**	11/10/2022
Activity Duration (days/weeks/months)	1 week	**Anticipated Start Date of Current Work**	12/05/2022
State of the Site/Facility	Active / NY	**Site Access**	Road

Site Topography	Relatively flat, industrial park, some stairs in building

Normal Shift Work	Yes
Lone Working	Check in person: text. John Simon or Anton Heitger
	Check in frequency: Upon Arrival, lunch, and prior to departing Site
Traffic	Outside Facility – Med to heavy / Inside Facility - Light
Major Tasks *The Job Safety Analysis (JSA) Form must be completed for each task. This form includes the task, hazard controls, and personal protective equipment (PPE) used for each task.*	• Underground Utility Location • Monitoring Well Installation • Soil Boring/Sampling • Groundwater Sampling • Sub-slab Vapor Point Installation • Sub-slab Vapor and Indoor Air Sampling • Surveying • Subcontractor Oversight
Equipment Needed	Geoprobe® / Drill Rig, Low-flow groundwater sampling equipment (QED bladder pump, peristaltic pump, water level meter, flow through cell and sonde), rotary hammer drill, PID, Summa Canisters, hand tools

See **Figure 2-1** for the Site location map, **Figure 2-2** for the Site plan, and **Figure 2-3** for an Aerial View of the Site.

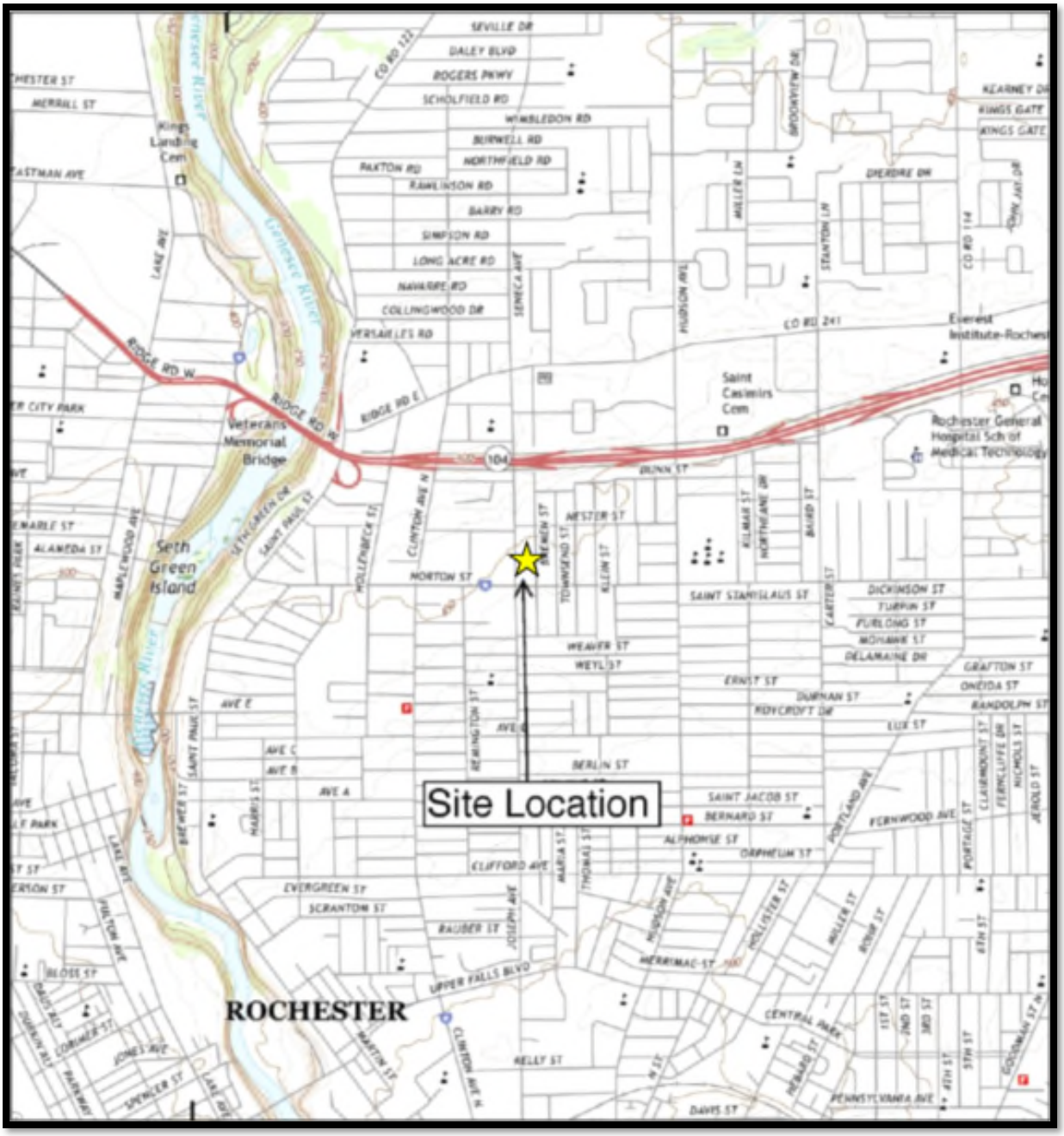


Figure 2-1 Site Location Map

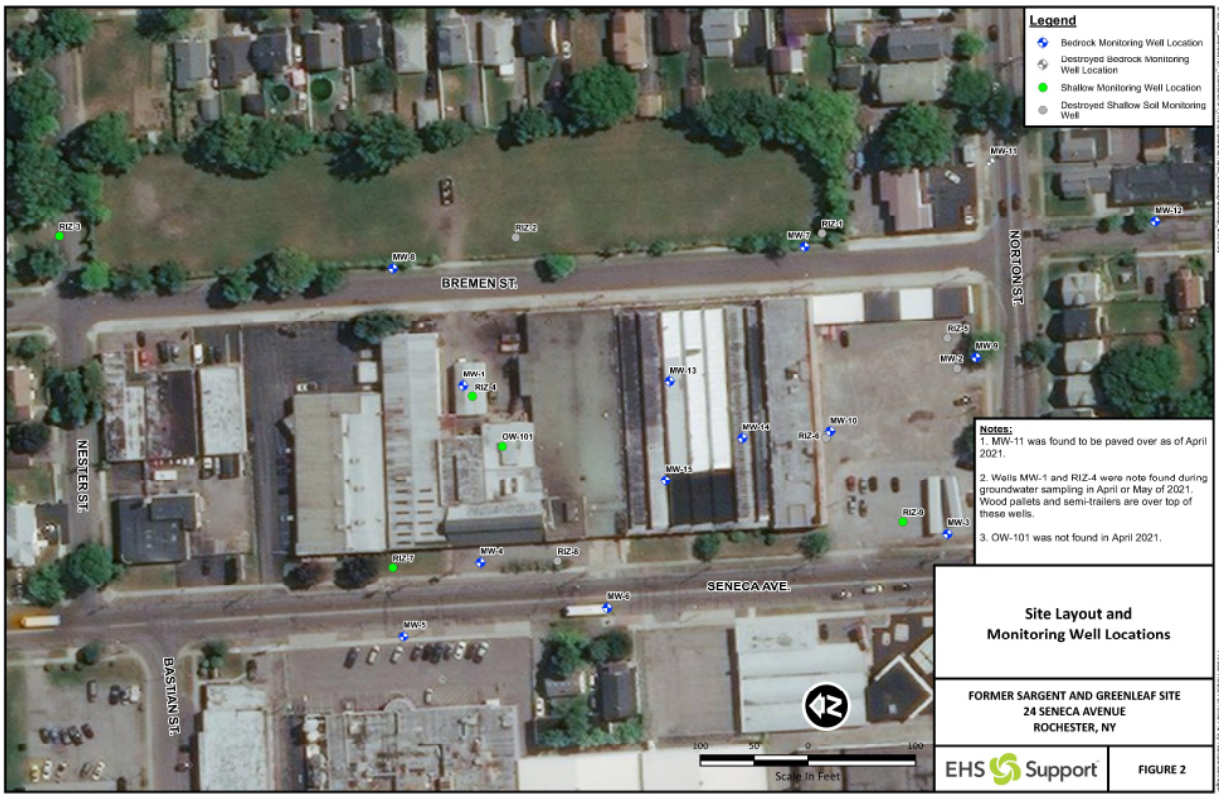


Figure 2-2 Site Plan

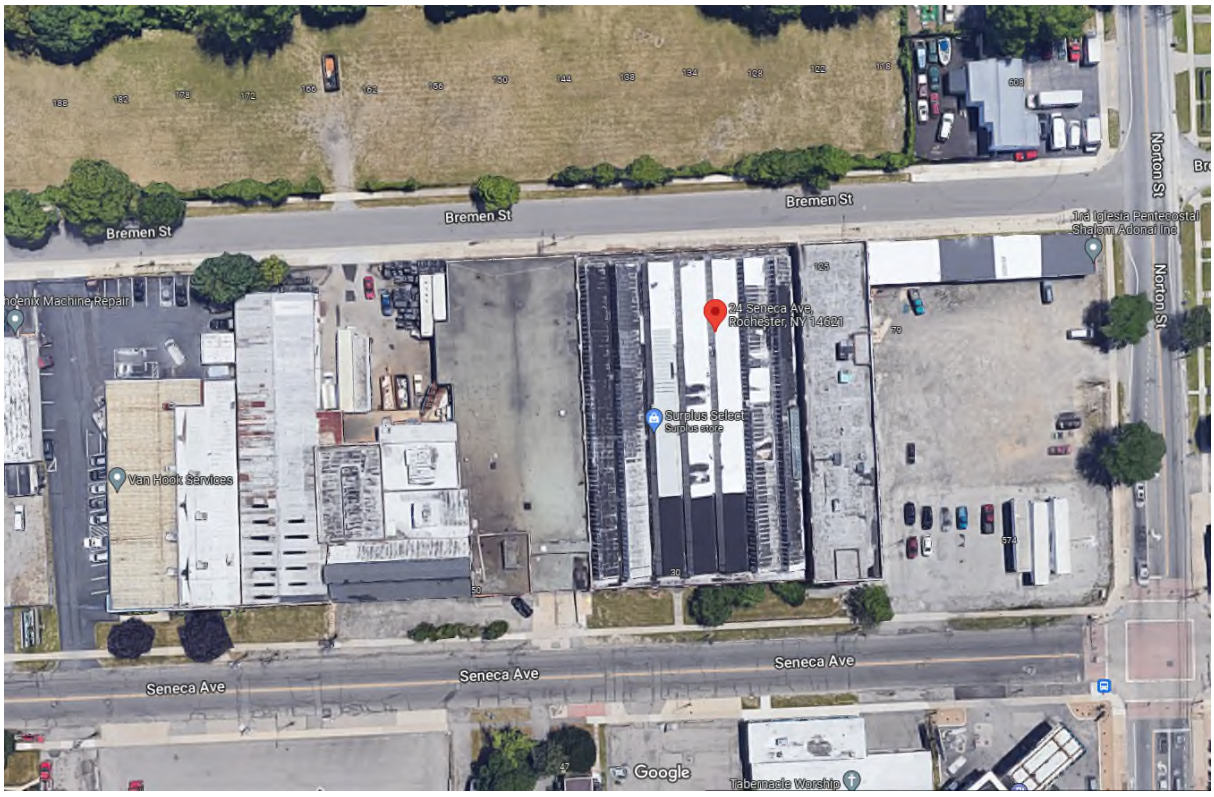


Figure 2-3 Site Ariel View Photograph

3 Task/Operation Preliminary Health and Safety Hazard Assessment

Physical Hazards	Physical hazards can include heavy equipment, drill rig/Geoprobe®, traffic, noise, slips, trips, falls, lifting hazards, hand safety/sharp objects, severe weather, fire/explosion, dust, aboveground utilities, underground utilities, aggressive individuals/animals or potentially dangerous locations, and driving/vehicle safety.
Biological Hazards	Biological Hazards include the potential for blood borne pathogens, poisonous plants, snakes, spiders, insects, mosquitoes, ticks, animal droppings, small biting animals and wildlife, and domestic pets.
Environmental Hazards and Site-Specific Conditions	Severe weather typical of the Upstate NY - Lake Ontario regional area can occur, including strong thunderstorms and snow/ice storms. Heat and cold stress are both identified as potential hazards.
Environmental Release/Spill Containment	EHS Support does not respond to major spills. Personnel will have equipment and/or absorbents on hand to clean minor spills related to the materials being handled for the work scope. For major spills, contact the appropriate agency. In the event of a spill or leak: 1. **Evacuate** (injured parties and all non-essential personnel). 2. **Stop, Coordinate and Eliminate** (stop source of incident (e.g. spill), coordinate shut down of equipment, and eliminate sources of ignition and sparks for flammables or incompatibles that could catch fire, explode, or vigorously react. Wear appropriate PPE). 3. **Notify** (call 911 for the appropriate response agency). 4. **Secure** the area. 5. **Treat** (provide immediate treatment to injured and affected personnel). 6. **Identify** material (if unknown) and identify PPE, hazard and response procedures using SDSs). 7. **Contain/Isolate** (contain released material/incident using emergency response equipment and/or set up perimeter to isolate area). 8. **Meet** the spill response crew and advise them of the spill location and the material spilled. 9. **Document** spill/environmental issue electronically via form located in the Issues section of MyMomentum. **10. Investigate and Remediate**
Chemical Hazards *Note: See* **Appendix H** *for safety data sheets and the Site-Specific Chemical Exposure Limits*	Impacts to Site soil and groundwater have been identified. Those chemicals are detailed below in **Section 3.1**

3.1 Site-Specific Chemical Exposure Limits

Site-Specific Chemical Exposure Limits										
Chemical Name	**OSHA PEL**		**ACGIH TLV**		**IDLH**	**Potential Exposure Routes**				**Exposure Symptoms**
	TWA	**STEL**	**TWA**	**STEL**		**Inhalation**	**Absorption**	**Ingestion**	**Injection**	
Diesel	NA	NA	100 mg/m^3 (vapor)	NA	NA	YES	YES	YES	YES	Irritation of eyes, skin, respiratory tract; dizziness, headache, nausea; chemical pneumonitis (from aspiration of liquid); dry, red skin; irritant contact dermatitis; eye redness, pain. Kidneys.
Trichloroethene	100	NA	10	25	NA	YES	YES	YES	YES	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; carcinogen.
Gasoline	NA	NA	300	500	NA	YES	YES	YES	YES	Eye & Throat Irritant, Chemical Pneumonia, Possible Liver and Kidney Damage, Central Nervous System.
1,1-Dichloroethene	100	100	NA	NA	100	YES	YES	YES	YES	Irrit skin; cns depress; liver, kidney, lung damage TO: skin, liver, kidneys, lungs, cns
Trans-1,2-Dichloroethene	200	200	NA	NA	200	YES	YES	YES	YES	Irrit eyes, resp system; cns depress TO: eyes, resp sys, cns

Site-Specific Chemical Exposure Limits										
Cis-1,2-Dichloroethene	200	200	NA	NA	200	YES	YES	YES	YES	Irrit eyes, resp system; cns depress TO: eyes, resp sys, cns
1,2-Dichloroethane	200	200	NA	NA	200	YES	YES	YES	YES	Irrit eyes, resp system; cns depress TO: eyes, resp sys, cns
Hydrochloric Acid	5	5	NA	NA	5	YES	YES	YES	YES	NA

All concentrations are in parts per million (ppm) unless otherwise noted.
ACGIH = American Conference of Governmental Industrial Hygienists
C = Ceiling Exposure Limit
Ca = Potential Occupational Carcinogen
CNS = central nervous system
GI = gastrointestinal
IDLH = Immediately Dangerous to Life and Health
mg/m^3 = milligrams per Cubic Meter
NA = Not Applicable
NIOSH = National Institute for Occupational Safety and Health
PEL = Permissible Exposure Limit
STEL = Short-Term Exposure Limit (15 minutes)
TLV = Threshold Limit Values
TWA = Time-Weighted Average

4 Employee Training Requirements

Training Type	Applies To:				
	Does Not Apply	All Personnel	EHS Support Employees	Contractor Site Personnel	Personnel Entering the Exclusion Zone
40-hour HAZWOPER training with a current 8-hour refresher certificate	☐	☒	☐	☐	☐
8-hour HAZWOPER supervisor training	☐	☐	☒	☐	☐
Contractor site-specific training	☒	☐	☐	☐	☐
Daily Tailgate Safety Meetings	☐	☒	☐	☐	☐
Fire Watch	☒	☐	☐	☐	☐
First Aid/CPR/AED training for remote Sites	☐	☐	☒	☐	☐
Initial training for Site workers and supervisors	☐	☐	☒	☐	☐
Pre-mobilization PSA and project kick off meeting	☐	☒	☐	☐	☐
Railroad Safety Training	☒	☐	☐	☐	☐
TWIC	☒	☐	☐	☐	☐
Other (specify)					
Click or tap here to enter text.		☐	☐	☐	☐
Click or tap here to enter text.		☐	☐	☐	☐
Click or tap here to enter text.		☐	☐	☐	☐

5 Employee Medical Qualifications

Type	Applies To:			
	Does Not Apply	All Personnel	EHS Support Employees	Contractor Site Personnel
Annual physical	☐	☐	☒	☐
Client/Site drug and/or alcohol testing	☒	☐	☐	☐
Respirator fit test and medical evaluation	☒	☐	☐	☐
Other (specify)				
Click or tap here to enter text.		☐	☐	☐
Click or tap here to enter text.		☐	☐	☐
Click or tap here to enter text.		☐	☐	☐

6 Hazard Controls

6.1 Engineering and Administrative Controls

EHS Support will implement engineering and administrative controls to prohibit access to hazardous areas, warn of physical hazards and/or otherwise minimize the likelihood of worker injury or exposure. Specific engineering and administrative controls for each EHS Support activity are listed in the Job Safety Analysis in **Appendix B**.

6.2 Personal Protective Equipment

Equipment	Required	Not Applicable	Comments
Steel Toe Boots/Shoes	X		
Chemical Boots		X	
Coveralls or Long Sleeve Shirt & Pants	X		
Safety Vest	X		
Hearing Protection	X		While drilling with Geoprobe or Rotary Hammer
Hard Hat	X		
Safety Glasses with Side Shields	X		
Safety Goggles		X	
Face Shield		X	
Cotton or Leather Work Gloves	X		When handling tools or drums or other equipment that may have pinch point hazards
Chemical Resistant Gloves (Nitrile)	X		While collecting soil and groundwater samples
Rain Gear	X		As needed
Half- or Full-Face Respirator (Specify Cartridges)		X	
Personal Flotation Device		X	
Chaps		X	
Other Required PPE			
All work is anticipated to be completed in Level D or modified Level D. ***NOTE: If Site conditions suggest another level than Level D or Modified Level D for EHS Support personnel, and they are not currently trained for necessary level with the appropriate equipment, stop and do not perform this work.***			

7 Air Monitoring

Periodic air monitoring will be conducted using direct-reading instruments (i.e., PID), and by collecting and analyzing personal samples. Air monitoring will be conducted with a PID with a 10.6 eV or other applicable lamp calibrated to isobutylene to evaluate concentrations of VOCs. The monitoring equipment must be calibrated in accordance with the manufacturer's instructions. In addition, the results of daily instrument calibrations must be recorded in the field notebook, or the Field Instrument Calibration Log included in Error! Reference source not found.. Continuous monitoring of the Operator's Breathing Zone (OBZ) is required during intrusive work. Document readings in the field notes or the Air Monitoring Log included in **Appendix D**.

Monitoring – Direct-Reading Instrumentation							
Task/ Operation	**Substance(s)/ Hazard(s)**	**Monitoring Location**	**Direct Reading Instrument and Response Factor**	**Frequency of Monitoring**	**Action Level**	**Required Action**	**PPE Required**
Soft digging, Drilling, soil logging/screening /sampling, sub-slab vapor point installation and sampling	Many organic and some inorganic gases and vapors	Exclusion zone (EZ)	Ultraviolet (UV) Photoionization Detector (PID)	Continuous	Depends on chemical	Consult standard reference manuals for air concentration/ toxicity data. Action level depends on PEL/REL/TLV.	Level D: (Hardhat, steel-toed boots, eye protection, hearing protection)
Soft digging, Drilling, soil logging/screening /sampling, sub-slab vapor point installation and sampling	Tetrachloroethylene	EZ	PID and colorimetric tube	Continuous	< 50 ppm	No action required.	Level D: (Hardhat, steel-toed boots, eye protection, hearing protection)
					>50 ppm, >1 minute	Monitor OBZ; don protective clothing; establish work zones	Level C: Coveralls, nitrile outer gloves, nitrile inner (surgical) gloves, and a full-face air purifying respirators with organic vapor cartridges. Cartridges will be changed in accordance with manufacturer's recommendations, or at a minimum, on a daily basis.
					>100 ppm, >1 minute	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover boring and cuttings, evacuate upwind, and notify EHS SSO	Level D: (Hardhat, steel-toed boots, eye protection, hearing protection)

Monitoring – Direct-Reading Instrumentation							
Soft digging, Drilling, soil logging/screening /sampling, sub-slab vapor point installation and sampling	Vinyl Chloride	Exclusion zone (EZ)	PID and Colorimetric Tubes	Continuous	<0.5 ppm	No action required.	Level D: (Hardhat, steel-toed boots, eye protection, hearing protection)
					>1 ppm, <5 ppm, >1 minute	Monitor OBZ; don protective clothing; establish work zones	Level C: Coveralls, nitrile outer gloves, nitrile inner (surgical) gloves, and a full-face air purifying respirators with organic vapor cartridges. Cartridges will be changed in accordance with manufacturer's recommendations, or at a minimum, on a daily basis.
					>5 ppm, >1 minute	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover boring and cuttings, evacuate upwind, and notify EHS SSO	As specified by EHS SSO.
Mob'ing drill rig into indoor drilling locations. Operating combustion engine powered equipment indoors.	Oxygen	Indoors	Oxygen Meter	Depending on site conditions, prior to site entry.	< 19.5%	Monitoring, wearing self-contained breathing apparatus. Note that combustible gas readings are not valid in atmospheres with <19.5% oxygen.	Self-contained breathing apparatus plus Level D.

Monitoring – Direct-Reading Instrumentation							
Mob'ing drill rig into indoor drilling locations. Operating combustion engine powered equipment indoors.	Oxygen	Exclusion zone and vicinity of indoor exhaust discharges	Oxygen Meter	Depending on site conditions, prior to site entry.	19.5% to 25%	Normal operating conditions. Note that deviation from normal level may be due to the presence of other substances.	Level D: (Hardhat, steel-toed boots, eye protection, hearing protection)
					> 25%	Fire hazard potential. Discontinue investigation.	
Mob'ing drill rig into indoor drilling locations. Operating combustion engine powered equipment indoors.	Carbon Monoxide	Exclusion zone and vicinity of indoor exhaust discharges	CO Meter	Continuous	<17ppm	No action required.	Level D: (Hardhat, steel-toed boots, eye protection, hearing protection)
					>17ppm	Ventilate Work Area	
					>200ppm	Evacuate Work Area	

8 Site Control, Decontamination, and Emergency Contingency Plan

Is the Site securely fenced?	No	Partial fencing
If no, how will the site prevent access by unauthorized persons?	Work is indoors, lock all exterior doors	
Coordination with Owners or Operators	EHS Support must receive permission to access private property from landowners and site operators.	
Personnel and PPE Decontamination	• Deposit disposable PPE in a waste container • Wash hands and face whenever leaving the Site and before eating, drinking, smoking, or using restroom facilities	
Equipment Decontamination	Refer to the following SOPs for specific decontamination requirements and procedures: • SOP 9 – Field Decontamination • SOP 10 – Decontamination of Heavy Equipment	
Medical Emergencies	Field personnel may administer first aid on a voluntary basis if they are trained to do so. Remember to follow "universal precautions" if blood or bodily fluids are present (i.e., assume all blood and bodily fluids are contaminated and avoid contact with these fluids). Use nitrile or latex gloves when performing first aid. Contact the EHS Support H&S Program Manager if you are exposed to another individual's blood or bodily fluids. For serious injuries or illnesses, transport the victim to the hospital via ambulance by calling 911. If exposure to hazardous substances is suspected, or if any symptoms of exposure are experienced, leave the contaminated area. If a dermal or ocular exposure is suspected, wash the affected area with plenty of water for a minimum of 15 minutes. If symptoms are serious in nature, seek medical assistance immediately. In the event of any work-related injury or illness, contact the EHS Support PM and an EHS Support Safety Specialist by phone. All accidents and injuries will be reported using the electronic New Injury Report form located in the Issues section of MyMomentum.	

HASP Revisions

HASP Section	Updated By	Site Safety Officer Initials	Date	Comment(s)

Acronyms

°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
ACGIH	American Conference of Governmental Industrial Hygienists
AED	automatic external defibrillator
ANSI	American National Standards Institute
APR	air-purifying respirator
C	ceiling exposure limit
Ca	potential occupational carcinogen
CFR	Code of Federal Regulations
COC	constituent of concern
CPR	cardiopulmonary resuscitation
dB	decibels
eV	electron volt
FID	flame ionization detector
GI	gastrointestinal
H&S	Health and Safety
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDW	investigation derived waste
IDLH	immediately dangerous to life and health
IP	ionization potential
JSA	Job Safety Analysis
LEL	lower explosive limit
mg/m^3	milligrams per cubic meter
mph	miles per hour
mrem/hr	milliroentgen equivalent in man per hour
NIOSH	National Institute for Occupational Safety and Health
OBZ	Operator's Breathing Zone
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
PID	photoionization detector
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million
PSA	Project Safety Analysis
REL	recommended exposure limit
SCBA	self-contained breathing apparatus

SPCC	Spill Prevention, Control, and Countermeasure
SSO	Site Safety Officer
STEL	short-term exposure limit
TLV	threshold limit value
TWA	time-weighted average
VOC	volatile organic compound

Appendix A PSA Checklist

Issue Date	Feb. 5, 2014
Revision No.	005
Revision Date	Jan. 1, 2021

Project Safety Analysis (PSA)

The purpose of the PSA Form and the PSA call is to ensure that all predictable hazards are identified and addressed before work begins. It should be considered the initial health and safety kickoff call for the proposed work and will be held prior of each field mobilization. Clients and contractors may provide additional information during the PSA call regarding Site characteristics and activities that could change hazard/safety analyses. Therefore, the HASP should be updated with any applicable information provided by the PSA analysis. The main objective of the PSA call is to review the information in this HASP and discuss known and predictable hazards.

The blank PSA form shall be completed by the PM, or designated representative, reviewed with the project team during a PSA call, and kept on-site by the SSO. The PSA call shall be conducted at least three days prior to commencement of work. The PSA call is required for all new projects involving two or more employees or subcontractors for periods of 3 or more days of field efforts, or when there is a change in project scope or project personnel. A PSA call encompassing new work tasks. The PSA call shall include, at a minimum, the following participants:

- EHS Support PM
- EHS Support Site Task Manager/Field Team Leader
- EHS Support SSO
- EHS Support H&S Specialist
- EHS Support contractor representative
- *Client PM
- *Client Site contact
- *Client H&S representative

*These participants are optional.

The PSA form is designed to be populated prior to the PSA call, and the sections that are not applicable to the upcoming mobilization may be removed from the document.

Personnel visiting the site for short periods of time (e.g., health and safety audits, client visits, or subcontractors preforming other duties) or during the middle of a major field mobilization, and who cannot attend the initial PSA, will be provided appropriate pre-job safety training based on the activities they may perform via the Daily Tailgate Safety Form.

PSA Process:

1. PM or designated representative completes the PSA form.
2. PSA call is scheduled with the project team at least three days prior to commencement of work.
3. PSA form and HASP is provided to all PSA call attendees via the call invite or sent prior to the call to allow for attendee review and preparation.
4. Update PSA form with any changes or new information during the PSA call and update HASP, if necessary.

General Project Information

Project Name	Click or tap here to enter text.	**PSA Date**	Click or tap to enter a date.
Site/Project Name	Click or tap here to enter text.	**Project Location**	Click or tap here to enter text.
PSA Participants (Note: If these key participants are not available, consider postponing the PSA.)			
EHS Support Project Manager	Click or tap here to enter text.	**EHS Support Task Manager/Field Team Leader**	Click or tap here to enter text.
EHS Support H&S Dept. Representative	Click or tap here to enter text.	**EHS Support Site Safety Officer**	Click or tap here to enter text.
Client Site Contact	Click or tap here to enter text.	**Subcontractor Representative(s)**	Click or tap here to enter text.

Scope of Work		
State of the Site/Facility	(Insert from HASP)	
Site Access	(Insert from HASP)	
Site Topography	(Insert from HASP)	
Normal Shift Work	☐ Yes	
	☐ No	• Ensure workers performing shift work are properly supervised and utilize the buddy system (no lone working) • Give workers adequate notice prior to shift/working hours changes • Save high-risk work for the day shift when team members are more alert (when able to) • Provide alternative transportation to and from work to limit fatigue-related vehicular accidents (uber or ride share, where feasible) • Shorten "off-shifts" to max 8-hours (when possible)
Lone Working	☐ Yes	Ensure a buddy system been developed for the work, if possible.
		CONTACT PERSON will be contacted by the lone worker at each of the specified intervals: 1. Prior to departure (phone, text message, or email) 2. During work (by phone, text message, or email in the morning and mid-day) 3. Daily upon completion of the task (by phone, text message, or email in the morning and mid-day) 4. Upon returning home (by phone, text message, or email when arriving at home airport, office, or town/city)
	☐ No	
Traffic	(Insert from HASP)	
Major Tasks	(Insert from HASP)	
Equipment Needed	(Insert from HASP)	

Location of assembly areas	(Insert from HASP)
Location of storm shelter	(Insert from HASP)
Nearest First Aid Kit/AED	(Insert from HASP)
Nearest Eyewash/Shower	(Insert from HASP)

Site Personnel Information

Item	Yes	No	N/A	PSA Discussion Topics	Comments
Do the personnel serving in the field have adequate safety expertise, training, and experience to serve in their respective project roles: • Transportation Workers Identification Credential (TWIC) • First Aid/CPR • Hot Work • Confined Spaces • Fire Watch • Other:	 ☐ ☐ ☐ ☐ ☐ ☐	 ☐ ☐ ☐ ☐ ☐ ☐	 ☐ ☐ ☐ ☐ ☐ ☐		Click or tap here to enter text.
Are there any Short Service Employees Working on the Field Team? (EHS Support or subcontractors)	☐	☐	☐	Who is serving as the field mentor for those individuals?	Click or tap here to enter text.
				How will the short service worker be identified? (e.g., color of hard hat, sticker etc.)	Click or tap here to enter text.
Are there subcontractors working on this project?	☐	☐	☐	A subcontractor representative must participate in the PSA call	Click or tap here to enter text.
				Proper subcontractor documents in the file and have been vetted by the H&S team	Click or tap here to enter text.
				Are the subcontractors required to be HAZWOPER trained under 29 CFR 1910.120(a)? Do we have verification of training?	Click or tap here to enter text.
Are EHS Support employees supervising subcontractors?	☐	☐	☐	Do they have the 8-hour Supervisor training in accordance with 1910.120(e)(4) and (e)(8)?	Click or tap here to enter text.

Documentation Checklist

Item	Yes	No	N/A	PSA Discussion Topics	Comments
Is the HASP current for the scope of work? Provide date and title of HASP in the Comments.	☐	☐	☐		Click or tap here to enter text.
Has a copy of the current HASP been made available to the PSA call attendees and have the attendees reviewed?	☐	☐	☐		Click or tap here to enter text.
Is there a written scope of work for the project? Provide date and title of the document in the Comments.	☐	☐	☐		Click or tap here to enter text.

Task Specific Physical Hazards

Activity	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
After hours/night work	☐	☐	☐	Is there adequate supplemental or task lighting?	☐	☐	☐	Click or tap here to enter text.
				How is the site secured during off-shifts?	☐	☐	☐	Click or tap here to enter text.
				Is there a buddy system in place?	☐	☐	☐	Click or tap here to enter text.
				Is there a plan for fatigue management?	☐	☐	☐	Click or tap here to enter text.
Audit Due Diligence in Operational Areas of Facility	☐	☐	☐	Will employees have an escort through the facility?	☐	☐	☐	Click or tap here to enter text.
				Will the site provide site-specific visitor/contractor training?	☐	☐	☐	Click or tap here to enter text.
				Has the PM or field team been made aware of site-specific PPE?	☐	☐	☐	Click or tap here to enter text.
				Have high hazard/off limit areas of the facility been discussed with the client?	☐	☐	☐	Click or tap here to enter text.
				Does the facility have specific emergency action protocols?	☐	☐	☐	Click or tap here to enter text.
Concrete or Asphalt Cutting or Coring	☐	☐	☐	How will dust be mitigated? (i.e. wet process)	☐	☐	☐	Click or tap here to enter text.
				High noise exposures during this process will need either distance or hearing protection	☐	☐	☐	Click or tap here to enter text.
Drilling	☐	☐	☐	How will personnel be protected from rotating equipment/moving parts?	☐	☐	☐	Click or tap here to enter text.
				Will there be any suspended loads?	☐	☐	☐	Click or tap here to enter text.
				What requirements will there be for spotters?	☐	☐	☐	Click or tap here to enter text.
				Has adequate clearing and leveling been conducted to accommodate drill rigs and supplies to provide a safe work area?	☐	☐	☐	Click or tap here to enter text.

Activity	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
				Ground crew working in the vicinity of heavy equipment will be minimized to prevent struck by and caught between accident types.	☐	☐	☐	Click or tap here to enter text.
				The following policies will be discussed with the operators: • Keep hands on machine controls and will not engage in distractions (texting, cell phones, radios) while equipment is moving and/or movement is not locked out • Seat belts will be worn while operating equipment.	☐	☐	☐	Click or tap here to enter text.
				Crew will wear traffic vests (Type II, white or yellow) when not wearing overprotective coveralls (i.e. Tyvek).	☐	☐	☐	Click or tap here to enter text.
Driving	☐	☐	☐	Will transportation involve personal, rental, or company vehicle? If "yes," include in the Comments if the car is a personal car, rental car, or a company car.	☐	☐	☐	Click or tap here to enter text.
				Is the vehicle appropriate for the project scope?	☐	☐	☐	Click or tap here to enter text.
				Are drivers familiar with vehicle to be used (e.g., brakes, mirrors, lights, small vs large or SUV)?	☐	☐	☐	Click or tap here to enter text.
				Will work and travel exceed 12 hours?	☐	☐	☐	Click or tap here to enter text.
				Will travel to site exceed 200 miles? *If yes, is there a journey management plan?*	☐	☐	☐	Click or tap here to enter text.
				Are directions to the site available?	☐	☐	☐	Click or tap here to enter text.
Electrical	☐	☐	☐	Ensure all electric services are installed by a licensed electrician.	☐	☐	☐	Click or tap here to enter text.

Activity	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
				Extension cords will be used in a manner that they are protected from damage and inspected prior to use to check for damage (i.e. cuts, breaks, splices, or missing prongs).	☐	☐	☐	Click or tap here to enter text.
				If equipment needs maintenance, how will energy control and isolation be completed?	☐	☐	☐	Click or tap here to enter text.
Excavations and Trenches	☐	☐	☐	Who is the competent person?	☐	☐	☐	Click or tap here to enter text.
				How will the excavation be sloped/shored/barricaded?	☐	☐	☐	Click or tap here to enter text.
Groundwater Sampling	☐	☐	☐	Traffic (flow and congestion)?	☐	☐	☐	Click or tap here to enter text.
				Pinch points when opening well heads	☐	☐	☐	Click or tap here to enter text.
				How will ergonomic concerns (i.e., lifting, repetitive motion, materials handling, awkward postures) be mitigated?	☐	☐	☐	Click or tap here to enter text.
				What hand protection will be used to protect against COC exposures?	☐	☐	☐	Click or tap here to enter text.
Heavy Equipment Use	☐	☐	☐	Traffic (flow and congestion)?	☐	☐	☐	Click or tap here to enter text.
				What are requirements for spotters?	☐	☐	☐	Click or tap here to enter text.
				How will daily equipment inspections be documented?	☐	☐	☐	Click or tap here to enter text.
Hot Work	☐	☐	☐	Verify with designated client representative that the planned hot work operations conform to the client's hot work procedures and permit requirements	☐	☐	☐	Click or tap here to enter text.
				How will atmospheric testing be completed?	☐	☐	☐	Click or tap here to enter text.
				Do you have a fire watch with an appropriate fire extinguisher?	☐	☐	☐	Click or tap here to enter text.

Activity	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
				Are there any known flammable or combustible materials in the hot work areas?	☐	☐	☐	Click or tap here to enter text.
Industrial Waste Characterization	☐	☐	☐	What tools will be used to collect soil samples?	☐	☐	☐	Click or tap here to enter text.
				How will potential exposures to vapors and chemicals be mitigated?	☐	☐	☐	Click or tap here to enter text.
Land Based Ecological Surveys	☐	☐	☐	Will work be done near water or sloped ground?	☐	☐	☐	Click or tap here to enter text.
				How are task locations accessed?	☐	☐	☐	Click or tap here to enter text.
Off-site Transportation of Waste	☐	☐	☐	How are moving vehicles/traffic flow managed?	☐	☐	☐	Click or tap here to enter text.
Overwater sediment and surface water sampling	☐	☐	☐	Does the site have a float plan?	☐	☐	☐	Click or tap here to enter text.
				Be aware of the water conditions in the fieldwork area. Know where currents, rapids, and obstructions exist and the locations of shallow and deep spots.	☐	☐	☐	Click or tap here to enter text.
				How will weather conditions be monitored?	☐	☐	☐	Click or tap here to enter text.
				How will the vessel be accessed?	☐	☐	☐	Click or tap here to enter text.
				How will the vessel be secured when not in use?	☐	☐	☐	Click or tap here to enter text.
				Have the proper authorities been notified and permits been approved for work on this waterway?	☐	☐	☐	Click or tap here to enter text.
				Do passengers have appropriate training and PPE?	☐	☐	☐	Click or tap here to enter text.
Pressure washing	☐	☐	☐	Minimum wand length is 48”	☐	☐	☐	Click or tap here to enter text.
				All personnel using pressure washing equipment shall be trained in the proper use and inspection of the equipment	☐	☐	☐	Click or tap here to enter text.

Activity	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
				Do personnel need special PPE to complete pressure washing (i.e. Tyvek suits or face shields)?	☐	☐	☐	Click or tap here to enter text.
Remedial Excavation Works	☐	☐	☐	Who is the competent person?	☐	☐	☐	Click or tap here to enter text.
				How will the excavation be sloped/shored/barricaded?	☐	☐	☐	Click or tap here to enter text.
				Will persons need to enter the excavation?	☐	☐	☐	Click or tap here to enter text.
Remedial Piping Installation	☐	☐	☐	Do any permits need to be obtained prior to starting work? (i.e. hot work)	☐	☐	☐	Click or tap here to enter text.
				Will rigging be used to suspend loads during placement?	☐	☐	☐	Click or tap here to enter text.
				How will pipes be placed? (i.e. manually or use of mechanical placement)	☐	☐	☐	Click or tap here to enter text.
Site Visit/Site Inspection	☐	☐	☐	Will employees have an escort through the facility?	☐	☐	☐	Click or tap here to enter text.
				Will the site provide site-specific visitor/contractor training?	☐	☐	☐	Click or tap here to enter text.
				Has the PM or field team been made aware of site-specific PPE?	☐	☐	☐	Click or tap here to enter text.
				Have high hazard/off limit areas of the facility been discussed with the client?	☐	☐	☐	Click or tap here to enter text.
Surface and Sediment Sampling (manual - maximum waist deep)	☐	☐	☐	What PPE needs to be utilized to enter the water? (i.e. waders, PFD)	☐	☐	☐	Click or tap here to enter text.
				How deep is the water expected to be and how swift the current?	☐	☐	☐	Click or tap here to enter text.
				Do field workers need a special permit to access water?	☐	☐	☐	Click or tap here to enter text.

Activity	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
				Where/how will the task locations be accessed (i.e. kayak, riverbank, dock) and how is the terrain at the access point (i.e. sloped, rocky, swampy)?	☐	☐	☐	Click or tap here to enter text.
Waste soil/cutting management from drilling	☐	☐	☐	Determine fill capacity based on materials and weather conditions. • The maximum weight a 55-gallon drum can weight by regulation is 400 KG or 832 pounds if the drums weight more than 800lbs the waste contractor could refuse to pick up the drums. If working in cold weather conditions (i.e., temperatures below freezing), space should be left in water based IDW drums to allow for expansion.	☐	☐	☐	Click or tap here to enter text.
				Does the waste removal contractor have proper mechanical means to move full drums? (i.e. forklift with drum grappler)	☐	☐	☐	Click or tap here to enter text.
				Has a staging area been decided? • Ensure space is left in between the drums for easy removal and inspection • Segregate waste types.	☐	☐	☐	Click or tap here to enter text.
Well Installation	☐	☐	☐	Traffic (flow and congestion)?	☐	☐	☐	Click or tap here to enter text.
				What are requirements for spotters?	☐	☐	☐	Click or tap here to enter text.
				How will daily equipment inspections be documented?	☐	☐	☐	Click or tap here to enter text.
Well Surveying	☐	☐	☐	Traffic (flow and congestion)?	☐	☐	☐	Click or tap here to enter text.
				Pinch points when opening well heads	☐	☐	☐	Click or tap here to enter text.

Activity	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
				How will ergonomic concerns (i.e., lifting, repetitive motion, materials handling, awkward postures) be mitigated?	☐	☐	☐	Click or tap here to enter text.
				What hand protection will be used to protect against COC exposures?	☐	☐	☐	Click or tap here to enter text.

Site Conditions Assessment

Site Condition	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
Heavy Wooded Site Area/High areas of vegetation where ecology present	☐	☐	☐	Does vegetation need to be cleared? If so, what tools will be used?	☐	☐	☐	Click or tap here to enter text.
High activity site with heavy equipment	☐	☐	☐	Will spotters be used?	☐	☐	☐	Click or tap here to enter text.
				How will ground crew communicate with operators?	☐	☐	☐	Click or tap here to enter text.
				If traffic is continually flowing (i.e. trucks continually entering/exiting the site) has a traffic flow plan been developed?	☐	☐	☐	Click or tap here to enter text.
Potential for unexploded ordinance	☐	☐	☐	Are explosion hazards throughout the site, or only in exclusion zone?	☐	☐	☐	Click or tap here to enter text.
				Smoking, open flames, and spark generating equipment will only be allowed in designated areas. Have those areas been defined?	☐	☐	☐	Click or tap here to enter text.
Activity in Private Homes or Third-Party Premises	☐	☐	☐	Have access permits been obtained?	☐	☐	☐	Click or tap here to enter text.
Remote Site with limited services	☐	☐	☐	Are field members CPR/AED/First Aid trained and comfortable providing care if needed?	☐	☐	☐	Click or tap here to enter text.
				Who on the field team will provide a first aid kit and eye wash?	☐	☐	☐	Click or tap here to enter text.
Absence of Cell Phone Reception	☐	☐	☐	How will team members communicate?	☐	☐	☐	Click or tap here to enter text.
				How will emergency response be contacted in the event of an emergency?	☐	☐	☐	Click or tap here to enter text.
Poor access requiring 4WD	☐	☐	☐	Do we have the appropriate rental vehicles?	☐	☐	☐	Click or tap here to enter text.
				Are we using ATVs?	☐	☐	☐	Click or tap here to enter text.

<table>
<tr><th>Site Condition</th><th>Yes</th><th>No</th><th>N/A</th><th>PSA Discussion Topics</th><th>Yes</th><th>No</th><th>N/A</th><th>Comments</th></tr>
<tr><td rowspan="4">High crime/area subject to civil disobedience</td><td rowspan="4">☐</td><td rowspan="4">☐</td><td rowspan="4">☐</td><td>Are there any site-specific/special clearance requirements for site access (e.g., government installation, site security notification)?</td><td>☐</td><td>☐</td><td>☐</td><td>Click or tap here to enter text.</td></tr>
<tr><td>If “yes,” were arrangements made to comply with the requirements?</td><td>☐</td><td>☐</td><td>☐</td><td>Click or tap here to enter text.</td></tr>
<tr><td>Is pre-site visit drug testing required?</td><td>☐</td><td>☐</td><td>☐</td><td>Click or tap here to enter text.</td></tr>
<tr><td>Is local Area Safety Council Training required?</td><td>☐</td><td>☐</td><td>☐</td><td>Click or tap here to enter text.</td></tr>
<tr><td rowspan="5">Overhead Utilities</td><td rowspan="5">☐</td><td rowspan="5">☐</td><td rowspan="5">☐</td><td>Has an avoidance plan been prepared?</td><td>☐</td><td>☐</td><td>☐</td><td>Click or tap here to enter text.</td></tr>
<tr><td>Have project overhead utility hazards been identified?</td><td>☐</td><td>☐</td><td>☐</td><td>Click or tap here to enter text.</td></tr>
<tr><td>Will ground crew member been assigned as a spotter to any piece of heavy equipment that is working close enough to an overhead line so that a part of the machine does not infringe on the safe distance?</td><td>☐</td><td>☐</td><td>☐</td><td>Click or tap here to enter text.</td></tr>
<tr><td>On the first day, team members must designate power line crossing points and post signs stating DANGER OVERHEAD POWER LINES.</td><td>☐</td><td>☐</td><td>☐</td><td>Click or tap here to enter text.</td></tr>
<tr><td>Safe distances from overhead power lines must be maintained (see table below)
<table>
<tr><th>System Voltage (kilovolts)</th><th>Minimum Distance Required Clearance (feet)</th></tr>
<tr><td>0 -50</td><td>10</td></tr>
<tr><td>51 – 100</td><td>12</td></tr>
<tr><td>101 – 200</td><td>15</td></tr>
<tr><td>201 – 300</td><td>20</td></tr>
<tr><td>301 – 500</td><td>25</td></tr>
</table></td><td>☐</td><td>☐</td><td>☐</td><td>Click or tap here to enter text.</td></tr>
</table>

Site Condition	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
				501 – 750: 35 751 – 1000: 45				
Underground Utilities	☐	☐	☐	How will underground utility clearance be conducted?	☐	☐	☐	Click or tap here to enter text.
				Has a public one-call been requested?	☐	☐	☐	Click or tap here to enter text.
				Private utility mark out be used?	☐	☐	☐	Click or tap here to enter text.
				Is there a minimum clearance of 5 feet from the edge of utility markings and proposed drilling locations?	☐	☐	☐	Click or tap here to enter text.
				Will the upper 4 feet of all intrusive work be manually cleared by hand augering/probing, air jet, or other similar method?	☐	☐	☐	Click or tap here to enter text.
				If intrusive work must be conducted within the required 5-foot minimum clearance, has the specific work been reviewed by an EHS Support H&S Specialist and the PM?	☐	☐	☐	Click or tap here to enter text.
Local Hunting Season	☐	☐	☐	Are there nearby woods where hunters could be?	☐	☐	☐	Click or tap here to enter text.
				What specific colors/highly visible clothing should be worn?	☐	☐	☐	Click or tap here to enter text.
				How will crew members make themselves “known” in the area? (i.e. making noise or using 4-ways on equipment)	☐	☐	☐	Click or tap here to enter text.
				Do we need to adjust working times to accommodate for typical hunting times (i.e. dawn and dusk)?	☐	☐	☐	Click or tap here to enter text.
Biological Hazards	☐	☐	☐	Alligators	☐	☐	☐	Click or tap here to enter text.
				Bears	☐	☐	☐	Click or tap here to enter text.

Site Condition	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
				Bees	☐	☐	☐	Click or tap here to enter text.
				Fire Ants	☐	☐	☐	Click or tap here to enter text.
				Poison Ivy	☐	☐	☐	Click or tap here to enter text.
				Poison Sumac	☐	☐	☐	Click or tap here to enter text.
				Snakes	☐	☐	☐	Click or tap here to enter text.
				Spiders	☐	☐	☐	Click or tap here to enter text.
				Ticks	☐	☐	☐	Click or tap here to enter text.
				Wasps	☐	☐	☐	Click or tap here to enter text.
				Other:	☐	☐	☐	Click or tap here to enter text.
Potential for Thunderstorms	☐	☐	☐	Is there a designated area where will the field team can take temporary shelter when lightning is seen, or thunder is heard?	☐	☐	☐	Click or tap here to enter text.
				30 minutes must pass since the last detected lightning strike or thunderclap, how will the team keep track?	☐	☐	☐	Click or tap here to enter text.
Potential for Tornadoes	☐	☐	☐	How will the field team track severe weather alerts for tornado warnings and watches?	☐	☐	☐	Click or tap here to enter text.
				Does the site have a site-specific evacuation and muster point? If not, the field team should define one upon arriving to the site.	☐	☐	☐	Click or tap here to enter text.
Potentials for Hurricanes	☐	☐	☐	Has the weather been checked prior to mobilization for potential hurricanes?	☐	☐	☐	Click or tap here to enter text.
Potential for snow/ice	☐	☐	☐	Is snow and ice in the forecast?	☐	☐	☐	Click or tap here to enter text.
				How will snow and ice be removed from access areas (i.e. walkways and roads) on the site?	☐	☐	☐	Click or tap here to enter text.

Site Condition	Yes	No	N/A	PSA Discussion Topics	Yes	No	N/A	Comments
Other Site-Specific Hazards	☐	☐	☐	Discuss any other site-specific hazards known to the site or encountered during other mobilization efforts.	☐	☐	☐	Click or tap here to enter text.

Site Required Personal Protective Equipment (PPE)

Equipment	Required	Not Applicable	Comments
Steel Toe Boots/Shoes			
Chemical Boots			
Coveralls or Long Sleeve Shirt & Pants			
Safety Vest			
Hearing Protection			
Hard Hat			
Safety Glasses with Side Shields			
Safety Goggles			
Face Shield			
Cotton or Leather Work Gloves			
Chemical Resistant Gloves (Nitrile)			
Rain Gear			
Half- or Full-Face Respirator (Specify Cartridges)			
Personal Flotation Device			
Chaps			
Other Required PPE			
All work is anticipated to be completed in Level D or modified Level D. ***NOTE: If Site conditions suggest another level than Level D or Modified Level D for EHS Support personnel, and they are not currently trained for necessary level with the appropriate equipment, stop and do not perform this work.***			

Appendix B Job Safety Analysis Worksheet

Issue Date	Oct. 12, 2017
Revision No.	003
Revision Date	Aug. 24, 2020

Job Safety Analysis (JSA)

Using the information accumulated regarding the potential hazards posed to EHS Support employees from your site-specific health and safety plan (HASP), an evaluation of the hazards must be conducted. The evaluation will be done as a JSA. A JSA is a method by which assigned jobs are reviewed to determine how to control hazards posed during the assigned tasks. The hierarchy of hazard control is as follows:

- Elimination – completely remove the hazard from the work environment.
- Substitution – substitute tools or chemicals to reduce the hazard.
- Engineering controls – install barriers or use mechanical means to reduce the hazard (e.g., ventilation).
- Administrative controls – change schedules, employee rotation, signage, and training to reduce exposure.
- Work practice controls – change the way tasks are conducted to reduce exposure.
- Personal Protective Equipment (PPE) – assign PPE when controls do not abate the hazard.

A JSA worksheet will be completed for each job that will be performed by EHS Support employees. The JSA is an important accident prevention tool that works by finding hazards and eliminating or controlling them before they have a chance to become accidents. The JSA can be used for job clarification and hazard awareness, as a guide in new employee training, for retraining existing employees, as a refresher on jobs which run infrequently, as an accident investigation tool, and for informing employees of specific job hazards and protective measures. JSAs should be completed by keeping in mind the potential risks of the separate tasks that comprise the job, as well as past injury/illness history of the task(s). Each job is broken into tasks that are listed on the worksheet. The hazards are then ranked using a calculation that accounts for the potential severity and the potential likelihood of the identified hazards. Before completing the JSA form, consider the following:

- The purpose of the job – what has to be done and who has to do it?
- The activities involved – how is it done, when is it done, and where is it done?

Employees assigned to perform the jobs being evaluated should be involved in the completion of the JSA form. The process for completing a JSA should include an observation and/or experience with how an EHS Support employee conducts the task/job and an operational review of the task/job.

Prior to conducting tasks that require the use of physical labor or mechanical equipment, the hazards of these tasks and mitigation measures to be used must be reviewed. If at any time tasks have not been addressed in the HASP, the Project Manager (PM) or Site Safety Officer (SSO) must review the hazards associated with that task. The time involved and level of crew involvement should be appropriate to the tasks being performed. This discussion of additional hazards should be documented in some manner (e.g., JSA, field book, Daily Tailgate Safety Meeting form). A daily Site safety briefing is required to discuss and document the tasks to be conducted that day, specific hazards associated with the tasks, and any lessons learned from the previous day. The meetings are to be held prior to the commencement of any tasks. The Daily Tailgate Safety Meeting form is in Error! Reference source not found. of the HASP or located on MyMomentum.info.

Client: Stanley Black & Decker **Project:** Former Sargent & Greenleaf Rochester **Location:** 24 Seneca Ave., Rochester, NY	**JSA Title:**	**Page** **of**	☐ New ☐ Revised

Work Activity Description:	**Project / Field Team Members:**	**JSA Author(S):** **Date:** **Reviewed By:** **Date:** **Approved By:** **Date:**

Risk Assessment Matrix		**Likelihood Ratings**					
Consequences Ratings		**A**	**B**	**C**	**D**	**E**	**F**
People	**Property**	**1** Very remote (1 in 1,000,000)	**2** Remote (1 in 100,000)	**3** Possible (1 in 10,000)	**4** Probable (1 in 1,000)	**5** Likely (1 in 100)	**6** Almost certain (1 in 10)
1 = No Injury / Illness	1 = No damage	**1 - Low**	**2- Low**	**3- Low**	**4- Low**	**5- Low**	**6- Low**
2 = Injury / Illness — first aid only	2 = Slight damage	**2- Low**	**4- Low**	**6- Low**	**8- Low**	**10- Medium**	**12- Medium**
3 = Injury / Illness — medical treatment	3 = Minor damage	**3- Low**	**6- Low**	**9- Medium**	**12- Medium**	**15- Medium**	**18- High**
4 = Disabling injury (restricted work or days away from work)	4 = Local damage	**4- Low**	**8- Low**	**12- Medium**	**16- Medium**	**20- High**	**24- High**
5 = Long-term disability or major disabling injury	5 = Major damage	**5- Low**	**10- Medium**	**15- Medium**	**20- High**	**25- High**	**30- High**
6 = Fatality	6 = Catastrophic damage	**6- Low**	**12- Medium**	**18- High**	**24- High**	**30- High**	**36- High**

Minimum Required PPE (See Critical Actions for Task-Specific Requirements)			
☐ Safety Vest	☐ Goggles	☐ Respirator (provide type)	☐ Nitrile Gloves
☐ Hard Hat	☐ Face Shield	☐ Protective Outerwear	☐ Leather or Work Gloves
☐ Lifeline / Body Harness	☐ Hearing Protection	☐ Chemical Protective Outerwear	☐ Other:
☐ Safety Glasses	☐ Safety Boots / Shoes	☐ Fire Extinguisher	

Job Steps (List Every Step in The Task)	**Potential Hazards** (List Every Hazard Associated with Every Step in The Task)	**Baseline Risk Score**	**Hazard Controls / Protection Measures**	**Post Prevention Risk Score**
Example: Access monitoring wells	• Pinch points from opening well • Metal plate covers/caps • Insects (bees, wasps etc.) • Poisonous spiders • Slips/Trips/Falls • Contaminated water / vapors	6 - Low	• Wear proper gloves to access and use tools to remove metal plate covers if necessary. • Be aware of insects and spiders in well annulus. • Watch where you are walking, avoid uneven surfaces. • Wear safety glasses, proper gloves (Nitrile). Allow well to vent long enough for vapors to dissipate.	3 - Low

Instructions for Completing the Job Safety Analysis Form

Complete a Job Safety Analysis (JSA) for all tasks being conducted on-site that may pose a hazard to EHS Support employees. Assigned jobs should be reviewed to determine how to control or minimize the hazards, as well as protect employees from these hazards. Each job is broken into tasks; the tasks are listed in order and an associated hazard ranking is calculated for each. This JSA worksheet was developed to aid in the review of jobs/tasks. The JSA is an important accident prevention tool that works by finding hazards and eliminating them before they become accidents. The JSA can be used for job clarification and hazard awareness, as a guide in new employee training, for retraining existing employees, as a refresher on jobs which run infrequently, as an accident investigation tool, and for informing employees of specific job hazards and protective measures.

Keep in mind the potential risks of the separate tasks that comprise the job, as well as the past injury/illness history of the task(s) when completing the JSA. Consider the following when completing the JSA:

- The purpose of the job — What must be done? Who will do it?
- The activities involved — How is it done? When is it done? Where is it done?

Employees assigned to perform the jobs being evaluated should be involved in the completion of the JSA form. The process for completing a JSA must include the following: a visual observation of (or experience with) how an EHS Support employee conducts the task/job and an operational review of the job/task. ALL JSAs SHOULD BE REVIEWED AT LEAST ANNUALLY OR AFTER AN INCIDENT/ACCIDENT AND REVISED AS NECESSARY. When applicable, this worksheet should be included in the site-specific health and safety plans (HASPs).

The following provides column-by-column instructions for completing the JSA form.

Column-by-Column Instructions

Job Steps

Examine a specific job/task by breaking it down into a list of steps (tasks) to discover the potential hazards employees may encounter.

Each job/task or operation will consist of a set of steps. For example, the job might be to collect a soil sample using a trowel. To determine where a step begins or ends, look for a change of activity as in a change in direction, movement, or tools. In the example, preparing the sampling equipment is one step. The next step might be to walk to the sample location (a change in activity). The following step may be clearing the area where the sample will be collected. Filling a sample container would be another step and so on.

Be sure to list all the steps needed to perform the job. It is OK if you break the job down into many small tasks rather than group too many of them together. Some steps may not be performed each time, for example, clearing a sample location. Not all sample collection areas will require clearing. However, if that step is generally part of the job, it should be listed.

Potential Hazards

A hazard is a potential physical, chemical, or environmental danger. The purpose of the JSA is to identify as many hazards as can be predicted. Consider the entire universe of the task when identifying hazards. Ask the five “Ws" and one "H" questions, who, what, when, where, why, and how. For example: who is conducting the step; what tools, equipment, and chemicals are used to complete the step; when is the task/step being conducted (e.g., time of day/year, light/dark conditions, cold/hot conditions); where is the task being conducted; why is the task being conducted (e.g., contamination); how will the step be conducted (e.g., what position will your body be in for the task — crouching, bending, standing, sitting).

To identify hazards, ask yourself these questions about each step of the task:

- Is there the chance the employee may strike against, be struck by, or otherwise making injurious contact with an object or a vehicle?
- Can an employee be caught in, by, or between objects?
- Is there potential for slipping, tripping, or falling?
- Could an employee suffer strains from pushing, pulling, lifting, bending, or twisting?
- What equipment will the employee use during the task?
- Is the environment hazardous to safety and/or health (e.g., over exposure to heat/cold, bees, snakes, ticks, spiders, fire ants, poison ivy/oak, heat, gases, mists, fumes)?
- Are there contaminants of concern present? Can the employee's activity cause a potential exposure to those contaminants?
- What is someone else doing that could negatively impact me/others or the project?

Close observation and knowledge of the job is important. Examine each step carefully to find and identify hazards: include the actions, conditions, and possibilities that could lead to an accident. Compiling an accurate and complete list of potential hazards will allow you to develop the recommended safety procedures needed to prevent accidents.

Baseline Risk Score & Post Prevention Risk Score

The Baseline Risk Score is an assessment of the risk level in the task prior to performing and acting on the findings of the JSA. The Post Prevention Risk Score provides an assessment of the risk level in the task after implementing the control and protection measures assigned by the JSA. The risk score is calculated by multiplying the Severity of the injury/illness by the Likelihood of the injury/illness occurring. Use the following matrix to determine the risk score:

Risk Assessment Matrix		Likelihood Ratings					
Consequences Ratings		A	B	C	D	E	F
People	Property	1 Very remote (1 in 1,000,000)	2 Remote (1 in 100,000)	3 Possible (1 in 10,000)	4 Probable (1 in 1000)	5 Likely (1 in 100)	6 Almost certain (1 in 10)
1 = No Injury / Illness	1 = No damage	1 - Low	2- Low	3- Low	4- Low	5- Low	6- Low
2 = Injury / Illness — first aid only	2 = Slight damage	2- Low	4- Low	6- Low	8- Low	10- Medium	12- Medium
3 = Injury / Illness — medical treatment	3 = Minor damage	3- Low	6- Low	9- Medium	12- Medium	15- Medium	18- High
4 = Disabling injury (restricted work or days away from work)	4 = Local damage	4- Low	8- Low	12- Medium	16- Medium	20- High	24- High
5 = Long-term disability or major disabling injury	5 = Major damage	5- Low	10- Medium	15- Medium	20- High	25- High	30- High
6 = Fatality	6 = Catastrophic damage	6- Low	12- Medium	18- High	24- High	30- High	36- High

To determine the risk level, complete the following:

1. Calculate the Baseline Risk score and enter it in the appropriate column on the JSA form. The baseline risk scores are used to determine the urgency of action or implementation of hazard controls (see the risk scores below).
2. Assign controls/protections for the identified hazards greater than a Baseline Prevention Risk Score of 4.
3. Re-calculate the score accounting for the changes the controls/protections will make — this new score is the Post Prevention Risk score.
4. Enter the Post Prevention Risk score in the appropriate column on the JSA form.

Using the risk scores below, determine the action to take based on the Post Prevention Risk score. (Note: If the Post Prevention Risk Score remains greater or equal to 9, the job should be suspended until controls/protections are implemented to lower the risk score.)

The risk scores are:

- 1 to 6 (Acceptable Risk) — No additional action needed.
- 5 to 8 (Low) — Review the operation/activity and take any steps necessary to reduce and control the risks.
- 9 to 16 (Medium) — Inform Site Safety Officer and seek further advice before proceeding any further with the operation/activity.
- 17 or Greater (High) — STOP the activity immediately. Review with Site Safety Officer and Project Manager and reduce the risks identified. Contact a member of the H&S Team if further guidance is needed.

Hazard Controls / Protection Measures

Using the first three columns of the JSA form as a guide, decide what actions or procedures are necessary to eliminate or minimize the hazards that could lead to an accident, injury, or occupational illness. Keep in mind the Occupational Safety and Health Administration (OSHA) requirement to control hazards before assigning personal protective equipment.

To begin minimizing/eliminating hazards, implement the following in order they are presented below:

1. Engineering controls to remove or abate the hazard
2. Administrative controls to protect from the hazard
3. Work practice controls (e.g., provide job instruction training)
4. Personal protective equipment
5. Good housekeeping
6. Good ergonomics (positioning the person in relation to the machine or other elements in such a way as to improve safety)

Once actions and/or procedures have been defined, enter them in the “Hazard Controls / Protection Measures” column on the form. Keep in mind the following:

1. List all appropriate safe operating procedures. Begin with an action word. Say exactly what needs to be done to correct the hazard, such as "lift using your leg muscles." Avoid general statements such as "be careful," "watch out," or “work safely.”
2. List the required PPE necessary to perform each step of the job if controls cannot completely abate the hazard.
3. Give a recommended action or procedure for each hazard. Serious hazards should be corrected immediately.

EHS Support

Issue Date	Oct. 12, 2017
Revision No.	002
Revision Date	Jan. 8, 2019

Job Safety Analysis (JSA)

Client: Stanley Black & Decker **Project:** Former Sargent & Greenleaf Rochester **Location:** 24 Seneca Ave., Rochester, NY	**JSA Title:** Groundwater Monitoring and Sampling	**Page 1 of 2**	☐ New ☒ Revised

Work Activity Description: Opening and closing monitoring wells. Groundwater gauging, purging, and sample collection. Site clean-up.	**Project / Field Team Members:** Anton Heitger Cal Figliozzi	**JSA Author(S):** Mark Smith	**Date:** 7/11/2017
		Reviewed By: Anton Heitger	**Date:** 11/11/2022
		Approved By: Gregg Hicks	**Date:** 11/11/2022

Minimum Required PPE (See Critical Actions for Task-Specific Requirements)			
☒ Safety Vest	☐ Goggles	☐ Air Purifying Respirator	☒ Gloves (Chemical / Leather)
☐ Hard Hat	☐ Face Shield	☐ Supplied Respirator	☒ Fire Extinguisher
☐ Lifeline / Body Harness	☐ Hearing Protection	☐ Protective Outerwear	☐ Other:
☒ Safety Glasses	☒ Safety Boots / Shoes	☐ Chemical Protective Outerwear	

Job Steps (List Every Step in The Task)	**Potential Hazards** (List Every Hazard Associated with Every Step in The Task)	**Baseline Risk Score** (L X S)	**Hazard Controls / Protection Measures**	**Post Prevention Risk Score** (L X S)
Assess the work area	Traffic, other work conducted in area, access to monitoring wells	1	• Adjust approach to avoid potential hazards	1
Isolate work area	Vehicle, equipment, and pedestrian traffic	18	• Create barricade around work area: Use work vehicle, cones, caution tape	6
Access monitoring wells	Pinch points from opening well • Metal plate covers/caps Contact with: • Insects (bees, wasps etc.) • Poisonous spiders Slips/Trips/Falls Exposure • contaminated water	9	• Wear proper gloves to access and use tools to remove metal plate covers if necessary. • Be aware of insects and spiders in well annulus. • Watch where you are walking, avoid uneven surfaces. • Open well caps from an upwind position.	3

	• vapors			
Calibrate and check equipment operation	Inaccurate data and poor data quality. Work stoppage due to equipment malfunction	1	• Ensure equipment is working properly and calibrated within acceptable range(s)	1
Collection of water levels	Potential exposure to impacted groundwater and vapors	15	• Wear safety glasses, proper gloves (Nitrile). Allow well to vent long enough for vapors to dissipate. • Use Organic Vapor Analyzer (OVA) such as PID or FID to verify existence or absence of vapors at monitoring well.	8
Installation of purging and sampling equipment into monitoring well	Pinch points installing sampling equipment. Strains installing pump. Splash hazards while installing sampling equipment. Hand cuts or abrasions.	9	• Wear appropriate PPE (gloves), keep hands clear of well while installing sampling equipment. • Lower equipment slowly. • Use proper body position while installing equipment • Use proper safety knife when cutting tubing or twine.	3
Purging and sampling	Slips, trips, falls. Exposure to impacted groundwater, vapors, sample preservative, and decontamination fluids.	9	• Avoid walking or stepping across sample tubing and equipment cords. • Wear appropriate PPE (gloves, safety glasses) and minimize potential for splash hazards by reducing flow rate to fill sample containers. • Use approved transfer containers when sampling with bailer.	3
Removal of purging and sampling equipment from monitoring well.	Pinch points removing sampling equipment. Strains removing pump. Splash hazards while removing sampling equipment.	9	• Use proper PPE (gloves, safety glasses). • Use proper lifting techniques. • Remove equipment slowly to prevent splashing.	3
Site Clean-up and sample packaging	Slips/Trips/Falls Strains Vehicle, equipment, and pedestrian traffic	9	• Watch where you are walking, avoid uneven surfaces. • Use proper lifting techniques when loading equipment and sample coolers (bend at the knees, keep back straight, use buddy system). • Remove work area barricades last.	3

EHS Support

Issue Date	Oct. 12, 2017
Revision No.	002
Revision Date	Jan. 8, 2019

Job Safety Analysis (JSA)

Client: Stanley Black & Decker **Project:** Former Sargent & Greenleaf Rochester **Location:** 24 Seneca Ave., Rochester, NY	**JSA Title:** Monitoring Well Installation	**Page** 1 **of 3**	☐ New ☒ Revised

Work Activity Description: Installation of monitoring well(s) using various drilling technologies (Direct Push Technology (DPT), Hollow Stem Auger (HSA).	**Project / Field Team Members:** Anton Heitger Cal Figliozzi	**JSA Author(S):** Mark Smith	**Date:** 7/14/2017
		Reviewed By: Anton Heitger	**Date:** 11/11/2022
		Approved By: Gregg Hicks	**Date:** 11/11/2022

Minimum Required PPE (See Critical Actions for Task-Specific Requirements)			
☒ Safety Vest	☐ Goggles	☐ Air Purifying Respirator	☒ Gloves (Chemical / Leather)
☒ Hard Hat	☐ Face Shield	☐ Supplied Respirator	☒ Fire Extinguisher
☐ Lifeline / Body Harness	☒ Hearing Protection	☐ Protective Outerwear	☐ Other:
☒ Safety Glasses	☒ Safety Boots / Shoes	☐ Chemical Protective Outerwear	

Job Steps (List Every Step in The Task)	**Potential Hazards** (List Every Hazard Associated with Every Step in The Task)	**Baseline Risk Score** (L X S)	**Hazard Controls / Protection Measures**	**Post Prevention Risk Score** (L X S)
Site walk to observe and mark location(s) of proposed monitoring wells	Slips, trips, falls. Vehicle and pedestrian traffic	1	• Clear route to each location.	1
Locate and mark overhead and underground utilities	Electrical shock, operational underground utilities	1	• Observe and mark all utilities. • Maintain safe distance from all utilities • Install barricades around utilities	1
Mobilization of rig to location	Vehicle and pedestrian traffic Uneven surfaces	3	• Use ground guides/flagmen to clear way, watch for potential obstructions, and manage traffic	2
Set up of rig at location	Contact with moving parts Pinch points	3	• Keep clear of moving parts • Wear proper PPE	1

	Exertion		• Proper lifting techniques • Ensure safety interlocks are in place and operational	
Preparation to drill (handling of augers and drill rods)	Pinch points Muscle strain	3	• Use mechanical lifting devices • Use buddy system for lifting and proper lifting techniques	3
General operation of rig	Slips, trips, falls High pressure fluids Struck by equipment Flying debris Chemical exposure Extreme temperatures Rotating equipment Pinch points Noise		• Assure stepping and standing areas are clean and dry. • Maintain 3 points of contact while on rig. • Assure all hydraulic lines are secure and fittings tightened properly. • Maintains safe distance from rotating parts. • Wear proper PPE (glove, safety glasses, hard hat, ear plugs) •	3
Advancement of drilling equipment into ground	Rotating equipment Heavy lifting Flying debris	12	• Maintain proper drill speed, torque, and force. • Keep hands on controls at all times • Proper lifting techniques	3
Handling of soil cuttings (IDW)	Slips, trips, falls, strains, rotating equipment	9	• Maintain proper footing, stay clear of rotating drill, use proper shovel, use proper techniques when operating shovel, use equipment to assist movement of IDW drums.	3
Installation of well construction materials (well screen, riser, sand, bentonite)	Muscle strains Pinch Points Sharp edges and objects	3	• Use mechanical devices to lift heavy objects. • Use buddy system to lift where mechanical device is not practicable • Use proper tools for cutting open bags of sand and bentonite (Safety knife) • Wear cut resistance gloves	1
Removal of drilling equipment from boring	Rotating equipment Heavy lifting	9	• Maintain proper drill speed, torque, and force. • Keep hands on controls at all time.	3

			• Proper lifting techniques	
De-mobilization from location	Vehicle and pedestrian traffic Uneven surfaces	3	• Use ground guides/flagmen to clear way, watch for potential obstructions, and manage traffic	2

EHS Support

Issue Date	Oct. 12, 2017
Revision No.	002
Revision Date	Jan. 8, 2019

Job Safety Analysis (JSA)

Client: Stanley Black & Decker **Project:** Former Sargent & Greenleaf Rochester **Location:** 24 Seneca Ave., Rochester, NY	**JSA Title:** Soil boring and sampling	**Page 1 of 2**	☐ New ☒ Revised

Work Activity Description: Clear underground and overhead utilities Equipment set up Conduct boring activity (drill rig, hand auger) Collection of soil sample Site clean up	**Project / Field Team Members:** Anton Heitger Cal Figliozzi	**JSA Author(S):** Mark Smith	**Date:** 7/20/2017
		Reviewed By: Anton Heitger	**Date:** 11/11/2022
		Approved By: Gregg Hicks	**Date:** 11/11/2022

Minimum Required PPE (See Critical Actions for Task-Specific Requirements)			
☒ Safety Vest	☐ Goggles	☐ Air Purifying Respirator	☒ Gloves (Chemical / Leather)
☒ Hard Hat	☐ Face Shield	☐ Supplied Respirator	☐ Fire Extinguisher
☐ Lifeline / Body Harness	☒ Hearing Protection	☐ Protective Outerwear	☐ Other:
☒ Safety Glasses	☒ Safety Boots / Shoes	☐ Chemical Protective Outerwear	

Job Steps (List Every Step in The Task)	**Potential Hazards** (List Every Hazard Associated with Every Step in The Task)	**Baseline Risk Score** (L X S)	**Hazard Controls / Protection Measures**	**Post Prevention Risk Score** (L X S)
Set up equipment at location	Vehicle and pedestrian traffic Overhead electric lines Underground utilities	18	• Use spotters and ground guides • Use caution tape and cones • Maintain proper distance from overhead • electric lines • Properly clear all underground utilities and maintain safe distance away	6
Unloading equipment and tools	Muscle strain Pinch points	12	• Use proper lifting techniques • Use buddy system for lifting • Keep hands and finger clear of pinch points and wear appropriate gloves	6

Perform soil boring via DPT, HSA, and Hand Auger	Flying debris Muscle strain Noise Potential exposure to vapors and chemicals	12	• Proper PPE (Gloves, eye protection, hearing protection) • Use proper lifting techniques • Proper body positioning when using hand auger • Monitor area with OVA	6
Collect soil samples	Exposure to vapors and chemicals	12	• Wear proper PPE (Nitrile gloves, safety glasses) • Properly label samples and preserve properly	8
Site clean up	Slips, trips, falls Muscle strain	6	• Proper PPE (gloves, eye protection) • Ensure area is policed (free of trash, tools, etc.) • Properly dispose of all trash	3

EHS Support

Issue Date	Oct. 12, 2017
Revision No.	002
Revision Date	Jan. 8, 2019

Job Safety Analysis (JSA)

Client: Stanley Black & Decker **Project:** Former Sargent & Greenleaf Rochester **Location:** 24 Seneca Ave., Rochester, NY	**JSA Title:** Sub-slab Probe installation and Sampling	**Page** 1 **of**	☒ New ☐ Revised

Work Activity Description: Installation of sub-slab probe (vapor pins) and sampling sub-slab vapor, indoor air, and ambient outdoor air	**Project / Field Team Members:** Anton Heitger Cal Figliozzi	**JSA Author(S):** Tim Davis	**Date:** 8/23/2019
		Reviewed By: Anton Heitger	**Date:** 03/03/2022
		Approved By: Marty Schmidt	**Date:** 03/07/2022

Minimum Required PPE (See Critical Actions for Task-Specific Requirements)			
☒ Safety Vest	☐ Goggles	☐ Air Purifying Respirator	☒ Gloves (Chemical / Leather)
☒ Hard Hat	☐ Face Shield	☐ Supplied Respirator	☐ Fire Extinguisher
☐ Lifeline / Body Harness	☒ Hearing Protection	☐ Protective Outerwear	☐ Other:
☒ Safety Glasses	☒ Safety Boots / Shoes	☐ Chemical Protective Outerwear	

Job Steps (List Every Step in The Task)	**Potential Hazards** (List Every Hazard Associated with Every Step in The Task)	**Baseline Risk Score** (L X S)	**Hazard Controls / Protection Measures**	**Post Prevention Risk Score** (L X S)
Work site setup.	Slips trips falls,	3	Set up cords, work area to prevent slips trips and falls.	1
Hammer drilling	Rotating bit, dust, noise, flying concrete debris	3	Do not wear loose items that may be caught in bit, use shop vac to control dust, wear eye protection, wear ear protection	1
Probe (Vapor Pin) installation	Pinch points, hammering	3	Use proper body/hand positioning to avoid pinch points	1
Set up SUMMA canisters and sample trains	Pinch points	2	Use proper body/hand positioning to avoid pinch points, wear gloves while assembling tubing	1

Probe sampling	Slips trips falls Pinch Points	1	Set up cords, work area to prevent slips trips and falls Use proper body/hand positioning to avoid pinch points	1
Probe (Vapor Pin) removal and sealing	Jerking or pulling motions;	3	Remove probe with proper tool and smooth solid pressure.	1

Instructions for Completing the Job Safety Analysis Form

Complete a Job Safety Analysis (JSA) for all tasks being conducted on-site that may pose a hazard to EHS Support employees. Assigned jobs should be reviewed to determine how to control or minimize the hazards, as well as protect employees from these hazards. Each job is broken into tasks; the tasks are listed in order and an associated hazard ranking is calculated for each. This JSA worksheet was developed to aid in the review of jobs/tasks. The JSA is an important accident prevention tool that works by finding hazards and eliminating them before they become accidents. The JSA can be used for job clarification and hazard awareness, as a guide in new employee training, for retraining existing employees, as a refresher on jobs which run infrequently, as an accident investigation tool, and for informing employees of specific job hazards and protective measures.

Keep in mind the potential risks of the separate tasks that comprise the job, as well as the past injury/illness history of the task(s) when completing the JSA. Consider the following when completing the JSA:

- The purpose of the job — What must be done? Who will do it?
- The activities involved — How is it done? When is it done? Where is it done?

Employees assigned to perform the jobs being evaluated should be involved in the completion of the JSA form. The process for completing a JSA must include the following: a visual observation of (or experience with) how an EHS Support employee conducts the task/job and an operational review of the job/task. ALL JSAs SHOULD BE REVIEWED AT LEAST ANNUALLY OR AFTER AN INCIDENT/ACCIDENT AND REVISED AS NECESSARY. When applicable, this worksheet should be included in the site-specific health and safety plans (HASPs).

The following provides column-by-column instructions for completing the JSA form.

Column-by-Column Instructions

Job Steps

Examine a specific job/task by breaking it down into a list of steps (tasks) to discover the potential hazards employees may encounter.

Each job/task or operation will consist of a set of steps. For example, the job might be to collect a soil sample using a trowel. To determine where a step begins or ends, look for a change of activity as in a change in direction, movement, or tools. In the example, preparing the sampling equipment is one step. The next step might be to walk to the sample location (a change in activity). The following step may be clearing the area where the sample will be collected. Filling a sample container would be another step and so on.

Be sure to list all the steps needed to perform the job. It is OK if you break the job down into many small tasks rather than group too many of them together. Some steps may not be performed each time, for example, clearing a sample location. Not all sample collection areas will require clearing. However, if that step is generally part of the job, it should be listed.

Potential Hazards

A hazard is a potential physical, chemical, or environmental danger. The purpose of the JSA is to identify as many hazards as can be predicted. Consider the entire universe of the task when identifying hazards. Ask the five “Ws" and one "H" questions; who, what, when, where, why, and how. For example: who is conducting the step; what tools, equipment, and chemicals are used to complete the step; when is the task/step being conducted (e.g., time of day/year, light/dark conditions, cold/hot conditions); where is the task being conducted; why is the task being conducted (e.g., contamination); how will the step be conducted (e.g., what position will your body be in for the task — crouching, bending, standing, sitting).

To identify hazards, ask yourself these questions about each step of the task:

- Is there the chance the employee may strike against, be struck by, or otherwise making injurious contact with an object or a vehicle?
- Can an employee be caught in, by, or between objects?
- Is there potential for slipping, tripping, or falling?
- Could an employee suffer strains from pushing, pulling, lifting, bending, or twisting?
- What equipment will the employee use during the task?
- Is the environment hazardous to safety and/or health (e.g., over exposure to heat/cold, bees, snakes, ticks, spiders, fire ants, poison ivy/oak, heat, gases, mists, fumes)?
- Are there contaminants of concern present? Can the employee's activity cause a potential exposure to those contaminants?

Close observation and knowledge of the job is important. Examine each step carefully to find and identify hazards: include the actions, conditions, and possibilities that could lead to an accident. Compiling an accurate and complete list of potential hazards will allow you to develop the recommended safety procedures needed to prevent accidents.

Baseline Risk Score & Post Prevention Risk Score

The Baseline Risk Score is an assessment of the risk level in the task prior to performing and acting on the findings of the JSA. The Post Prevention Risk Score provides an assessment of the risk level in the task after implementing the control and protection measures assigned by the JSA. The risk score is calculated by multiplying the Severity of the injury/illness by the Likelihood of the injury/illness occurring. Use the following matrix to determine the risk score:

Risk Score = Likelihood x Severity

Severity of Injury/Illness	Likelihood of Injury/Illness
6 = Fatality	6 = Almost certain (1 in 10)
5 = Long-term disability or major disabling injury	5 = Likely (1 in 100)
4 = Disabling injury (restricted work or days away from work)	4 = Probable (1 in 1000)
3 = Injury / Illness — medical treatment	3 = Possible (1 in 10,000)
2 = Injury / Illness — first aid only	2 = Remote (1 in 100,000)
1 = No Injury / Illness	1 = Very remote (1 in 1,000,000)

To determine the risk level, complete the following:

1. Calculate the Baseline Risk score and enter it in the appropriate column on the JSA form. The baseline risk scores are used to determine the urgency of action or implementation of hazard controls (see the risk scores below).
2. Assign controls/protections for the identified hazards greater than a Baseline Prevention Risk Score of 4.
3. Re-calculate the score accounting for the changes the controls/protections will make — this new score is the Post Prevention Risk score.
4. Enter the Post Prevention Risk score in the appropriate column on the JSA form.

Using the risk scores below, determine the action to take based on the Post Prevention Risk score. (Note: If the Post Prevention Risk Score remains greater or equal to 9, the job should be suspended until controls/protections are implemented to lower the risk score.)

The risk scores are:

- 1 to 4 (Acceptable Risk) — No additional action needed.
- 5 to 8 (Low) — Review the operation/activity and take any steps necessary to reduce and control the risks.
- 9 to 16 (Medium) — Inform H&S management and seek further advice before proceeding any further with the operation/activity.
- 17 or Greater (High) — STOP the activity immediately. Review and reduce the risks identified. Contact a member of the H&S Team if further guidance is needed.

Hazard Controls / Protection Measures

Using the first three columns of the JSA form as a guide, decide what actions or procedures are necessary to eliminate or minimize the hazards that could lead to an accident, injury, or occupational illness. Keep in mind the Occupational Safety and Health Administration (OSHA) requirement to control hazards before assigning personal protective equipment.

To begin minimizing/eliminating hazards, implement the following in order they are presented below:

1. Engineering controls to remove or abate the hazard
2. Administrative controls to protect from the hazard
3. Work practice controls (e.g., provide job instruction training)
4. Personal protective equipment
5. Good housekeeping
6. Good ergonomics (positioning the person in relation to the machine or other elements in such a way as to improve safety)

Once actions and/or procedures have been defined, enter them in the “Hazard Controls / Protection Measures” column on the form. Keep in mind the following:

1. List all appropriate safe operating procedures. Begin with an action word. Say exactly what needs to be done to correct the hazard, such as "lift using your leg muscles." Avoid general statements such as "be careful," "watch out," or “work safely.”
2. List the required PPE necessary to perform each step of the job if controls cannot completely abate the hazard.
3. Give a recommended action or procedure for each hazard. Serious hazards should be corrected immediately.

Appendix C Daily Tailgate Safety Meeting Form

Issue Date	Jan. 2, 2013
Revision No.	005
Revision Date	January 2021

Daily Tailgate Safety Form

General Information			
Project Name/Location: Former Sargent & Greenleaf, Rochester, NY		**Name(s) of Person(s) Conducting Meeting:**	
Date:	**Time:**	**Weather:**	
Lone Worker			
☐ No **If no, continue to rest of form*	☐ Yes ***If yes, complete check-in person and daily tasks/hazards section below*	**Check-In Person:**	**Check-In Frequency:** *(i.e. arrival, lunch, and de-mob; or every 2 hours)*
Subcontractor(s):			

Day 1/Project Restart topics to cover:

Who is: ☐ PM(s) ☐ SSO ☐ Client ☐ Client PM ☐Subs ☐ Contact for Emergency

Chain of command for communicating hazards, incidents, stop work, etc.?

Location of: ☐ 1st Aid Kits ☐ Fire Extinguishers ☐ SDSs ☐ JSAs ☐ Emergency Contacts ☐ Hospital/Clinic

☐ What is different on the site from what was covered during the PSA call?

☐ What are we doing today that is not captured on the JSAs?

☐ What are obvious unique risks identified?

☐ Other EHS Support, Client, Sub or Other Party activities that may pose a hazard to today's activities?

☐ Complete all pre-use inspections (i.e., heavy equipment, power/hand tools, fall protection, electrical) and turn in to Project Manager at the end of the field event

**Regroup during/after lunch to discuss morning activities and plan for afternoon activities.*

Discuss the following – review of previous day's outcomes (Check if YES):

☐ Incidents? ☐ Lessons Learned? ☐ Any Stop Work Interventions? ☐ Corrective Actions Worked?

☐ Issues with Equipment? ☐ Issues with PPE? ☐ Audits/Inspections Performed? ☐ Communication Changes?

☐ Topics from Corp H&S or Client to Cover? ☐ Any work deviate from plan? – Notify PM & client

☐ Other: Click or tap here to enter text.

Notes: Click or tap here to enter text.

**All incidents and audits shall be uploaded to MyMomentum.*

Prework authorization – check activities to be conducted that require permit issuance or completion of a checklist, or similar, before work begins:

☐ Not Applicable ☐ Access Permits ☐ Confined Space ☐ Energy Isolation (LOTO) ☐ Hot Work ☐ Steam ☐ Live Electrical

☐ Buried or Overhead Utilities ☐ Excavation/Trenching ☐ Mechanical Lifting Ops ☐ Pressure System ☐ Working at Height

☐ Float Plan ☐ Other: Click or tap here to enter text.

Permit Name/Numbers and Notes: Click or tap here to enter text.

Today's Task(s)	
1.	2.
3.	4.
5.	6.

Potential Hazards Associated – Review the known risks from the JSA Hazard Rating (left column) and determine if risk level has changed (check risk level of Low (L), Medium (M), High (H) - refer to Risk Assessment Matrix on JSA Form). If the risk has increased to HIGH, the JSA shall be updated and new controls implemented.

Previous Hazard Rating – Tasks with	L	M	H	Tailgate Hazard Rating	L	M	H
☐ Mechanical (i.e., augers, moving parts)	☐	☐	☐	☐ Mechanical (i.e., augers, moving parts)	☐	☐	☐
☐ Pressure (i.e., gas cylinders, wells)	☐	☐	☐	☐ Pressure (i.e., gas cylinders, wells)	☐	☐	☐
☐ Electrical (i.e., utilities, equip. repair/shut down)	☐	☐	☐	☐ Electrical (i.e., utilities, equip. repair/shut down)	☐	☐	☐
☐ Radiation (i.e., alpha, sun, laser)	☐	☐	☐	☐ Radiation (i.e., alpha, sun, laser)	☐	☐	☐
☐ Security (i.e., lighting, equipment, check-ins)	☐	☐	☐	☐ Security (i.e., lighting, equipment, check-ins)	☐	☐	☐
☐ Gravity (i.e., ladder, scaffold, trips)	☐	☐	☐	☐ Gravity (i.e., ladder, scaffold, trips)	☐	☐	☐
☐ Chemical (i.e., fuel, acid, waste)	☐	☐	☐	☐ Chemical (i.e., fuel, acid, waste)	☐	☐	☐
☐ Motion (i.e., traffic, moving water)	☐	☐	☐	☐ Motion (i.e., traffic, moving water)	☐	☐	☐
☐ Driving (i.e., boat, ATV, skid steer)	☐	☐	☐	☐ Driving (i.e., boat, ATV, skid steer)	☐	☐	☐
☐ Sound (i.e., machinery, generators)	☐	☐	☐	☐ Sound (i.e., machinery, generators)	☐	☐	☐
☐ Environment (i.e., heat, cold, rain)	☐	☐	☐	☐ Environment (i.e., heat, cold, rain)	☐	☐	☐
☐ Biological (i.e., ticks, snakes, poison ivy)	☐	☐	☐	☐ Biological (i.e., ticks, snakes, poison ivy	☐	☐	☐
☐ Personal (i.e., alone, night, not fit for duty)	☐	☐	☐	☐ Personal (i.e., alone, night, not fit for duty)	☐	☐	☐
☐ Other:	☐	☐	☐	☐ Other:	☐	☐	☐
Proposed Corrective Actions	**Yes**	**No**	**N/A**	**Proposed Corrective Actions**	**Yes**	**No**	**N/A**
Protective Clothing/Equipment Required	☐	☐	☐	Work Permit Required	☐	☐	☐
Delineate Work Areas to Protect Workers and/or Public	☐	☐	☐	Other:	☐	☐	☐
Comments:							

Attendees
Site Workers (including EHS Support Contractors and Subcontractors) by signing here, you are stating the following: • You have been involved in the Daily Tailgate Safety Meeting, the review of the JSAs, and understand the hazards and control measures associated with each task you are about to perform. • You are aware of your authority and obligation to 'Stop Work' **Fit for duty:** • You are physically and mentally fit for duty. • You are not under the influence of any type of medication, drugs, or alcohol that could negatively affect your ability to work safely. • You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or fatigue issue you may have to the EHS Support SSO. • You leave the site uninjured unless you have otherwise notified the EHS Support SSO.
EHS Support Site Safety Officer: _____ _____ Name Signature

Site Personnel Name and Affiliation	Signature	Site Personnel Name and Affiliation	Signature

Site Visitors – Not involved in work activities				
Name (print)	**Company Name**	**Arrival Time**	**Depart Time**	**Signature** *(I have been informed of today's activities and site safety parameters)*

Post Daily Activities Review – To be completed once activities for day have concluded and BEFORE leaving the Site		
Were there any incidents or near misses?	☐ Yes* ☐ No	If yes, details:
Where there any 'Stop Work' interventions?	☐ Yes ☐ No	If yes, details:
Where there any areas for improvement noted?	☐ Yes ☐ No	If yes, details:
Was the site audited by EHS Support, client, or regulatory representative?	☐ Yes* ☐ No	If yes, details:
The job site is being left in a safe condition and there were no reports of injury or first aid.	☐ Yes ☐ No	
EHS Support SSO Signature: _____		

** If response is YES, entry into MyMomentum is required.*

Please upload into SharePoint under your project in a folder titled Daily Tailgate Safety Forms.

Appendix D Air Monitoring Log

Issue Date	Aug. 16, 2013
Revision No.	002
Revision Date	Jan. 8, 2019

Air Monitoring Log

Project Information			
Company Name:	**Address:**	**Telephone:**	**Date:**
Project Name:	**Client:**	**Site Location:**	**Operation Monitored:**
Instrument:	**Model:**	**Serial No.:**	
Calibration Date:	**Probe:**	**Settings:**	
Temp/Rel. Hum:	**Wind:**	**Indoor:**	**Outdoor:**
Interference:		**Operator Name:**	

Air Monitoring Log							
Sample No.	***Time***	***LEL***	***O_2***	***H_2S***	***CO***	***Location***	***Comments***

Appendix E Corrective Action Form

EHS Support

Issue Date	Jan. 2, 2014
Revision No.	001
Revision Date	Jan. 8, 2019

Corrective Action Form

Item No.	Corective Actions (Must match Causative Factor)	Responsible Party	Due Date	Date Completed	Details

Appendix F Incident Forms

EHS Support

Issue Date	Nov. 6, 2012
Revision No.	001
Revision Date	Jan. 8, 2019

Employee Notification of Injury or Illness

Case No. _____

Employee Information (To be Completed by Injured Employee)		
Employee's First Name:	**Employee's Last Name**	**Date of Birth:**
Address, City, State, Zip:		**Social Security #:**
Phone Number(s): Home: **Other:**	**Job Title:**	**Time in Occupation at EHS Support:**

Accident Information			
Date of Accident:	**Start Shift Time:**	**Time of Accident:** Click here to enter a time.	**Worked Until End of Shift:** ☐Yes ☐No

Location of Accident (Be Specific – Place, Address, Customer Site, Area/Department, etc.):

Description of Injury (Be Specific – Describe how the injury occurred and what the employee was doing prior to the injury):

Part(s) of the Body Injured (List **all** that apply):

☐ Arm	☐ Elbow	☐ Neck	☐ Face	☐ Foot/Feet	☐ Groin
☐ Hand	☐ Finger(s)	☐ Back	☐ Leg	☐ Toe(s)	☐ Chest
☐ Wrist	☐ Eye	☐ Head	☐ Knee	☐ Stomach	☐ Internal Organs
☐ Other (Describe):					

Please describe the injured Body Part(s) [i.e., Right Shoulder, Left Ankle]:

Injury communicated to:	**Date Reported:**

Treatment Information

Type of medical treatment given: ☐ No Medical Treatment/Precautionary Report ☐ First Aid/In House ☐ Occupational Health Center/Clinic ☐ Hospitalized Overnight ☐ Emergency Room

Treatment rendered (forward copies of all treatment notes to the H&S Program Manager):

Name of the facility where initial medical treatment was given:

Treating physician's name: **Facility Phone Number**:

Date of Treatment:

Did employee miss any days of work? ☐Yes ☐No **If yes, date of first day missed**:

Witness name:	**Witness Phone Number**:
I hereby declare that the statements provided in this document are; to the best of my knowledge and belief, complete and true. **Fraud Notice**: Any Individual filing misleading or incomplete information knowingly and with the intent to defraud is in violation of Section1102 of the Pennsylvania Workers' Compensation Act and may also be subject to criminal and civil penalties through Pennsylvania Act165.	
Employee Signature: _____ Original Signature Required	**Date: _____**

Please submit to the Health and Safety Program Manager.

Appendix G Safety Data Sheets

SAFETY DATA SHEET

Version 4.4
Revision Date 12/01/2015
Print Date 05/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : cis-Dichloroethylene

Product Number : 48597
Brand : Supelco
Index-No. : 602-026-00-3

CAS-No. : 156-59-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H332 Harmful if inhaled.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.

P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C2H2Cl2
Molecular weight	:	96.94 g/mol
CAS-No.	:	156-59-2
EC-No.	:	205-859-7
Index-No.	:	602-026-00-3

Hazardous components

Component	Classification	Concentration
cis-Dichloroethylene		
	Flam. Liq. 2; Acute Tox. 4; Aquatic Acute 3; Aquatic Chronic 3; H225, H332, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Handle and store under inert gas. Air and moisture sensitive. Light sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
cis-Dichloroethylene	156-59-2	TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Eye irritation		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-80.0 °C (-112.0 °F)
f)	Initial boiling point and boiling range	60.0 - 61.0 °C (140.0 - 141.8 °F)
g)	Flash point	6.0 °C (42.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.28 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available

p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LC50 Inhalation - Rat - 13700 ppm
Remarks: Behavioral:Somnolence (general depressed activity). Liver:Fatty liver degeneration.

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KV9420000

narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

Poison Inhalation Hazard: No

IMDG
UN number: 1150 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: 1,2-DICHLOROETHYLENE

IATA
UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H332	Harmful if inhaled.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	1

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.4 Revision Date: 12/01/2015 Print Date: 05/01/2016

SAFETY DATA SHEET

Version 3.11
Revision Date 12/01/2015
Print Date 05/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Vinyl chloride

Product Number : 387622
Brand : Aldrich
Index-No. : 602-023-00-7

CAS-No. : 75-01-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable gases (Category 1), H220
Gases under pressure (Liquefied gas), H280
Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H350 May cause cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P405	Store locked up.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Chloroethylene
Formula	:	C_2H_3Cl
Molecular weight	:	62.50 g/mol
CAS-No.	:	75-01-4
EC-No.	:	200-831-0
Index-No.	:	602-023-00-7

Hazardous components

Component	Classification	Concentration
Vinyl chloride		
	Flam. Gas 1; Press. Gas Liquefied gas; Carc. 1A; SA ; H220, H280, H350,	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Clean up promptly by sweeping or vacuum.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Contents under pressure. Light sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Vinyl chloride	75-01-4	TWA	1 ppm	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Lung cancer Confirmed human carcinogen		
		STEL	5 ppm	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	5 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		See 1910.1017		
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 120 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Liquefied gas
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -153.8 °C (-244.8 °F) - lit.
f)	Initial boiling point and boiling range	-13.4 °C (7.9 °F) - lit.
g)	Flash point	-61.0 °C (-77.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or	Upper explosion limit: 33 %(V) Lower explosion limit: 3.6 %(V)

	explosive limits	
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.911 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Contains the following stabiliser(s):
Hydroquinone (>=0 - <=0.0001 %)
Phenol (>=0 - <=0.01 %)

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Chemically active metals, Copper

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LC50 Inhalation - Rat - 0.3 h - 180000 ppm
Remarks: Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold. Respiratory disorder

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Human carcinogen.

IARC: 1 - Group 1: Carcinogenic to humans (Vinyl chloride)

NTP: Known to be human carcinogen (Vinyl chloride)

OSHA: OSHA specifically regulated carcinogen (Vinyl chloride)

Reproductive toxicity
No data available

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KU9625000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -
Stomach - Irregularities - Based on Human Evidence (Phenol)
Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1086 Class: 2.1 EMS-No: F-D, S-U
Proper shipping name: VINYL CHLORIDE, STABILIZED

IATA
UN number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Phenol	108-95-2	2007-07-01
Hydroquinone	123-31-9	2007-07-01

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01
Phenol	108-95-2	2007-07-01
Hydroquinone	123-31-9	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01
Phenol	108-95-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

	May displace oxygen and cause rapid suffocation.
Carc.	Carcinogenicity
Flam. Gas	Flammable gases
H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
H350	May cause cancer.
Press. Gas	Gases under pressure
SA	Simple Asphyxiant

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	3

NFPA Rating

Health hazard:	2
Fire Hazard:	4
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.11 Revision Date: 12/01/2015 Print Date: 05/01/2016

SAFETY DATA SHEET

Version 5.10
Revision Date 02/26/2015
Print Date 01/22/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 2-Propanol

Product Number : I9516
Brand : Sigma
Index-No. : 603-117-00-0

CAS-No. : 67-63-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : sec-Propyl alcohol
Isopropyl alcohol
Isopropanol

Formula : C_3H_8O

Molecular weight : 60.10 g/mol

CAS-No. : 67-63-0

EC-No. : 200-661-7

Index-No. : 603-117-00-0

Hazardous components

Component	Classification	Concentration
2-Propanol		
	Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; H225, H319, H336	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Handle and store under inert gas. Hygroscopic.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
2-Propanol	67-63-0	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Upper Respiratory Tract irritation		

		Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	400 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	400.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	400.000000 ppm 980.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	400.000000 ppm 980.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	500.000000 ppm 1,225.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
2-Propanol	67-63-0	Acetone	40.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 60 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	alcohol-like
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -89.5 °C (-129.1 °F)
f)	Initial boiling point and boiling range	82 °C (180 °F)
g)	Flash point	12.0 °C (53.6 °F) - closed cup
h)	Evaporation rate	3.0
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 12.7 %(V) Lower explosion limit: 2 %(V)
k)	Vapour pressure	43.2 hPa (32.4 mmHg) at 20.0 °C (68.0 °F) 58.7 hPa (44.0 mmHg) at 25.0 °C (77.0 °F)
l)	Vapour density	No data available

m)	Relative density	0.785 g/mL at 25 °C (77 °F)
n)	Water solubility	completely soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0.05
p)	Auto-ignition temperature	425.0 °C (797.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension 20.8 mN/m at 25.0 °C (77.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.
Stable under recommended storage conditions.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Acid anhydrides, Aluminium, Halogenated compounds, Acids

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 5,045 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Somnolence (general depressed activity).

LC50 Inhalation - Rat - 8 h - 16000 ppm

LD50 Dermal - Rabbit - 12,800 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (2-Propanol)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
Inhalation, Oral - May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: NT8050000

Central nervous system depression, prolonged or repeated exposure can cause:, Nausea, Headache, Vomiting, narcosis, Drowsiness, Overexposure may cause mild, reversible liver effects., Aspiration may lead to:, Lung oedema, Pneumonia
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney - Irregularities - Based on Human Evidence
Kidney - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 9,640.00 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 5,102.00 mg/l - 24 h
	Immobilization EC50 - Daphnia magna (Water flea) - 6,851 mg/l - 24 h
Toxicity to algae	EC50 - Desmodesmus subspicatus (green algae) - > 2,000.00 mg/l - 72 h
	EC50 - Algae - > 1,000.00 mg/l - 24 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No bioaccumulation is to be expected (log Pow <= 4).

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1219 Class: 3 Packing group: II
Proper shipping name: Isopropanol
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG
UN number: 1219 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ISOPROPANOL

IATA
UN number: 1219 Class: 3 Packing group: II
Proper shipping name: Isopropanol

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.10 Revision Date: 02/26/2015 Print Date: 01/22/2016

SAFETY DATA SHEET

Version 5.6
Revision Date 12/03/2015
Print Date 05/27/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Diesel Fuel No. 2

Product Number : UST147
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, Central nervous system, H335, H336
Specific target organ toxicity - repeated exposure, Oral (Category 2), Liver, Blood, H373
Specific target organ toxicity - repeated exposure, Inhalation (Category 2), Central nervous system, H373

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H373	May cause damage to organs (Liver, Blood) through prolonged or repeated exposure if swallowed.
H373	May cause damage to organs (Central nervous system) through prolonged or repeated exposure if inhaled.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Hazardous components

Component		Classification	Concentration
Methylene chloride			
CAS-No. EC-No. Index-No.	75-09-2 200-838-9 602-004-00-3	Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; STOT SE 3; STOT RE 2; H315, H319, H335, H336, H351, H373, H373	>= 90 - <= 100 %
Fuels, diesel, no. 2			
CAS-No. EC-No. Index-No.	68476-34-6 270-676-1 649-227-00-2	Flam. Liq. 4; Carc. 2; STOT SE 3; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 2; H227, H304, H336, H351, H411	>= 0.1 - < 1 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Store at Room Temperature.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
	Remarks	Potential Occupational Carcinogen See Appendix A		
Methylene chloride	75-09-2	TWA	50.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Carboxyhemoglobinemia		

		Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		TWA	50 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Carboxyhemoglobinemia Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		Substance listed; for more information see OSHA document 1910.1052		
		Substance listed; for more information see OSHA document 1910.1052		
		See Table Z-2		
		PEL	25.000000 ppm	OSHA Specifically Regulated Chemicals/Carcinogens
		1910.1052 This section applies to all occupational exposures to methylene chloride (MC), Chemical Abstracts Service Registry Number 75-09-2, in general industry, construction and shipyard employment. Methylene chloride (MC) means an organic compound with chemical formula, CH2Cl2. Its Chemical Abstracts Service Registry Number is 75-09-2. Its molecular weight is 84.9 g/mole OSHA specifically regulated carcinogen		
		STEL	125.000000 ppm	OSHA Specifically Regulated Chemicals/Carcinogens
		1910.1052 This section applies to all occupational exposures to methylene chloride (MC), Chemical Abstracts Service Registry Number 75-09-2, in general industry, construction and shipyard employment. Methylene chloride (MC) means an organic compound with chemical formula, CH2Cl2. Its Chemical Abstracts Service Registry Number is 75-09-2. Its molecular weight is 84.9 g/mole OSHA specifically regulated carcinogen		
Fuels, diesel, no. 2	68476-34-6	TWA	100.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Dermatitis Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption varies		
		TWA	100.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Dermatitis Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption varies		
		TWA	100 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Dermatitis Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption varies		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Methylene chloride	75-09-2	Dichloromethane	0.3000 mg/l	Urine	ACGIH - Biological Exposure Indices

					(BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition	No data available

	temperature	
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	2A - Group 2A: Probably carcinogenic to humans (Methylene chloride)
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Fuels, diesel, no. 2)
NTP:	Reasonably anticipated to be a human carcinogen (Methylene chloride)
OSHA:	OSHA specifically regulated carcinogen (Methylene chloride)

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1593 Class: 6.1 Packing group: III
Proper shipping name: Dichloromethane, solution
Reportable Quantity (RQ): 1005 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1593 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: DICHLOROMETHANE, SOLUTION

IATA
UN number: 1593 Class: 6.1 Packing group: III
Proper shipping name: Dichloromethane, solution

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Methylene chloride	75-09-2	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Methylene chloride	75-09-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Methylene chloride	75-09-2	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Methylene chloride	75-09-2	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H227	Combustible liquid.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H373	May cause damage to organs (/$/*_ORG_REP_INHA/$/) through prolonged or repeated exposure if inhaled.
H411	Toxic to aquatic life with long lasting effects.
Skin Irrit.	Skin irritation
STOT RE	Specific target organ toxicity - repeated exposure
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	1

NFPA Rating

Health hazard:	2
Fire Hazard:	0

Reactivity Hazard: 0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 12/03/2015 Print Date: 05/27/2016

SAFETY DATA SHEET

Version 5.2
Revision Date 07/03/2014
Print Date 12/23/2014

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Gasoline, premium unleaded

Product Number : 47516-U
Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Germ cell mutagenicity (Category 1B), H340
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 1), H370

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H340	May cause genetic defects.
H350	May cause cancer.
H370	Causes damage to organs.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P307 + P311	IF exposed: Call a POISON CENTER or doctor/ physician.
P322	Specific measures (see supplemental first aid instructions on this label).
P330	Rinse mouth.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Synonyms : Gasoline
Petrol
Petroleum benzin

Hazardous components

Component		Classification	Concentration
Methanol			
CAS-No.	67-56-1	Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301 + H311 + H331, H370	90 - 100 %
EC-No.	200-659-6		
Index-No.	603-001-00-X		
Registration number	01-2119433307-44-XXXX		
Gasoline			
CAS-No.	86290-81-5	Flam. Liq. 2; Muta. 1B; Carc. 1B; Asp. Tox. 1; H225, H304, H340, H350	1 - 5 %
EC-No.	289-220-8		
Index-No.	649-378-00-4		

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Methanol	67-56-1	TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Headache Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		STEL	250 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Headache Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		TWA	200 ppm 260 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	250 ppm 325 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	200 ppm 260 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		STEL	250 ppm 325 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		TWA	200 ppm 260 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
Gasoline	86290-81-5	TWA	300 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Confirmed animal carcinogen with unknown relevance to humans		
		STEL	500 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Confirmed animal carcinogen with unknown relevance to humans		
		TWA	500 ppm 2,000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	400 ppm 1,600 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Methanol	67-56-1	Methanol	15 mg/l	Urine	ACGIH - Biological Exposure Indices

					(BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	no data available

g)	Flash point	9.7 °C (49.5 °F) - closed cup
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Acids, Oxidizing agents, Alkali metals, Strong oxidizing agents, Acid chlorides, Acid anhydrides, Reducing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
no data available

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Gasoline)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: Not available

Methyl alcohol may be fatal or cause blindness if swallowed., Cannot be made non-poisonous., Effects due to ingestion may include:, Nausea, Dizziness, Gastrointestinal disturbance, Weakness, Confusion., Drowsiness, Unconsciousness, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence
Bladder - (Gasoline)

12. ECOLOGICAL INFORMATION

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1230 Class: 3 Packing group: II
Proper shipping name: Methanol, solution
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1230 Class: 3 (6.1) Packing group: II EMS-No: F-E, S-D
Proper shipping name: METHANOL, SOLUTION
Marine pollutant: No

IATA
UN number: 1230 Class: 3 (6.1) Packing group: II
Proper shipping name: Methanol, solution

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01
Gasoline	86290-81-5	2009-07-17

New Jersey Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01
Gasoline	86290-81-5	2009-07-17

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Gasoline	86290-81-5	2007-09-28
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Methanol	67-56-1	2012-03-16

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Asp. Tox.	Aspiration hazard
Carc.	Carcinogenicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H304	May be fatal if swallowed and enters airways.
H311	Toxic in contact with skin.
H331	Toxic if inhaled.
H340	May cause genetic defects.
H350	May cause cancer.
H370	Causes damage to organs.
Muta.	Germ cell mutagenicity
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.2 Revision Date: 07/03/2014 Print Date: 12/23/2014

Appendix H Miscellaneous Safety Forms

Utility Clearance (UC) Checklist

GENERAL INFORMATION	
Project Name	EHS Support Project Manager
Project Address, City, State, Zip	
Competent UC Person Completing Checklist	Client Contact/Project Manager

PROJECT PLANNING		
Written Scope of Work and Figure Completed	☐ YES	☐ NO
Scope of Work and Figure Approved by PM?	☐ YES	☐ NO
Has a site walk been performed to identify potential underground and aboveground utilities and obstructions?	☐ YES	☐ NO
Have aboveground utilities or obstruction been identified within 20 feet of the location of the proposed work?	☐ YES	☐ NO
If Yes, can the work location be moved to avoid the hazard? If not, follow the appropriate federal regulations regarding safe working distances from electrical lines.	☐ YES	☒ NO
Have utility maps been requested of site personnel?	☐ YES	☐ NO
Do utility drawings exist for location?	☐ YES	☐ NO
If Yes, have they been acquired and reviewed? Check if Not Applicable ☐	☐ YES	☐ NO
Does the HASP or other relevant document specifically address the course of action following contact with a utility?	☐ YES	☐ NO
Additional Comments (Provide any relevant notes from site walk and drawing review)		

PUBLIC UTILITY MARKOUT	
Date of Public One-Call	Ticket Number(s)
One-Call Request Time	Utility Service Name
Utility Service Number	Utility Service Contact Person
Date of Public Markout Completed	Date Public Utility Markings Expire
List the Contacted Utilities	

PRIVATE UTILITY MARKOUT		
Is the boring location on private property? If YES, then private utility markout is REQUIRED **Signature of EHS Support PM waiving this requirement*	☐ YES	☐ NO
Method of underground utility clearance (UUC) utilized:		
Company providing Private UUC: Date Private UUC completed:		
Did the UUC contractor provide all existing utility figures prior to the markout?	☐ YES	☐ NO
Did the Private UUC contractor provide a detailed sketch/drawing/figure of the identified utilities?	☐ YES	☐ NO
Are any borings located within the Critical Zone (Area 5 feet vertically or horizontally of a located or suspected utility? If NO, then manual clearance (e.g. hand auger) to ~~4~~ 5 feet below ground surface is required. If YES, then manual clearance to a Minimum depth of 6 feet below ground surface and Minimum width of 120% of the boring diameter is REQUIRED. ***Signature of EHS Manager waiving this requirement** **X**_____	☐ YES	☐ NO
Please note the above clearances are the minimum. The farther the distance from the utility, the better.		

INTRUSIVE WORK		
Has a visual site inspection of all locations been completed and private and public utility markings been reviewed?	☐ YES	☐ NO
Is manual vertical clearance required?	☐ YES	☐ NO
Has the competent on-site UUC person shared any documented results of the Private UUC with the person completing the intrusive work?	☐ YES	☐ NO
Method of manual clearance utilized:		
Company providing manual clearance: Date manual clearance completed:		
EXPLANATION FOR ANY WAIVED REQUIREMENT(s) – REQUIRED:		

Signature of Person Completing Checklist: _____

Date of Completion: _____

EHS Support

Issue Date	Jan. 2, 2014
Revision No.	001
Revision Date	Jan. 8, 2019

Daily Site Safety Record (Site Register of Everyone Entering Site)

Site (Site Name):						**Date:**	
Company Name	**Name (Print)**	**Type of Work Performed / Reason for Visit**	**Time In**	**Time Out**	**Visitor Signature (*)**	**JSA Reviewed /Checklists Completed**	**Attended Today's Toolbox Meeting**
						(Site Safety Officer Initials for Acknowledgement)	

(*) Signatory acknowledges having either attended start work discussion (operatives) or read and understood the site safety rules (delivery – visit)

Start work discussion held by:		
Works to be performed during the day – safety precautions to take – review of hazardous situations spotted during the previous day:		
Hazardous situations spotted during the day (describe briefly what? Where? What could have happened? And corrective actions taken):		
Safety tailgate discussion topics (log attendance on page 1):		
Notes and action points:		
Reviewed by:		
Site safety officer:	Signature:	Date:
Other:		
Other:		

EHS Support

Issue Date	Mar. 7, 2013
Revision No.	001
Revision Date	Jan. 8, 2019

Damage Information Reporting Tool (DIRT) Field Form

☐ Near Miss ☐ Utility Strike

Part A – Who is Submitting this Information			
☐ Electric ☐ Insurance ☐ Private Water ☐ State Regulator	☐ Engineer/Design ☐ Liquid Pipeline ☐ Public Works ☐ Telecommunications	☐ Equipment Manufacturer ☐ Locator ☐ Railroad ☐ Unknown/Other	☐ Excavator ☐ Natural Gas ☐ Road Builders
Name of the person providing the information: **Name of EHS Support Project Manager Gathering Information:**			

Part B – Date and Location of Event		
Date of Event:	**Country:**	**State:**
County:	**City:**	
Street Address:	**Nearest Intersection:**	

Right of Way where event occurred:

Public: ☐ City Street ☐ State Highway ☐ County Road ☐ Interstate Highway ☐ Public-Other

Private: ☐ Private Business ☐ Private Land Owner ☐ Private Easement ☐ Pipeline
☐ Power/Transmission Line ☐ Dedicated Public Utility Easement
☐ Federal Land ☐ Railroad ☐ Data Not Collected ☐ Unknown/Other

Part C – Affected Facility Information

What type of facility operation was affect?

☐ Cable Television ☐ Electric ☐ Natural Gas ☐ Liquid Pipeline ☐ Sewer (Sanitary Sewer)
☐ Steam ☐ Telecommunications ☐ Water ☐ Unknown/Other

What type of facility was affected?

☐ Distribution ☐ Gathering ☐ Service/Drop ☐ Transmission ☐Unknown/Other

Was the facility part of a joint trench?

☐ Unknown ☐ Yes ☐ No

Was the facility owner a member of One-Call Center?

☐ Unknown ☐ Yes ☐ No

Part D – Excavation Information

Type of Excavator

☐ Contractor ☐ County ☐ Developer ☐ Farmer ☐ Municipality ☐Occupant
☐ Railroad ☐ State ☐ Utility ☐ Date not collected ☐ Unknown/Other

Type of Excavation Equipment

☐ Auger ☐ Backhoe/Trackhoe ☐ Boring ☐ Drilling ☐ Directional Drilling
☐ Explosives ☐ Farm Equipment ☐ Hand tools ☐ Grader/Scraper ☐ Milling Equipment
☐ Trencher ☐ Vacuum Equipment ☐ Probing Device ☐ Data Not Collected ☐ Unknown/Other

Type of Work Performed

☐ Drainage ☐ Bldg Construction ☐ Electric ☐ Engineering/Survey ☐ Bldg Demolition
☐ Fencing ☐ Grading ☐ Irrigation ☐ Landscaping ☐ Liquid Pipeline
☐ Milling ☐ Natural Gas ☐ Pole ☐ Road Work ☐ Sewer (san/storm)
☐ Steam ☐ Site Development ☐ Water ☐ Telecommunication ☐ Storm Drain/Culvert
☐ Waterway Improvement ☐ Data Not Collected ☐ Unknown/Other

Part E – Notification

Was the One-Call Center notified?
☐ Yes (If YES, Part F is required) ☐ No (If NO, Skip Part F)

If Yes, which One-Call Center?

If Yes, please provide ticket number:

Part F – Locating and Marking

Type of Locator
☐ Utility Owner ☐ Contract Locator ☐ Data Not Collected ☐ Unknown/Other

Were facility marks visible in the area of excavation?
☐ Yes ☐ No ☐ Data Not Collected ☐ Unknown/Other

Were facilities marked correctly?
☐ Yes ☐ No ☐ Data Not Collected ☐ Unknown/Other

Part G – Excavator Downtime

Did Excavator Incur Downtime?
☐ Yes ☐ No

If yes, how much time?
☐ Unknown ☐ Less than 1 hour ☐ 1 hour ☐ 2 hours ☐ 3 hours or more Exact Value____

Estimated cost of down time?
☐ Unknown ☐ $0 ☐ $1 to 500 ☐ $501 to 1,000 ☐ $1,001 to 2,500 ☐ $2,501 to 5,000
☐ $5,001 to 25,000 ☐ $25,001 to 50,000 ☐ $50,001 and over Exact Value_____

Part H – Description of Damage

Was there damage to a facility?
☐ Yes ☐ No (i.e., near miss)

Did the damage cause an interruption in service?
☐ Yes ☐ No ☐ Data Not Collected ☐ Unknown/Other

If Yes, duration of interruption?
☐ Unknown ☐ <1 hour ☐ 1-2 hrs ☐ 2-4 hrs ☐ 4-8 hrs ☐ 8-12 hrs ☐ 12-24 hrs
☐ 1-2 days ☐ 2-3 days ☐ 3 or more days Exact Value _____ ☐ Data Not Collected

Approximately how many customers were affected?
☐ Unknown ☐ 0 ☐ 1 ☐ 2 to 10 ☐ 11 to 50 ☐ 51 or more Exact Value _____

Estimated cost of damage/repair/restoration?
☐ Unknown ☐ $0 ☐ $1 to 500 ☐ $501 to 1,000 ☐ $1,001 to 2,500 ☐ $2,501 to 5,000
☐ $5,001 to 25,000 ☐ $25,001 to 50,000 ☐ $50,001 and over Exact Value_____

Number of people injured?
☐ Unknown ☐ 0 ☐ 1 ☐ 2 to 9 ☐ 10-19 ☐ 20 to 49 ☐ 50 to 99
☐ 100 or more Exact Value _____

Number of fatalities?
☐ Unknown ☐ 0 ☐ 1 ☐ 2 to 9 ☐ 10-19 ☐ 20 to 49 ☐ 50 to 99
☐ 100 or more Exact Value _____

Part I – Injury Reporting	
Refer to EHS Support Incident Report form and Investigation Report Form **Attach completed investigation form to DIRT Form**	
Part J – Description of Root Cause	
One-Call Notification Practices Not Sufficient ☐ No notification made to the One-Call Center ☐ Notification to One-Call Center made, but not sufficient ☐ Wrong information provided to One-Call Center	**Locating Practices Not Sufficient** ☐ Facility could not be found or located ☐ Facility marking or location not sufficient ☐ Facility was not located or marked ☐ Incorrect facility records/map
Excavation Practices Not Sufficient ☐ Failure to maintain marks ☐ Failure to support exposed facilities ☐ Failure to use hand tools where required ☐ Failure to test-hole (pot-hole) ☐ Improper backfilling practices ☐ Failure to maintain clearance ☐ Other insufficient excavation Practices	**Miscellaneous Root Causes** ☐ One-Call Center error ☐ Abandoned facility ☐ Deteriorated facility ☐ Previous damage ☐ Lack of/Insufficient Training ☐ Lack of/Insufficient Management Control ☐ Did not follow procedure(s)/requirement(s) ☐ Data Not Collected ☐ Other
Part K – Additional Comments	
Witness Name:	**Witness Phone Number:**
Witness Name:	**Witness Phone Number:**
I hereby declare that the statements provided in this document are; to the best of my knowledge and belief, complete and true. Signature: _____	Date: _____

Please submit to the EHS Support Health and Safety Program Manager.

EHS Support

Issue Date	Jan 2, 2014
Revision No.	002
Revision Date	Jan. 8, 2019

Field Instrument Calibration Log

Project Information			
Project Name	Project Location	Name	Date

Field Instrument Calibration Log

Equipment Information								**Initial Reading(s)**			**Final Reading(s)**		
Date	**Type (FID, PID, IR)**	**Make**	**Model #**	**Lamp Ev (10.6 or 11.8)**	**Serial #**	**Calibration Gas (Type and Concentration)**	**Cylinder/ Batch #**	**Equipment Reading (PPM)**	**Time**	**Name of Person Performing Calibration**	**Equipment Reading (PPM)**	**Time**	**Name of Person Performing Calibration**

EHS Support

Issue Date	Oct. 12, 2017
Revision No.	001
Revision Date	Jan. 8, 2019

Heavy Equipment Safety Checklist

Project Name: _____ Date: _____

Project Location: _____ Inspector: _____

Operator(s): _____

Equipment Type: _____

Category	Inspection Items	Yes	No	N/A	Action(s) Needed
Records	Equipment inspection and maintenance records available				
	Operator training records available				
	Is a list of all chemicals being used on the current job kept on file and made available to all employees? (Check SDS book and verify its location is known to each employee)				

Category	Inspection Items	Pass	Fail	N/A	Action(s) Needed
Equipment	Emergency stop(s) functional (verify)				
	Leveling devices/ Outriggers/ Tracks (no damage)				
	Protective guards on moving parts (drill shaft, drive shafts, belts, chain drives and universal joints)				
	Fuel, hydraulic lines, oil reservoirs properly filled				
	No fluid leaks (pneumatic/hydraulic)				
	Operator controls, panel and gauges functional				
	Warning lights functional				
	Brakes and clutches functional				
	Steps and handholds (condition and cleanliness)				
	Tires (sidewall condition, cuts, tread condition)				
	Cracked welds/unusual wear patterns around attachment				
	Safety latches on hooks				
	Slings, chokers, and lifting devices (no damage)				
	Shackles/Clevises (no damage)				
	Fire extinguisher (10 lb. or larger; fully charged and inspected)				
PPE	Proper safety gear worn given the work environment				

Category	Inspection Items	Pass	Fail	N/A	Action(s) Needed
Fire Prevention	No smoking or open flames is observed within exclusion zone				
	Flammable liquids not stored within 50 ft (15.2m)				
Exclusion/ Work Zones	Exclusion/work zone has been established with proper controls				
Overhead Obstructions	Except where electrical distribution and transmission lines have been de-energized and visibly grounded, drill rigs will be operated proximate to under, by, or near power lines as follows: • 50 KV or less - minimum clearance of 10 feet • 50 KV to 200 KV – minimum clearance of 15 feet. • 200 KV or higher – add 5 feet for every 100KV over 200KV If voltage is unknown, maintain at least 20 feet of clearance.				
	Spotter is utilized around overhead obstructions ≤15 feet				
Housekeeping	Proper housekeeping measures implemented				
Repairs	Repairs, when possible, are conducted offsite to reduce the risk of any onsite incidents				
Support Vehicles	Vehicles are road ready (tires, seatbelts, lights, brakes, mirrors, windshield wipers)				
	Trailers are properly hitched with working brake lights				
	Vehicles meet height and weight requirements				
	Equipment is secured.				
Other	First Aid Kit available onsite				
	Proper safety measures on elevated decks				

Comments:

_____
_____
_____
_____

Signature: _____ Date: _____

EHS Support

Issue Date	Sep. 18, 2014
Revision No.	001
Revision Date	Jan. 8, 2019

Personal Air Sampling Form

PROJECT INFORMATION

Project/Company Name	**Project Number**	**Project/Company Location**

Field Technician	**Sample Date**	**Weather Conditions**

Wind Direction/Speed	**Relative Humidity**	**Shift** ☐ Day ☐ Evening ☐ Night **Shift Length** _____ hours

Sample Location ☐ Indoor ☐ Outdoor

Location Description:

POTENTIAL HAZARDOUS SOURCE(S)

☐ Non-Ionizing Radiation: Type (e.g. microwave, radiofrequency, infrared): _____

☐ Inhalation – Type: ☐ Metal: _____ ☐ Dust: _____ ☐ Mist _____ ☐ Acid: _____

☐ Base: _____ ☐ Solvent: _____ ☐ Fumes: _____ ☐ Other: _____

☐ Biological Inhalation – Type: ☐ Mold ☐ Bacteria ☐ Other: _____

☐ Blank (Air not drawn through media) Location: _____

Area Sample: ☐ Source ☐ Background (located at area not impacted by source) ☐ Other: _____

Frequency of Operation: ☐ Daily ☐ 2–3/Week ☐ Weekly ☐ 2–3/Month ☐ Monthly ☐ ___/Year ☐ Yearly ☐ Other ___

Duration of Operation: ☐ <15 min ☐ 15–30 min ☐ 30–60 min ☐ 1–4 hours ☐ 4–6 hours ☐ 6–8 hours ☐ >8 hours

Exposure Represents: ☐ Typical Work Activity ☐ Typical Area Conditions ☐ Unusual Event: _____

Comments: _____

Employee Name or ID _____ Job Title _____ Job Performed _____

Balance of Day: ☐ Balance of Shift Represented by Sampling Period ☐ Balance of Shift had No Exposure to Contaminant or Source

Type of PPE Used (respirator, open face, closed face, shield, gloves, body protections, etc.):_____

Pump Make and Model: _____

Pump SN: _____

Pump Number: _____

Sampler Type: ☐ Filter ☐ Passive Badge ☐ Tubes

Filter Type: ☐ PVC ☐ PTFE ☐ MCEF ☐

Other: _____

Filter Diameter: ____ mm Filter Pore Size ____ µm

Passive Badge or Tube Type: _____

Media Expiration Date: _____

Sample Inlet ☐ BZ (Worn on Lapel)

☐ (Fixed BZ (Location near nose/mouth)

Total Volume Pumped (mL or L): _____

Pump Operation	**Calibration by**	**Temp** **°F / °C**	**Flow** **__L/min**	**Sampling Time** **On**	**Off**
Pre Sample					
Post Sample					
Average/ Totals			Ave. Flow	Sample Time (min)	

Comments:

Sample ID	Time	Analyses	QA/QC Sample	Remarks

Metals (Pb, Be, Cu, Al, Cr, Ni, etc.)
Dusts (nuisance, silica, asbestos, fiberglass, insulation, etc.)
Mists (spray inhalation, painting, fluxes)
Fumes (welding, brazing torch cutting, glues, etc.)
Acids (hydrochloric, sulfuric)
Bases (sodium hydroxide)
PVC – Polyvinyl Chloride
PTFE – Teflon
MCE – Mixes Celluose Ester
BZ – Breathing Zone

Signature: _____ Date: _____

EHS Support

Issue Date	May 21, 2014
Revision No.	001
Revision Date	Jan. 8, 2019

Site Visitor Sign-In Log

Site Name: _____ **Date:** _____

Name (Please Print)	Organization	Email	Telephone Number	Time	Reason for Visit

SOP 3 –UTILITY CLEARANCE

Application:

The purpose of this procedure is to ensure that all aboveground and subsurface utilities (e.g., electrical lines, gas lines, telephone lines, etc.) are located and marked before initiating any intrusive activities (drilling, test pits, trenching) or using long handled tools or equipment (e.g., back hoes, drill rigs) that can impact overhead lines. Compliance with this procedure will allow the work to be conducted safely and will minimize the potential for damaging utilities.

Materials:

EHS Utility Clearance (UC) Checklist (**Attachment 1**)
Bound field log book
Black or blue ink pens
Wooden stakes
Spray paint
Camera
Flagging tape
Hand auger or post-hole digger
Facility as-built drawings
Replacement batteries or parts for instruments (if applicable)

Procedure:

Pre-site Mobilization

1. The EHS UC Checklist will be completed by a competent person prior to commencement of intrusive activities, and any variance request must be reviewed and approved by the EHS project manager prior to initiating the intrusive work or using long handled tools or equipment (e.g., back hoes, drill rigs) that can impact overhead lines. The UC Checklist includes minimum clearance requirements and is to be used in addition to consultant-specific requirements. Please ensure that the EHS Support project manager, the client project manager, and all field personnel actively participate in the planning of proposed work locations and the utility clearance procedures.

2. Gather information on the on-site and off-site areas where activities will be conducted. This information should include the following:

- Site address
- Nearest cross street or street intersection
- Map grid (if applicable)
- Site boundaries
- As-built drawings

3. Before start of subsurface activities, place a call to the federally-mandated national "Call Before You Dig" number, 811, at least 72 hours prior to field activities. State specific information can be found on the "Call Before You Dig" website: www.call811.com. Provide the utility locating service with any information they request concerning the site and work activity in order to locate utilities at the site. (In California, the proposed drilling locations must be marked with white spray paint before contacting the locating services.) The date of call, utility clearance ticket number and utilities to be located should be documented in EHS UC Checklist (see **Attachment 1**). The ticket number will be used by the various

utility companies to reference the clearance request (see note below). The public utility companies will typically mark their lines up to the property lines unless a junction box or meter is present on the site. However, request that the utility companies mark their utilities in the work areas on the site.

Note: Some utilities (e.g., sewer, water, cable TV) may not be included with the utility locating service. These utility companies will have to be contacted directly by EHS Support for clearance before the start of intrusive activities.

a. If the site is located on private property, three lines of evidence, at a minimum, shall be obtained. Lines of evidence may include:
As-built drawings
Statement from and site walk with site contact who is familiar with property
Marked utilities
Use of hand-held magnetic or magnetic-cable locating device to clear work area
Ground penetrating radar

b. If three lines of evidence cannot be obtained, or where uncertainty exists concerning the presence of underground utilities, a private utility locating company must be used to mark utilities. In this case, the private utility locating company shall provide a detailed and scaled drawing of utilities located on-site. The competent person should request a field sketch or drawing of identified utilities from the private utility locating company before the locator leaves the site.

4. Prior to working with tools and equipment that can impact overhead lines, survey the site for overhead lines. Look up! Consider all overhead lines as energized until the electric utility indicates otherwise or an electrician verifies that that the line is not energized and has been grounded.

    a. If overhead lines are present, call the utility company and find out what voltage is on the lines. Ask if the utility company can shut off the lines while you are working near them.
    b. If overhead lines cannot be shut down, ask the utility company if they can install insulation near the lines during the time you will be working near them.

Site Mobilization

1. Verify that all utility companies listed by the locating service(s) have marked all underground lines in the area and whether the lines have been marked.

2. Take photographs and detailed documentation of ground markings, flags, overhead lines, etc. in the case that the markings are washed away. Photo documentation and associated drawings must be onsite and cross-checked prior to intrusive activities.

3. Conduct a site walk prior to field activities. Review all available as-built utility diagrams and plans with the site contact to identify other potential areas where underground lines may be present. Check the drawings to ensure they are as-builts and not design plans. During the site walk, attempt to obtain a general knowledge of the types of utilities present in the work areas. Check to see whether major electrical lines are aboveground. In addition to being a potential hazard for aboveground work, the presence of aboveground lines may indicate that there are non-underground lines in that portion of the site. Underground sewer lines may be traced using the locations of manholes and storm water grates.

Note: As-built drawings are not always accurate for locating underground lines.

4. Clear each proposed work area with the performing contractor using utility markings, photographs, drawings, etc.

a. For subsurface activities, a minimum of five feet clearance should exist between utilities and proposed drilling locations; if five feet of horizontal clearance is not possible, manual clearance to a minimum of six feet below ground surface AND a minimum width of 120% of the boring diameter is required. If a utility conflict is identified, adjust the proposed location(s) using the criteria given above. If a drilling/boring location is located outside the five foot clearance zone, a manual clearance is only required four feet below ground surface.

b. If aboveground lines cannot be shut down and/or insulation applied, a minimum safe distance of 20 feet must be established. Have a brief job site meeting to discuss the planned work as it relates to power lines and identify tools and equipment that could come into contact with the lines. Consider the need for a designated person to monitor activities around the lines.

i. Only use nonconductive ladders when working near overhead power lines.

ii. Employees are not permitted to approach or carry any conductive object closer than 10 feet to an energized line.

5. Discuss the site conditions with the subcontractor (e.g., driller, excavator), and recommend that care be used at the start of the field activities. Field personnel should always consider the presence of unidentified utilities at each work area. Ensure the work is conducted safely.

6. If the scope of the field activities expands to a new on-site or off-site area(s) that have not been previously cleared, the above UC procedures must be followed beginning with public and private utility markout. (Remember, the new request will require another 72-hour period before all underground utilities can be cleared.)

Utility Strike

1. Utility strikes (unplanned contact with utilities resulting in damage to the utility or its protective coating) shall be reported in accordance with the EHS Support Incident Reporting Procedure – EHSMS 8.1, utilizing the Damage Information Reporting Tool (DIRT) form (see Attachment 2).

2. All damaged utilities shall be repaired by a qualified and/or licensed professional.

Training

1. Conduct a briefing for site employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the methods used to isolate the utility and the hazards presented by breaching the isolation.