EA Engineering, P.C. and Its Affiliate
EA Science and Technology

269 W. Jefferson Street
Syracuse, NY 13202
Telephone: 315-431-4610
www.eaest.com

8 March 2024

Mr. Jacky Luo
Project Manager
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

RE: Letter Work Plan for Site Characterization
Contract/Work Assignment No: D009806-39
Site/Spill No.: Sulphur Springs Road Fill Area (Site No. 754020)
Owego, Tioga County, New York

Dear Mr. Luo:

This letter work plan describes the activities proposed for the performance of a site characterization (SC) at the Sulphur Springs Road Fill Area (New York State Department of Environmental Conservation [NYSDEC] Site No. 754020) located in Owego, Tioga County, New York (**Figure 1**).

1. SITE DESCRIPTION AND HISTORY

The Sulphur Springs Road Fill Area site, hereinafter referred to as the Site, is approximately 1 acre in size and located in a rural area. The Site lies on the east side of Sulphur Springs Road, approximately 500 feet (ft) south of Interstate 86 in the Town of Owego. The Site is bounded to the east by an undeveloped parcel, to the north by an inactive truck depot (NYSDEC "N" Site No. 754017), to the west by a closed landfill referred to as the Chandler Landfill Site (NYSDEC Site No. 754001) and to the south by a garage and sawmill. The Susquehanna River is approximately one quarter of a mile to the north of the Site. The Site is zoned for commercial use as a sawmill/lumber yard, which is not currently active. Surrounding parcels to the south and east are residential. The Site slopes up slightly from the road. No buildings occupy the Site. There are multiple large mounds and berms of soil and debris visible on the northern edge of the property.

Overburden in the Susquehanna River valley is primarily sand and gravel deposited by glacial outwash overlain by silty floodplain alluvium with interbedded clay. Bedrock is primarily shale and siltstone. Depth to bedrock on the adjacent Chandler Landfill Site was recorded to be approximately 26 ft below ground surface (bgs). The approximate depth to groundwater in MW-6S, located approximately 250 ft west-northwest on the Chandler Landfill site[1], is 12-14 ft bgs. Regional overburden groundwater flows to the north towards the Susquehanna River, which has been confirmed by groundwater elevation measurements at the adjacent Chandler Landfill Site.

[1] ENSR Consulting and Engineering. 1991. *Remedial Investigation Report, Chandler Landfill Site, Owego, New York.* May.

There is an ephemeral stream adjacent to the east side of the Site boundary, as shown on **Figure 1**.

The past use of the Site is unknown at this time but will be better defined during the SC. Discussions with the property owner suggest that dumping of construction debris, motor vehicles, and chemicals occurred from the early 1970s through the 1990s. The nature and extent of contamination at the Site has not been determined.

The SC will determine if past uses of the Site have impacted soil, groundwater, or surface water at the Site.

2. PREVIOUS INVESTIGATIONS

A preliminary site assessment of the adjacent, down-gradient Sulphur Springs Road site (inactive truck depot) conducted in 2000 by Harding Lawson Associates[2] identified groundwater contaminated with volatile organic compounds (VOCs) such as 1,1,1-Trichloroethane (TCA) at concentrations up to 15 parts per million on the shared border with the Site. Concentrations were observed to increase towards the border of the Site. 1,1,1-Trichloroethane and trichloroethene were the primary VOCs detected above groundwater standards. The private well on the Site (PW-1, shown on **Figure 2**) contained concentrations of 1,1,1-TCA, 1,1-dichloroethane, 1,2-dichloroethene, and trichloroethene exceeding the NYSDEC Ambient Water Quality Standards[3]. At the time of the preliminary site assessment of the adjacent site, mounded debris and/or soil piles were observed on the edge of the Site and identified as possible sources of contamination. A supplemental soil sampling event was conducted by Harding Lawson Associates that consisted of the collection of three vadose zone soil samples in the northern corner of the [Sulphur Springs Road Fill Area] Site near the mounded debris piles[4]; one of the samples collected from 7-9 ft below ground surface contained acetone, 2-butanone, and chlorobenzene above 6 New York Code of Rules and Regulations Part 375 Unrestricted Use Soil Cleanup Objectives. Communications with the site owner at that time indicated that the debris piles contained construction debris.

3. SITE CHARACTERIZATION

The objective of the SC is to determine whether the site poses any level of threat to public health and the environment, and if the threat requires further investigation. A records search and field investigation will be conducted for this SC. Site soil, groundwater, surface water, and off-site groundwater will be evaluated for the presence of VOCs and metals, with select media being evaluated for the presence of 1,4-dioxane, and per- and polyfluoroalkyl substances (PFAS).

[2] Harding Lawson Associates. 2000. *Preliminary Site Assessment Data Summary Report Sulphur Springs Road Site Owego, New York.* November.
[3] New York State Department of Environmental Conservation Department of Water. 1998. *Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.* June.
[4] Harding Lawson Associates. 2001. *Supplemental Soil Sampling and Analysis, Sulphur Springs Road Site, Owego, NY.* December.

The scope of the SC will include the following activities:

- Installation of up to 12 soil borings to bedrock
- One surface soil sample and an average of two subsurface soil samples will be collected from each soil boring location and analyzed for VOCs and metals
- Up to seven of the soil borings will be used for the installation of monitoring wells
- Newly installed monitoring wells will be developed
- Collection of groundwater levels from site monitoring wells and seven off-site monitoring wells
- Groundwater samples will be collected from the newly installed wells and seven off-site monitoring wells and analyzed for VOCs, metals, and 1,4-dioxane; samples from three on-site monitoring wells will be analyzed for PFAS
- Surface water samples will be collected from three locations along an ephemeral stream located along the eastern boundary of the Site and a drainage ditch located along the northern boundary of the Site
- At the request of the New York State Department of Health, samples will be collected from four local potable wells and analyzed for VOCs and metals
- Site topography and features, including all new monitoring wells and soil boring locations will be surveyed by a licensed surveyor.

In total, it is estimated that up to 12 surface soil, 24 subsurface soil, 18 groundwater and 4 surface water samples will be collected during SC activities.

4. FIELD ACTIVITIES

All on-site field activities will be performed in accordance with EA Engineering, P.C. and its affiliate EA Science and Technology's (EA's) Generic Quality Assurance Project Plan[5], Health and Safety Plan[6], and Field Activities Plan (FAP)[7] for Work Assignments under the NYSDEC Standby Contract No. D0098906. A schedule is provided as **Attachment A.** A Site-specific Health and Safety Plan Addendum is included as **Attachment C**.

[5] EA. 2020. *Generic Quality Assurance Project Plan for Work Assignments under NYSDEC Contract D009806. Revision 01.* April.
[6] EA. 2020. *Generic Health and Safety Plan for Work Assignments under NYSDEC Contract D009806. Revision 01.* March.
[7] EA. 2023. *Generic Field Activities Plan for Work Assignments under NYSDEC Contract D009806. Revision 02.* March.

Utility Clearance

Prior to field activities, EA's subcontractor Summit Drilling LLC (Summit) will contact Dig Safely New York so that public utilities may be marked out. Copies of all Dig Safely notifications and responses will be provided to EA prior to field activities.

Soil Borings

EA's subcontractor will install 12 soil borings at the Site and surrounding area under supervision by an EA geologist. Proposed locations are shown on **Figure 3** but are subject to change based on field conditions. The subcontractor will hand-clear each soil boring to 5 ft bgs to confirm no utility interference exists at each soil boring. The subcontractor will advance borings with an all-terrain, tracked rotosonic drilling unit. Borings will be advanced to the top of bedrock or a maximum depth of 50 ft bgs with continuous sampling of the soil.

Soil Logging and Sampling

An EA geologist will complete soil logging and classification following ASTM Method D 2488. Blank boring log forms are provided in **Attachment B**. At a minimum, the following information will be recorded on boring logs:

- Date/times drilling occurred
- Subsurface interval and recovery
- Headspace photoionization detector (PID) readings
- Lithology description in accordance with the Unified Soil Classification System (USCS) ASTM Method D2487 (including USCS code, soil type, color, grain size and shape, texture, moisture content, density, consistency, etc.)
- Any unusual characteristics (e.g. odor, sheens, staining, debris, etc.)
- Depth to water
- Borehole depth

Soil samples for chemical analysis will be collected per the following protocols:

- One surface soil sample per boring location from the top 0 to 6-inch interval
- One subsurface soil sample per boring location from the highest PID reading in the vadose zone, or just above the groundwater interface

- One subsurface soil sample per boring location from the highest PID reading below the water table, or just above bedrock/bottom of the boring (maximum depth of 50 ft)

Surface soil and subsurface soil samples will be collected as grab samples with a Terra Core™ sampler from the center of the 0 to 6-inch discreet soil sample interval for analysis of VOCs via U.S. Environmental Protection Agency (EPA) Method 8260. Target Analyte List (TAL) metals via EPA Method 6010 and moisture content samples will be collected from an entire discrete soil sample interval and homogenized with non-dedicated sampling equipment prior to being put into sample containers. **Table 1** summarizes the number of soil samples to be collected, quality assurance (QA)/quality control (QC) samples, sample identifications (IDs), and sample analyses.

All drill cuttings and soil generated during soil boring advancement, logging, and sampling will be containerized in New York State Department of Transportation (NYSDOT) approved 55-gallon steel drums labeled and stored on-site at a central waste accumulation area for future disposal by EA.

Monitoring Well Installation

Monitoring well installation will be conducted in accordance with EA Standard Operating Procedure No. 019, provided as an appendix to the generic FAP[7].

Following reaching desired depth of soil borings, up to seven soil borings will be converted to permanent 2-inch diameter monitoring wells. PID readings, visual, and olfactory indicators from soil borings will be considered when selecting soil borings to be converted to permanent monitoring wells and screen intervals. The EA field geologist will communicate with the EA project manager to select final monitoring well installation locations.

Monitoring wells will be constructed of 2-inch diameter polyvinyl chloride (PVC) casings with 10-ft long, #10-slot Schedule 40 PVC screens. The annulus around the outside of the monitoring well screen will be backfilled with US Silica #0 or equivalent sand to 2 ft above the screen, followed by a 2-ft minimum bentonite seal, then grouted with a bentonite/cement mixture to grade. Each monitoring well will be completed with a 4-inch diameter steel protective stick-up casing with a vented locking adjustable cap with a 2-ft by 2-ft concrete pad. Soil borings that will not be converted to monitoring wells will be tremie grouted from bottom to top using a bentonite/cement grout.

The construction of each well will be depicted as built in a well construction diagram. A blank monitoring well construction diagram form is included in **Attachment B**. The diagram will be attached to the boring log and will graphically denote:

- Borehole depth
- Screen location and length
- Granular filter pack
- Seal
- Grout

- Height of riser
- Protective casing detail
- Water level on the construction date

Decontamination Procedures

Summit will be required to decontaminate all drilling equipment between drilling locations utilizing a steam cleaner and potable water. A temporary decontamination pad will be built to contain all decontamination water. All decontamination water will be containerized in NYSDOT 55-gallon steel drums, labeled and stored on-site at a centralized waste accumulation area for future disposal by EA.

Monitoring Well Development

Monitoring well development will be conducted in accordance with EA Standard Operating Procedure No. 019, provided as an appendix to the generic FAP[7].

All newly installed monitoring wells will be developed by EA. Well development will be initiated no sooner than 48 hours after but no longer than 7 calendar days following well grouting and/or placement of surface protection. Two well development techniques, over pumping and surging, will be employed in tandem. Over pumping is simply pumping the well at a rate higher than recharge. Surging is the operation of a plunger-like device (e.g., surge block) up and down within the well casing similar to a piston in a cylinder.

At a minimum, development will remove 3 to 5 well volumes of water. One development volume is defined as (1) equivalent volume, plus (2) the amount of fluid lost during drilling, plus (3) the volume of water used in filter pack placement.

Water quality parameters (temperature, pH, conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity) will be recorded by an EA geologist on a monitoring well development log (**Attachment B**) after removing 2, 2.5, and 3 well volumes of water. If these parameters have stabilized over three readings, the well will be considered developed. If the parameters have not stabilized after these three readings, the EA geologist will stop surging but continue pumping the well, monitoring the stabilization parameters every half well volume. When the parameters have stabilized over three consecutive readings at half development volume intervals, the well will be considered developed.

All water generated during monitoring well development activities will be containerized in NYSDOT 55-gallon steel drums, labeled and stored on-site at a centralized waste accumulation area for future disposal by EA.

Groundwater Monitoring Well Sampling

EA will conduct one groundwater sampling event inclusive of the seven newly installed on-site monitoring wells and seven off-site wells associated with the Chandler Landfill Site. Off-site

groundwater sampling locations are shown on **Figure 2**. Monitoring wells will be purged prior to sampling in accordance with the EA Generic FAP[7]. During well purging, EA will monitor water level and water quality (including temperature, pH, conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity). Stability parameters will be logged on a groundwater monitoring well purge form provided in **Attachment B**. Water samples will be collected following stabilization of parameters in accordance with the EA Generic FAP[7].

Groundwater samples will be analyzed for VOCs via EPA Method 8260, TAL metals via EPA Method 6010, 1,4-dioxane via EPA Method 8270 SIM. Three samples will be analyzed for PFAS via EPA Method 1633.

Table 1 provides a summary of the number of groundwater samples to be collected, QA/QC samples, sample IDs, and sample analyses.

All water generated during monitoring well sampling activities will be purged through granular activated carbon (if headspace PID reading is low and not visibly contaminated) or containerized in NYSDOT 55-gallon steel drums, labeled, and stored on-site at a centralized waste accumulation area for future disposal by EA.

Surface Water Sampling

EA will conduct a round of surface water sampling from the ephemeral stream on the east side of the Site and the drainage ditch on the north side of the Site. Four surface water grab samples will be collected at locations shown on **Figure 4**. Each sample will be marked with a Global Positioning System unit to record sampling coordinates and mark sampling locations on a site map. Photographs and descriptions of each surface water sampling location will be recorded. A measurement of surface water quality parameters will be collected with a handheld water quality meter; these results will be recorded on a surface water sample collection form (**Attachment B**). Samples will be collected starting with the downstream location and working upstream, to avoid disturbance of sediments. Samples will be collected from the top of the water column by submerging a laboratory-provided bottle into the water and then transferring the collected water into a preserved sample bottle.

Surface water samples will be analyzed for VOCs via EPA Method 8260 and TAL metals via EPA Method 6010. **Table 1** summarizes the number of surface water samples to be collected, QA/QC samples, sample IDs, and sample analyses.

Private Water Supply Wells Sample Collection

EA will collect samples from four private water supply wells on and near the vicinity of the Site. The wells will be sampled from taps/faucets if available. Each tap/faucet will be turned on and permitted to purge for 15 minutes prior to sample collection. Water quality parameters will be recorded on a well sample collection form (**Attachment B**) prior to filling sample containers.

Private water supply well samples will be analyzed for Purgeable Organics via EPA Method 524.2, TAL metals via EPA Method 6010, and 1,4-dioxane via EPA Method 8270 SIM. **Table 1**

summarizes the number of private water supply well samples to be collected, QA/QC samples, sample IDs, and sample analyses.

Investigation-Derived Waste

Investigation-derived waste (IDW) including personal protective equipment, solids, and liquids generated during monitoring well installation, development, and sampling activities will be containerized in NYSDOT approved 55-gallon steel drums. Drummed materials will be clearly labeled as to their contents and origin. An IDW log (**Attachment B**) will be updated as drums are filled for reference at later times. Drums will undergo waste characterization sampling to select the appropriate disposal facility. Characterization sampling of IDW will consist of laboratory analysis for Toxic Characteristic Leaching Procedure for VOCs, semivolatile organic compounds, nonhalogenated organics, metals, ignitability, cyanide, sulfide, and pH. Drums will be transported off-site by a disposal contractor to be determined following IDW characterization.

Site Survey

HUNT EAS, a licensed land surveyor from Binghamton, New York will perform a comprehensive Site survey in vertical datum North American Vertical Datum of 1988 and horizontal datum North American Datum of 1983 (2011), New York State Plane Central Zone 3102 to collect the following data:

- High resolution topographic survey (i.e., 1-ft contours)
- Tree trunk diameters and drip lines (trees over 4 inches in diameter)
- Surface identification – exposed soil, vegetated areas, concrete foundations, pavement, bedrock, etc.
- Streams, surface drains, culverts (pipe material, diameter, condition, etc.)
- Property lines/benchmarks, property dimensions
- Easements/right-of-way
- Roads/vehicle traffic
- Fencing/barriers – location, type, description
- Spot elevations of topographic features: grade breaks, high points, swales, and berms
- Buildings/structures, measure position and elevation of corners, overhangs, roof drains
- Monitoring wells (ground surface, outer casing elevation, inner PVC casing elevation)
- Soil borings (ground surface)

- Identify locations of all utilities (surface, underground, overhead) by type – power, gas, sanitary/storm sewer, phone, domestic water, irrigation, telecommunications, etc.

The subcontractor will also provide an AutoCAD dwg file with a triangular irregular network surface generated from field located points and feature lines. These features will be used in the reporting phase of the SC.

5. SITE CHARACTERIZATION REPORT

EA will prepare a report summarizing field activities and analytical results following completion of the investigation. The report will include at a minimum:

- Summary of field activities, including daily field reports, photographs, soil boring logs, monitoring well construction diagrams, groundwater purge forms, surface water collection forms, equipment and equipment calibration logs
- Summary of on-site and off-site contaminants of concern
- Summary of analytical results with tables and figures depicting groundwater elevation contours, analytical results, and surveyed Site features
- Conclusions and recommendations

Analytical data will be validated by a third-party data validator (Environmental Data Services, Inc.) and uploaded to the EQuIS database system.

Please feel free to contact me if you have any questions or concerns at: 315-565-6557.

Sincerely yours,

EA SCIENCE AND TECHNOLOGY

Megan Miller
Project Manager

EA ENGINEERING, P.C.

Donald F. Conan, P.E., P.G.
Program Manager

Tables

Figures

Attachments

Tables

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Table 1. Sample Summary

Matrix	Quantity	QA/QC Samples				Location	Sample Type	Sample ID	Analysis
		FD	MS/ MSD	RB	TB*				
Field Samples									
Surface Soil (0-6 in.)	12	2	4	2	5	On-site	Grab Sample	754020-SS-XX-DDMMYY	VOCs 8260D, Metals 6010, Moisture Content
Subsurface Soil	24					On-site	Grab Sample	754020-SB-XX-XX-XX-DDMMYY	VOCs 8260D, Metals 6010, Moisture Content
Surface Water	4	1	2	0	1	Off-site	Grab Sample	754020-SW-XX-DDMMYY	VOCs 8260D, TAL Metals 6010
Drinking Water	4	1	2	0	1	On-site and Off-site	Grab Sample	754020-PW-XX-DDMMYY	Purgeable Organics 524.2, TAL Metals 6010, 1,4-Dioxane 8270 SIM
Groundwater	7	1	2	0	1	On-site	Grab Sample	754020-MW-XX-DDMMYY	VOCs 8260D, TAL Metals 6010, 1,4-Dioxane 8270 SIM, PFAS 1633[2]
Groundwater	7					Off-site	Grab Sample	754020-Chandler-MW-XX-DDMMYY	VOCs 8260D, TAL Metals 6010, 1,4-Dioxane 8270 SIM
IDW Samples									
Solid IDW	Composite sample of solid IDW drums (1 per 10 drums)					On-site	Composite Sample	754020-IDW-1-DDMMYYYY	TCLP - VOCs (8260D), TCLP (RCRA 8) Metals (6010C/7471), SVOCs (8270D), Nonhalogenated Organics (8015), Ignitability (1311), Reactivity (846 7.3CN and 846 7.3), pH (4500)
Liquid IDW	Composite sample of liquid IDW drums (1 per 10 drums)					On-site	Composite Sample	754020-IDW-1-DDMMYYYY	TCLP - VOCs (8260D), RCRA 8 Metals (6010C/7471), 8270D SVOCs, Nonhalogenated Organics (8015), Ignitability (1311), Reactivity (846 7.3CN and 846 7.3), pH (4500)

Notes:

1 Sampling depth for groundwater is estimated and will need to be confirmed and adjusted if needed based on field conditions.

2 Three on-site monitoring wells will be sampled for PFAS

FD = Field duplicate

ft = Foot (feet)

GW = Groundwater

IDW = Investigation-derived waste

in. = Inch(es)

MS = Matrix spike

MSD = Matrix spike duplicate

PFAS = Per- and polyfluoroalkyl substances

QA = Quality assurance

QC = Quality control

RB = Rinsate blank

SIM = Selected ion monitoring

TAL = Target Analyte List

TB = Trip blank

TCLP = Toxicity Characteristic Leaching Procedure

VOC = Volatile organic compound

Equipment blanks will be performed daily when nondedicated equipment is used. Field blank and equipment blank quantities are estimated and subject to change based on duration of field activities.

Matrix spike/matrix spike duplicate samples will be collected at a ratio of 1 per 20 samples.

Trip Blanks will be assigned to each shipment as "TB-DDMMYYYY""

PFAS 1633 method includes 40 compounds.

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Figures

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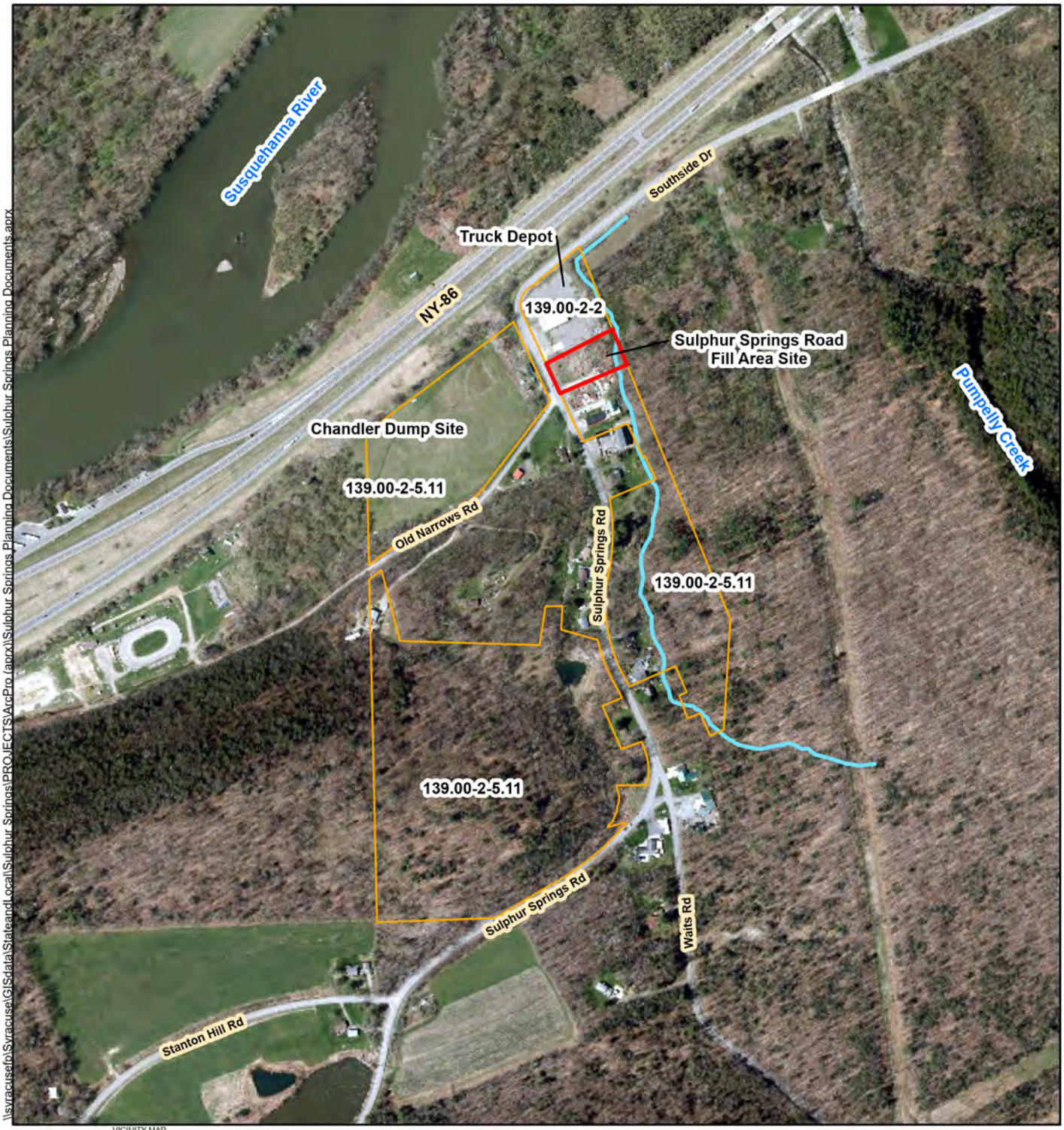

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VICINITY MAP

Legend

- Site Boundary
- 139.00-2-5.11 Tax Parcel (with Parcel ID)
- Ephemeral Stream (Approximate Footprint)

0 250 500
Feet

N

Figure 1
Site Location
Sulphur Springs Road Fill Area Site
Owego, New York

Map Date: 3/4/2024
Projection: NAD 1983 (2011) State Plane New York Central FIPS 3102 (US Feet)
Source: Esri, NYS GIS Clearinghouse

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VICINITY MAP

Legend

- Site Boundary
- Tax Parcel
- Ephemeral Stream (Approximate Footprint)
- Proposed Soil Boring

Notes:

-Proposed soil boring locations are subject to change and will be adjusted according to site conditions.

-Up to 7 of the proposed 12 soil borings will be converted to permanent groundwater monitoring wells to be sampled as part of the site characterization.

0 25 50

Feet

N

Figure 2
Proposed Soil Boring Locations
Sulphur Springs Road Fill Area Site
Owego, New York

Map Date: 3/4/2024
Projection: NAD 1983 (2011) State Plane New York Central FIPS 3102 (US Feet)
Source: Esri, NYS GIS Clearinghouse

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VICINITY MAP

Legend

- Site Boundary
- Tax Parcel
- Ephemeral Stream (Approximate Footprint)
- Groundwater Monitoring Well
- Private Water Supply Well

N

0 100 200

Feet

Map Date: 3/4/2024
Projection: NAD 1983 (2011) State Plane New York Central FIPS 3102 (US Feet)
Source: Esri, NYS GIS Clearinghouse

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Figure 3
Offsite Groundwater Monitoring Well and Private Water Supply Well Sampling Locations
Sulphur Springs Road Fill Area Site
Owego, New York

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VICINITY MAP

Legend

- Site Boundary
- Tax Parcel
- Ditch (Approximate)
- Ephemeral Stream (Approximate Footprint)
- Proposed Surface Water Sample

0 25 50
Feet

N

Figure 4
Proposed Surface Water Sampling Locations
Sulphur Springs Road Fill Area Site
Owego, New York

Map Date: 3/4/2024
Projection: NAD 1983 (2011) State Plane New York Central FIPS 3102 (US Feet)
Source: Esri, NYS GIS Clearinghouse

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Attachment A

Project Schedule

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Project Schedule
Sulphur Springs Road Fill Area SC (Site No. 754020)
Owego, NY

Project Name	Days	Start	End	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
Sulphur Springs Road Fill Area Site - Site Characterization																	
Task 1 - Preliminary Activities																	
WA Issuance / NTP	0	14-Nov-23	14-Nov-23														
Develop WA Package	55	14-Nov-23	12-Jan-24														
NYSDEC Review of WA Package	32	12-Jan-24	13-Feb-24														
WA Approval	0	13-Feb-24	13-Feb-24														
Task 2 - Site Characterization Investigation																	
Site Characterization (SC) Letter Work Plan	24	13-Feb-24	8-Mar-24														
NYSDEC Review	24	8-Mar-24	1-Apr-24														
SC Letter Work Plan Approval	0	1-Apr-24	1-Apr-24														
SC Field Activities - Mobilization 1: Soil boring, soil sampling and well installation/development	12	17-Apr-24	29-Apr-24														
SC Field Activities - Mobilization 2: Groundwater, private well and surface water sampling	5	13-May-24	18-May-24														
Laboratory Analysis and Data Validation	120	18-May-24	15-Sep-24														
Task 3 - Site Characterization Report																	
Develop Draft SC Report	60	8-Jun-24	7-Aug-24														
NYSDEC Review of Draft SC Report	30	7-Aug-24	6-Sep-24														
Revisions to Draft, Submit Final SC Report	14	15-Sep-24	29-Sep-24														
NYSDEC Approval of Final SC Report	14	29-Sep-24	13-Oct-24														

Note: report development will begin following initial SC field activities, and will be updated as additional information is collected and/or received.

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Attachment B

Field Forms

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FIELD CALIBRATION FORM

Site Name:

INSTRUMENT:	INSTRUMENT ID No:
OPERATOR:	WEATHER:
SPAN GAS TYPE:	DATE:
CALIBRATION NOTES:	
COMMENTS:	
SIGNATURE:	DATE:

FIELD CALIBRATION FORM
Horiba U-52
pH, CONDUCTIVITY, AND TURBIDITY

CALIBRATION
DATE:
TIME:
METER ID:

pH CALIBRATION

pH STANDARD	INITIAL READING	FINAL READING
4.0		

CONDUCTIVITY CALIBARATION

CONDUCTIVITY STANDARD	STANDARD READING	FINAL READING
4.49		

TURBIDITY CALIBRATION

STANDARD	INITIAL READING	FINAL READING
0 NTU		

COMMENTS

SIGNATURE

EA Engineering, P.C. and Its Affiliate
EA Science and Technology

SOIL BORING LOG

Coordinates: Northing _____ Easting: _____
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	**Client:** NYSDEC **Project:**	**Location:**
Drilling Method:		**Soil Boring Number:**
Sampling Method:		**Sheet 1 of**

					Drilling	
Water Level:					**Start**	**Finish**
Time:					DATE	DATE
Date:					TIME	TIME

Surface Conditions:
Weather:
Temperature:

Blow Counts (140-lb)	**Ft. Driven/ Ft. Record**	**Boring Diagram**	**PID (ppm)**	**Depth in Feet**	**USCS Log**
				0	
				1	
				2	
				3	
				4	
				5	
				6	
				7	
				8	
				9	
				10	
				11	
				12	
				13	
				14	
				15	
				16	
				17	
				18	
				19	
				20	
				21	
				22	
				23	
				24	
				25	
				26	
				27	
				28	
				29	

Monitoring Well Construction Information

Monitoring Well Diameter: _____ in
Bottom of Monitoring Well: _____ ft bgs
Stick Up or Flush Mount: _____
Screen Interval: _____ To _____ ft bgs
Riser Interval: _____ To _____ ft bgs
Sand Pack Interval: _____ To _____ ft bgs
Bentonite Seal: _____ To _____ ft bgs
Grout Interval: _____ To _____ ft bgs

Soil Vapor Point Installation Information

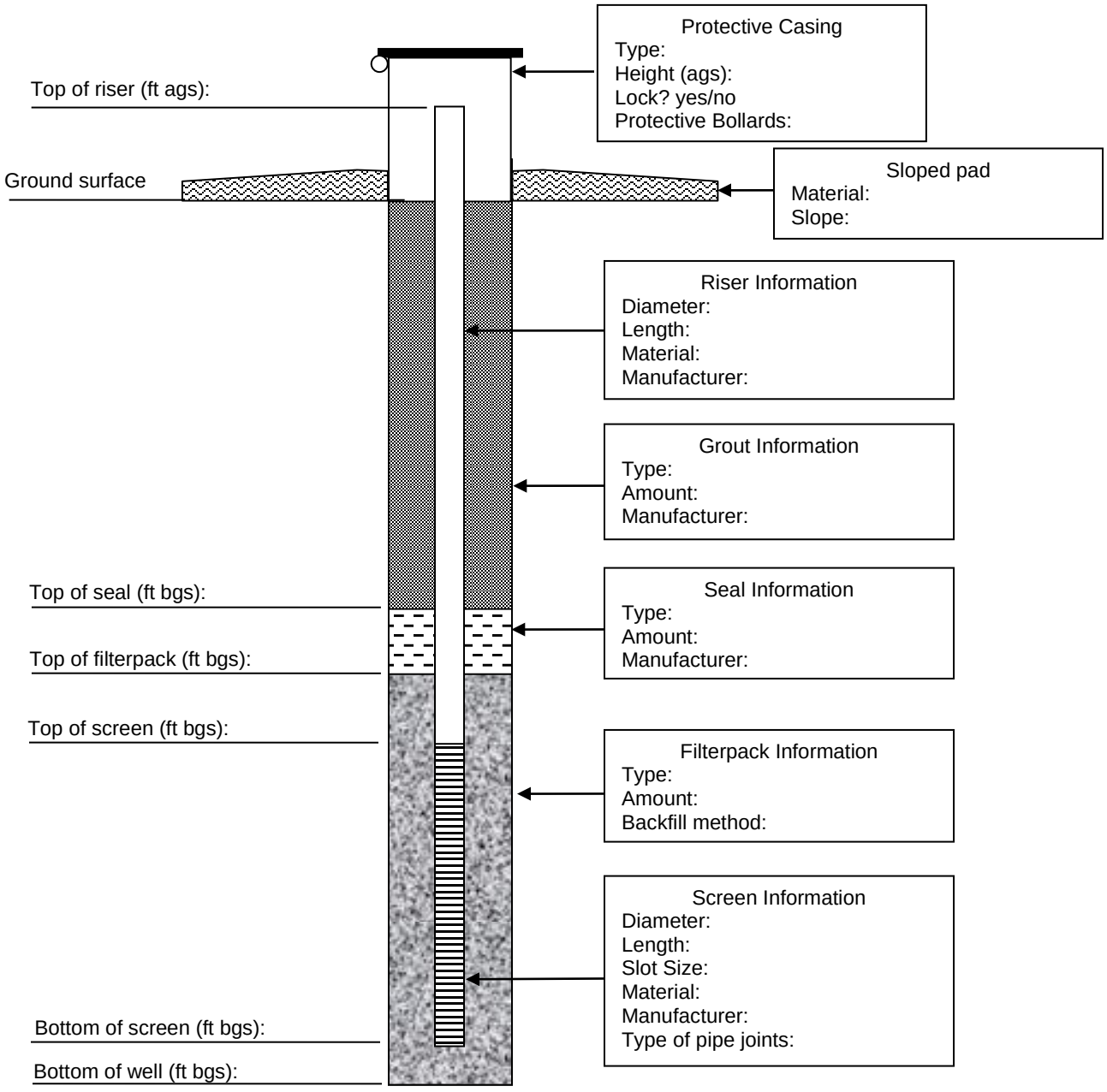
Depth of Soil Vapor Point: _____ ft
Bottom of Tubing: _____ ft
Top of Sand Pack: _____ ft
Top of Bentonite Seal: _____ ft

Logged by: _____ Date: _____
Drilling Contractor: _____ Driller: _____

RECORD OF WELL CONSTRUCTION

(STICK-UP)

EA Engineering, Science, and Technology, Inc., PBC	Well/Soil Boring ID No.:
Project Title/ Project No.:	Date/Time Installed: Time Finished:
Location:	Depth to Water:
Site Geologist:	Drilling Method:



Note: All features not to scale

ags – Above Ground Surface
bgs – Below Ground Surface

EA Engineering, P.C. and Its Affiliate
EA Science and Technology

MONITORING WELL DEVELOPMENT LOG

Well I.D.:	**EA Personnel:**	**Client:** NYSDEC
Location:	**Well Condition:**	**Weather:**
Sounding Method:	**Gauge Date:**	**Measurement Ref:**
	Gauge Time:	
Stick Up/Down (ft):	**PID Headspace Reading:**	**Well Diameter (in):**

Purge Date:	**Purge Time:**
Purge Method:	**Field Technician:**

Well Volume

A. Well Depth (ft):	**D. Well Volume (ft):**	**Depth/Height of Top of PVC:**
B. Depth to Water (ft):	**E. Well Volume (gal) C*D):**	**Pump Type:**
C. Liquid Depth (ft) (A-B):	**F. Three Well Volumes (gal) (E3):**	**Pump Intake Depth:**

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)

Total Quantity of Water Removed (gal): _____ **Personnel:** _____

COMMENTS AND OBSERVATIONS: _____

EA Engineering, P.C.
EA Science and Technology

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

GROUNDWATER SAMPLING PURGE FORM

Well I.D.:	**EA Personnel:**	**Client:** NYSDEC
Location:	**Well Condition:**	**Weather:**
Sounding Method:	**Gauge Date:**	**Measurement Ref:**
Stick Up/Down (ft):	**Gauge Time:**	**Well Diameter (in):**

Purge Date:	**Purge Time:**
Purge Method: Peristaltic Pump	**Field Technician:**

Well Volume

A. Well Depth (ft):	**D. Well Volume (ft):**	**Depth/Height of Top of PVC:**
B. Depth to Water (ft):	**E. Well Volume (gal) C*D):**	**Pump Type:** Peristaltic
C. Liquid Depth (ft) (A-B):	**F. Three Well Volumes (gal) (E3):**	**Pump Intake Depth:**

Water Quality Parameters

Time (hrs) 3-5 min	Temperature (oC) ± 1 °C	pH (pH units) ± 0.1 pH	ORP (mV) ± 10 mV	Conductivity (S/m) ± 3%	Turbidity (ntu) ± 10 NTUs	DO (mg/L) ± 10% / <0.5	DTW (ft btoc) ± 0.3 feet	Rate (Lpm) 0.1-0.5 Lpm	Volume (liters)

Total Quantity of Water Removed (gal): _____ **Sampling Time:** _____
Samplers: _____ **Split Sample With:** _____
Sampling Date: _____ **Sample Type:** _____

COMMENTS AND OBSERVATIONS: _____

EA Engineering, P.C. and Its Affiliate
EA Science and Technology

SURFACE WATER SAMPLE LOG

Job. No.	**Client:** NYSDEC **Project:**	**Location**	
Sampling Location Description:		**Sample Location ID:**	
		Sheet 1 of 1	
Sample Method:			
Depth of Water Body:		**Sampling Date/Time**	
Width of Water Body:		**Start**	**Finish**
Water Body Location		DATE	DATE
		TIME	TIME

Coordinates: Northing: Easting:
Surface Water Elevation:
Reference Elevation:
Reference Description:

	Water Quality Parameters							
	Time	**pH**	**Cond.**	**Turb.**	**DO**	**Temp**	**ORP**	**Surface Conditions:**
	(hrs)	**(pH units)**	**(mS/cm)**	**(ntu)**	**(mg/L)**	**(°C)**	**(mV)**	**Weather:**
								Description of Surface Water

Total Quantity of Water Removed (gal):
Samplers:
Sampling Date:

Sampling Time:
Split Sample With:
Sample Type:

INVESTIGATIVE DERIVED WASTE INVENTORY SHEET

Drum ID	Drum Contents	Monitoring Well ID	Accumulation Start Date	Accumulation End Date	Gallons

(a) Purge water, decontamination fluids

NOTES: ID = Identification
IDW = Investigative Derived Waste

Attachment C

Health and Safety Plan Addendum

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Health and Safety Plan Addendum
Sulphur Springs Road Fill Area Site (754020)
Owego, Tioga County, New York

Prepared for

New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Prepared by

EA Engineering, P.C. and Its Affiliate
EA Science and Technology
269 W. Jefferson Street
Syracuse, New York 13202
315-431-4610

March 2024
EA Project No. 1602539

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Health and Safety Plan Addendum
Sulphur Springs Road Fill Area Site (754020)
Owego, Tioga County, New York

Prepared for

New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Prepared by

EA Engineering, P.C. and Its Affiliate
EA Science and Technology
269 W. Jefferson Street
Syracuse, New York 13202
315-431-4610

8 March 2024

Donald F. Conan, P.E., Program Manager
EA Engineering, P.C.

Date

8 March 2024

Megan Miller, Project Manager
EA Science and Technology

Date

March 2024
EA Project No. 1602539

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TABLE OF CONTENTS

LIST OF APPENDIXES

LIST OF ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
EA	EA Engineering, P.C. and its affiliate EA Science and Technology
HASP	Health and Safety Plan
No.	Number
NYSDEC	New York State Department of Environmental Conservation
OSHA	Occupational Safety and Health Administration
P.E.	Professional Engineer
PPE	Personal protective equipment
SSHO	Site Health and Safety Officer

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1. INTRODUCTION

1.1 GENERAL

A Generic Health and Safety Plan (HASP) (EA Engineering, P.C. and its affiliate EA Science and Technology [EA] 2020)[1] was developed for field activities performed under the New York State Department of Environmental Conservation (NYSDEC) Standby Contract Number (No.) D009806. This HASP Addendum is to supplement the Generic HASP with site-specific information to protect the health and safety of personnel while performing field investigation activities to complete implementation of a Site Characterization for the Sulphur Springs Road Fill Area Site (NYSDEC Site No. 754020) (Site), in Owego, Tioga County, New York

This HASP Addendum describes the safety organization, procedures, and protective equipment that have been established based on an analysis of potential physical, chemical, and biological hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential for accidents or injuries to occur. One copy of the Generic HASP (EA 2020)[1] and this HASP Addendum will be maintained for use during the scheduled field investigation activities. The copies will be made available for site use and employee review at all times.

This HASP Addendum addresses regulations and guidance practices set forth in the Occupational Safety and Health Administration (OSHA) Standards for Construction Industry, 29 Code of Federal Regulations (CFR) 1926, including 29 CFR 1926.65, Hazardous Waste Operations and Emergency Response and 29 CFR 1926.59, Hazardous Communications.

The following are provided as appendixes:

- **Appendix A:** Emergency Telephone Numbers and Hospital Directions
- **Appendix B:** Health and Safety Plan Addendum Review Record
- **Appendix C:** Safety Data Sheets
- **Appendix D:** Site Entry and Exit Log

Note: This site-specific HASP Addendum should be left open to display **Appendix A** (Emergency Telephone Numbers and Hospital Directions) and made available to all site personnel in a conspicuous location for the duration of field investigation activities in the event of an emergency.

[1] EA. 2020. *Generic HASP for Work Assignments under NYSDEC Contract No. D009806. Revision 01.* April.

1.2 SITE DESCRIPTION AND BACKGROUND

The Site, which includes soil, groundwater, surface water, and soil vapor associated with the Sulphur Springs Road Fill Area Site is located at 195 Sulphur Springs Road in Owego, Tioga County, New York (Figure 1 of the Letter Work Plan). The site occupies approximately 1 acre in a rural area. The Site is bounded to the east by an undeveloped parcel, to the north by an inactive truck depot (NYSDEC "N" Site No. 754017), to the west by a closed landfill referred to as the Chandler Landfill Site (NYSDEC Site No. 754001) and to the south by a garage and sawmill. The Susquehanna River is approximately one quarter of a mile to the north of the Site. The Site is zoned for commercial use as a sawmill/lumber yard, which is not currently active. Surrounding parcels to the south and east are residential. The Site slopes up slightly from the road. No buildings occupy the Site. There are multiple large mounds and berms of soil and debris visible on the northern edge of the property.

The past use of the Site is unknown at this time but will be better defined during the SC. Discussions with the property owner suggest that dumping of construction debris, motor vehicles, and chemicals occurred from the early 1970s through the 1990s. The nature and extent of contamination at the Site has not been determined.

1.3 POLICY STATEMENT

EA takes every reasonable step to provide a safe and healthy work environment, and to eliminate or control hazards in order to minimize the possibility of injuries, illnesses, or accidents to site personnel. EA and EA subcontractor employees will be familiar with this HASP Addendum for the project activities they are involved in. Prior to entering the Site, the HASP Addendum will be reviewed and an agreement to comply with the requirements will be signed by EA personnel, subcontractors, and visitors (**Appendix B**).

Operational changes that could affect the health and safety of site personnel, the community, or the environment will not be made without approval from the Project Manager and the Program Health and Safety Officer. This document will be periodically reviewed to ensure it is current and technically correct. Any changes in site conditions and/or the Scope of Work will require a review and modification to the HASP Addendum. Such changes will be documented in the form of a revision to this Addendum.

2. KEY PERSONNEL

The following table contains information on key project personnel.

Title	Name	Telephone Nos.
NYSDEC Project Manager	Jacky Luo	P: 518-402-9676
Program Health and Safety Officer	Rob Marcase	P: 410-329-5192
Program Manager	Donald Conan	M: 315-877-7403
Quality Assurance/Quality Control Officer	Frank Barranco	P: 410-584-7000
Project Manager	Megan Miller	P: 315-565-6557 M: 716-680-2618
Site Manager/SSHO	Lincoln Backman-Lowe	P: 315-930-3763 M: 716-364-7282
Site Geologist	Edward Ashton	P: 315-565-6560 M: 315-551-1161

Notes:
SSHO = Site Safety and Health Officer

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3. SCOPE OF WORK

This HASP Addendum was developed to designate and define site-specific health and safety protocols applicable to project activities to be implemented and followed during field activities and consulting work at the Site. The Scope of Work covered by this HASP Addendum includes the following:

- Surface soil sampling
- Drilling for soil boring installation and sampling and monitoring well installation and development
- Monitoring well gauging and sampling
- Surface water sampling
- Investigation-derived waste storage and disposal

Each of these activities is summarized below and additional detail for each activity is provided in the Letter Work Plan that this HASP Addendum is attached to.

3.1 SURFACE SOIL SAMPLING

Surface soil samples will be collected from 12 points from 0-6 inches depth. Samples will be collected using hand-held equipment, such as a shovel and/or dedicated scoops. It is not anticipated that the field activities will pose a risk to subsurface utilities or generate nuisance odors or dust.

3.2 DRILLING FOR SOIL BORING INSTALLATION AND SAMPLING AND MONITORING WELL INSTALLATION AND DEVELOPMENT

Soil borings will be installed at 12 locations. Dig Safely New York will be called to mark out site utilities. Before drilling at each location, the subcontractor will be required to soft dig each location to a depth of 5 ft bgs. After the utility clearance has been completed, the overburden will be drilled and continuously sampled with a tracked rotosonic drilling unit and subsurface soil samples will be collected from the desired depth intervals. Seven monitoring wells will be installed to the desired depth. Personnel will develop newly installed monitoring wells.

3.3 MONITORING WELL GAUGING AND SAMPLING

EA will collect groundwater samples from locations identified in the Letter Work Plan. Groundwater sampling procedures will include water-level measurements, well purging with a peristaltic pump, field water quality measurements (including dissolved oxygen and oxidation-reduction potential), and sample collection at each well location. Purge water will first be discharged to a 5-gallon carbon vessel before being discharged to the ground surface away from the well, unless otherwise directed by NYSDEC. If non-aqueous phase liquid or an odor is observed, or if directed by NYSDEC, the purge water will be containerized, handled, and disposed of with other investigation-derived waste detailed in the Letter Work Plan.

3.4 SURFACE WATER SAMPLING

A total of four surface water samples will be collected from an ephemeral stream to the east of the site and from a drainage ditch along the northern boundary. The samples will be collected using a clean jar and transferred to laboratory glassware.

3.5 WASTE STORAGE AND DISPOSAL

EA is responsible for the proper storage, handling, and disposal of investigation-derived waste including personal protective equipment (PPE), solids and liquids generated during drilling and groundwater sampling in accordance with EA's Generic Field Activities Plan (EA 2023).[2] All downhole sampling equipment will be decontaminated between each well. Decontamination fluids and monitoring well development water will be collected and containerized for disposal by a waste-disposal contractor. Associated investigation-derived waste disposal will be conducted by a NYSDEC call-out contractor.

[2] EA. 2020. *Generic Field Activities Plan for Work Assignments under NYSDEC Contract D009806. Rev 01*. March.

4. POTENTIAL HAZARD ANALYSIS

Based on the field activities detailed in Section 3, the following potential hazard conditions may be anticipated:

- Personnel may be injured during physical lifting and handling of equipment, construction materials, or containers. Additionally, personnel may encounter slip, trip, and fall hazards associated with sampling activities. Precautionary measures should be taken in accordance with the Generic HASP (EA 2020)[1] and this HASP Addendum.

- Field operations conducted during early spring could impose excessive heat loss to personnel conducting strenuous activities during unseasonably cold weather days, and can impose cold-related illness symptoms during unseasonably cold weather days or when the wind chill is high. In addition, heavy rains, electrical storms, and high winds may create extremely dangerous situations for employees.

- Field operations conducted during the summer months can impose heat stress on field personnel conducting strenuous activities during unseasonably hot weather days. Because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses and be able to recognize these signs and symptoms in both themselves and their co-workers.

- Work around large equipment and traffic often creates excessive noise. Noise can cause workers to be startled, annoyed, or distracted; can cause physical damage to the ear, pain, and temporary and/or permanent hearing loss; and can interfere with communication. If workers are subjected to noise exceeding an 8-hour time-weighted average sound level of 85 decibels, hearing protection will be selected with an appropriate noise reduction rating to comply with 29 CFR 1910.95 and to reduce noise below levels of concern.

- The use of mechanical and construction equipment such as drill rigs, skid steers, etc. can create a potential for crushing and pinching hazards due to movement and positioning of the equipment; movement of lever arms and hydraulics; entanglement of clothing and appendages in exposed drives and augers; and impact of steel tools, masts, and cables should equipment rigging fail or other structural failures occur during hydraulic equipment operation and drilling mast extension and operation. Heavy equipment work must be conducted only by trained, experienced personnel. If possible, personnel must remain outside the turning radius of large, moving equipment. At a minimum, personnel must maintain visual contact with the equipment operator. When not operational, equipment must be set and locked so that it cannot be activated, released, dropped, etc. Hard hats, safety glasses, and steel toe boots are required when working around mechanical and construction equipment.

- Equipment can be energized due to contact with overhead or underground electrical lines, utilities impaired by excavation of communication or potable/wastewater lines, or a potential for fire or explosion due to excavation of below ground propane/ natural gas lines. Prior to commencement of intrusive operations, a drilling/excavation permit will be

obtained, and the area will be inspected and flagged. Personnel should be aware that although an area may be cleared, it does not mean that unanticipated hazards will not appear. Safe distances will be maintained from live electrical equipment. Workers should always be alert for unanticipated events such as snapping cables, digging into unmarked underground utilities, etc. Such occurrences should prompt involved individuals to halt work immediately and take appropriate corrective measures to gain control of the situation.

- Entry into a confined space in support of this project is not anticipated and is forbidden.

- Field investigation activities intended to define potential sources of environmental contamination often require employees to be in direct proximity or contact with hazardous substances. Employees may be exposed through inhalation of toxic dusts, vapors, or gases. Normal dust particulates from surficial soil may have adsorbed or absorbed toxic solvents, petroleum compounds, or toxic metal salts or metal particulates. The proposed work is not anticipated to generate nuisance odors or dust. Toxic materials contained in dusts or particulates can be ingested if eating, smoking, drinking, and gum chewing prior to personnel washing their hands and face or removing contaminated work clothing and PPE. Some chemicals may be absorbed directly through the skin. PPE, properly designed for the chemicals of concern, will always be provided and worn when a potential for skin contact is present.

- Biological Hazards—Potential hazards may be present at the Site due to bites from stray domestic and wild animals (to include rodents), spiders, bees, and other venomous anthropods. Potential hazards may also be present at the Site in the form of poisonous plant life, which can result in skin rashes or abrasions. In the case of an animal or insect bite that can be serious or fatal, workers must seek immediate medical attention and report the incident to the site safety and health officer (SSHO) prior to leaving the Site. An employee known to be allergic or sensitive to poisonous insects should alert the Site Manager and SSHO.

- The potential chemicals of concern present at the site include, but are not limited to, volatile organic compounds.

- Safety data sheets for chemicals that may be used on-site are provided in **Appendix C**.

5. PERSONAL PROTECTIVE EQUIPMENT

Based upon currently available information, it is anticipated that Level D PPE will be required for currently anticipated conditions and activities. If, at any time, the sustained level of total organic vapors in the worker breathing zone exceeds 5 parts per million above background, site workers will evacuate the area and the condition will be brought to the attention of the SSHO. Efforts will be undertaken to mitigate the source of the vapors. Once the sustained level of total organic vapors decreases to below 5 parts per million above background, site workers will be allowed to continue activities at the direction of the SSHO. If dust levels exceed the Occupational Safety and Health Administration (OSHA) permissible exposure limit (EA 2020)[1]; dust masks will be worn by all on-site personnel until dust suppression using water methods reduce the levels.

The PPE components for use during this project are detailed in the Generic HASP (EA 2020).[1] The components of Level D PPE are summarized below. Level D will be worn for initial entry on-site and for all activities and will consist of the following:

- Coveralls or appropriate work clothing
- Steel-toe, steel-shank safety boots/shoes
- Hard hats (when overhead hazards are present or as required by the SSHO
- Chemical resistant gloves (nitrile/neoprene) when contact with potentially contaminated soil or water is expected
- Safety glasses with side shields
- Hearing protectors (during operations producing excessive noise).

Insulated clothing, hats, etc. must be worn when temperatures or wind chill fall below 40 degrees Fahrenheit.

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6. SITE CONTROL AND SECURITY

All personnel shall sign the site entry and exit log (**Appendix D**) prior to beginning work and leaving the site for the day. Only authorized personnel will be permitted to conduct field activities. Authorized personnel include those who have completed hazardous waste operations initial training, as defined under OSHA 29 CFR 1910.120/29 CFR 1926.65, have completed their training or refresher training within the past 12 months, and have been certified by a physician as fit for hazardous waste operations.

6.1 SAFE WORK PRACTICES

Safe work practices that will be followed by site workers include, but are not limited to, the following rules:

- Working before or after daylight hours without special permission is prohibited.
- Do not enter restricted or posted areas without permission from the SSHO.
- Smoking on-site is prohibited.
- Possessing, using, purchasing, distributing, or having controlled substances in their system throughout the day or during meal breaks is prohibited.
- Consuming or possessing alcoholic beverages is prohibited.
- Good housekeeping; employees will be instructed about housekeeping throughout field activities.
- Sitting or kneeling in areas of obvious contamination is prohibited.
- Avoid overgrown vegetation and tall grass areas.

6.2 DAILY STARTUP AND SHUTDOWN PROCEDURES

The following protocols will be followed daily prior to start of work activities:

- The SSHO will review site conditions to determine if modification of work and safety plans is needed.
- Personnel will be briefed and updated on new safety procedures as appropriate.

- Safety equipment will be checked for proper function.
- The SSHO will ensure that the first aid kit is adequately stocked and readily available.
- On-site equipment and supplies will be locked and secure.

6.3 PEDESTRIAN PROTECTION MEASURES

The following protocols will be followed to protect the public while construction activities are occurring:

- Cones and caution tape will be used around well vaults and adjacent work areas to prevent pedestrians from entering the work space.
- Well sampling activities will avoid blocking pedestrian walkways, if a walkway is partially blocked due to sampling activities an alternate pathway will be provided.

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Appendix A

Emergency Telephone Numbers and Hospital Directions

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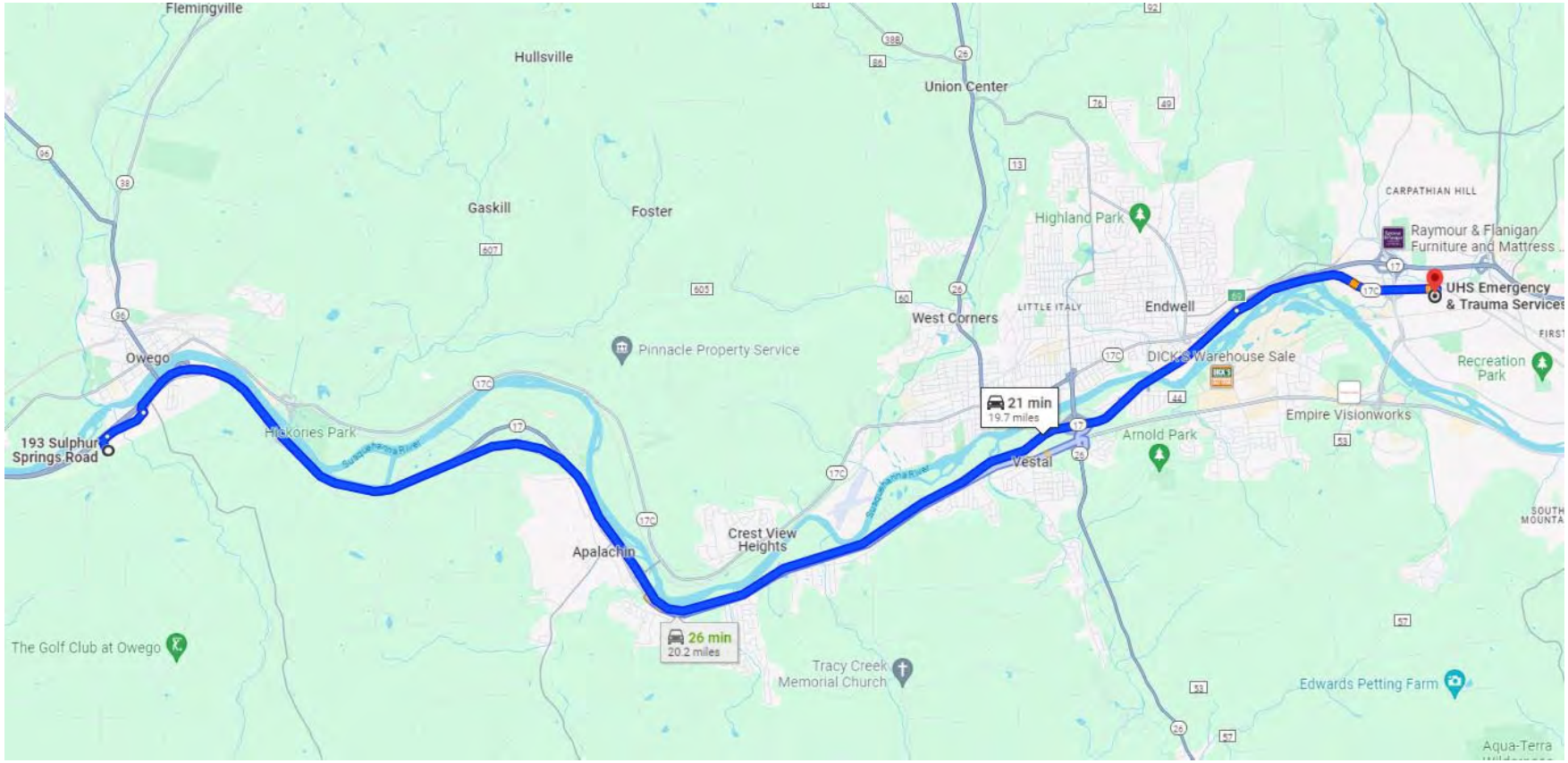
Appendix A

Emergency Telephone Numbers and Hospital Directions

SITE: Sulphur Springs Road Fill Area Site, Tioga County, New York	
Police: Owego Village Police	9-1-1 / (607) 687-2233
Fire: Apalachin Fire Department	9-1-1 / (607) 625-2216
Ambulance	9-1-1
Hospital: UHS Emergency and Trauma Services	(607) 763-6311
Directions to UHS Emergency and Trauma Services (33-57 Harrison St, Johnson City, NY 13790): Head northwest on Sulphur Springs Road toward Old Narrows Road. Continue onto Southside Drive. Turn left to merge onto NY-17E. Take exit 69 to merge onto NY-17 E toward Westover. Turn right onto Baldwin Street.	
Program Safety and Health Officer: **Rob Marcase, CIH, CSP, CHMM**	(410) 329-5192 Office (717) 586-9878 Cell
Program Manager: **Donald Conan, P.E., P.G.**	(315) 877-7403
EA Project Manager **Megan Miller**	(315) 565-6557 Office (716) 680-2618 Cell
In case of spill, contact **Megan Miller**	(315) 565-6557 Office (716) 680-2618 Cell
EA Medical Services (Physician) **All One Health Services**	(800) 229-3674
Field Manager/Site Health and Safety Officer: **Lincoln Backman-Lowe**	(315) 930-3763 Office (716) 364-7282 Cell
Site Geologist: **Edward Ashton**	(315) 565-6560 Office (315) 551-1161 Cell
In case of accident or exposure incident, contact Corporate Health and Safety Officer **Robert Marcase, CIH, CSP, CHMM**	(410) 329-5192 Office (717) 586-9878 Cell

Map to Hospital



Appendix B

Health and Safety Plan Addendum Review Record

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Appendix B

Health and Safety Plan Addendum Review Record

I have read the Health and Safety Plan Addendum for this site and have been briefed on the nature, level, and degree of exposure likely as a result of participation in this project. I agree to conform to all the requirements of this Plan.

SITE: Sulphur Springs Road Fill Area Site, Owego, Tioga County, New York			
Name	Signature	Affiliation	Date

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Appendix C

Safety Data Sheets

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SAFETY DATA SHEET

Creation Date 01-May-2012 **Revision Date** 24-Dec-2021 **Revision Number** 5

1. Identification

Product Name **1,1,2-Trichloroethane**

Cat No. : **AC139430000; AC139430010; AC139430025; AC139432500**

CAS No 79-00-5
Synonyms beta-Trichloroethane; Ethane trichloride; Vinyl trichloride

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Vapors	Category 3
Carcinogenicity	Category 2

Label Elements

Signal Word
Danger

Hazard Statements
Toxic if inhaled
Suspected of causing cancer

Harmful if swallowed or in contact with skin

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician
Skin
IF ON SKIN: Wash with plenty of soap and water
Call a POISON CENTER or doctor/physician if you feel unwell
Wash contaminated clothing before reuse
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Harmful to aquatic life with long lasting effects
Repeated exposure may cause skin dryness or cracking
WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
1,1,2-Trichloroethane	79-00-5	<=100

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature 459 °C / 858.2 °F

Explosion Limits
Upper 15.5%
Lower 6.0%
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Vapors may form explosive mixtures with air. Non-combustible. Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2). Chlorine. Phosgene. Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

Environmental Precautions Should not be released into the environment. Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Keep in suitable, closed containers for disposal. Soak up with inert absorbent material.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away

from heat/sparks/open flames/hot surfaces. - No smoking. Incompatible Materials. Bases. Strong oxidizing agents. Strong bases. Metals.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
1,1,2-Trichloroethane	TWA: 10 ppm Skin	(Vacated) TWA: 10 ppm (Vacated) TWA: 45 mg/m^3 Skin TWA: 10 ppm TWA: 45 mg/m^3	IDLH: 100 ppm TWA: 10 ppm TWA: 45 mg/m^3	TWA: 10 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear
Odor	sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-37 °C / -34.6 °F
Boiling Point/Range	110 - 115 °C / 230 - 239 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	15.5%
Lower	6.0%
Vapor Pressure	20 @ 25 mbar °C
Vapor Density	4.63 (Air = 1.0)
Specific Gravity	1.430
Solubility	4 g/L @ 20 °C
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	459 °C / 858.2 °F
Decomposition Temperature	No information available
Viscosity	1.69 cP at 25 °C
Molecular Formula	C2 H3 Cl3

Molecular Weight 133.4

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Excess heat. Incompatible products.

Incompatible Materials Bases, Strong oxidizing agents, Strong bases, Metals

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Chlorine, Phosgene, Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
1,1,2-Trichloroethane	LD50 = 836 mg/kg (Rat)	LD50 = 5371 mg/kg (Rabbit)	LC50 = 2.78 mg/L (Rat) 8 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
1,1,2-Trichloroethane	79-00-5	Not listed	Not listed	A3	Not listed	A3

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen

Mexico - Occupational Exposure Limits - Carcinogens

ACGIH: (American Conference of Governmental Industrial Hygienists)
Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains. Contains a substance which is:. Harmful to aquatic organisms. The product contains following substances which are hazardous for the environment. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
1,1,2-Trichloroethane	EC50: = 167 mg/L, 96h static (Desmodesmus subspicatus)	LC50: = 81.6 mg/L, 96h flow-through (Pimephales promelas) LC50: 35 - 47 mg/L, 96h static (Lepomis macrochirus)	EC50 = 105 mg/L 5 min	EC50: 57 - 110 mg/L, 48h Static (Daphnia magna) EC50: = 18 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
1,1,2-Trichloroethane	1.89

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
1,1,2-Trichloroethane - 79-00-5	U227	-

14. Transport information

DOT

- **UN-No** UN2810
- **Proper Shipping Name** TOXIC LIQUIDS, ORGANIC, N.O.S.
- **Technical Name** (1,1,2-TRICHLOROETHANE)
- **Hazard Class** 6.1
- **Packing Group** III

TDG

- **UN-No** UN2810
- **Proper Shipping Name** TOXIC LIQUIDS, ORGANIC, N.O.S.
- **Hazard Class** 6.1
- **Packing Group** III

IATA

- **UN-No** UN2810
- **Proper Shipping Name** Toxic liquid, organic, n.o.s.
- **Hazard Class** 6.1
- **Packing Group** III

IMDG/IMO

- **UN-No** UN2810
- **Proper Shipping Name** Toxic liquid, organic, n.o.s.
- **Hazard Class** 6.1
- **Packing Group** III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
1,1,2-Trichloroethane	79-00-5	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

Component	CAS No	**TSCA 12(b)** - Notices of Export
1,1,2-Trichloroethane	79-00-5	Section 4

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
1,1,2-Trichloroethane	79-00-5	X	-	201-166-9	X	X	X	X	X	KE-34069

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
1,1,2-Trichloroethane	79-00-5	<=100	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
1,1,2-Trichloroethane	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
1,1,2-Trichloroethane	X		-

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
1,1,2-Trichloroethane	100 lb 1 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
1,1,2-Trichloroethane	79-00-5	Carcinogen	10 µg/day	Carcinogen

U.S. State Right-to-Know

Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
1,1,2-Trichloroethane	X	X	X	X	X

U.S. Department of Transportation
Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
1,1,2-Trichloroethane	-	Use restricted. See item 34 (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
1,1,2-Trichloroethane	79-00-5	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
1,1,2-Trichloroethane	79-00-5	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 01-May-2012
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information

relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 22-Sep-2009 **Revision Date** 24-Dec-2021 **Revision Number** 4

1. Identification

Product Name **cis-1,2-Dichloroethylene**

Cat No. : **AC113380000; AC113380025; AC113380100; AC113380500**

Synonyms cis-Acetylene dichloride.

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Acute oral toxicity	Category 4
Acute Inhalation Toxicity - Vapors	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
Harmful if swallowed

Harmful if inhaled
Causes serious eye irritation
Causes skin irritation
May cause respiratory irritation

Precautionary Statements
Prevention
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Avoid breathing dust/fume/gas/mist/vapors/spray
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Take precautionary measures against static discharge
Do not eat, drink or smoke when using this product
Response
Call a POISON CENTER or doctor/physician if you feel unwell
Inhalation
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
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
Rinse mouth
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Fire
Explosion risk in case of fire
Fight fire with normal precautions from a reasonable distance
Evacuate area
Storage
Store in a well-ventilated place. Keep cool
Store in a closed container
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
cis-1,2-Dichloroethylene	156-59-2	97

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.

Inhalation Remove to fresh air. Get medical attention. If not breathing, give artificial respiration.

Ingestion Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects Difficulty in breathing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. Water mist may be used to cool closed containers. Chemical foam. Water mist may be used to cool closed containers.

Unsuitable Extinguishing Media No information available

Flash Point 6 °C / 42.8 °F

Method - No information available

Autoignition Temperature 440 °C / 824 °F

Explosion Limits

Upper	12.80%
Lower	9.70%
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Flammable. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2). Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes or clothing.

Environmental Precautions See Section 12 for additional Ecological Information. Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling

Ensure adequate ventilation. Wear personal protective equipment/face protection. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. Avoid contact with skin, eyes or clothing. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage.

Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat, sparks and flame. Flammables area. Keep container tightly closed in a dry and well-ventilated place. Incompatible Materials. Bases.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
cis-1,2-Dichloroethylene	TWA: 200 ppm			TWA: 200 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

Engineering Measures

Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

No protective equipment is needed under normal use conditions.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-80 °C / -112 °F
Boiling Point/Range	60 °C / 140 °F @ 760 mmHg
Flash Point	6 °C / 42.8 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	12.80%
Lower	9.70%
Vapor Pressure	201 mmHg @ 25 °C
Vapor Density	3.34 (Air = 1.0)
Specific Gravity	1.280
Solubility	No information available
Partition coefficient; n-octanol/water	No data available

Autoignition Temperature	440 °C / 824 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C2 H2 Cl2
Molecular Weight	96.94

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Exposure to air. Exposure to light. Incompatible products. Exposure to moist air or water.

Incompatible Materials Bases

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
cis-1,2-Dichloroethylene	156-59-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains. Do not flush into surface water or sanitary sewer system. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
cis-1,2-Dichloroethylene	Not listed	Not listed	EC50 = 721 mg/L 5 min EC50 = 905 mg/L 30 min	Not listed

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN1150
Proper Shipping Name 1,2-DICHLOROETHYLENE
Hazard Class 3
Packing Group II

TDG

UN-No UN1150
Proper Shipping Name 1,2-DICHLOROETHYLENE
Hazard Class 3
Packing Group II

IATA

UN-No UN1150
Proper Shipping Name 1,2-DICHLOROETHYLENE
Hazard Class 3
Packing Group II

IMDG/IMO

UN-No UN1150
Proper Shipping Name 1,2-DICHLOROETHYLENE
Hazard Class 3
Packing Group II

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
cis-1,2-Dichloroethylene	156-59-2	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
cis-1,2-Dichloroethylene	156-59-2	-	X	205-859-7	-	X	X	X	X	KE-10124

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
cis-1,2-Dichloroethylene	X	-	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
cis-1,2-Dichloroethylene	156-59-2	Not applicable	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
cis-1,2-Dichloroethylene	156-59-2	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	22-Sep-2009
Revision Date	24-Dec-2021
Print Date	24-Dec-2021
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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End of SDS

SAFETY DATA SHEET

Creation Date 10-Dec-2009 **Revision Date** 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name **Tetrachloroethylene**

Cat No. : **B20089**

CAS-No 127-18-4
Synonyms Perchloroethylene

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes skin irritation

Causes serious eye irritation
May cause an allergic skin reaction
May cause drowsiness or dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Contaminated work clothing should not be allowed out of the workplace
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects
WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Tetrachloroethylene	127-18-4	>95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water.
Most important symptoms and effects	None reasonably foreseeable. May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated.

Hazardous Combustion Products
Chlorine. Phosgene. Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Ensure adequate ventilation.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation. Avoid ingestion and inhalation.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Tetrachloroethylene	TWA: 25 ppm STEL: 100 ppm	(Vacated) TWA: 25 ppm (Vacated) TWA: 170 mg/m³ Ceiling: 200 ppm TWA: 100 ppm	IDLH: 150 ppm	TWA: 25 ppm STEL: 100 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic, sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-22 °C / -7.6 °F
Boiling Point/Range	120 - 122 °C / 248 - 251.6 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	6.0 (Ether = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	18 mbar @ 20 °C
Vapor Density	No information available
Density	1.619
Specific Gravity	1.625
Solubility	0.15 g/L water (20°C)
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	> 150°C
Viscosity	0.89 mPa s at 20 °C
Molecular Formula	C2 Cl4
Molecular Weight	165.83

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Exposure to moist air or water.

Incompatible Materials Strong acids, Strong oxidizing agents, Strong bases, Metals, Zinc, Amines, Aluminium

Hazardous Decomposition Products Chlorine, Phosgene, Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tetrachloroethylene	LD50 = 2629 mg/kg (Rat)	LD50 > 10000 mg/kg (Rat)	LC50 = 27.8 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Tetrachloroethylene	127-18-4	Group 2A	Reasonably Anticipated	A3	X	A3

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Kidney Liver Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Tetrachloroethylene	Group II Chemical	Not applicable	Not applicable

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Tetrachloroethylene	EC50: > 500 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 4.73 - 5.27 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: 11.0 - 15.0 mg/L, 96h static (Lepomis macrochirus) LC50: 8.6 - 13.5 mg/L, 96h static (Pimephales promelas) LC50: 12.4 - 14.4 mg/L, 96h flow-through (Pimephales promelas)	EC50 = 100 mg/L 24 h EC50 = 112 mg/L 24 h EC50 = 120.0 mg/L 30 min	EC50: 6.1 - 9.0 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Insoluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its volatility.

Component	log Pow
Tetrachloroethylene	2.88

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Tetrachloroethylene - 127-18-4	U210	-

14. Transport information

DOT

UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Packing Group III

TDG

UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE

Hazard Class 6.1
Packing Group III

IATA
UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Packing Group III

IMDG/IMO
UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Tetrachloroethylene	127-18-4	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Tetrachloroethylene	127-18-4	X	-	204-825-9	X	X	X	X	KE-33294

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Tetrachloroethylene	127-18-4	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Tetrachloroethylene	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Tetrachloroethylene	X		-

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs

Tetrachloroethylene	100 lb 1 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Tetrachloroethylene	127-18-4	Carcinogen	14 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Tetrachloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant Y
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com

Creation Date 10-Dec-2009
Revision Date 14-Feb-2020
Print Date 14-Feb-2020
Revision Summary SDS authoring systems update, replaces ChemGes SDS No. 127-18-4.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 03-Feb-2010 **Revision Date** 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name **Trichloroethylene**

Cat No. : **L14474**

CAS-No 79-01-6
Synonyms Triclene; Trichloroethene; Ethylene trichloride

Recommended Use Laboratory chemicals.
Uses advised against .
Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Heart, spleen, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements

Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause drowsiness or dizziness
Suspected of causing genetic defects
May cause cancer
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Contaminated work clothing should not be allowed out of the workplace
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Harmful to aquatic life with long lasting effects
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Trichloroethylene	79-01-6	>95

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately.
Most important symptoms and effects	May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	410 °C / 770 °F
Explosion Limits	
Upper	44.8 vol %
Lower	8 vol %
Oxidizing Properties	Not oxidising
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Chlorine. Phosgene. Carbon monoxide (CO). Carbon dioxide (CO_2). Hydrogen chloride gas.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.
Environmental Precautions	Should not be released into the environment. Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from light. Do not store in aluminum containers.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Trichloroethylene	TWA: 10 ppm STEL: 25 ppm	(Vacated) TWA: 50 ppm (Vacated) TWA: 270 mg/m³ Ceiling: 200 ppm (Vacated) STEL: 200 ppm (Vacated) STEL: 1080 mg/m³ TWA: 100 ppm	IDLH: 1000 ppm	TWA: 10 ppm STEL: 25 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-85 °C / -121 °F
Boiling Point/Range	87 °C / 188.6 °F
Flash Point	No information available
Evaporation Rate	0.69 (Carbon Tetrachloride = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	44.8 vol %
Lower	8 vol %

Vapor Pressure	77.3 mbar @ 20 °C
Vapor Density	4.5 (Air = 1.0)
Specific Gravity	1.460
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	410 °C / 770 °F
Decomposition Temperature	> 120°C
Viscosity	0.55 mPa.s (25°C)
Molecular Formula	C2 H Cl3
Molecular Weight	131.39

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Light sensitive.

Conditions to Avoid Incompatible products. Excess heat. Exposure to light. Exposure to moist air or water.

Incompatible Materials Strong oxidizing agents, Strong bases, Amines, Alkali metals, Metals,

Hazardous Decomposition Products Chlorine, Phosgene, Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Trichloroethylene	LD50 = 4920 mg/kg (Rat) LD50 = 4290 mg/kg (Rat)	LD50 = 29000 mg/kg (Rabbit) LD50 > 20 g/kg (Rabbit)	LC50 = 26 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization May cause sensitization by skin contact

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Trichloroethylene	79-01-6	Group 1	Known Reasonably Anticipated	A2	X	A2

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

Mutagenic Effects Mutagenic effects have occurred in humans.

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Kidney Liver Heart spleen Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. The product contains following substances which are hazardous for the environment. Contains a substance which is:. Harmful to aquatic organisms. Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Trichloroethylene	EC50: = 175 mg/L, 96h (Pseudokirchneriella subcapitata) EC50: = 450 mg/L, 96h (Desmodesmus subspicatus)	LC50: 31.4 - 71.8 mg/L, 96h flow-through (Pimephales promelas) LC50: 39 - 54 mg/L, 96h static (Lepomis macrochirus)	EC50 = 0.81 mg/L 24 h EC50 = 115 mg/L 10 min EC50 = 190 mg/L 15 min EC50 = 235 mg/L 24 h EC50 = 410 mg/L 24 h EC50 = 975 mg/L 5 min	EC50: = 2.2 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Trichloroethylene	2.4

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Trichloroethylene - 79-01-6	U228	-

14. Transport information

DOT

UN-No UN1710
Proper Shipping Name TRICHLOROETHYLENE
Hazard Class 6.1
Packing Group III

TDG

UN-No	UN1710
Proper Shipping Name	TRICHLOROETHYLENE
Hazard Class	6.1
Packing Group	III

IATA

UN-No	UN1710
Proper Shipping Name	TRICHLOROETHYLENE
Hazard Class	6.1
Packing Group	III

IMDG/IMO

UN-No	UN1710
Proper Shipping Name	TRICHLOROETHYLENE
Hazard Class	6.1
Packing Group	III

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Trichloroethylene	79-01-6	X	ACTIVE	R

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

TSCA 12(b) - Notices of Export

Component	CAS-No	**TSCA 12(b)** - Notices of Export
Trichloroethylene	79-01-6	Section 5 Section 6

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Trichloroethylene	79-01-6	X	-	201-167-4	X	X	X	X	X

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Trichloroethylene	79-01-6	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Trichloroethylene	X	100 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Trichloroethylene	X		-

OSHA - Occupational Safety and Not applicable

Health Administration

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Trichloroethylene	100 lb 1 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Trichloroethylene	79-01-6	Carcinogen Developmental Male Reproductive	14 µg/day 50 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Trichloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com

Creation Date 03-Feb-2010
Revision Date 14-Feb-2020
Print Date 14-Feb-2020
Revision Summary SDS authoring systems update, replaces ChemGes SDS No. 79-01-6.

Disclaimer

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End of SDS

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Appendix D

Site Entry and Exit Log

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Appendix D

Site Entry and Exit Log

SITE: Sulphur Springs Road Fill Area Site, Owego, Tioga County, New York				
Name	**Date**	**Time of Entry**	**Time of Exit**	**Initials**

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