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Draft Environmental Media Assessment for 1,2-Dichloroethane

Technical Support Document for the Draft Risk Evaluation

CASRN 107-06-2

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KEY ABBREVIATIONS AND ACRONYMS

30Q5	Lowest 30-day average flow that occurs (on average) once every 5 years
7Q10	Lowest 7-day average flow that occurs (on average) once every 10 years
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AMTIC	Ambient Monitoring Technology Information Center
CASRN	Chemical Abstracts Service Registry Number
CDR	Chemical Data Reporting
CFR	Code of Federal Regulations
COU	Condition of use
DMR	Discharge Monitoring Report
DOT	Department of Transportation
DRAS	Hazardous Waste Delisting Risk Assessment Software
ECHO	Enforcement and Compliance History Online (Database)
EPA	Environmental Protection Agency (U.S.)
EROM	Enhanced Unit Runoff Method
HAP	Hazardous air pollutant
HERO	Health and Environmental Research Online (Database)
HM	Harmonic mean
IOAC	Integrated Indoor/Outdoor Air Calculator
IUR	Inhalation Unit Risk
K_{OC}	Organic carbon: water partition coefficient
K_{OW}	Octanol: water partition coefficient
MDL	Method detection limit
MLD	Million liters per day
MRL	Minimum Reporting Limit

NAICS	North American Industry Classification System
NEI	National Emissions Inventory
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHD	National Hydrography Dataset
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
OCSPP	Office of Chemical Safety and Pollution Prevention (EPA)
OES	Occupational exposure scenario
OPPT	Office of Pollution Prevention and Toxics (EPA)
POTW	Publicly owned treatment works
PSC	Point Source Calculator
PWS	Public water system
RCRA	Resource Conservation and Recovery Act
RTR	Risk and technology review
SCC	Source classification code
TRI	Toxics Release Inventory
TSCA	Toxic Substances Control Act
TSD	Technical support document
UCMR3	Third Unregulated Contaminant Monitoring Rule
U.S.	United States
USGS	U.S. Geological Survey
VVWM-PSC	Variable Volume Water Model with Point Source Calculator (Model)
WQP	Water Quality Portal

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Docket

Supporting information can be found in the public docket, Docket ID EPA-HQ-OPPT-2018-0427.

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SUMMARY

This technical support document (TSD) accompanies the *Draft Risk Evaluation for 1,2-Dichloroethane* (also called the "1,2-dichloroethane draft risk evaluation" or "draft risk evaluation") (U.S. EPA, 2025i). This draft assessment describes the use of reasonably available information to evaluate concentrations of 1,2-dichloroethane in various media resulting from releases under Toxic Substances Control Act (TSCA) conditions of use (COUs).

EPA quantitatively assessed the concentration of 1,2-dichloroethane in ambient air, water (surface water and drinking water), and land (soil, biosolids, and groundwater) based on 1,2-dichloroethane releases to the environment (U.S. EPA, 2025g). The following are key points from the Agency's evaluation:

- For the air pathway, EPA modeled ambient air concentrations and air deposition from facilities releasing 1,2-dichloroethane resulting from TSCA COU activities to air using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD), as reported to Toxics Release Inventory (TRI) and National Emissions Inventory (NEI) databases from 2015 to 2020.
    - AERMOD-modeled annual average ambient air concentrations of 1,2-dichloroethane ranged from 0 to 6.4 µg/m^3 from 1,000 to 10,000 m from releasing facilities using reported releases from NEI and TRI facilities. EPA has high confidence in the modeled results representing 1,2-dichloroethane ambient air concentrations because (1) AERMOD is the Agency's primary regulatory model for ambient air modeling and is peer-reviewed; (2) EPA used industry reported TRI and NEI releases as inputs for modeling; and (3) the ranges of the ambient air modeled concentrations from AERMOD are within the ranges of monitored concentrations from Ambient Monitoring Technology Information Center (AMTIC) data.
    - EPA has moderate confidence in the modeled 1,2-dichloroethane air deposition results due to the medium confidence in the input parameter values for AERMOD deposition modeling.
- For the water pathway, 1,2-dichloroethane is reported to be released to surface waters and due to its high-water solubility (8,600 mg/L), it remains in water. Facility releases of 1,2-dichloroethane and the respective receiving water bodies as reported to EPA were used to estimate receiving water concentrations at the point of effluent release.
- For the land pathway, EPA evaluated exposures via land applied biosolids and soil containing 1,2-dichloroethane due to air deposition. Of these pathways, application of biosolids is estimated to result in lower soil concentrations of 1,2-dichloroethane (0.63 mg/kg) compared to ambient air deposition (2 mg/kg). Releases from facilities associated with the Manufacturing occupational exposure scenario (OES) resulted in the highest soil concentrations due to air deposition.
- Based on the physical and chemical properties, as well as 1,2-dichloroethane concentrations reported from databases and literature, air and water pathways are expected to be the main pathways contributing to both general population and environmental exposures. Therefore, quantitative assessments were conducted for these pathways.
- Based on reported TRI releases of 1,2-dichloroethane to land (Water Quality Portal [WQP] and scientific literature), land pathways could be a source of exposures to environmental receptors and the general population. Therefore, quantitative estimates were also conducted for the land pathway.

1 INTRODUCTION

Also known as ethylene dichloride, 1,2-dichloroethane is a volatile, synthetic hydrocarbon that is primarily used in the synthesis of vinyl chloride; over 90 percent is produced to be converted to vinyl chloride (EPA-HQ-OPPT-2018-0427-0040). It is included on the TSCA Inventory reported under the Chemical Data Reporting (CDR) rule and had a total production volume in the United States between 30 to 40 billion pounds (lb) from the 2020 CDR reporting period (U.S. EPA, 2025i).

This draft TSD describes the use of reasonably available information to estimate environmental concentrations of 1,2-dichloroethane in different environmental media from releases associated with TSCA COUs. EPA evaluated the reasonably available information for releases of 1,2-dichloroethane from facilities that use, manufacture, or process 1,2-dichloroethane under industrial and/or commercial COUs as detailed in the *Draft Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g). Table 1-1 provides a crosswalk between COUs and occupational exposure scenarios (OESs). Table 1-2 shows the types of releases to the environment by OES.

Table 1-1. Crosswalk of Conditions of Use to Occupational Exposure Scenarios Assessed

Life Cycle Stage[a]	Category[b]	Subcategory[c]	Occupational Exposure Scenario
Manufacturing	Domestic manufacture	Domestic manufacture	Manufacturing[d]
	Import	Import	Repackaging
Processing	Processing – as a reactant	Intermediate in: petrochemical manufacturing; plastic material and resin manufacturing; all other basic organic chemical manufacturing; all other basic inorganic chemical manufacturing	Processing as a reactant
	Processing – incorporated into formulation, mixture, or reaction product	Fuels and fuel additives: all other petroleum and coal products manufacturing	Processing into formulation, mixture, or reaction product
		Processing aids: specific to petroleum production	Processing into formulation, mixture, or reaction product
		Adhesives and sealants; lubricants and greases; oxidizing/reducing agents; degreasing and cleaning solvents; pesticide, fertilizer, and other agricultural chemical manufacturing	Processing into formulation, mixture, or reaction product
	Repackaging	Repackaging	Repackaging
	Recycling	Recycling	Processing as a reactant
Distribution in Commerce	Distribution in commerce	Distribution in commerce	Distribution in commerce[e]
Industrial Use	Adhesives and sealants	Adhesives and sealants	Industrial application of adhesives and sealants
	Functional fluids (closed systems)	Heat transferring agent	Heat transferring agent[f]
	Lubricants and greases	Solid film lubricants and greases	Industrial application of lubricants and greases

Life Cycle Stage[a]	Category[b]	Subcategory[c]	Occupational Exposure Scenario
Industrial Use	Oxidizing/reducing agents	Oxidation inhibitor in controlled oxidative chemical reactions	Processing as a reactant
	Solvents (for cleaning and degreasing)	A component of degreasing and cleaning solvents	Commercial aerosol products
			Non-aerosol cleaning and degreasing
Commercial Use	Plastic and rubber products	Products such as: plastic and rubber products	Plastic and rubber products[f]
	Fuels and related products	Fuels and related products	Fuels and related products[f]
	Other use	Laboratory chemical (*e.g.*, reagent)	Laboratory use
Consumer Use	Plastic and rubber products	Plastic and rubber products	N/A[g]
Disposal	Disposal	Disposal	Waste handling, treatment, and disposal

[a] Life Cycle Stage Use Definitions (40 CFR § 711.3)
- "Industrial use" means use at a site at which one or more chemicals or mixtures are manufactured (including imported) or processed.
- "Commercial use" means the use of a chemical or a mixture containing a chemical (including as part of an article) in a commercial enterprise providing saleable goods or services.
- "Consumer use" means the use of a chemical or a mixture containing a chemical (including as part of an article, such as furniture or clothing) when sold to or made available to consumers for their use.
- Although EPA has identified both industrial and commercial uses here for purposes of distinguishing scenarios in this document, the Agency interprets the authority over "any manner or method of commercial use" under TSCA section 6(a)(5) to reach both.

[b] These categories of COUs reflect CDR codes and broadly represent conditions of use for 1,2-dichloroethane in industrial and/or commercial settings.

[c] These subcategories reflect more specific uses of 1,2-dichloroethane.

[d] During the manufacture of 1,2-dichloroethane, the byproducts 1,1-dichloroethane (75-34-3), 1,1,2-trichloroethane (7900-5), *trans*-1,2-dichloroethylene (156-60-5), trichloroethylene (79-01-6), perchloroethylene (127-18-4), methylene chloride (75-09-2), and carbon tetrachloride (56-23-5) are formed, and are assessed in this draft TSD and risk evaluation. See *Draft Byproducts Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025c).

[e] EPA considers the activities of loading and unloading of chemical product part of distribution in commerce; however, these activities were assessed as part of each use's OES. EPA's current approach for quantitively assessing releases and exposures for the remaining aspects of distribution in commerce consists of searching Department of Transportation (DOT) and National Response Center (NRC) data for incident reports pertaining to 1,2-dichloroethane distribution.

[f] Although these uses were identified during scoping, upon further investigation EPA made the decision to not quantitatively assess the releases due to these uses of 1,2-dichloroethane. The rationale for not performing a quantitative assessment is described later in this draft TSD.

[g] Consumer uses are not assigned to OESs but are assessed elsewhere in the *Draft Consumer Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025e).

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317 **Table 1-2. Type of Release to the Environment by Occupational Exposure Scenario**

Occupational Exposure Scenario (OES)	Type of Discharge,[a] Air Emission,[b] or Transfer for Disposal[c]	Number of Facilities	Source(s)
Manufacturing	Surface water	33	TRI/DMR
	Fugitive air	24	TRI
	Stack air	23	TRI
	Fugitive air	10	NEI
	Stack air	12	NEI
	Land	15	TRI
Repackaging	Surface water	19	TRI/DMR
	Fugitive air	4	TRI
	Stack air	4	TRI
	Fugitive or stack air	1 generic site	Environmental release modeling
	Hazardous waste landfill or incineration	1 generic site	Environmental release modeling
Processing as a reactant	Surface water	22	TRI/DMR
	Fugitive air	9	TRI
	Stack air	10	TRI
	Fugitive air	17	NEI
	Stack air	17	NEI
Processing into formulation, mixture, or reaction product	Surface water	20	TRI/DMR
	Fugitive air	9	TRI
	Stack air	11	TRI
	Fugitive air	6	NEI
	Stack air	4	NEI
Industrial application of adhesives and sealants	Fugitive air	38	NEI
	Stack air	65	NEI
	Fugitive or stack air	1–2 generic sites	Environmental release modeling
	Hazardous landfill or incineration	1–2 generic sites	Environmental release modeling
Industrial application of lubricants and greases	Fugitive air	2	NEI
	Stack air	1	NEI
Industrial and commercial non-aerosol cleaning/ degreasing	Surface water	3	TRI/DMR
	Fugitive air	6	NEI
	Stack air	8	NEI
	Fugitive or stack air	8–61 generic sites	Environmental release modeling
	Wastewater treatment	8–61 generic sites	Environmental release modeling
	Hazardous waste incineration	8–61 generic sites	Environmental release modeling
	Hazardous waste landfill	8–61 generic sites	Environmental release modeling

Occupational Exposure Scenario (OES)	Type of Discharge,[a] Air Emission,[b] or Transfer for Disposal[c]	Number of Facilities	Source(s)
Commercial aerosol products	Fugitive air	N/A	Environmental release modeling
Laboratory use	Surface water	4	TRI/DMR
	Fugitive air	6	NEI
	Stack air	2	NEI
	Fugitive or stack air	1	Environmental release modeling
	Hazardous landfill or incineration	1	Environmental release modeling
Waste handling, treatment and disposal (non-POTW)	Surface water	17	TRI/DMR
	Fugitive air	17	TRI
	Stack air	17	TRI
	Fugitive air	725	NEI
	Stack air	199	NEI
Waste handling, treatment, and disposal (POTW)	Surface water	141	TRI/DMR
Waste handling, treatment, and disposal (remediation)	Surface water	19	TRI/DMR
	Fugitive air	1	NEI
	Stack air	3	NEI

DMR = Discharge Monitoring Report; NEI = National Emissions Inventory; POTW = publicly owned treatment works; TRI = Toxic Release Inventory
[a] Direct discharge to surface water; indirect discharge to non-POTW; indirect discharge to POTW
[b] Emissions via fugitive air; stack air; or treatment via incineration
[c] Transfer to surface impoundment, land application, or landfills
[d] Where available, EPA used peer reviewed literature (*e.g.*, Generic Scenarios [GSs] or Emission Scenario Documents [ESDs]) to provide a basis to estimate the number of release days of 1,2-dichloroethane within a COU.

As detailed in the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g), releases are reported to ambient air, surface water, and landfills. EPA analyzed data from TRI, NEI, and DMRs to evaluate releases of 1,2-dichloroethane for the 2016 to 2020 reporting years. The Agency used these data to evaluate exposures of 1,2-dichloroethane to the environment and general population; assessed in other TSDs. This draft TSD uses data and input from both the *Draft Chemistry, Fate, and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025d) as well as the *Draft Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g). In addition, this document supports the *Draft Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025f), *Draft General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025h), and *Draft Byproduct Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025c) (see also Appendix C of the draft risk evaluation for a complete list of TSDs and supplemental files).

2 APPROACH AND METHODOLOGY

A literature search was conducted to identify peer-reviewed or gray sources of 1,2-dichloroethane measured and reported modeled data. Environmental media concentration data from studies and databases identified through systematic review were evaluated according to the process described in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances Version 1.0: A Generic TSCA Systematic Review Protocol with Chemical-Specific Methodologies* (also referred to as the "Draft Systematic Review Protocol") (U.S. EPA, 2021b). A summary of the measured and reported modeled data for the various environmental media is provided in this draft TSD as well as the (chemical-specific) *Draft Systematic Review Protocol for 1,2-Dichloroethane* (U.S. EPA, 2025m).

The approaches for estimating the concentrations of 1,2-dichloroethane in environmental media rely on facility-specific releases associated with TSCA COUs as reported to TRI (air, water, and land), NEI (air), and National Pollutant Discharge Elimination System (NPDES) DMRs (surface water). Where facility-specific releases were not identified for a given TSCA COU, releases were estimated, as described in detail in the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g).

Based on the 1,2-dichloroethane releases, EPA developed a conceptual model for the 1,2-dichloroethane environmental media assessment that defines the pathways and media considered for all COUs/OESs (Figure 2-1). Multiple COUs/OESs can be associated with each pathway, depending on the media of release, as described in the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g). EPA considered the physical and chemical properties, fate, and transport mechanisms, as well as monitoring and modeling results, to delineate and assess each pathway/media. For releases to land, the Agency was unable to associate specific media concentrations such as groundwater concentrations with facility-specific releases as reported to TRI. Thus, EPA used models to estimate media concentrations resulting from disposal to landfills and biosolids application to soil.

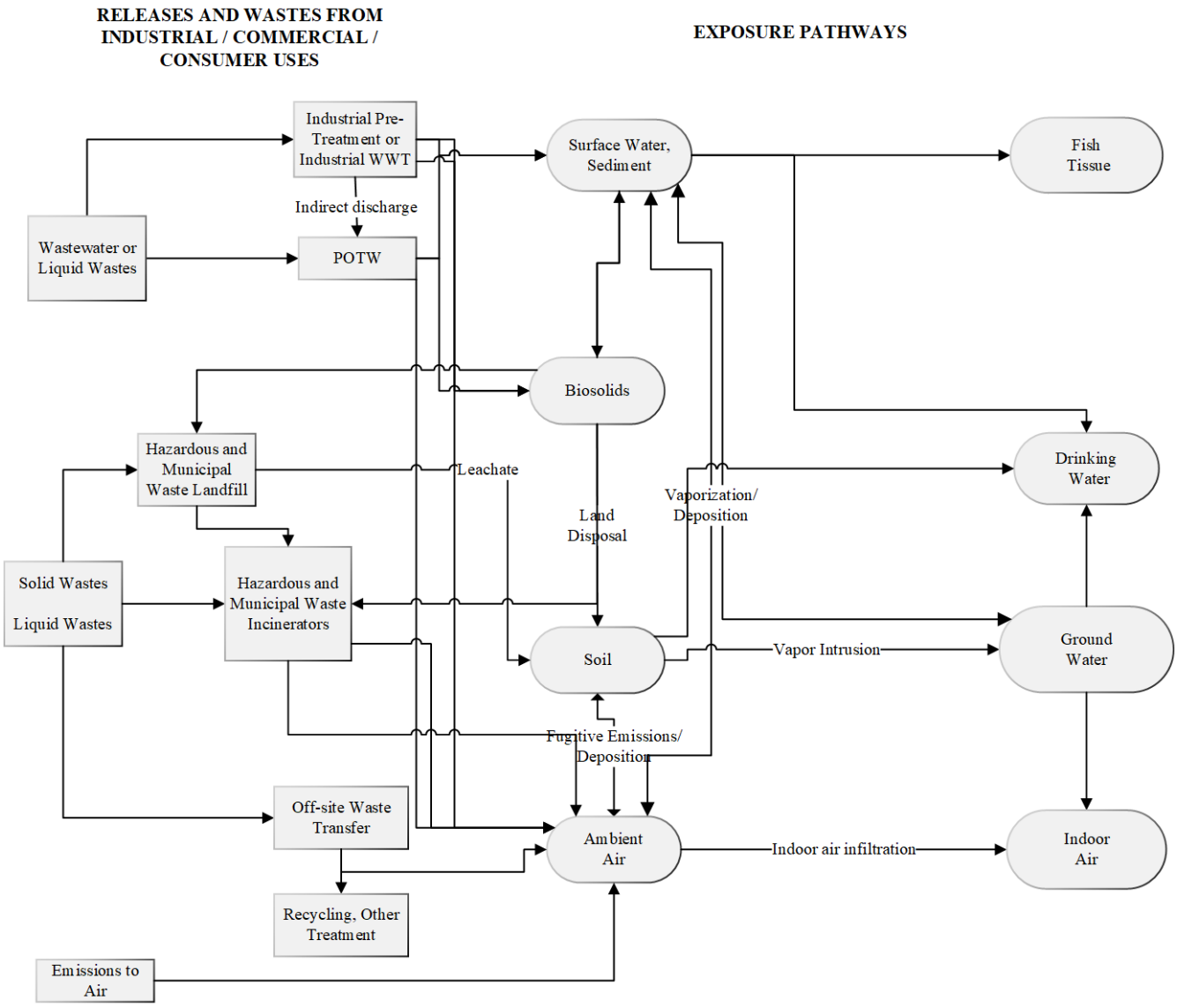

Figure 2-1. Conceptual Model for 1,2-Dichloroethane Environmental Media Assessment

3 AIR PATHWAY

1,2-dichloroethane is a volatile organic compound and air is expected to be a major exposure pathway. EPA searched peer-reviewed literature, gray literature, and databases to obtain concentrations of 1,2-dichloroethane in ambient air. Section 3.3 shows the results of reported measured concentrations for ambient air found in the peer-reviewed and gray literature from the systematic review and from the EPA AMTIC archive. Section 3.4 reports EPA-modeled ambient air concentrations and air deposition of 1,2-dichloroethane from facility releases. Based on the ambient air exposure analysis performed for the *Risk Evaluation for 1,1-Dichloroethane* (U.S. EPA, 2025n), EPA did not perform a tiering analysis for 1,2-dichloroethane. For 1,1-dichloroethane, the tiering analysis performed resulted in the Agency using the most refined approach available at the time because cancer risk estimates above benchmark were found in the lower-tier analyses. Because 1,1- and 1,2-dichloroethane use the same Inhalation Unit Risk (IUR) value, and because reported releases of 1,2-dichloroethane to ambient air are higher than those of 1,1-dichloroethane, EPA only performed the highest-tier of exposure analysis available. For this analysis, EPA estimated ambient air concentrations of 1,2-dichloroethane using AERMOD, which is EPA's highest-tier model for estimating ambient air concentrations from industrial point and area sources.

The Agency used AMTIC monitoring data as evidence of presence of 1,2-dichloroethane in ambient air and to compare it with modeled estimates of concentrations of 1,2-dichloroethane from facility-reported releases associated with TSCA COUs. Literature data were used to provide context as it did not temporally or spatially align with 1,2-dichloroethane releases from COUs.

3.1 Modeling Approach for Estimating Concentrations in Ambient Air

For 1,2-dichloroethane, EPA used AERMOD to estimate ambient air concentrations and air deposition of 1,2-dichloroethane from facility releases.[1] This analysis focuses on inhalation exposures to a subset of the general population residing within 10,000 m of facilities reporting 1,2-dichloroethane releases to TRI and NEI. EPA considered the release years of 2015 to 2020 and multiple datasets (TRI and NEI) for this analysis. The Agency used the air release estimates obtained using the methodology described in the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g) as direct inputs for AERMOD to estimate concentrations at various distances from a releasing facility. For the EPA estimated releases for OESs where facility-specific data were either not available or limited, the Agency ran the model using two sets of meteorological data (Lake Charles, Louisiana, for high-end meteorology, and Sioux Falls, South Dakota, for central tendency meteorology, respectively) and assuming urban and rural topography (see more details in subsections below).

This methodology was first presented in the *Draft TSCA Screening Level Approach for Assessing Ambient Air and Water Exposures to Fenceline Communities*, also referred to as the "2022 Fenceline Report."[2] EPA expanded on this methodology by evaluating air deposition from TRI and NEI, and modeled alternative release estimates where facility specific data were not available. The full details of the methodologies and the full set of inputs used in this draft assessment/TSD are provided below and in the *Draft AERMOD Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2025a). For this analysis, 10,000 m was selected based on prior professional knowledge and experience with exposures associated with the ambient air pathway involving other chlorinated solvents where risks were typically found within 1,000 m of a releasing facility. If risks were identified at 10,000 m, additional analysis would be conducted to determine at what distance the risks decrease to below levels of concern.

[1] See https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models#aermod (accessed August 13, 2025) for more information.
[2] See EPA 2022 Fenceline Report (accessed August 13, 2025).

3.1.1 Description of AERMOD

The modeling of TRI and NEI data uses EPA's AERMOD to estimate modeled ambient air concentrations to members of the general population at multiple finite distances and area distances from a facility releasing a chemical to the ambient air. AERMOD is a steady-state, Gaussian plume dispersion model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources and both simple and complex terrain. AERMOD can incorporate a variety of emission source characteristics, chemical deposition properties, complex terrain, and site-specific hourly meteorology to estimate air concentrations and deposition amounts at user-specified receptor distances and at a variety of averaging times. Readers can learn more about AERMOD, equations within the model, detailed input and output parameters, and supporting documentation by reviewing the AERMOD users guide (U.S. EPA, 2018).

3.1.2 TRI and NEI Release Data

EPA modeled ambient air concentrations using the release data from the TRI and NEI datasets as described in the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g) and summarized below. EPA considered TRI release data from the years 2015 to 2020 for this analysis. TRI releases were categorized into 10 OESs. Where data were available, releases were modeled on a facility-by-facility basis. Facility-specific release data were available for five of the OESs. For OESs where release data were not available, EPA used alternative release estimates, as described in the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g), to model ambient air concentrations around a generic facility under a generic exposure scenario. Concentrations were modeled for both fugitive and stack emissions. For facilities reporting both stack and fugitive emissions, modeled concentrations from both types of emissions were added together to determine a total concentration of 1,2-dichloroethane in the ambient air at the distances evaluated specific to TSCA COUs. Additionally, one facility (TRI ID 77541THDBUILD) had two separate data entries in the TRI for different North American Industry Classification System (NAICS) codes. The two entries were modeled separately; however, because the facility was assigned one OES, the resulting concentrations were summed for use in this analysis.

TRI reporters may report either with a Form R or a Form A. To use Form A, reporters must release less than 500 lb/year, and facilities do not need to report release quantities or uses/sub-uses on Form A. EPA included both TRI reporting Form R and Form A submissions in this analysis. For facilities reporting with Form A to TRI, EPA used the Form A threshold for total releases of 500 lb/year as the input for modeling. EPA used the entire 500 lb/year for both the fugitive and stack air release estimates; however, because this threshold is for total site releases, these 500 lb/year are attributed either to fugitive air or stack air for this analysis and cannot be source apportioned to both release types.

For NEI data, EPA considered releases from the years 2014 and 2017 as the latest data available at the time of this analysis. NEI release data are process level data. The release data include source-specific parameter values used in modeling like stack parameters (*e.g.*, stack height, stack temperature, plume velocity) and may capture releases from facilities not required to report to TRI. Additionally, because the NEI contains data on the process level, facilities may have multiple releases. EPA modeled all individual releases separately. For facilities with multiple releases, EPA also modeled the combined releases to estimate a total concentration resulting from a facility. For the combined releases, the facility release point was assumed to be the average latitude and longitude of all individual release points. The average latitude/longitude was used to determine the meteorological station closest to the NEI facility, the urban/rural designation, and surrounding land cover setting for the deposition modeling (see Section 3.1.4 for additional details). For the NEI analysis, EPA relied on concentrations resulting from

individual release points for this assessment and not the combined releases. NEI releases were categorized into 13 OESs.

3.1.3 Modeled Distances

The AERMOD modeling for TRI and NEI data evaluated exposures to members of the general population by estimated ambient air concentrations at eight finite distances (10, 30, 60, 100, 1,000, 2,500, 5,000, and 10,000 m) and two area distances (30–60 m and 100–1,000 m) from each TRI or NEI releasing facility for each OES and generic facility for alternative release estimates. Concentrations estimated at area distances averages across the distances stated and represent a community average. Human populations for each of the eight finite distances were placed in a polar grid every 22.5 degrees around the respective distance ring. This results in a total of 16 modeled exposure points around each finite distance ring for which exposures are modeled. Figure 3-1 provides a visual depiction of the placement of exposure points around a finite distance ring. Although the visual depiction only shows exposure point locations around a single finite distance ring, the same placement occurred for all eight finite distance rings.

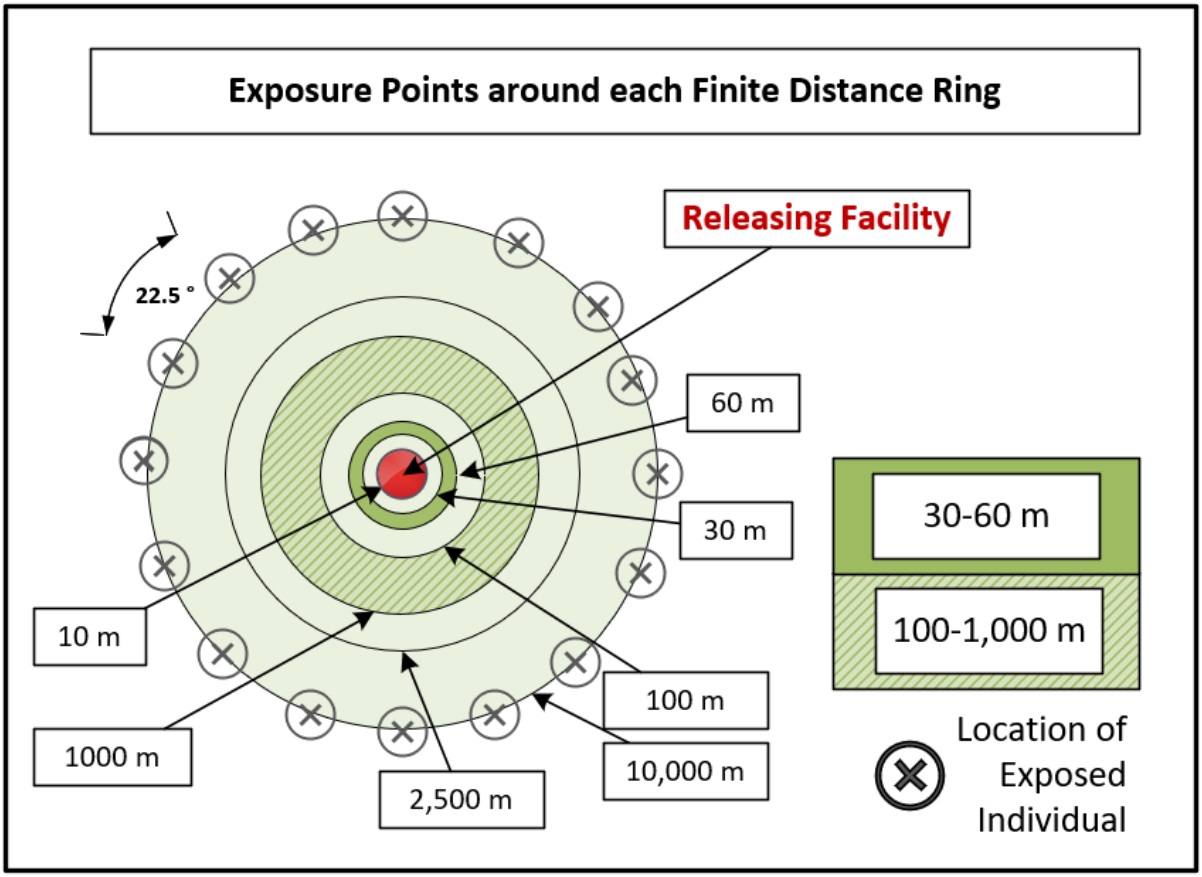

Figure 3-1. Modeled Exposure Points for Finite Distance Rings for Ambient Air Modeling Using AERMOD

Modeled exposure points for the area distance 30 to 60 m evaluated were placed in a cartesian grid at equal distances between 30 and 60 m around each releasing facility. Exposure points were placed at 10-meter increments. This results in a total of 80 points for which concentrations are modeled. Modeled exposure points for the area distance 100 to 1,000 m evaluated were placed in a cartesian grid at equal distances between 100 and 1,000 m around each releasing facility. Exposure points were placed at 100-

meter increments. This results in a total of 300 points for which concentrations are modeled. Figure 3-2 provides a visual depiction of the placement of exposure points (each dot) around the 100 to 1,000 m area distance ring. All exposure points were at 1.8 m above ground, as an approximation for breathing height for ambient air concentration estimations. A duplicate set of exposure points was at ground level (0 m) for deposition estimations.

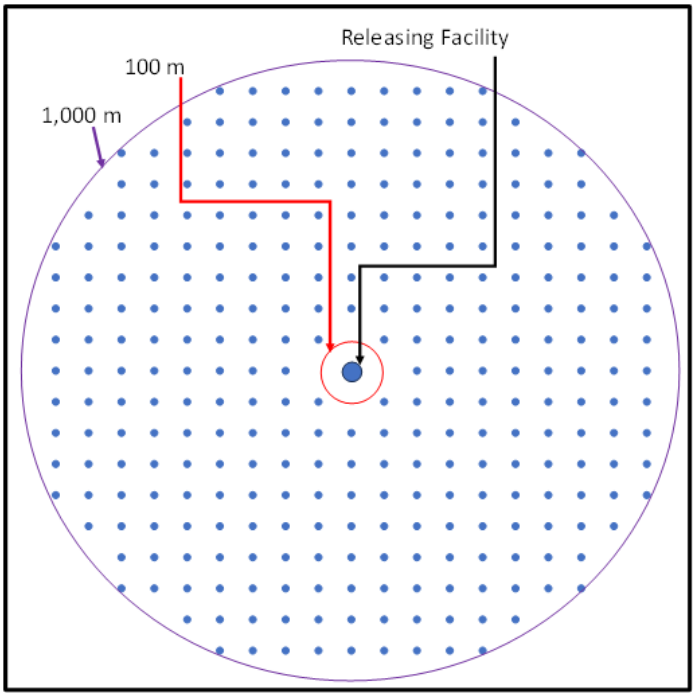

Figure 3-2. Modeled Exposure Point Locations for Area Distance for Ambient Air Modeling Using AERMOD

3.1.4 Meteorological Data

Meteorological data for TRI and NEI reporting facilities were obtained using the same AERMOD-ready meteorological data that EPA's Risk and Technology Review (RTR) program uses for multimedia, multipathway-risk modeling in review of National Emission Standards for Hazardous Air Pollutants (NESHAP). The 2019 meteorological data[3] that the RTR program currently uses includes 838 hourly stations with data mostly from the year 2019. For 47 stations (mainly in Alaska and West Virginia), EPA used data from 2016, 2017, or 2018 to fill notable spatial gaps. The 2016 meteorological data (no longer available for download from the EPA website) covers 824 hourly stations in the 50 states, District of Columbia, and Puerto Rico. The 2019 meteorological data were used to model 2018, 2019, and 2020 air emission releases. The 2016 meteorological data was used to model air emission releases reported from 2014 through 2017. The 2016 meteorologic data was processed with version 16216 of AERMOD's meteorological preprocessor (AERMET), and the 2019 meteorologic data was processed with version 19191 of AERMET. Following EPA guidance,[4] all processing used sub-hourly wind measurements (to calculate hourly-averaged wind speed and wind direction; see Section 8.4.2 of that guidance). The processing for the 2016 and 2019 data also used the "ADJ_U*" option, which adjusts the surface friction velocity to correct for overestimation of ground level concentrations during light-wind, stable

[3] 2019 meteorological data: https://www.epa.gov/fera/download-human-exposure-model-hem (accessed August 13, 2025).
[4] EPA Guideline on Air Quality Models: https://www.epa.gov/sites/default/files/2020-09/documents/appw_17.pdf (accessed August 13, 2025).

conditions. Facility coordinates, in the form of latitude/longitude coordinates, were used to match the facility to the closest available meteorological station. All processing also used automatic substitutions for small gaps in data for cloud cover and temperature. Each facility was matched to its closest surface meteorological station.

When modeling total emissions from NEI facilities, which can have individual sources with different latitude/longitude, EPA consolidated each facility around a single latitude/longitude by averaging the individual source latitudes and longitudes. The average latitude/longitude was used to determine the meteorological station closest to the NEI facility, the urban/rural designation, and surrounding land cover setting for the deposition modeling.

Meteorological data for the EPA estimated releases for the generic facilities/scenarios were modeled with two meteorological stations, Sioux Falls, South Dakota, for central tendency meteorology, and Lake Charles, Louisiana, for high-end meteorology. These two meteorological stations represent meteorological datasets that tended to provide high-end and central tendency concentration estimates relative to the other stations within the EPA's Integrated Indoor/Outdoor Air Calculator (IIOAC)[5] based on a sensitivity analysis of the average concentration and deposition predictions conducted in support of IIOAC development. These two meteorological stations are based on 5 years of data (2011–2015) and provide high-end and central tendency exposure concentrations used for risk calculation purposes to identify potential risks. All processing used sub-hourly wind measurements to calculate hourly-averaged wind speed and wind direction. The "ADJ_U*" option, which is used for mitigating modeling issues during light wind, stable conditions, was not used for the 2011 to 2015 data as this could lead to model overpredictions of ambient concentrations.[6] All processing also used automatic substitutions for small gaps in data for cloud cover and temperature.

3.1.5 Urban/Rural Designations

Urban/rural designations of the area around a facility are relevant when considering possible boundary layer effects on concentrations. Air emissions taking place in an urbanized area are subject to the effects of urban heat islands, particularly at night. When sources are set as urban in AERMOD, the model will modify the boundary layer to enhance nighttime turbulence, often leading to higher nighttime air concentrations. AERMOD uses urban-area population as a proxy for the intensity of this effect.

EPA used a population density analysis to identify facilities warranting an urban designation for the AERMOD runs. Specifically, EPA considered a facility to be in an urban area if it had a population density exceeding 750 people/km^2 within a 3-kilometer radius of the facility (see Section 7.2.1.1 of the guidance referenced in footnote 7 below) and set the relevant inputs to urban within AERMOD. For facilities set for urban modeling, AERMOD requires an estimate of the urban population count. EPA estimated the urban-area population by identifying a proxy for the area of urbanization. The urban-area proxy was the largest radius around the facility (out to a limit of 15 km) having a population density exceeding 750 people per km^2. EPA identified the population within that radius and applied it for modeling purposes. EPA used U.S. Census data at the level of block groups for these analyses with geographies from the 2019 census TIGER/Line shapefiles[7] and population counts from the American Community Survey[8] 2015 to 2019 5-year estimates-detailed tables (Table B01003). Facilities that did

[5] See IIOAC website (accessed August 13, 2025) for more information.
[6] EPA Guideline on Air Quality Models: https://www.epa.gov/sites/default/files/2020-09/documents/appw_17.pdf (accessed August 13, 2025).
[7] 2019 census TIGER/Line shapefiles page: https://www.census.gov/geographies/mapping-files/timE−series/geo/tiger-linE−file.2019.html (accessed August 13, 2025).
[8] American Community Survey page: https://www.census.gov/programs-surveys/acs (accessed August 13, 2025).

not meet the urban-area proxy criteria were designated as rural.

For the EPA estimated releases where TRI or city data were not available for a facility requiring modeling, the Agency modeled each such facility once as urban and once as rural.[9] Additionally, for these facilities EPA assumed an urban population of 1 million people, which is consistent with the estimated populations used with IIOAC.

3.1.6 Physical Source Specifications for TRI Release Facilities and Alternative Release Estimates

Source-specific physical characteristics (*e.g.*, actual release location, stack height, exit gas temperature) are generally not reported as part of the TRI dataset but can affect the plume characteristics and associated dispersion of the plume. TRI release facilities and EPA estimated releases (where TRI or city data were not available) were modeled centering all emissions on one location and using IIOAC default physical parameters. EPA assumed a flat terrain for all modeling scenarios. Stack emissions were modeled from a point source at 10 m above ground from a 2-meter inside diameter, with an exit gas temperature of 300 K and an exit gas velocity of 5 m/s (see Table 6 of the IIOAC User Guide). Fugitive emissions were modeled at 3.05 m above ground from a square area source of 10 m on a side (Table 7 of the IIOAC User Guide). These parameters were selected since they represent a slow-moving, low-to-the-ground plume with limited dispersion that results in a more conservative estimate of concentrations at the distances evaluated.

3.1.7 Physical Source Specifications for NEI Release Facilities

EPA modeled each NEI emission source in its own model run—even for facilities with multiple sources. A total 12,454 releases were modeled across 4,528 facilities. Site-specific parameter values were used in modeling, when available. When parameters were not available and/or values were reported outside of normal bounds, reported values were replaced using procedures that EPA uses in its AirToxScreen (see Section 2.1.3 of the AirToxScreen TSD[10]). The Agency assumed a flat terrain for all modeling scenarios. For some stack parameters, a default value based on the source classification code (SCC) of the emission source as reported in the NEI was used. If there was no default value for the source's SCC, a global default value was used.

Most sources did not report values for release height, length, and width. EPA used replacement values for these parameters as described below and in Table 3-1. For 5,628 NEI fugitive sources, the release heights, length, and width values were missing or reported as zero; the Agency set the release heights for these sources to 3.048 m. Values were missing or reported as 0 m for length for 5,826 sources and for width for 5,812 sources; EPA replaced the length and width values with a value of 10 m as needed for these sources. For any missing values of angle (1,584 sources), EPA replaced each with 0 degrees.

There were 11,801 regular vertical sources (modeled as "POINT" sources in AERMOD), while 155 were vertical sources with rain caps (modeled as "POINTCAP"), 239 were horizontal sources (modeled as "POINTHOR"), and 112 were downward-facing vents (modeled as "POINTHOR"). These source-type designations in AERMOD engage distinct algorithms regarding how the releases initially disperse when leaving the sources. SCCs were provided for each point source.

[9] Although this may be viewed as a potential double counting of these releases, EPA only utilized the highest estimated releases from a single exposure scenario from the suite of exposure scenarios modeled for surrogate/estimated facility releases as exposure estimates and for associated risk calculations.

[10] See *Technical Support Document: EPA's Air Toxics Screening Assessment 2018 AirToxScreen TSD* (accessed August 13, 2025).

EPA used the NEI-provided values for most point sources, but replacement values were needed for exit gas temperature and/or exit gas velocity for over 2,920 point sources. For 18 sources, the reported exit gas temperature was 0 °F; for 17 of these sources EPA replaced the value with the default values based on the SCC; and for 1 source that did not have a default value based on the SCC, EPA used a global default of 295.4 K. All point sources had in-bounds values for release heights and inside stack diameters, so no replacements were required for those parameters. For sources that had values for exit gas velocity that were missing or 0 (2,903 sources) the values of inside stack diameter and exit gas flow rate were used to calculate exit gas velocity as shown in Table 3-1. The calculated values were out of bounds for 41 sources, so the minimum or maximum in-bounds values were used as appropriate.

Table 3-1. Procedures for Replacing Values Missing, Equal to Zero, or Out of Normal Bounds for Physical Source Parameters in AERMOD for NEI Sources

Parameter	Bounds	Condition			
		Value Missing or 0			Value Out of Normal Bounds
		First Pass	Second Pass (First Pass Unsuccessful)	Third Pass (First Two Passes Unsuccessful)	
Stack height	1–1,300 ft (0.3048–396 m)	Use default value by SCC (pstk file)	Use global default: 3.048 m	N/A	Use the minimum or maximum in-bound value if below or above bounds, respectively
Stack inside diameter	0.001–300 ft (0.0003048–91.4 m)	Use default value by SCC (pstk file)	Use global default: 0.2 m	N/A	Use the minimum or maximum in-bound value if below or above bounds, respectively
Stack exit gas temperature [a]	>0–4,000 °F (>255.4–2,477.6 K)	Use default value by SCC (pstk file)	Use global default: 295.4 K	N/A	Use the minimum or maximum in-bound value if below or above bounds, respectively
Stack exit gas velocity	0.001–1,000 ft/s (0.0003048–304.8 m/s)	Calculate from existing exit gas flow rate and inside diameter: $(4\times flow)/(\pi\times diameter^2)$	Use default value by SCC (pstk file)	Use global default: 4 m/s	Use the minimum or maximum in-bound value if below or above bounds, respectively
Fugitive height	N/A	0 m if length and width are not missing and are above 0; 3.048 m if length or width are missing or 0	N/A	N/A	N/A
Fugitive length	N/A	10 m	N/A	N/A	N/A
Fugitive width	N/A	10 m	N/A	N/A	N/A
Fugitive angle	N/A	0 deg	N/A	N/A	N/A

American Meteorological Society/Environmental Protection Agency Regulatory Model; K = Kelvin; NEI = National Emissions Inventory; SCC = source classification code

[a] For exit gas temperatures, AirToxScreen's bounds were set so that values must exceed 0 °F.

Notes: pstk file = file of default stack parameters by source classification code (SCC) from EPA's SMOKE emissions kernel: pstk_13nov2018_v1.txt, retrieved on 28 September 2022 from https://cmascenter.org/smoke/ (accessed August 13, 2025).

3.1.8 Temporal Emission Patterns

3.1.8.1 TRI and NEI Release Facilities

Temporal emission patterns are another factor that can affect the overall modeled concentration estimates. The *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g) for this work included information on temporal emission patterns—release duration (across the hours of a day, or intraday) and release pattern (across the days of a year, or inter-day)—stratified by OES. For 1,2-

dichloroethane, intraday release durations were not known for any facility; therefore, EPA assumed releases occurred each hour of the day.

EPA's assumptions for inter-day release pattern are provided in Table 3-2. The Agency started with the assumption that emissions took place every day of the year. Next, EPA turned emissions off for certain days of the year as needed to achieve the desired number of emission days: assumptions such as no emissions on Saturday and Sunday, no emissions on the days around New Year's Day, no emissions at regular patterns, such as the first Monday of every month, and so on.

Table 3-2. Assumptions for Inter-Day Emission-Release Pattern for Modeling Ambient Air Concentrations of 1,2-Dichloroethane in AREMOD Using TRI and NEI Reported Releases

Provided Language for Release Pattern	Implemented Release Pattern: Days When Emissions Are on (Format of Month Number/Day Number)
Release pattern: **365 days/year** assumes year-round operations	All days
Release pattern: **350 days/year** assumes emitting operations **7 days/week and 50 weeks/year**	All days except 1/1–1/4 and 12/21–12/31 (and 1/5 for years 2016 and 2020)
Release pattern: **300 days/year**	All days except for the first 5 days of each month and 12/27–12/31 (and 12/26 for years 2016–2020)
Release pattern: **296 days/year**	The first 25 days of each month, except 3/25, 6/25, 9/25, and 12/25
Release pattern: **260 days/year** assuming emitting operations **5 days/week and 50 weeks/year**	All Monday through Friday, except 1/1 (in 2014–2016) and 12/25 (in 2020 only)
Release pattern: **250 days/year** assuming emitting operations **5 days/week for 50 weeks/year**	All Monday through Friday, except 1/1 (in 2014–2016 and 2018–2020) and 12/25 (in 2020 only)
Note: Some of the "Provided Language for Release Pattern" is specific to an OES.	

3.1.8.2 Alternative Release Estimates

The Agency's assumptions for intraday release duration for the EPA-estimated releases are provided in Table 3-3. When a release duration was a non-integer value, the duration was rounded down to the nearest integer, except when the release duration was less than 0, in which case the duration was rounded up to 1. The hours shown conform to AERMOD's notation scheme of using hours 1 to 24, where hour 1 is the hour ending at 1 a.m. and hour 24 is the final hour of the same day ending at midnight.

Table 3-3. Assumptions for Intraday Emission-Release Duration for Modeling Ambient air Concentrations of 1,2-Dichloroethane in AERMOD Using Alternative Releases Estimates

Hours per Day of Emissions	Assumed Hours of the Day Emitting (Inclusive)
1	Hour 13 (hour ending at 1 p.m.; *i.e.,* 12–1 p.m.)
2	Hours 13–14 (hour ending at 1 p.m. through hour ending at 2 p.m.; *i.e.*, 12–2 p.m.)
4	Hours 13–16 (hour ending at 1 p.m. through hour ending at 4 p.m.; *i.e.*, 12–4 p.m.)
5	Hours 13–17 (hour ending at 1 p.m. through hour ending at 5 p.m.; *i.e.*, 12–5 p.m.)
8	Hours 9–16 (hour ending at 9 a.m. through hour ending at 4 p.m.; *i.e.*, 8 a.m.to 4 p.m.)
24	All hours

EPA's assumptions for inter-day release frequency are provided in Table 3-4.

Table 3-4. Assumptions for Inter-day Emission-Release Pattern for Modeling Ambient Air Concentrations of 1,2-Dichloroethane in AERMOD Using Alternative Releases Estimates

Days of Emissions per Year	Implemented Release Pattern: Days When Emissions Are on (Format of Month Number/Day Number)
3	The first day of February, July, and October
12	The first day of each month
24→26[a]	The 1st and 15th of each month, plus the 25th of June and December
74	The first six days of each month, plus the 7th of January and February
119	The first nine days of each month, plus the 10th of January through November
217→220[a]	The first 18 days of each month, plus the 19th of January through April
235	Every Monday–Friday, but not the 1st–8th of January, the 1st–7th of April, the 1st–7th of July, the 1st–7th of October, and the 25th–31st of December (and not the 24th of December in 2020)
250	Every Monday–Friday, but not the 1st–4th of January and the 21st–31st of December (and not the 5th of January in 2016 and 2020)
258	Every Monday–Friday, but not the 24th–26th of December (and not the 27th–28th of December in 2015, 2016, and 2020; and not the 29th of December in 2020)
296	The first 25 days of each month, except the 25th of March, June, September, and December

[a] Frequencies of 24 and 217 days per year were modeled as 26 and 220 days per year, respectively. This was done because existing files for release frequencies of 26 and 220 days per year had already been created and the differences in emission patterns were minimal between the 2 scenarios.

3.1.9 Emission Rates

The release assessments included emission rates for each facility in pounds per year for TRI reporting facilities, tons per year for NEI reporting facilities, and kilograms per year for each scenario for the EPA estimated releases for fugitive and stack sources as appropriate. Emission rates included in the release assessments were converted to units needed by AERMOD (g/s for stack sources and g/s/m^2 for fugitive sources). The conversion from per-hour to per-second used the number of emitting hours per year based on the assumed temporal release patterns (see Section 3.1.8). The conversion to per m^2 for fugitive sources used length and width values outlined in Sections 3.1.6 and 3.1.7. Annual emissions were distributed evenly to each hour and day during emissions were assumed to be occurring. For release

media which may be incinerators, EPA assumed that 99.9 percent of 1,2-dichloroethane was destroyed by incineration (*i.e.*, the emission rates on incinerators were reduced 99.9%). See the *Draft Chemistry, Fate, and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025d) and the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g) for more details on emission rates and releases, respectively.

3.1.10 Deposition Parameters

AERMOD was used to model daily (g/m^2/day) and annual (g/m^2/year) deposition fluxes from air to land and water at eight finite distances (10, 30, 60, 100, 1,000, 2,500, 5,000, and 10,000 m) and two area distances (30–60 m and 100–1,000 m) from each releasing facility. Concentrations of 1,2-dichloroethane in soil from total (wet and dry) air deposition was estimated to assess exposures of 1,2-dichloroethane to terrestrial species. AERMOD can model both gaseous and particle deposition. Based on physical and chemical properties of 1,2-dichloroethane (see *Draft Chemistry and Fate and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025d)), EPA considered only gaseous deposition. Input parameter values for AERMOD deposition modeling are shown in Table 3-5.

Table 3-5. Settings for Gaseous Deposition for Modeling Ambient Air Concentrations of 1,2-Dichloroethane using AERMOD

Parameter	Value	Source(s)
Diffusivity in air	8.60E−02 cm^2/s	U.S. EPA (2024b)
Diffusivity in water	1.10E−05 cm^2/s	U.S. EPA (2024b)
Henry's Law constant	211.8 $Pa \cdot m^3/mol$	U.S. EPA (2025d)
r_{cl}: Cuticular resistance to uptake by lipids for individual leaves	1.13E05 s/cm	Wesely et al. (2002); (Welke et al., 1998; Kerler and Schoenherr, 1988)
Seasons	DJF = winter with no snow; MAM = transitional spring with partial green coverage or short annuals; JJA = midsummer with lush vegetation; SON = autumn with unharvested cropland	Assumption
Land cover	Site-specific in 36 directions around the source, using the 2019 version of the National Land Cover Database (supplemented with the 2011 version for Hawaii and 2001 version for Puerto Rico) [a]	National Land Cover Database (accessed August 28, 2025)

Pa = Pascal; mol = mole; log = logarithm base 10; µm = micrometer; DJF = December–February; MAM = March–May; JJA = June–August; SON = September–November
[a] For the NEI facility that did not have a latitude or longitude (EIS Facility ID 16206511), EPA assumed a default land cover of suburban forest in all directions.

3.1.11 Ambient Air Concentration Outputs

Hourly average air concentration and total (wet and dry) deposition flux outputs were provided from AERMOD for each exposure point around each distance ring (*i.e.*, each of 16 exposure points around a finite distance ring or each exposure point within the area distance ring). Daily and period averages were then calculated from the modeled hourly data. Daily averages for the finite distance rings were calculated as arithmetic averages of all hourly data for each day modeled for each exposure point around each ring. Daily averages for the area distance ring were calculated as the arithmetic average of the hourly data for each day modeled across all exposure points within the area distance ring. This results in the following number of daily average concentrations at each distance modeled:

1. Daily averages for TRI and NEI reporting facilities using 2016 calendar year meteorological data: one daily average concentration for 366 days for each of 16 exposure points around each finite distance ring, which results in a total of 5,856 daily average concentration values for each finite distance modeled (366 × 16 = 5,856).
2. Daily averages for TRI reporting facilities using 2019 calendar year meteorological data: one daily average concentration for 365 days for each of 16 exposure points around each finite distance ring, which results in a total of 5,840 daily average concentration values for each finite distance modeled (365 × 16 = 5,840).

Period averages were calculated by averaging all the hourly values at each exposure point for each distance ring over 1 year. This results in a total of 16 period average concentration values for each finite distance ring. Additionally, period averages across all years were calculated by averaging all hourly values at each exposure point for each distance ring across multiple years.

Daily and period average outputs were stratified by different source scenarios, such as urban/not urban setting or emission-strengths where needed. Outputs from AERMOD are provided in units of micrograms per cubic meter ($\mu g/m^3$) for ambient air concentrations and grams per square meter (g/m^2) for deposition fluxes.

Post-processing scripts were used to extract and summarize the output concentrations for each facility, release, and modeled distance or area distance. The following statistics for daily- and period-average concentrations were extracted or calculated from the results for each of the modeled distances (*i.e.,* each ring or grid of exposure points) and scenarios (see Table 3-6):

- minimum;
- maximum;
- average;
- standard deviation; and
- 10th, 25th, 50th, 75th, and 95th percentiles.

Table 3-6. Description of Daily or Period Average and Air Concentration Statistics

Statistic	Description
Minimum	The minimum daily or period average concentration estimated across all exposure points at the modeled distance.
Maximum	The maximum daily or period average concentration estimated across all exposure points at the modeled distance.
Average	Arithmetic mean of all daily or period average concentrations estimated across all exposure points at the modeled distance. This incorporates lower values (from days when the receptor location largely was upwind from the facility) and higher values (from days when the receptor location largely was downwind from the facility).
Percentiles	The daily or period average concentration estimate representing the numerical percentile value across the entire distribution of all concentrations across all exposure points at the modeled distance. The 50th percentile represents the median of the daily or period average concentration across all concentration values for all receptor locations on any day at the modeled distance.

3.2 Modeling Approach for Estimating Concentrations in Soil from Air Deposition

Because 1,2-dichloroethane has low potential to sorb to particulates in air, EPA focused on soils concentrations resulting from gaseous deposition. The parameters used to model gaseous deposition in

AERMOD were described in Section 3.1.10. Concentrations of 1,2-dichloroethane in soil were calculated using the following equations and the modeled 95th percentile maximum daily deposition fluxes described below in Equation 3-1:

Equation 3-1.

$$Daily_{Dep} = Tot_{Dep} \times Ar \times CF$$

Where:

$Daily_{Dep}$	=	Total daily deposition to soil (µg)
Tot_{Dep}	=	Daily deposition flux to soil (g/m^2)
Ar	=	Area of soil (m^2)
CF	=	Conversion of grams to micrograms

Equation 3-2.

$$Soil_{Conc} = \frac{Daily_{Dep}}{Ar \times Mix \times Dens}$$

Where:

$Soil_{Conc}$	=	Daily average concentration in soil (µg/kg)
$Daily_{Dep}$	=	Total daily deposition to soil (µg)
Mix	=	Mixing depth (m); default = 0.1 m from the European Commission Technical Guidance Document (ECB, 2003)
Ar	=	Area of soil (m^2)
$Dens$	=	Density of soil; default = 1,700 kg/m^3 from the European Commission Technical Guidance Document (ECB, 2003)

The above equations assume instantaneous mixing with no degradation or other means of chemical reduction in soil over time and that 1,2-dichloroethane loading in soil is only from direct air-to-surface deposition (*i.e.*, no runoff).

3.3 Measured Concentrations in Ambient Air

Ambient air concentrations of 1,2-dichloroethane were extracted from fifteen studies based on the criteria in the systematic review protocol (U.S. EPA, 2025m). Only three of the extracted studies were conducted in the United States (Figure 3-3). Of the three studies conducted in the United States where concentrations were extracted (U.S. EPA, 2025m): (1) one study was conducted as part of EPA's National-scale Air Toxics Assessment (U.S. EPA, 2015); (2) one study examined the spatial variation of air toxics among industrial, urban and rural sites in and around Pittsburgh, Pennsylvania (Logue et al., 2010); and (3) one study measured concentrations of volatile organic compounds in the Kanawaha Valley of West Virginia (Cohen et al., 1989). The highest reported concentration from these three studies was 7.6 µg/m^3 (Cohen et al., 1989); however, this value was the limit of detection and was established using a potentially contaminated field blank. Due to uncertainties in the sampling and analytical methods, the results of Cohen (1989) were not considered further for this analysis. Of the two remaining studies conducted in the United States, reported ambient air concentrations of 1,2-dichloroethane ranged from not detected to 0.04 µg/m^3.

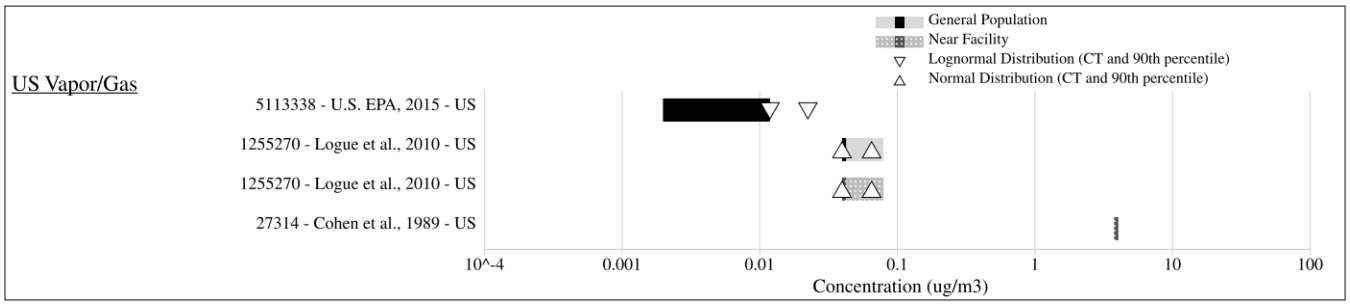

Figure 3-3. Measured Concentrations of 1,2-Dichloroethane (µg/m^3) in Ambient Air from 1987–2017

See Appendix A.1 for a detailed description of how to interpret this figure.

Additional ambient air concentrations of 1,2-dichloroethane were obtained from the EPA's AMTIC (accessed August 13, 2025) archive. The AMTIC archive houses data from 2,800 ambient air monitoring sites across the United States from 1990 to 2020, with 90 percent of the data from the years 2000 to 2020, resulting from the air toxics program. The air toxics program includes the National Air Toxics Trends Sites (NATTS) Network, Community-Scale Air Toxics Ambient Monitoring (CSATAM) and Urban Air Toxics Monitoring Program (UATMP) that monitor for hazardous air pollutants (HAPs), including 1,2-dichloroethane. The data are reported from federal, state, local, and tribal monitoring networks. AMTIC HAPs monitoring data are summarized in Table 3-7 for the years 2015 to 2020. These years were selected to be consistent with the TRI and NEI data used in the modeled ambient air concentrations (Section 3.1.2). As shown in Table 3-7, measured concentrations from the AMTIC archive ranged from non-detect to 256 µg/m^3.

For more information on 1,2-dichloroethane in ambient air monitoring data, see the *Draft Ambient Monitoring Technology Information Center (AMTIC) Monitoring Data 2015 to 2020 for 1,2-Dichloroethane* (U.S. EPA, 2025b).

Table 3-7. Summary of Selected Statistics of 1,2-Dichloroethane Ambient Air Concentrations (µg/m^3) from EPA's Ambient Monitoring Technology Information Center Archive

Chemical	Statistics[a]	Year					
		2015	2016	2017	2018	2019	2020
1,2-Dichloroethane	Number of samples	13,597	13,256	13,231	13,250	11,813	11,101
	Percent ND	58.5	57.3	65.3	61.4	62.9	67.1
	Minimum	ND	ND	ND	ND	ND	ND
	Mean	0.16	0.15	0.15	0.19	0.22	0.23
	Max	186	46	115	123	256	241

ND = non-detect

[a] For the purposes of this analysis, EPA considered any sample with a concentration below a reported method detection limit (MDL) to be a non-detect. Additionally, for samples with no reported MDL, EPA considered any sample with a concentration ≤0 to be an ND. For calculation of summary statistics, the Agency did not include data points where no concentration was reported. EPA also did not include data points in the summary statistics where no MDL was reported, and the concentration was ≤0. For data points where the concentration was less than the reported MDL, a concentration of ½ the MDL was used for calculating the mean.

3.4 Modeled Concentrations in Ambient Air

The TRI and NEI release data were used as direct inputs to AERMOD. Daily and period average outputs were obtained via modeling, and post-processing scripts were used to extract a variety of statistics from the modeled concentration distribution, including the 10th (low-end), 50th (central tendency), and 95th (high-end) percentile 1,2-dichloroethane concentrations at each distance modeled. The 95th percentile concentrations are most representative of concentrations at locations that are predominantly downwind of releasing facilities. The 50th percentile concentrations incorporate lower values from days when the receptor location largely was upwind from the facility and higher values from days when the receptor location largely was downwind from the facility. The 10th percentile concentrations are most representative of locations that predominantly upwind of releasing facilities. Summary statistics for modeled concentrations (maximum, mean, median, and minimum) were calculated for each OES. TRI data provide annual total facility releases. NEI data provide process-specific data. Due to differences in reporting requirements, frequency, and thresholds, not all facilities report to both program and there can be differences in reported releases among facilities reporting to both NEI and TRI. Ultimately, modeling of both datasets increases confidence that EPA did not miss any releasing facilities and completed a robust modeling analysis. Results of each dataset are treated as two separate lines of evidence, with the results of the modeling effort being compared in the draft 1,2-dichloroethane risk evaluation (U.S. EPA, 2025i). Strength and limitations of the datasets themselves are described in the 1,2-dichloroethane draft risk evaluation (U.S. EPA, 2025g).

The full inputs and results are presented in the *Draft Supplemental Information on AERMOD TRI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2025l), the *Draft Supplemental Information on AERMOD Generic Releases Exposure and Risk Analysis* (U.S. EPA, 2025j), and the *Draft Supplemental Information on AERMOD NEI Exposure and Risk Analysis* (U.S. EPA, 2025k) (also called "supplemental files").

3.4.1 Modeled Ambient Air Concentrations for TRI Reporting Facilities

A summary of the annual average air concentration ranges estimated using AERMOD for reported TRI releases is provided in Table 3-8. The summary includes five OESs and select statistics (maximum, mean, median, and minimum) calculated from the modeled concentration distributions within each OES at each distance modeled based on the maximum 95th percentile annual average concentrations for each distance. Data for the 95th percentile are presented here to show high-end exposure scenarios. Data for the 50th and 10th percentiles are available in the supplemental files. Daily modeled air concentrations for 10th, 50th, and 95th percentile exposure scenarios were also calculated and presented in the *Draft Supplemental Information on AERMOD TRI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2025l).

The highest modeled concentrations occur at 10 m from the release point; however, this distance is generally not relevant for exposures to the general population. Therefore, this discussion will focus on distance of greater 1,000 m as these are the distances at which the general population is more likely to be exposed. When considering distances of 1,000 m or more, the 95th percentile modeled average annual air concentrations per facility ranged from 0 to 6.4 $\mu g/m^3$ for the Manufacturing OES; 0 to 5.26×10^{-2} $\mu g/m^3$ for the Repackaging OES; 0 to 6.64×10^{-2} $\mu g/m^3$ for the Processing as a reactant OES; 0 to 0.61 $\mu g/m^3$ for the Processing into formulation, mixture, or reaction product OES; up to 3.81×10^{-2} for the Non-aerosol cleaning and degreasing OES; and 0 to 4.17×10^{-2} $\mu g/m^3$ for the Waste handling, treatment, and disposal (incinerator) OES. The difference between minimum and maximum values occurs because within each OES there are multiple facilities with varying releases. These varying releases, in turn, affect the range of estimated concentrations at a given distance. The Manufacturing OES had the highest

804 modeled concentrations, with the maximum 95th percentile concentration being approximately one
805 order of magnitude higher than the maximum modeled concentration for the next highest OES of
806 Processing into formulation, mixture, or reaction product. For comparison, the second highest facility in
807 the Manufacturing OES had a modeled 95th percentile annual average concentration of 3.95 μg/m^3 at
808 1,000 m. Additionally, in total, 10 facilities in the Manufacturing OES had higher maximum modeled
809 annual average concentrations than any other facility in any other OES. The maximum 95th percentile
810 modeled annual average concentration of 282 μg/m^3 at 10 m from the releasing facility is approximately
811 the same as the maximum monitored concentration of 256 μg/m^3 from the AMTIC archive database
812 (Table 3-7). Although the AMTIC sampling locations may not align exactly with the modeled distances,
813 the similarity of the maximum monitored and modeled concentrations provides evidence that the
814 ambient air modeling approached used in this risk evaluation was appropriate and representative. The
815 highest modeled concentration is more than an order of magnitude higher than the highest value
816 extracted during systematic review from peer-reviewed literature (Figure 3-3). The reason for this
817 difference is that the peer-reviewed studies were not conducted near TSCA releasing facilities.

Table 3-8. Summary Statistics for 95th Percentile Annual Average Ambient Air Concentrations for 1,2-Dichloroethane Releases Reported to TRI from 2015–2020 Modeled Using AERMOD[a]

Occupational Exposure Scenario (OES)	Number of Facilities Evaluated in OES[b]	Statistic	95th Percentile Annual Average Ambient Air Concentrations (µg/m³) Estimated for 10–10,000 m from Releasing Facilities									
			10 m	30 m	30–60 m	60 m	100 m	100–1,000 m	1,000 m	2,500 m	5,000 m	10,000 m
Manufacturing	24	max	3,680	1,510	1,030	606	282	39	6.4	1.5	0.48	0.16
		mean	389	172	117	71	34	4.0	0.87	0.21	7.55E−02	2.61E−02
		median	211	95	61	38	18	1.9	0.47	0.11	3.97E−02	1.36E−02
Repackaging	5	max	22	10	7.0	4.4	2.2	0.22	5.26E−02	1.12E−02	3.50E−03	1.09E−03
		mean	7.7	3.7	2.5	1.6	0.77	8.30E−02	1.85E−02	4.08E−03	1.32E−03	4.34E−04
		median	4.4	2.1	1.3	0.91	0.45	4.87E−02	1.10E−02	2.44E−03	7.85E−04	2.54E−04
Processing as a reactant	12	max	37	14	9.3	5.5	2.6	0.33	6.64E−02	1.71E−02	6.31E−03	2.36E−03
		mean	11	4.1	2.9	1.7	0.78	0.10	1.85E−02	4.26E−03	1.44E−03	4.94E−04
		median	4.1	1.9	1.3	0.80	0.39	4.84E−02	1.05E−02	2.55E−03	8.42E−04	2.79E−04
Processing into formulation, mixture, or reaction product	12	max	456	173	130	68	30	4.5	0.61	0.13	4.35E−02	1.45E−02
		mean	40	16	11	6.2	2.9	0.42	6.73E−02	1.57E−02	5.34E−03	1.83E−03
		median	9.4	4.0	2.7	1.6	0.74	8.29E−02	1.54E−02	5.06E−03	2.21E−03	8.39E−04
Non-aerosol cleaning and degreasing	1	max	0.20	0.12	7.37E−02	4.90E−02	2.28E−02	3.73E−03	8.40E−04	2.22E−04	7.89E−05	2.75E−05
		mean	0.13	7.65E−02	4.95E−02	3.14E−02	1.50E−02	2.05E−03	3.81E−04	8.99E−05	3.02E−05	1.01E−05
		median	0.14	7.91E−02	5.17E−02	3.23E−02	1.51E−02	1.97E−03	3.21E−04	7.04E−05	2.27E−05	7.37E−06
Waste handling, treatment, and disposal (incinerator)	18	max	15	7.1	4.8	3.0	1.5	0.18	4.17E−02	1.10E−02	4.15E−03	1.53E−03
		mean	2.2	0.97	0.66	0.40	0.19	2.28E−02	4.74E−03	1.12E−03	3.87E−04	1.34E−04
		median	0.15	5.57E−02	3.65E−02	2.25E−02	1.50E−02	2.08E−03	3.81E−04	9.18E−05	3.42E−05	1.19E−05

AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model

[a] The full inputs and results are presented in the *Draft AERMOD Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2025a) and *Draft Supplemental Information on AERMOD TRI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2025k).

[b] For each OES, EPA modeled all Toxic Release Inventory-reported releases considering source attribution (fugitive and stack releases) for each facility from 2015–2020. Not all facilities reported for all 6 years.

3.4.2 Modeled Ambient Air Concentrations for EPA Estimated Releases for Generic Facilities/Sites

Table 3-9 provides a summary of the 95th percentile annual average air concentrations estimated using AERMOD for the four OESs where there were either no or limited site-specific data available for modeling of ambient air concentrations (see *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g) for the methods used for to estimate releases for OESs where there were either no or limited site-specific data). Data for the 95th percentile are presented here to show high-end exposure scenarios. Data for the 50th and 10th percentiles are available in the supplemental files. Daily modeled air concentrations for 10th, 50th, and 95th percentile exposure scenarios were also calculated and presented in the supplemental file (U.S. EPA, 2025a). Daily modeled air concentrations for 10th, 50th, and 95th percentile exposure scenarios were also calculated and presented in the supplemental file (U.S. EPA, 2025a). The ambient air modeled concentrations values are presented for high-end exposure modeled, high-end meteorology (Lake Charles, Louisiana), and both rural and urban settings. The high-end meteorological station used represents meteorological datasets that tended to provide high-end concentration estimates relative to the other stations within IIOAC. Modeling was also conducted using meteorological data from Sioux Falls, South Dakota, to represent a central tendency exposure scenario, and these data are presented in the supplemental files.

The highest modeled concentrations occur at 10 m from the release point; however, this distance is generally not relevant for exposures to the general population. Therefore, this discussion will focus on distance of greater 1,000 m, as these are the distances at which the general population is more likely to be exposed. When considering distances of 1,000 m or more, the maximum modeled ambient annual average air concentration for each modeled OES was 2.28×10^{-2} µg/m^3 for Commercial aerosol products; 1.66×10^{-4} for Laboratory use; 36 µg/m^3 for Industrial use of adhesives and sealants; and 0.48 µg/m^3 for Non-aerosol cleaning and degreasing. The highest modeled concentration of 812 µg/m^3 at 10 m is the same order of magnitude as the maximum monitored concentration of 256 µg/m^3 from the AMTIC archive database (Table 3-7). Although the AMTIC sampling locations may not align exactly with the modeled distances, the similarity of the maximum monitored and modeled concentrations provides evidence that the ambient air modeling approaches used in this risk evaluation were appropriate and representative.

Table 3-9. Summary Statistics for 95th Percentile Annual Average Ambient Air Concentrations for 1,2-Dichloroethane Using EPA Estimated Releases for Generic Facilities/Sites Modeled Using AERMOD[a] [b]

OES	Meteorology [c]	Land	95th Percentile Annual Average Ambient Air Concentrations (µg/m^3) Estimated for 10–10,000 m for Modeled OES Releases									
			10 m	30 m	30–60 m	60 m	100 m	100–1,000 m	1,000 m	2,500 m	5,000 m	10,000 m
Industrial application of adhesives and sealants	High	Rural	5,789	3,003	2,430	1,496	812	165	36	9.0	3.07	1.03
	High	Urban	9,140	2,721	2,146	997	433	56	8.5	1.9	0.60	0.20
Commercial aerosol products	High	Rural	21	7.3	4.6	2.7	1.2	0.11	2.28E−02	4.80E−03	1.52E−03	5.07E−04
	High	Urban	23	6.7	4.3	2.3	0.92	7.34E−02	1.21E−02	2.27E−03	7.04E−04	2.39E−04
Non-aerosol cleaning and degreasing	High	Rural	1,931	535	362	173	65	5.4	0.48	7.85E−02	2.69E−02	1.30E−02
	High	Urban	1,941	592	355	169	63	5.2	0.46	6.55E−02	2.35E−02	1.07E−02
Laboratory use	High	Rural	0.56	1.55E−01	9.95E−02	5.00E−02	1.87E−02	1.57E−03	1.66E−04	2.87E−05	9.92E−06	4.70E−06
	High	Urban	0.56	1.54E−01	9.97E−02	4.97E−02	1.86E−02	1.56E−03	1.57E−04	2.60E−05	8.43E−06	3.49E−06

AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model; OES = occupational exposure scenario

[a] The full inputs and results are presented in the *Draft AERMOD Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2025a) and *Draft Supplemental Information on AERMOD Generic Releases Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2025j).

[b] See *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g) for the methods used for to estimate releases for OESs where there were either no or limited site-specific data.

[c] High refers to the meteorological conditions for Lake Charles, LA. Because the data in this table are for generic facilities/sites, they were modeled using a meteorological station that tends to provide high-end concentration estimates relative to other stations in the Integrated Indoor/Outdoor Air Calculator (IIOAC).

3.4.3 Modeled Ambient Air Concentrations for NEI Reporting Facilities

1,2-Dichloroethane AERMOD NEI modeled annual average concentrations for the 95th percentile exposure scenario ranged from 0 to 5,120 µg/m^3 (Table 3-10) across distances modeled. Data for the 95th percentile are presented here to show high-end exposure scenarios. Data for the 50th and 10th percentiles are available in the supplemental files. Daily modeled air concentrations for 10th, 50th, and 95th percentile exposure scenarios were also calculated and presented in the supplemental file (U.S. EPA, 2025k). The highest modeled concentrations occur at 10 m from the release point; however, this distance is generally not relevant for exposures to the general population. Therefore, this discussion will focus on distance of greater 1,000 m, as these are the distances at which the general population is more likely to be exposed. When considering distances of 1,000 m or above, the maximum 95th percentile modeled annual concentration of 4.6 µg/m^3 is approximately the same as the maximum AERMOD TRI modeled concentration of 282 µg/m^3 (Section 3.4.1). Like the results for TRI reporting facilities, the large range in modeled concentrations occurs because within each OES there are multiple facilities with varying releases.

As stated in the draft risk evaluation (U.S. EPA, 2025i), there is uncertainty regarding reported releases of 1,2-dichloroethane from a subset of municipal solid waste landfills. For the purposes of this analysis, municipal solid waste landfills were identified by the NAICS code of 562212. Due to the level of uncertainty, modeling results for municipal solid waste landfills are presented in this document separately in Table 3-11. As shown in Table 3-11, at distances of 1,000 m and higher, modeled concentrations range from 0 to 4.93×10^{-2} µg/m^3. The maximum modeled concentration is more than two orders of magnitude lower than the highest NEI modeled concentration from non-landfill sources of 4.6 µg/m^3 at 1,000 m (Table 3-10) and the maximum monitored concentration of 256 µg/m^3 from the AMTIC archive (Table 3-7). Also, on average, modeled air concentrations of 1,2-dichloroethane from the municipal solid waste landfill releases in the Waste handling, treatment, and disposal OES are less than half of modeled concentrations from the non-municipal solid waste landfill releases in the same OES, across all distances.

Table 3-10. Summary Statistics for 95th Percentile Annual Average Ambient Air Concentrations for 1,2-Dichloroethane Releases Reported to NEI for the Reporting Years of 2014–2017 Modeled Using AERMOD[a] [b]

OES	Number of Releases [c]	Statistic	95th Percentile Annual Average Ambient Air Concentrations (µg/m^3) Estimated for 10–10,000 m from NEI Releases									
			10 m	30 m	30– 60 m	60 m	100 m	100–1,000 m	1,000 m	2,500 m	5,000 m	10,000 m
Manufacturing	439	max	5,120	1,660	1,110	562	234	32	4.6	1.0	0.32	0.10
		mean	11	4.8	3.7	2.4	1.3	0.23	4.72E−02	1.04E−02	3.41E−03	1.13E−03
		median	6.40E−03	1.06E−02	1.63E−02	1.37E−02	1.30E−02	4.42E−03	1.14E−03	3.14E−04	1.27E−04	4.47E−05
Repackaging	1,093	max	22	11	6.0	3.9	1.7	0.88	0.11	2.22E−02	7.32E−03	2.39E−03
		mean	5.77E−02	2.26E−02	1.60E−02	1.10E−02	6.91E−03	1.72E−03	3.10E−04	6.94E−05	2.25E−05	7.34E−06
		median	1.97E−07	9.37E−08	7.07E−08	4.00E−08	1.96E−08	2.54E−09	4.71E−10	1.02E−10	3.21E−11	1.00E−11
Processing as a reactant	127	max	158	60	41	34	33	3.8	0.56	0.12	3.78E−02	1.29E−02
		mean	2.4	1.4	1.2	0.93	0.61	8.05E−02	1.62E−02	3.77E−03	1.27E−03	4.30E−04
		median	1.49E−02	1.59E−02	1.30E−02	9.32E−03	8.83E−03	2.60E−03	8.55E−04	2.03E−04	6.78E−05	2.36E−05
Processing into formulation, mixture, or reaction product	76	max	238	247	193	122	62	6.3	1.6	0.33	0.10	3.09E−02
		mean	4.4	4.0	3.1	2.0	1.0	0.11	2.64E−02	5.90E−03	1.89E−03	6.09E−04
		median	2.26E−10	1.63E−06	1.24E−05	1.71E−05	5.18E−05	4.10E−05	2.48E−05	1.03E−05	4.40E−06	1.81E−06
Industrial application of adhesives and sealants	419	max	1.2	17	13	6.2	2.7	0.34	5.47E−02	1.20E−02	3.73E−03	1.23E−03
		mean	2.30E−02	6.31E−02	4.86E−02	2.81E−02	1.42E−02	2.49E−03	4.65E−04	1.21E−04	4.57E−05	1.74E−05
		median	7.30E−09	2.51E−06	1.74E−05	2.30E−05	4.77E−05	3.47E−05	1.64E−05	6.00E−06	2.80E−06	1.31E−06
Industrial application of lubricants and greases	6	max	3.66E−03	1.24E−03	7.76E−04	4.70E−04	2.07E−04	1.88E−05	4.01E−06	8.38E−07	2.59E−07	8.22E−08
		mean	1.22E−03	4.17E−04	2.64E−04	1.61E−04	7.25E−05	6.80E−06	1.51E−06	3.23E−07	1.01E−07	3.22E−08
		median	2.59E−07	1.06E−05	1.74E−05	1.41E−05	1.05E−05	1.59E−06	5.13E−07	1.30E−07	4.32E−08	1.42E−08
Non-aerosol cleaning and degreasing	53	max	22	7.0	4.6	2.6	1.2	0.10	2.63E−02	7.49E−03	2.64E−03	8.81E−04
		mean	0.38	0.13	9.27E−02	5.77E−02	3.21E−02	6.08E−03	2.34E−03	6.53E−04	2.25E−04	7.44E−05
		median	1.32E−05	5.14E−04	5.96E−04	4.59E−04	3.41E−04	9.35E−05	2.27E−05	6.85E−06	3.03E−06	1.22E−06
Laboratory use	9	max	1.1	0.83	1.1	1.0	0.71	0.11	2.47E−02	5.50E−03	1.76E−03	5.65E−04
		mean	0.21	0.21	0.23	0.21	0.14	2.09E−02	4.72E−03	1.05E−03	3.36E−04	1.08E−04
		median	4.06E−02	2.48E−02	1.74E−02	9.28E−03	4.01E−03	8.75E−04	1.48E−04	3.14E−05	9.92E−06	3.20E−06

OES	Number of Releases [c]	Statistic	95th Percentile Annual Average Ambient Air Concentrations (µg/m^3) Estimated for 10–10,000 m from NEI Releases									
			10 m	30 m	30– 60 m	60 m	100 m	100–1,000 m	1,000 m	2,500 m	5,000 m	10,000 m
Waste handling, treatment, and disposal (incinerator)	103	max	41	8.5	5.4	2.9	1.2	0.14	2.25E−02	4.62E−03	1.43E−03	4.63E−04
		mean	0.44	0.19	0.13	7.20E−02	3.13E−02	3.11E−03	6.21E−04	1.34E−04	4.52E−05	1.65E−05
		median	2.53E−09	1.72E−07	6.20E−07	7.90E−07	1.20E−06	1.05E−06	5.64E−07	2.42E−07	1.28E−07	4.93E−08
Waste handling, treatment, and disposal (landfill)	147	max	8.2	2.4	1.9	0.89	0.37	5.28E−02	1.02E−02	2.61E−03	8.70E−04	2.83E−04
		mean	0.26	9.30E−02	6.41E−02	3.61E−02	1.65E−02	1.95E−03	3.88E−04	8.73E−05	2.86E−05	9.56E−06
		median	9.47E−03	3.66E−03	2.64E−03	1.53E−03	7.50E−04	1.22E−04	1.86E−05	4.25E−06	1.38E−06	4.75E−07
Waste handling, treatment, and disposal (non-POTW WWT)	68	max	6.2	6.4	4.7	2.3	0.98	0.12	2.15E−02	5.00E−03	1.68E−03	5.51E−04
		mean	0.20	0.24	0.19	0.11	5.46E−02	8.05E−03	1.61E−03	3.74E−04	1.23E−04	4.03E−05
		median	2.39E−04	1.21E−03	1.70E−03	1.86E−03	1.66E−03	4.82E−04	1.25E−04	3.50E−05	1.28E−05	4.76E−06
Waste handling, treatment, and disposal (POTW)	68	max	19	7.4	5.1	3.0	1.5	0.19	3.71E−02	8.22E−03	2.66E−03	8.61E−04
		mean	1.2	0.43	0.30	0.17	7.61E−02	8.81E−03	1.66E−03	3.62E−04	1.17E−04	3.80E−05
		median	2.28E−02	8.25E−03	5.95E−03	2.93E−03	1.26E−03	2.51E−04	4.96E−05	1.05E−05	3.29E−06	1.04E−06
Waste handling, treatment, and disposal (remediation)	45	max	3.0	0.94	0.65	0.34	0.18	0.14	9.47E−02	3.44E−02	1.33E−02	4.69E−03
		mean	0.19	6.53E−02	4.54E−02	2.70E−02	1.77E−02	6.62E−03	3.90E−03	1.38E−03	5.40E−04	1.95E−04
		median	1.80E−03	1.65E−03	1.06E−03	8.06E−04	4.33E−04	4.48E−05	7.10E−06	1.51E−06	4.77E−07	1.65E−07
Facilities not mapped to an OES [d]	115	max	9.9	3.8	2.6	1.5	0.69	8.53E−02	1.46E−02	3.72E−03	1.82E−03	8.23E−04
		mean	3.54E−02	1.36E−02	9.52E−03	5.64E−03	2.82E−03	5.77E−04	1.14E−04	3.35E−05	1.35E−05	5.36E−06
		median	2.15E−10	9.29E−08	4.96E−07	6.57E−07	1.56E−06	1.09E−06	4.74E−07	1.58E−07	7.48E−08	3.56E−08

AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model; NEI = National Emissions Inventory; OES = occupational exposure scenario; POTW = publicly owned treatment works; WWT = wastewater treatment

[a] The full inputs and results are presented in the *Draft AERMOD Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2025a) and *Draft Supplemental Information on AERMOD NEI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2025k)

[b] Facilities reporting to NEI with the NAICS code of 562212, which is for non-hazardous solid waste landfills, were not included in this analysis (see Table 3-11 for data for non-hazardous landfills) because the releases were assumed to be due to biodegradation of other chlorinated solvents (U.S. EPA, 2025g).

[c] For each OES, EPA modeled all NEI-reporting releases considering source attribution (fugitive and stack releases) for each facility for the 2014 and 2017 reporting years. Not all facilities reported in both years.

[d] Facilities were not mapped to an OES in cases where information on the 1,2-dichloroethane use at the site was not available.

Table 3-11. Summary Statistics for 95th Percentile Annual Average Concentrations for 1,2-Dichloroethane Releases Reported to NEI from Municipal Solid Waste Landfills for the Reporting Years of 2014 and 2017 Modeled Using AERMOD[a] [b] [c]

OES	Number of Releases	Statistic	95th Percentile Annual Average Concentrations (µg/m^3) Estimated for 10–10,000 m from NEI Releases Reported from Municipal Solid Waste Landfills									
			10 m	30 m	30–60 m	60 m	100 m	100–1,000 m	1,000 m	2,500 m	5,000 m	10,00 m
Industrial application of lubricants and greases [d]	1	max	4.6	2.8	1.9	1.0	0.43	5.78E−02	8.47E−03	1.85E−03	5.92E−04	1.93E−04
		mean	4.6	2.9	1.9	1.0	0.43	5.78E−02	8.47E−03	1.85E−03	5.92E−04	1.93E−04
		median	4.6	2.9	1.9	1.0	0.43	5.78E−02	8.47E−03	1.85E−03	5.92E−04	1.93E−04
Waste handling, treatment, and disposal (incinerator)	2	max	1.6	0.72	0.52	0.29	0.14	2.00E−02	3.15E−03	6.86E−04	2.17E−04	6.91E−05
		mean	0.32	0.16	0.11	6.65E−02	3.37E−02	4.46E−03	9.28E−04	2.04E−04	6.44E−05	2.02E−05
		median	0.13	8.20E−02	5.21E−02	3.52E−02	1.79E−02	1.49E−03	4.69E−04	1.02E−04	3.24E−05	1.03E−05
Waste handling, treatment, and disposal (landfills)	751	max	26	1.1	6.8	4.4	2.1	0.20	4.93E−02	1.07E−02	3.42E−03	1.11E−03
		mean	0.52	0.21	0.14	8.64E−02	4.12E−02	5.13E−03	1.05E−03	2.26E−04	7.30E−05	2.39E−05
		median	7.13E−02	3.31E−02	2.37E−02	1.45E−02	7.39E−03	9.90E−04	2.22E−04	5.09E−05	1.70E−05	5.87E−06
Waste handling, treatment, and disposal (non-POTW WWT)	20	max	0.12	0.12	0.12	0.10	2.19E−02	3.33E−03	8.55E−04	1.96E−04	6.25E−05	2.02E−05
		mean	1.04E−02	9.42E−03	9.40E−03	8.20E−03	3.05E−03	6.39E−04	1.49E−04	3.36E−05	1.07E−05	3.46E−06
		median	4.70E−05	4.53E−04	9.99E−04	1.27E−03	1.05E−03	1.25E−04	2.44E−05	5.35E−06	1.70E−06	5.64E−07
Waste handling, treatment, and disposal (remediation)	12	max	2.3	0.73	0.52	0.29	0.14	1.86E−02	3.32E−03	7.13E−04	2.32E−04	7.66E−05
		mean	0.69	0.24	0.17	9.66E−02	4.55E−02	5.93E−03	1.04E−03	2.29E−04	7.34E−05	2.39E−05
		median	0.35	0.16	0.11	6.63E−02	3.11E−02	3.77E−03	6.47E−04	1.37E−04	4.28E−05	1.37E−05

AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model; NEI = National Emissions Inventory; OES = occupational exposure scenario; POTW = publicly owned treatment works; WWT = wastewater treatment

[a] The full inputs and results are presented in the *Draft AERMOD Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2025a) and *Draft Supplemental Information on AERMOD NEI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2025k).

[b] For each OES, EPA modeled all NEI-reporting releases considering source attribution (fugitive and stack releases) for each facility for the 2014 and 2017 reporting years. Not all facilities reported in both years.

[c] Only facilities reporting to NEI with the NAICS code of 562212, which is for solid waste landfills, were included in this analysis. Results for solid waste landfills are being showing separately because the releases were assumed to be due to biodegradation of other chlorinated solvents (U.S. EPA, 2025g).

[d] One facility mapped to the OES of Application of lubricants and greases reports a NAICS code of 562212 and was treated as landfill for the ambient air analysis.

3.5 Modeled Air Deposition Fluxes

Summaries of the air deposition flux ranges estimated using AERMOD for reported TRI releases are provided in Table 3-12 and Table 3-13. The summary includes five OESs and select statistics (maximum, mean, median, and minimum) calculated from the TRI modeled deposition fluxes distributions within each OES at each distance modeled. The associated range of estimated deposition fluxes is based on the maximum 95th percentile daily (Table 3-12) and annual (Table 3-13) deposition fluxes for each distance. Data for the 95th percentile are presented here to show high-end exposure scenarios. Data for the 50th and 10th percentiles are available in the supplemental files. Daily modeled air concentrations for 10th, 50th, and 95th percentile exposure scenarios were also calculated and presented in the supplemental files (U.S. EPA, 2025l). The OES of Manufacturing had the highest deposition flux for both daily and annual deposition, with rates of 0.23 g/m^2/day and 54 g/m^2/year, respectively.

Table 3-12. Summary Statistics for 95th Percentile Daily Deposition Fluxes for 1,2-Dichloroethane Releases Reported to TRI from 2015–2020 Using AERMOD[a]

OES	Number of Facilities Evaluated in OES [b]	Statistic	95th Percentile Daily Deposition Flux (g/m^2/day) Estimated Within 10 to 10,000 m of Releasing Facilities									
			10 m	30 m	30–60 m	60 m	100 m	100–1,000 m	1,000 m	2,500 m	5,000 m	10,000 m
Manufacturing	24	max	0.23	0.34	0.21	0.14	5.39E−02	1.90E−03	6.67E−04	1.22E−04	3.49E−05	1.08E−05
		mean	3.90E−02	4.03E−02	2.39E−02	1.50E−02	6.30E−03	2.69E−04	9.43E−05	1.73E−05	5.16E−06	1.65E−06
		median	2.03E−02	2.24E−02	1.25E−02	8.25E−03	3.56E−03	9.73E−05	3.31E−05	4.98E−06	1.40E−06	4.10E−07
Repackaging	5	max	2.66E−03	2.26E−03	1.34E−03	8.36E−04	3.28E−04	1.04E−05	4.04E−06	7.88E−07	2.46E−07	8.63E−08
		mean	8.02E−04	7.41E−04	4.41E−04	2.77E−04	1.11E−04	3.70E−06	1.38E−06	2.65E−07	8.42E−08	2.91E−08
		median	6.24E−05	4.76E−05	2.79E−05	1.73E−05	6.74E−06	2.22E−07	8.14E−08	1.51E−08	4.60E−09	1.76E−09
Processing as a reactant	12	max	1.97E−03	1.98E−03	1.07E−03	6.84E−04	2.76E−04	1.03E−05	3.66E−06	5.92E−07	1.71E−07	5.57E−08
		mean	3.13E−04	2.13E−04	1.21E−04	7.31E−05	2.88E−05	1.04E−06	3.40E−07	5.85E−08	1.77E−08	5.91E−09
		median	1.13E−04	8.60E−05	5.52E−05	3.29E−05	1.50E−05	5.78E−07	1.67E−07	2.42E−08	7.11E−09	2.54E−09
Processing into formulation, mixture, or reaction product	12	max	1.94E−02	2.51E−02	1.37E−02	9.46E−03	3.97E−03	1.62E−04	6.00E−05	1.01E−05	2.72E−06	8.58E−07
		mean	1.89E−03	2.19E−03	1.19E−03	8.12E−04	3.29E−04	1.20E−05	4.49E−06	7.44E−07	2.01E−07	6.18E−08
		median	1.58E−04	9.57E−05	5.23E−05	2.96E−05	1.30E−05	6.55E−07	1.38E−07	1.70E−08	5.13E−09	2.21E−09
Non-aerosol cleaning and degreasing	1	max	6.30E−07	7.85E−07	4.44E−07	2.79E−07	1.04E−07	3.05E−09	1.02E−09	1.85E−10	6.05E−11	2.33E−11
		mean	3.32E−07	4.01E−07	2.29E−07	1.43E−07	5.66E−08	1.74E−09	6.16E−10	1.04E−10	3.20E−11	1.18E−11
		median	2.61E−07	3.03E−07	1.76E−07	1.10E−07	4.85E−08	1.53E−09	5.68E−10	9.21E−11	2.74E−11	9.99E−12
Waste handling, treatment, and disposal (incinerator)	18	max	1.84E−03	2.51E−03	1.48E−03	9.99E−04	3.97E−04	1.25E−05	4.52E−06	7.35E−07	2.01E−07	6.46E−08
		mean	9.08E−05	1.03E−04	6.13E−05	4.05E−05	1.70E−05	6.55E−07	2.39E−07	3.90E−08	1.08E−08	3.46E−09
		median	5.33E−07	2.59E−07	3.10E−07	1.83E−07	1.28E−07	4.53E−09	1.20E−09	1.94E−10	6.59E−11	2.62E−11

AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model; OES = occupational exposure scenario; TRI = Toxic Release Inventory

[a] The full inputs and results are presented in the *Draft AERMOD Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2025a) and *Draft Supplemental Information on AERMOD TRI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2025l).

[b] For each OES, EPA modeled all TRI-reporting releases considering source attribution (fugitive and stack releases) for each facility from 2015–2020. Not all facilities reported for all 6 years.

Table 3-13. Summary Statistics for 95th Percentile Annual Deposition Fluxes for 1,2-Dichloroethane Releases Reported to TRI from 2015–2020 Using AERMOD[a]

OES	Number of Facilities Evaluated in OES [b]	Statistic	95th Percentile Annual Deposition Flux (g/m^2/year) Estimated Within 10 to 10,000 m of Releasing Facilities									
			10 m	30 m	30–60 m	60 m	100 m	100–1,000 m	1,000 m	2,500 m	5,000 m	10,000 m
Manufacturing	24	max	54	74	51	29	12	0.58	0.15	2.73E−02	7.84E−03	2.48E−03
		mean	6.4	7.7	5.4	3.1	1.3	0.10	2.54E−02	5.16E−03	1.61E−03	5.26E−04
		median	3.7	3.9	2.9	1.6	0.88	6.61E−02	1.53E−02	3.05E−03	9.57E−04	3.13E−04
Repackaging	5	max	0.54	0.58	0.35	0.21	8.71E−02	3.95E−03	1.15E−03	2.41E−04	8.24E−05	2.94E−05
		mean	0.15	0.17	0.11	6.46E−02	2.62E−02	1.33E−03	3.67E−04	7.50E−05	2.49E−05	8.69E−06
		median	9.48E−03	1.43E−02	1.23E−02	5.84E−03	2.41E−03	1.45E−04	3.01E−05	5.78E−06	2.00E−06	7.40E−07
Processing as a reactant	12	max	0.31	0.36	0.23	0.15	6.14E−02	3.69E−03	8.12E−04	1.58E−04	4.91E−05	1.63E−05
		mean	4.57E−02	4.00E−02	2.78E−02	1.54E−02	6.40E−03	3.95E−04	9.81E−05	1.90E−05	5.79E−06	1.90E−06
		median	1.30E−02	2.52E−02	1.76E−02	1.03E−02	4.27E−03	2.50E−04	5.91E−05	1.15E−05	3.36E−06	1.10E−06
Processing into formulation, mixture, or reaction product	12	max	3.5	5.2	4.3	2.1	0.93	7.32E−02	1.69E−02	3.16E−03	9.05E−04	2.73E−04
		mean	0.36	0.50	0.40	0.20	8.49E−02	6.20E−03	1.37E−03	2.55E−04	7.35E−05	2.25E−05
		median	2.51E−02	1.68E−02	1.10E−02	5.55E−03	2.59E−03	2.78E−04	4.54E−05	8.94E−06	3.11E−06	1.29E−06
Non-aerosol cleaning and degreasing	1	max	4.72E−05	5.55E−05	4.02E−05	2.06E−05	7.90E−06	9.95E−07	1.10E−07	1.99E−08	7.14E−09	2.96E−09
		mean	2.52E−05	2.98E−05	2.16E−05	1.12E−05	4.59E−06	5.63E−07	5.52E−08	9.79E−09	3.24E−09	1.25E−09
		median	2.01E−05	2.41E−05	1.74E−05	9.21E−06	4.29E−06	4.87E−07	4.53E−08	7.88E−09	2.47E−09	9.34E−10
Waste handling, treatment, and disposal	18	max	0.24	0.31	0.22	0.14	5.56E−02	4.47E−03	1.36E−03	2.56E−04	7.42E−05	2.24E−05
		mean	1.82E−02	1.97E−02	1.34E−02	8.01E−03	3.64E−03	3.20E−04	7.99E−05	1.70E−05	5.51E−06	1.83E−06
		median	8.83E−05	7.88E−05	1.01E−04	5.86E−05	3.64E−05	3.93E−06	1.17E−06	2.88E−07	1.01E−07	3.66E−08

AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model; OES = occupational exposure scenario; TRI = Toxic Release Inventory

[a] The full inputs and results are presented in the *Draft AERMOD Input Specifications for 1,2-Dichloroethane* (U.S. EPA, 2025a) and *Draft Supplemental Information on AERMOD TRI Exposure and Risk Analysis for 1,2-Dichloroethane* (U.S. EPA, 2025l).

[b] For each OES, EPA modeled all TRI-reporting releases considering source attribution (fugitive and stack releases) for each facility from 2015–2020. Not all facilities reported for all 6 years.

3.6 Evidence Integration for Ambient Air Pathway

Measured and modeled ambient air concentrations of 1,2-dichloroethane provide evidence that exposure to 1,2-dichloroethane via the ambient air pathway is expected. EPA used data from the AMTIC archive to assess measured concentrations of 1,2-dichloroethane in the ambient air. The Agency modeled releases from the TRI and NEI, and modeled releases for OESs with no facility data using AERMOD to estimate ambient air concentrations near 1,2-dichloroethane releasing facilities. EPA also used modeled ambient air concentrations to quantitatively assess general population exposure to ambient air from facility releases of 1,2-dichloroethane. For more details on environmental releases and general population, see the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g) and the *Draft General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025h).

4 SURFACE WATER PATHWAY

1,2-Dichloroethane is released to surface waters from the direct discharge of wastewater from industrial operations and wastewater treatment plants facilities as covered under TSCA COUs. Annual 1,2-dichloroethane discharge data as reported by facilities under NPDES permit requirements and found in the EPA ECHO database was collected by EPA for site specific analysis in estimating 1,2-dichloroethane concentrations in the respective receiving surface water bodies.

EPA searched peer-reviewed literature, gray literature, and databases of environmental monitoring data to obtain concentrations of 1,2-dichloroethane in ambient surface water, drinking water, and aquatic sediments. Although the available monitoring data were limited, 1,2-dichloroethane was found in detectable concentrations in ambient surface waters and finished drinking water. EPA conducted modeling of industrial releases to surface water to assess the expected resulting environmental media concentrations from TSCA COUs presented in Table 1-1.

4.1 Modeling Approach for Estimating Concentrations in Surface Water

As described in *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g), annual releases of 1,2-dichloroethane to surface waters from regulated facility discharges were retrieved from the TRI and DMR public data records. To the extent possible, modeled hydrologic flow data (*i.e.*, stream flow) associated with the facility's receiving water body was retrieved from the NHDPlus V2.1 dataset (U.S. EPA and U.S.G.S., 2016). The receiving water body was identified from NPDES permit information of the releasing facility for the 2015 to 2020 reporting period.

The EPA Enforcement and Compliance History Online (ECHO) database was accessed via the API and queried for the facilities reporting releases of 1,2-dichloroethane. All available NPDES permit IDs were retrieved from the facilities returned by the query. An additional query of the DMR REST service was conducted via the ECHO API to return NHDPlus reach code associated with the receiving water body for each available facility. Modeled flow metrics were then extracted for the retrieved reach codes, from the National Hydrography Dataset (NHD) Plus V2.1 Flowline Network EROM Flow database. The Enhanced Unit Runoff Method (EROM) is used to estimate mean annual flow and incremental flow for NHDFlowline Feature in the NHDPlus HR network. The EROM Flow database provides modeled monthly average flows for each month of the year. While the EROM Flow database represents averages across a 30-year time period, the lowest of the monthly average flows was selected as a substitute for the 30Q5 flow used in modeling, as both approximate the lowest observed monthly flow at a given location. The substitute 30Q5 flow was then plugged into the regression equation used by E-FAST General Population and Ecological Exposure from Industrial Releases Module to convert between these flow metrics and solved for the 7Q10 using Equation 4-1. In previous assessments, the EPA has selected the 7Q10 flow as a representative low flow scenario for biological impacts due to effluent in streams, while the harmonic mean represents a more average flow for assessing chronic drinking water exposure.

Equation 4-1.

$$\boldsymbol{7Q10} = \frac{\left(0.409\,\frac{cfs}{MLD} \times \frac{\boldsymbol{30Q5}}{1.782}\right)^{1.0352}}{0.409\,\frac{cfs}{MLD}}$$

Where:

7Q10 = Modeled 7Q10 flow, in MLD (million liters per day)
30Q5 = Lowest monthly average flow from NHD, in MLD

cfs = Cubic feet per second

Furthermore, the harmonic mean (HM) flow was calculated using Equation 4-2, derived from the relevant E−FAST regression.

Equation 4-2.

$$\boldsymbol{HM} = 1.194 \times \frac{\left(0.409\frac{cfs}{MLD} \times \boldsymbol{AM}\right)^{0.473} \times \left(0.409\frac{cfs}{MLD} \times \boldsymbol{7Q10}\right)^{0.552}}{0.409\frac{cfs}{MLD}}$$

Where:

HM = Modeled harmonic mean flow, in MLD
AM = Annual average flow from NHD, in MLD
7Q10 = Modeled 7Q10 flow from the previous equation, in MLD

In addition to the hydrologic flow data retrieved from the NHDPlus database, information about the facility effluent rate was collected, as available, from the ECHO Application Programming Interface (API). Where the facility effluent rate exceeded the hydrologic flow, the facility effluent flow rate was applied as the flow in the receiving water body.

The OESs were additionally run under the harmonic mean and 30Q5 flow conditions (Table 4-1). These additional results were selected to screen for risks to human health.

Table 4-1. Surface Water Estimates per OES for Various Flow Metrics

Scenario/OES	Release Estimate (kg/day)	Release Days	Harmonic Mean Flow (m^3/d)	30Q5 Flow (m^3/d)	Harmonic Mean Conc. (µg/L)	30Q5 Conc. (µg/L)	7Q10 Conc. (µg/L)
Manufacturing	13.9	350	12,500	7,090	1,110	1,950	3,420
Processing as a reactant	0.648	350	4,970	2,940	129	217	399
Processing into formulation, mixture, or reaction product	0.000298	350	17.4	17.1	12.0	17.4	37.7
Waste handling, treatment, and disposal (WWT)	1.43	250	998	511	1,380	2,610	5,390
Waste handling, treatment, and disposal (POTW)	0.0313	365	35.5	9.78	526	1,380	7,063
Waste handling, treatment, and disposal (remediation)	0.00471	365	16,057	13,060	0.029	0.036	0.057

7Q10 = the modeled 7Q10 flow, in MLD (million liters per day); 30Q5 = the lowest monthly average flow from NHD, in MLD; OES = occupational exposure scenario

4.1.1 Modeling Surface Water Concentrations from Releases During Storm Events

EPA generally does not include exposures associated with extreme weather events within the scope of the risk evaluation. However, when specific chemical information is available to the Agency and can provide additional characterization of facility operations and associated exposures, EPA considers this as part of a fact-specific, chemical-specific analysis. The Eagle US 2 LLC – Lake Charles Complex facility submitted 6 years of release data with the largest releases associated with storm events (see Table 4-2). Based on the chemical- and facility- specific data received, EPA considered the exposures associated with these storm events. The Agency is presenting the data that are reflective of the range of releases and corresponding conditions, particularly the frequency of storm events in Louisiana. EPA also considered the 2020 releases resulting from extreme storm events separately and considered the 2016 releases as representative of normal operating conditions.

EPA estimated the 1,2-dichloroethane surface water concentration resulting from the releases during the 2020 post Hurricane Laura storm event. The NPDES permit data listed the receiving water body as Bayou Verdine but during a significant storm it is assumed that the Bayou and the Calcasieu River will flood at their confluence so that the Calcasieu River becomes the major flow at the point of discharge. Thus, EPA used Calcasieu River flow from NHDPlus (12,069 MLD) to estimate 1,2-dichloroethane concentrations in the receiving water body resulting from the 6,249 lb (2,834.5 kg) released from September 21 to September 25, 2020. The corresponding 1,2-dichloroethane surface water concentration was estimated to be 58.7 µg/L.

Table 4-2. Six Years of Westlake Facility Release Data in Louisiana

Year		Discharge 1	Discharge 2	Discharge 3	Discharge 4	Discharge 5	TOTAL (lb/yr)
2016	Dates	12/3–4/2016	8/13–14/2016	4/30/2016	5/1/2016	N/A	
	Flow (GPM)	1042	1115	42	2916	N/A	
	1,2-Dichloroethane Release (lb)	163.96	11.95	0.45	140.42	N/A	**316.79**
			Power Failure	**200 Year Rain**			
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2017	Dates	3/29/2017	4/28/2017	5/3/2017	6/21/2017	N/A	
	Flow (GPM)	7	76	2764	208	N/A	
	1,2-Dichloroethane Release (lb)	0.1	0.2	5	0.4	N/A	**5.7**
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2018	Date	10/9/2018	10/15/2018	10/16/2018	10/31/2018	N/A	
	Flow (GPM)	1.6	59	144	2	N/A	
	1,2-Dichloroethane Release (lb)	0.1	64	157	2	N/A	**223.1**
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2019	Date	4/4/2019	5/10/2019	N/A	N/A	N/A	
	Flow (GPM)	333	729	N/A	N/A	N/A	
	1,2-Dichloroethane Release (lb)	1.5	0.6	N/A	N/A	N/A	**4.1**
			Post Hurricane Laura		**Hurricane Delta**		
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2020	Date	4/29/2020	9/21–25/2020	9/28/2020	10/9/2020	10/20/2020	
	Flow (GPM)	7	1,651	44	2640	17	
	1,2-Dichloroethane Release (lb)	0	6,249	83	86	0	**6418**
		Winter Storm Uri					
		Discharge 1	**Discharge 2**	**Discharge 3**	**Discharge 4**	**Discharge 5**	**TOTAL (lb/yr)**
2021	Date	2/16–17/2021	5/19/2021			N/A	
	Flow (GPM)	2,900	430	0	0	N/A	
	1,2-Dichloroethane Release (lb)	312	18	0	0	N/A	**330**

4.2 Measured Concentrations in Surface Water

Measured concentrations of 1,2-dichloroethane from surface waters were retrieved from the WQP (NWQMC, 2022) to characterize the distribution of 1,2-dichloroethane levels found in ambient surface water from across the nation, and to provide context for the modeled surface water concentrations of 1,2-dichloroethane presented in Section 4.1. Measured data were retrieved irrespective of the reason for sample collection to assess trends in the observed concentrations more broadly. WQP data were downloaded in July 2025 for samples collected between 2015 to 2020, resulting in 5,972 data points (Figure 4-1 and Figure 4-2). Full details of the retrieval and data processing steps of ambient surface water monitoring data from the WQP are presented in Appendix B.

The only reported measurement of 1,2-dichloroethane above the detection limit in the WQP from 2015 to 2020 was a concentration of 0.89 µg/L. The overall detection frequency was 0.017 percent. The detection limits ranged from 0.0358 to 50 µg/L. Figure 4-1 shows the national spatial distribution of these results, with most samples collected from New Mexico, Louisiana, North Carolina, and New Jersey. In the absence of a national standardized study of 1,2-dichloroethane in ambient surface water and without greater national coverage and metadata, it is difficult to characterize the national occurrence of 1,2-dichloroethane in surface waters. Over-representation of certain states or regions may reflect targeted sampling campaigns of specific locations expected to have potentially high concentrations of 1,2-dichloroethane. Conclusions about areas without monitoring data cannot be drawn without further exploration through modeling. However, for those areas containing sufficient data coverage, 1,2-dichloroethane is infrequently measured at concentrations above the detection limit in ambient surface waters (Figure 4-2).

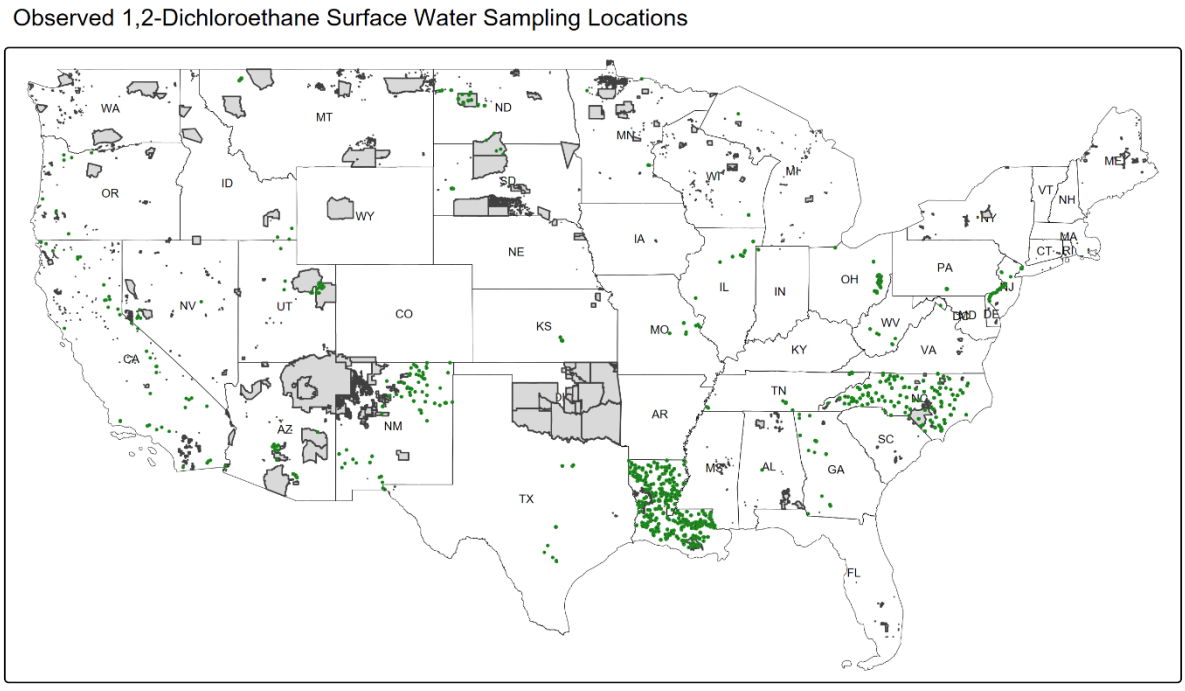

Figure 4-1. Locations of 1,2-Dichloroethane Measured in Ambient Surface Waters Obtained from the WQP, 2015–2020

American Indian, Alaska Native and Native Hawaiian (AIANNH) tribal boundaries are shaded gray.
Note: Alaska, American Samoa, Guam, Hawaii, N. Mariana Islands, Puerto Rico, and the U.S. Virgin Islands are not shown because they do not contain surface water monitoring data within the WQP.

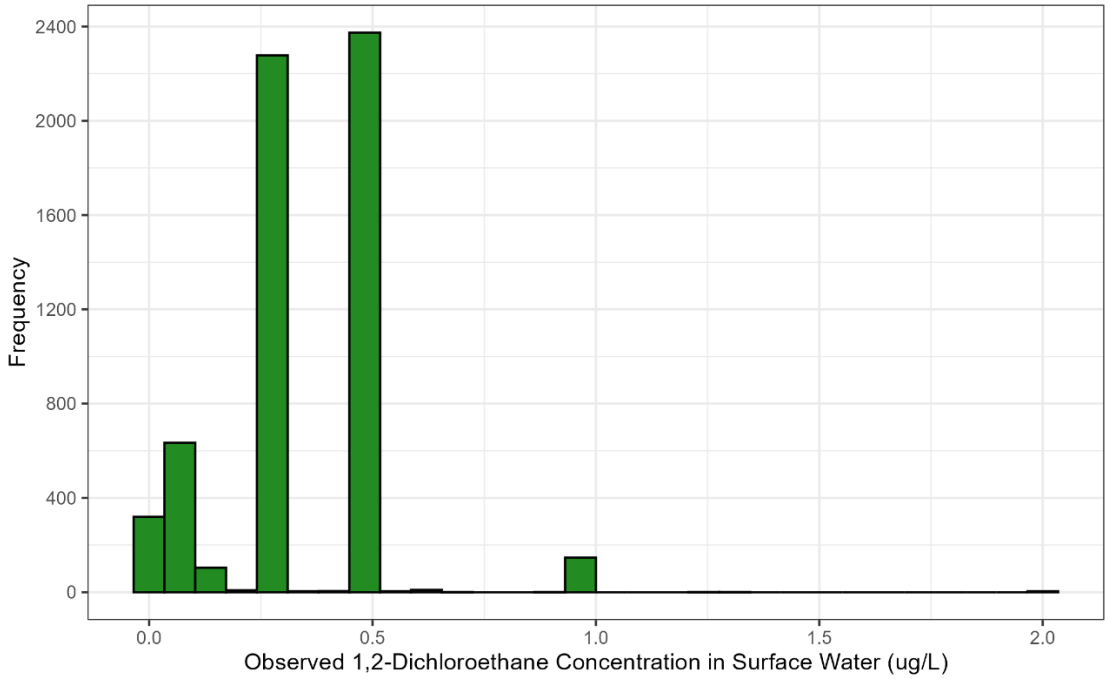

Figure 4-2. National Distribution of 1,2-Dichloroethane Concentrations Measured in Ambient Surface Waters from Surface Waters Obtained from the WQP, 2015–2020

Note: The figure is only showing 1,2-dichloroethane concentrations up to a concentration of 2 µg/L to enhance visualization of the distribution.

A limited amount of 1,2-dichloroethane concentration data was identified through EPA's systematic review of published literature. Concentrations of 1,2-dichloroethane in surface water were reported in one study (Kingsbury et al., 2008) (Figure 4-3). The U.S. Geological Survey (Kingsbury et al., 2008) collected samples from nine streams and eight community water systems throughout the United States during 2002 to 2005. Source water samples were collected from four surface water bodies in undeveloped areas (Cache la Poudre River, CO; Truckee River, NV; Clackamas River, OR; Running Gutter Brook, MA); three rivers in mixed-use areas (Chattahoochee River, GA; Neuse River, NC; Potomac River, MD); and two rivers in agricultural areas (Elm Fork Trinity River, TX; White River, IN). During the first sampling phase, samples were collected monthly during a variety of flow conditions at locations as close as practicable to drinking water intakes or at untreated water taps. In a similar fashion, samples were collected during the second phase in all but one of the locations (Cache la Poudre River) due to few compounds being detected there during the first phase. Of the 147 samples collected in the first phase and 95 samples collected in the second phase, no 1,2-dichloroethane was detected (less than 0.13 µg/L).

Measured concentrations of 1,2-dichloroethane in surface water were extracted from eight sources and are summarized in Figure 4-3 and Table 4-3. Location types were categorized as "Near Facility" and "General Population." Reported detection frequency ranged from 0 to 1.

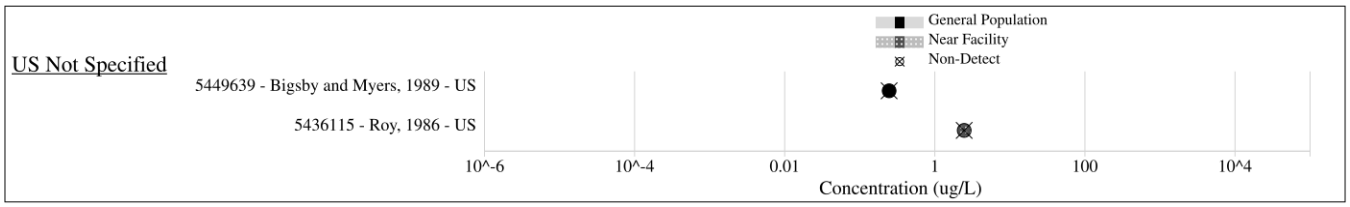

Figure 4-3. Concentrations of 1,2-Dichloroethane (µg/L) in Surface Water from 1984–2012

Table 4-3. Summary of Peer-Reviewed Literature that Measured 1,2-Dichloroethane (µg/L) Levels in Surface Water

Citation	Country	Location Type	Sampling Year	Sample Size (Frequency of Detection)	Detection Limit (µg/L)	Overall Quality Level
Bigsby and Myers (1989)	US	General Population	1988	3 (0)	0.5	Medium
Roy F. Weston Inc (1986)	US	Near Facility	1984	6 (0)	5	Medium
US = United States						

4.3 Evidence Integration for Surface Water

EPA reviewed surface water monitoring data from the WQP database and from peer-reviewed literature and confirmed the presence of 1,2-dichloroethane in surface waters in the United States. However, specific monitoring data was not identified that could align spatially and temporally with the TSCA facility releases as reported in the EPA DMR's ECHO database. Using publicly available release data as well as receiving water body characteristics, EPA quantitatively estimated concentrations of 1,2-dichloroethane in surface waters associated with the COU releases.

4.4 Modeling Approach for Estimating Concentrations in Sediment

EPA used a higher tier model, the U.S. EPA's Variable Volume Water Model with Point Source Calculator tool (VVWM-PSC), to estimate concentrations of 1,2-dichloroethane within water column and sediment. PSC considers model inputs of physical and chemical properties of 1,2-dichloroethane (*i.e.*, K_{OC}, water column half-life, photolysis half-life, hydrolysis half-life, and benthic half-life) allowing EPA to model predicted water column concentrations (U.S. EPA, 2019). The organic carbon:water partition coefficient is expressed as:

Equation 4-3.

$$K_{OC} = \frac{K_d}{f_{OC}}$$

Where:

K_d = Solids:water partition coefficient
f_{OC} = Fraction of organic carbon

Site-specific parameters influence how partitioning occurs over time. For example, the concentration of suspended sediments, water depth, and weather patterns all influence how a chemical may partition between compartments. Physical and chemical properties of the chemical itself also influence partitioning and half-lives into environmental media.

Physical and chemical and fate properties selected by EPA for this assessment were applied as inputs to the PSC Model (Table 4-4) (U.S. EPA, 2025d).

Table 4-4. PSC Model Inputs (Chemical Parameters)

Parameter	Value
K_{OC}	58.88 mL/g
Water column half-life	51.5 days at 25 °C
Photolysis half-life	51 days at 30N
Hydrolysis half-life	26,280 days at 25 °C
Benthic half-life	10,000 days at 25 °C
Molecular weight	98.95 g/mol
Vapor pressure	78.9 torr at 25 °C
Solubility	8,600 mg/L at 25 °C
Henry's Law constant	0.00154 atm·m^3/mol at 25 °C
Heat of Henry	29,423 J/mol
Reference temperature	25 °C

A generic setup for the model environment and media parameters was applied consistently across all PSC runs. The standard EPA "farm pond" water body characteristics were used to parameterize the water column and sediment parameters (Table 4-5) and generic PSC modeled water body parameters were also applied, with a standardized width of 5 m, length of 40 m, and depth of 1 m (U.S. EPA, 2025d).

Table 4-5. PSC Model Inputs (Water Body Characteristics)

Parameter	Value
DFAC	1.19
Water column suspended sediment	30 mg/L
Chlorophyll	0.005 mg/L
Water column foc	0.04
Water column DOC	5.0 mg/L
Water column biomass	0.4 mg/L
Benthic depth	0.05 m
Benthic porosity	0.50
Benthic bulk density	1.35 g/cm^3
Benthic foc	0.04
Benthic DOC	5.0 mg/L
Benthic biomass	0.006 g/m^2
Mass transfer coefficient	1.00E−08 m/s
DOC = dissolved organic carbon; foc = fraction of organic carbon	

Quantified release estimates to surface water were evaluated with PSC modeling. The total days of release associated with the highest COU release was applied as continuous days of release per year (for example, a scenario with 250 days of release per year was modeled as 250 consecutive days of release,

followed by 115 days of no release, per year). For each modeled release, the number of days of release was applied as a custom averaging window for the results (*i.e.*, in the example given in the previous sentence, and 250-day average would be applied to calculate the resulting environmental media concentrations).

Releases were evaluated for resulting environmental media concentrations at the point of release (*i.e.*, in the immediate receiving water body receiving the effluent). Release modeling results are shown in Table 4-6. These values are carried through to the ecological risk assessment for further evaluation in the *Draft Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025f).

Table 4-6. Water and Benthic Sediment Concentrations in the Receiving Water Body, Applying a 7Q10 Flow

Occupational Exposure Scenario	Number of Operating Days Per Year	Daily Release (kg/day)	7Q10 Total Water Column Concentration (µg/L)	7Q10 Benthic Pore Water Concentration (µg/L)	7Q10 Benthic Sediment Concentration (µg/kg)
Manufacturing	21	231	57,000	15,300	41,700
Waste handling, treatment, and disposal (incinerator)	21	17.1	62,900	17,200	46,800
Processing as a reactant	21	10.8	6,640	1,780	4,860
Waste handling, treatment, and disposal (POTW)	21	0.544	37,400	16,900	46,100
Processing into formulation, mixture, or reaction product	21	0.00497	278	111	303
Manufacturing	350	13.9	3,380	3,260	8,890
Waste handling, treatment, and disposal (incinerator)	250	1.43	4,740	4,090	11,200
Processing as a reactant	350	0.648	387	374	1,020
Waste handling, treatment, and disposal (POTW)	365	0.0313	2,310	2,290	6,240
Processing into formulation, mixture, or reaction product	250	0.000417	20.7	19.4	52.8

30Q5 = lowest 30-day average flow that occurs (on average) once every 5 years; 7Q10 = lowest 7-day average flow that occurs (on average) once every 10 years; POTW = publicly owned treatment works

4.5 Measured Concentrations in Sediment

There were no monitoring studies conducted in the United States with data on concentrations of 1,2-dichloroethane in sediment identified during systematic review.

4.6 Evidence Integration for Sediment

EPA assessed the peer-reviewed literature and confirmed the presence of 1,2-dichloroethane in surface water sediments in the United States. However, specific monitoring data was not identified that could align spatially and temporally with the TSCA facility releases as reported in EPA's DMR ECHO database. Using publicly available release data, receiving water body characteristics and 1,2-dichloroethane water solubility, EPA quantitatively estimated concentrations of 1,2-dichloroethane in surface water sediments and benthic pore water associated with the COU releases.

5 DRINKING WATER PATHWAY

EPA considered the impacts of 1,2-dichloroethane COU facility releases to surface water receiving water bodies as sources of drinking water. As presented in Table 4-1, releases to surface water at the point of discharge were used to estimate concentrations downstream after dilution at the point of a drinking water intake. 1,2-Dichloroethane concentration estimates using harmonic mean flow statistics summarized in Table 4-1 represent drinking water concentrations.

5.1 Modeling Approach for Estimating Concentrations in Drinking Water

To provide more robust estimates of 1,2-dichloroethane concentrations in drinking water, known facility releases were mapped to drinking water sources using public water systems (PWS) data stored in EPA's Safe Drinking Water Information System Federal Data Warehouse (SDWIS) (U.S. EPA, 2022b). This dataset is updated quarterly and the 2nd quarter 2022 version was used for this analysis. Following the mapping, the colocation of and proximity of facility release sites to PWS drinking water intake locations were evaluated. These drinking water data are considered sensitive by EPA's Office of Water and are protected from public release. Geospatial analysis using the NHDPlus V2.1 flowline network was used to determine PWS intake locations within 250 km downstream of facility 1,2-dichloroethane release sites. Provided a PWS may have multiple intake locations, concentrations of 1,2-dichlorethane were estimated at the most upstream intake for a given PWS; therefore, reflecting a more conservative estimate. Results of surface water concentrations of 1,2-dichloroethane modeled from the highest annual facility releases between 2015 and 2020 for the OES specific operating days per year scenario were adjusted by a dilution factor that was calculated from the change in hydrologic flow between the facility release site and receiving water body associated with the identified PWS intake location. It is important to note that multiple facility releases can be upstream of the same PWS intake. Estimates of 1,2-dichloroethane concentration in finished drinking water were evaluated independently for each facility-intake linkage.

Table 5-1. Estimated Drinking Water Concentrations per OES at Intakes Downstream of Highest Facility Releases

OES	Release Days	Release Estimate per Release Days (kg/days)	Harmonic Mean Flow (m^3/d)	Downstream Harmonic Mean Conc. (µg/L)
Manufacturing	350	0.28	22	4.78E−04
Waste handling, treatment, and disposal (POTW)	365	1.01E−01	2.4	1.23E−04
Waste handling, treatment, and disposal	250	1.4	1.0	9.07E−02
Processing as a reactant	350	0.65	4.9	1.75E−02
Processing into formulation, mixture, or reaction product	300	4.14E−03	22	7.06E−06
Repackaging	250	3.42E−06	4.38E−02	1.20E−08
Waste handling, treatment, and disposal (remediation)	365	1.30E−04	100	1.18E−05
Unknown (250 days)	250	5.39E−04	0.14	8.11E−05
Industrial and commercial non-aerosol cleaning/degreasing		N/A	N/A	N/A
Laboratory use		N/A	N/A	N/A

5.2 Measured Concentrations in Drinking Water

Measured concentrations of 1,2-dichloroethane in drinking water were extracted from four sources and are summarized in Figure 5-1 and Table 5-2. All studies were conducted in the United States and concentrations ranged from 0.04 to 3 µg/L from 241 samples collected between 1983 and 2011. All samples were collected from a drinking water treatment plant or distribution system.

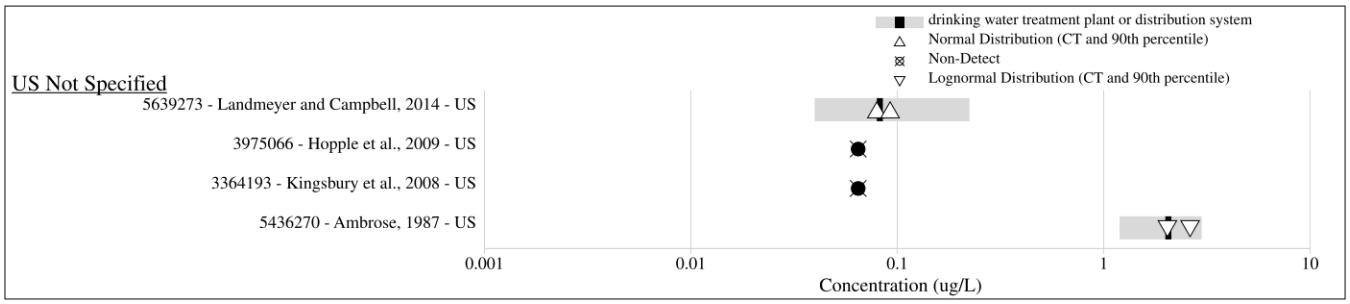

Figure 5-1. Concentrations of 1,2-Dichloroethane (µg/L) in Drinking Water from 1983–2011

Table 5-2. Summary of Peer-Reviewed Literature that Measured 1,2-Dichloroethane (µg/L) Levels in Drinking Water

Citation	Country	Location Type	Sampling Year(s)	Sample Size (Frequency of Detection)	Detection Limit (µg/L)	Overall Quality Level
Landmeyer and Campbell (2014)	US	Drinking water treatment plant or distribution system	2010–2011	17 (0.12)	0.08	High
Hopple et al. (2009)	US	Drinking water treatment plant or distribution system	2004–2005	71 (0)	0.13	High
Kingsbury et al. (2008)	US	Drinking water treatment plant or distribution system	2002–2004	147 (0)	0.13	High
Ambrose (1987)	US	Drinking water treatment plant or distribution system	1983	6 (1)	1	Medium
US = United States						

Because 1,2-dichloroethane is a regulated chemical under the National Primary Drinking Water Regulations, concentrations in drinking water are monitored by PWSs. EPA collects voluntary submissions of contaminant occurrence data, including 1,2-dichloroethane, in PWSs at least every 6 years. The latest assessment is the fourth Six-Year Review (SYR4) published in February 2024. According to SYR4 data, 0.57 percent (298) of the 52,209 reporting systems had detected concentrations of 1,2-dichloroethane and only 0.05 percent (27) of systems had levels detected above the maximum contaminant level (MCL) of 5 µg/L.

5.3 Evidence Integration for Drinking Water

EPA reviewed peer-reviewed literature and confirmed the presence of 1,2-dichloroethane in drinking water in the United States. However, specific monitoring data was not identified that could align spatially and temporally with the TSCA facility releases as reported in EPA's DMR ECHO database.

Using publicly available release data as well as receiving water body characteristics, EPA quantitatively estimated concentrations of 1,2-dichloroethane in drinking water intake locations downstream of and associated with TSCA COU releases. The highest estimate was for the Waste handling and disposal OES (0.091 µg/L), which was well below the highest sampled concentration presented in literature (3 µg/L) as well as below the 95th percentile reported in the PWS occurrence levels in drinking water (2.4 µg/L).

6 LAND (SOIL) PATHWAY

Although air is expected to be the major exposure pathway for 1,2-dichloroethane, its physical and chemical properties indicate that 1,2-dichloroethane can be present and mobile in groundwater and soil (*Draft Chemistry,* Fate*, and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025d)). Therefore, EPA evaluated concentrations of 1,2-dichloroethane in soil and groundwater.

6.1 Concentrations of 1,2-Dichloroethane in Soil

6.1.1 Measured Concentrations in Soil

There were no monitoring studies conducted in the United States with data on concentrations of 1,2-dichloroethane in soil identified during systematic review.

6.1.2 Modeled Concentrations in Soil due to Air Deposition

EPA used AERMOD to estimate air deposition fluxes from TRI and NEI reporting facilities; however, the Agency is only presenting data from TRI in the section because it contains the highest releasing facilities. The resulting concentrations of 1,2-dichloroethane in soil and soil pore water were then calculated using the methods described in Section 3.2 and Section 6.4. The highest 95th percentile maximum daily air deposition fluxes for each OES generally occurred at 10 or 30 m from the facility (Table 3-12). Table 6-1 presents the resulting calculated 95th percentile maximum 1,2-dichloroethane soil concentrations and soil pore water concentrations at 10 or 30 m for each OES. The exposure scenario for the Manufacturing OES resulted in the highest estimated 1,2-dichloroethane concentrations in soil and soil pore water. These calculated soil concentrations were used for determining dietary exposure of terrestrial ecological receptors (see *Draft Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025f) for this analysis).

Table 6-1. Soil Catchment and Soil Catchment Pore Water Concentrations Estimated from 95th Percentile Maximum Daily Air Deposition Fluxes for 1,2-Dichloroethane Releases Reported to TRI

OES	Number of Facilities	Maximum Daily Air Deposition ($g/m^2/day$)	Soil Concentrations (µg/kg)	Soil Pore Water Concentrations (µg/L) [a]
Repackaging	5	2.66E−03[a]	16[a]	7.2[b]
Manufacturing	24	0.34[b]	1,982[b]	910[c]
Processing into formulation, mixture, or reaction product	12	2.51E−02[b]	148[b]	68[c]
Processing as a reactant	12	1.98E−03[b]	12[b]	5.4[c]
Waste handling, treatment, and disposal	19	2.51E−03[b]	15[b]	6.8[c]

OES = occupational exposure scenario
[a] See Section 6.4 for soil pore water concentration calculation
[b] Estimated at 10 m from facility
[c] Estimated at 30 m from facility

6.2 Concentrations of 1,2-Dichloroethane in Groundwater

6.2.1 Measured Concentrations in Groundwater (µg/L)

Concentrations of 1,2-dichloroethane measured from groundwater monitoring wells are collated by the National Water Quality Monitoring Council and stored in the WQP (NWQMC, 2022). Groundwater 1,2-dichloroethane concentration results were acquired between 2015 to 2020 from the WQP. Figure 6-2 shows the spatial distribution of measured concentrations of 1,2-dichloroethane in groundwater across the contiguous United States. Groundwater was measured at a much higher frequency in Oregon, Georgia, Minnesota, New York, and New Jersey in comparison to the rest of the states. The distribution of the groundwater sample concentrations is shown in Figure 6-3. WQP data were downloaded in July 2025 for samples collected between 2015 to 2020, resulting in 14,125 data points (Figure 6-2 and Figure 6-3). Full details of the retrieval and data processing steps of ambient surface water monitoring data from the WQP are presented in Appendix C. Concentrations of 1,2-dichloroethane in groundwater reported in the WQP ranged from 0 to 73 µg/L for samples collected between 2015 and 2020. The overall detection frequency was 3.7 percent. The detection limits ranged from 5×10^{-4} to 2,000 µg/L. There were 147 groundwater samples with concentrations of 1,2-dichloroethane that exceeded 1 µg/L and were above the detection limit. This analysis is intended to characterize the observed ranges of 1,2-dichloroethane concentrations in groundwater irrespective of the reasons for sample collection and to provide context for the modeled groundwater concentrations presented in Section 6.2.2.

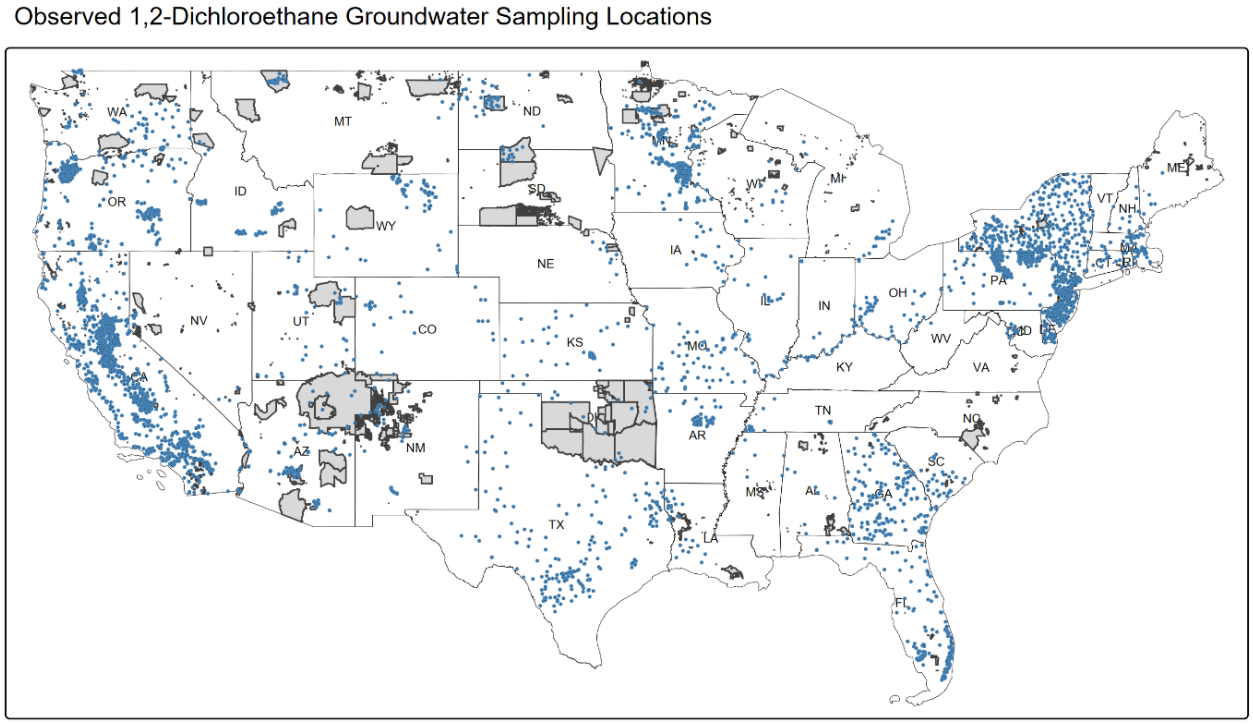

Figure 6-1. Locations of 1,2-Dichloroethane Measured in Groundwater Monitoring Wells Acquired from the WQP, 2015–2020

AIANNH Tribal boundaries are shaded in gray. Note that Alaska, American Samoa, Guam, Hawaii, N. Mariana Islands, Puerto Rico, and the U.S. Virgin Islands are not shown because they do not contain groundwater monitoring data within the WQP.

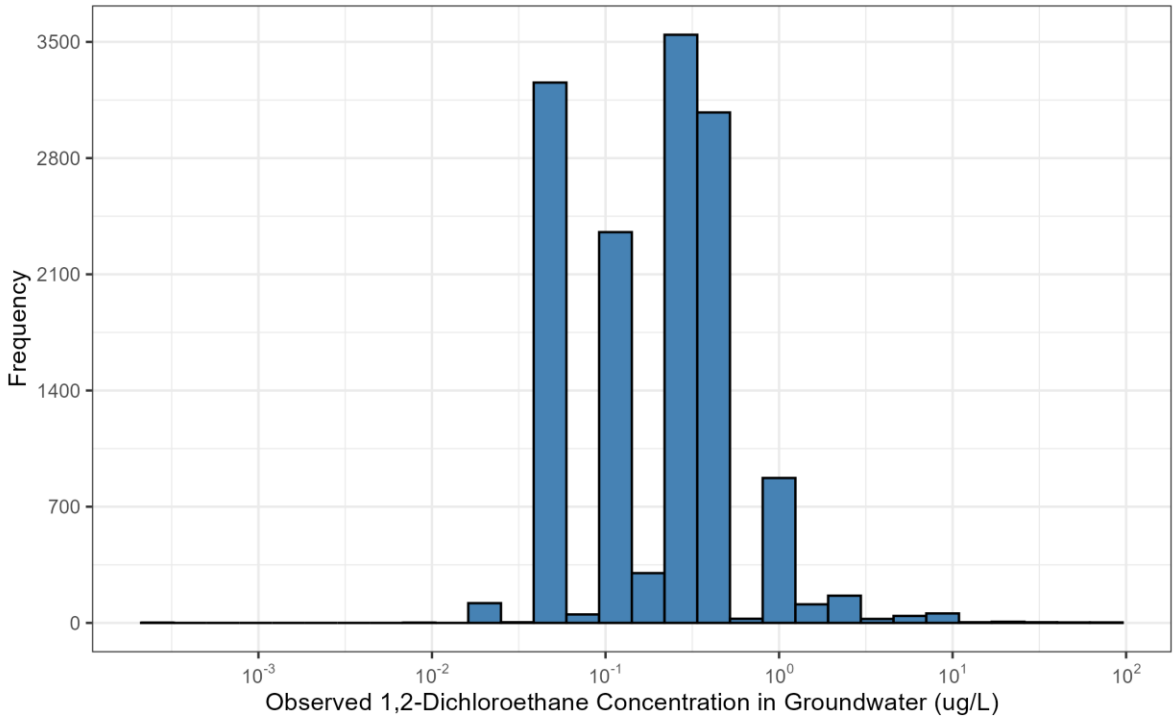

Figure 6-2. Distribution of 1,2-Dichloroethane Concentrations from Groundwater Monitoring Wells (N = 14,125) Acquired from the Water Quality Portal, 2015–2020

Measured concentrations of 1,2-dichloroethane in groundwater were extracted from eight sources and are summarized in Figure 6-3 and Table 6-2. Concentrations ranged from not detected to 240 µg/L from 659 samples collected in the United States between 1982 and 2011. The highest reported concentration of 240 µg/L was taken from a groundwater well that was suspected to be contaminated from a nearby landfill. Reported detection frequency across all extracted studies ranged from 0 to 0.23 (Table 6-2).

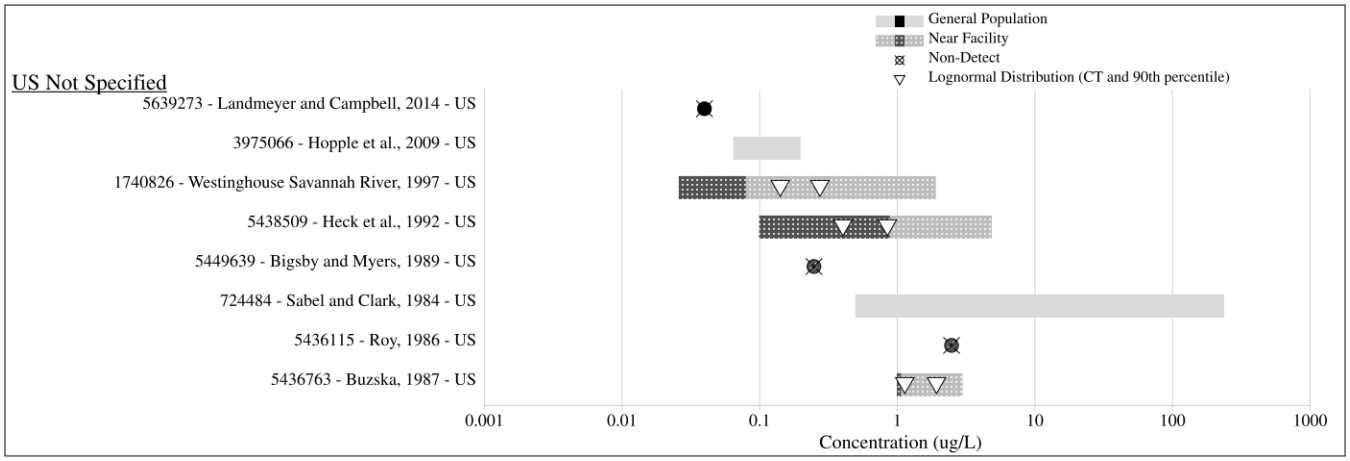

Figure 6-3. Concentrations of 1,2-Dichloroethane (µg/L) in Groundwater from 1982–2011

Table 6-2. Summary of Peer-Reviewed Literature that Measured 1,2-Dichloroethane (µg/L) Levels in Groundwater

Citation	Country	Location Type	Sampling Year(s)	Sample Size (Frequency of Detection)	Detection Limit (µg/L)	Overall Quality Level
Landmeyer and Campbell (2014)	US	General Population	2011	3 (0)	0.08	High
Hopple et al. (2009)	US	General Population	2002–2005	292 (0.02)	0.13	High
Westinghouse Savannah River Company (1997)	US	Near Facility	1995–1996	308 (0.08)	0.052	Medium
Heck et al. (1992)	US	Near Facility	1990	13 (0.23)	0.2	Medium
Bigsby and Myers (1989)	US	Near Facility	1988	7 (0)	0.5	Medium
Sabel and Clark (1984)	US	General Population	1984	20 (0.20)	N/R	Medium
Roy F. Weston Inc (1986)	US	Near Facility	1984	8 (0)	5	Medium
Buzska (1987)	US	Near Facility	1982–1984	8 (0)	N/R	Medium

N/R = not reported; US = United States

6.2.2 Modeled Concentrations in Groundwater from Landfill Leachate

This assessment was completed using the Hazardous Waste Delisting Risk Assessment Software (DRAS). DRAS was specifically designed to address the Criteria for Listing Hazardous Waste identified in Title 40 Code of Federal Regulations (40 CFR) 261.11(a)(3), a requirement for evaluating proposed hazardous waste delisting. In this assessment, DRAS is being used to determine potential groundwater concentrations of 1,2-dichloroethane after disposal into a non-hazardous waste landfill. The results of this assessment are found in Table 6-3. This assessment relied on the default waste loading rates for Resource Conservation and Recovery Act (RCRA) Subtitle C landfills available in DRAS. Similarly, the assessment relied on the default values for 1,2-dichloroethane as the chemical of concern. Lastly, leachate concentrations were estimated for a range of possibilities at the lower end of those concentrations. Because DRAS calculates a weight adjusted dilution attenuation factor (DAF) rather than a groundwater concentration, a back calculation was used to convert the DAF to a potential concentration that receptors located within 1 mile of a landfill might be exposed if the release was not controlled.

EPA found that the maximum land release of 1,2-dichloroethane from a TRI reporting facility was 16,470.3 lb (7,471 kg) in 2017 to a single RCRA Subtitle C landfill. However, due to uncertainties in the disposal rates to landfills, EPA performed DRAS runs across loading rates that span five orders of magnitude, including one run at 100,000 kg/year, which is approximately one order of magnitude higher than the highest reported loading rate. The resulting possible groundwater concentrations were predicted to be less than 8.2×10^{-3} mg/L when assuming a max leachate concentration of 10 mg/L and a loading rate of 100,000 kg/year (Table 6-3).

Table 6-3. Estimated Groundwater Concentrations (mg/L) of 1,2-Dichloroethane Found in Wells Within 1 Mile of a Disposal Facility Determined by the DRAS Model[a]

Leachate Concentration	Loading Rate				
	10 (kg/year)	100 (kg/year)	1,000 (kg/year)	10,000 (kg/year)	100,000 (kg/year)
1.0E−05 mg/L	9.90E−13	9.43E−12	9.01E−11	8.62E−10	8.2E−09
1.0E−04 mg/L	9.90E−12	9.43E−11	9.01E−10	8.62E−09	8.2E−08
1.0E−03 mg/L	9.90E−11	9.43E−10	9.01E−09	8.62E−08	8.2E−07
1.0E−02 mg/L	9.90E−10	9.43E−09	9.01E−08	8.62E−07	8.2E−06
1.0E−01 mg/L	9.90E−09	9.43E−08	9.01E−07	8.62E−06	8.2E−05
1.0 mg/L	9.90E−08	9.43E−07	9.01E−06	8.62E−05	8.2E−04
10 mg/L	9.90E−07	9.43E−06	9.01E−05	8.62E−04	8.2E−03

DRAF = Hazardous Waste Delisting Risk Assessment Software
[a] Concentrations organized by potential loading rates (kg/year) and potential leachate concentrations (mg/L).

6.3 Concentrations of 1,2-Dichloroethane in Wastewater Treatment Plant Biosolids and Soils Receiving Land Applied Biosolids

Biosolids are a primarily organic solid product produced by wastewater treatment processes that can be beneficially recycled via land application. EPA published "The Standards for the Use or Disposal of Sewage Sludge" (40 CFR, part 503) in 1993 to protect public health and the environment from any reasonably anticipated adverse effects of certain pollutants that might be present in sewage sludge biosolids. Municipal wastewater treatment systems mainly treat biosolids to ensure pathogen and vector attraction (*e.g.*, rats) reduction and limits in metals concentrations; however, other chemicals are monitored as well. Biosolids may then be land applied, which may result in exposure of 1,2-dichloroethane to humans and environmental receptors.

6.3.1 Measured Concentrations of 1,2-Dichloroethane in Wastewater Treatment Plant Sludge and Biosolids

Limited data regarding 1,2-dichloroethane measured concentrations in biosolids have been identified in public databases or published literature—particularly for those facilities that treat and report discharges of 1,2-dichloroethane. However, 1,2-dichloroethane was not reported in EPA's National Sewage Sludge Surveys from 1988, 2001, or 2006 (U.S. EPA, 2009). The Agency did identify a 2004 report published by the King County Department of Natural Resources and Parks, Wastewater Treatment Division (WTD) that characterized two municipal wastewater treatment facilities that monitored biosolids for 135 organic compounds, including 1,2-dichloroethane (King County DNRP, 2004). 1,2-Dichloroethane was not detected in these biosolids in the 2004 report. Data on concentrations of 1,2-dichloroethane in biosolids are not available for the 141 POTWs identified in the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g).

6.3.2 Modeled Concentrations in Wastewater Treatment Plant Sludge

Chemical substances in wastewater undergoing biological wastewater treatment may be removed from the wastewater by processes including biodegradation, sorption to wastewater solids, and volatilization. As discussed in the *Draft Chemistry and Fate and Transport Assessment for 1,2-Dichloroethane* (U.S.

EPA, 2025d), 1,2-dichloroethane is expected to be removed in wastewater treatment—primarily by volatilization with little removal by biodegradation or sorption to solids. Chemicals removed by sorption to sewage sludge may enter the environment when treated biosolids are land applied. The removal of a nonbiodegradable neutral organic chemical present in WWTP influent via sorption to sludge is evaluated by considering its partitioning to sludge organic carbon. Because organic substances predominantly partition to organic carbon present in solids, the measured solid:water partition coefficient is normalized to the fraction of organic carbon (f_{OC}) present in the solids to yield the chemical's organic-carbon sorption coefficient (K_{OC}).

Generally, as the K_{OC} increases, more of the chemical will be found associated with the sludge. Based on its K_{OC} value of 20 to 58.9, 1,2-dichloroethane is not expected to significantly partition to sewage sludge. Releases of 1,2-dichloroethane to wastewater treatment are expected to be low and disperse across many sites; therefore, land application of biosolids containing 1,2-dichloroethane is not expected to be a significant exposure pathway. To support this conclusion, EPA used the POTW with the highest reported releases of 1,2-dichloroethane based on DMR data to estimate high-end concentrations of 1,2-dichloroethane in soils receiving biosolids and soil pore water concentrations resulting from biosolids application. The effluent loading from the facility were used to calculate the theoretical influent load of 1,2-dichloroethane based wastewater treatment plant removal efficiency 39.6 percent (*Draft Chemistry and Fate and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025d)). The calculated annual influent load was then divided by 365 to get a daily loading rate and used as input to the SimpleTreat 4.0 wastewater treatment plant model to estimate concentrations in sludge (RIVM, 2015). It was assumed that the modeled site used activated sludge wastewater treatment and that SimpleTreat 4.0 defaults were a reasonable representation of the activated sludge treatment at the site. Using calculated influent loading data, the model predicted a 1,2-dichloroethane concentration in combined sludge of 213.9 mg/kg.

6.3.3 Modeled Concentrations in Soil Receiving Biosolids

To assess soil concentrations of 1,2-dichloroethane resulting from biosolid applications, EPA used Equation R.16-48 of the *Guidance on information requirements and Chemical Safety Assessment Chapter R.16: Environmental exposure assessment* (ECHA, 2016). Guidance document default values used are shown in brackets.

Equation R.16-48 is as follows:

$$PEC_{soil} = \frac{C_{sludge} \times AR_{sludge}}{D_{soil} \times BD_{soil}}$$

Where:

PEC_{soil}	=	Predicted environmental concentration (PEC) for soil (mg/kg)
C_{sludge}	=	Concentration of 1,2-dichloroethane in sludge (mg/kg)
AR_{sludge}	=	Application rate to sludge amended soils (kg/m^2/yr) [0.5]
D_{soil}	=	Depth of soil tillage (m) [0.2 m in agricultural soil and 0.1 m in pastureland]
BD_{soil}	=	Bulk density of soil (kg/m^3) [1,700 kg/m3]

The concentration in sludge was set to 213.9 mg/kg dry weight based on the combined sludge concentration estimated by SimpleTreat 4.0 (Section 6.3.2). Using these assumptions, the Predicted environmental concentrations (PEC_{soil}) for soil estimated for 1,2-dichloroethane after the first year of biosolids application were 0.31 mg/kg in tilled agricultural soil and 0.63 mg/kg in pastureland.

The method assumes complete mixing of the chemical in the volume of soil it is applied to, no losses from transformation, degradation, volatilization, erosion, or leaching to lower soil layers. Additionally, it is assumed there is no input of 1,2-dichloroethane from atmospheric deposition and there are no background 1,2-dichloroethane in the soil.

6.4 Modeled Concentrations in Soil Pore Water

To estimate soil pore water concentrations for 1,2-dichloroethane in soil receiving biosolids, EPA used a modified version of the equilibrium partitioning (EqP) equation developed for weakly adsorbing chemicals, such as 1,2-dichloroethane and other volatile organic compounds. The modified equation accounts for the contribution of dissolved chemical to the total chemical concentration in soil or sediment (Fuchsman, 2003). The equation assumes that the adsorption of chemical to the mineral components of sediment particles is negligible:

$$C_{total} = C_{dissolved}\left[(f_{oc} \times K_{OC}) + \frac{1 - f_{solids}}{f_{solids}}\right]$$

Where:

C_{total}	=	Total chemical concentration in soil (mg/kg) (calculated in Sections 6.1.2 and 6.3.3)
$C_{dissolved}$	=	Chemical concentration dissolved in pore water (mg/L)
f_{OC}	=	Fraction of sediment present as organic carbon (kg organic carbon/kg solid)
K_{OC}	=	Organic carbon:water partition coefficient (L/kg organic carbon)
f_{solids}	=	Fraction of soil solids (unitless)

Using this equation and assuming a K_{OC} of 20 L/kg , an f_{OC} of 0.02, and a soil solids fraction of 0.5, the estimated pore water concentrations for soils receiving biosolids, based on the PEC_{soil} calculated in Section 6.3.3, are 0.14 mg/L in tilled agricultural soil and 0.29 mg/L in pastureland. The estimated pore water concentration for the maximum soil deposition scenario, as discussed Section 6.1.2, is 0.91 mg/L.

6.5 Evidence Integration for Land Pathway

EPA identified limited data concentrations of 1,2-dichloroethane in soil; however, physical and chemical properties suggest that 1,2-dichloroethane may be present in soil. Therefore, EPA modeled soil concentrations via ambient air deposition from 1,2-dichloroethane TRI releasing facilities, and via land application of biosolids from POTWs. Of these pathways, application of biosolids is estimated to result in lower soil concentrations of 1,2-dichloroethane (0.63 mg/kg) compared to ambient air deposition (2 mg/kg).

Monitoring data from the WQP shows that 1,2-dichloroethane is widespread in groundwater across the United States. Modeling results show that disposal of 1,2-dichloroethane also could be a source of 1,2-dichloroethane in groundwater. However, given limited geographical releases of 1,2-dichloroethane, the majority of 1,2-dichloroethane in groundwater is projected to be due to the anaerobic transformation to 1,2-dichloroethane from other chlorinated solvents contaminating groundwater.

7 WEIGHT OF SCIENTIFIC EVIDENCE

According to the *Draft Systematic Review Protocol for 1,2-Dichloroethane* (U.S. EPA, 2025m), the selection of data and information are informed by the hierarchy of preferences, which considers the use of both measured (monitoring) and estimated (modeled) data. Monitoring data from both published literature and sampling databases provides strong evidence for the presence of 1,2-dichloroethane in ambient air, surface water, and groundwater—although sampling has often been done in areas associated with a known or potential source of release. EPA modeling of TSCA releases also predicts presence in ambient air and surface water. Fate and physical and chemical properties provide additional context; that is, high water solubility of 1,2-dichloroethane and low potential for hydrolysis are factors that strengthen the evidence of 1,2-dichloroethane presence in water and the volatility of 1,2-dichloroethane and low potential for photolysis provides evidence of its presence in air.

7.1 Strengths, Limitations, Assumptions, and Key Sources of Uncertainty for Ambient Air Pathway

AMTIC data has been previously reviewed and verified by the AMTICs Ambient Air Monitoring Group, which has taken various quality assurance steps to ensure data quality and has been certified in accordance with 40 CFR part 58.15. Due to strictly regulated monitoring requirements, EPA has high confidence in the AMTIC ambient air dataset (U.S. EPA, 2022a), which also received a high quality rating from the Agency's systematic review process (U.S. EPA, 2021a).

A primary limitation of the AMTIC data is that the data have not been annualized; therefore, it represents a diverse collection of sampling durations (none of which are annual averages) that are not directly comparable to modeled data. Additionally, because monitored data represents a total aggregate concentration from all sources of 1,2-dichloroethane contributing to ambient air concentrations, the AMTIC data cannot be used to characterize exposures exclusively from TSCA COUs. See the *Draft Risk Evaluation for 1,2-Dichloroethane* (U.S. EPA, 2025i) for more details comparing modeled and measured data.

EPA also evaluated three studies from systematic review that were conducted in the United States and received data quality rankings of high (Section 3.3). Limitations of measured data from systematic review are that the data vary temporally and geospatially. Methodology for sample collection and analysis are specific to each peer-reviewed literature and vary in instrumentation and analysis. Additionally, it can be difficult to identify a specific TSCA COU to data collected through systematic review.

EPA modeled air concentrations from reported TRI and NEI releases. TRI and NEI data are reported by both facilities and state/county government entities and provide data on the levels of 1,2-dichloroethane being emitted into ambient air. EPA monitoring of HAPs via the AirToxic monitoring program provides high-quality data for the monitoring location. The Agency has high confidence in the air concentrations and deposition fluxes estimated from TRI and NEI release data using AERMOD.

AERMOD is an EPA regulatory model and has been thoroughly peer reviewed; therefore, the general confidence in results from the model is high but relies on the integrity and quality of the inputs used and interpretation of the results. For this analysis, the Agency used releases reported to the TRI and NEI as direct inputs to AERMOD. EPA conducted a multi-year analysis using 6 years of TRI data and 2 years of NEI data.

As discussed in the Section 3.1.2, some facilities modeled using AERMOD relied on release data from

the TRI Form A, which has a reporting threshold of 500 lb. Because there is no release type associated with a Form A reporting value, EPA modeled each facility associated with a Form A submittal twice—once assuming all 500 lb of the reporting threshold was fugitive and once assuming all 500 lb of the reporting threshold was stack. This maintains a conservative estimate, in terms of total release, but may overestimate concentrations associated with these releases if a facility did not actually release all 500 lb. At the same time, although it maintains a conservative estimate the resulting modeled concentrations for Form A facilities tended to be low in comparison to most TRI reporting facilities reporting an actual stack and/or fugitive release across a given OES.

AERMOD uses the latitude/longitude information reported by each facility to TRI as the location for the point of release. While this may generally be a close approximation of the release point for a small facility (*e.g.*, a single building), it may not represent the release point within a much larger facility. Therefore, there is some uncertainty associated with the modeled distances from each release point and the associated concentrations, especially for communities that may live near release sites. The TRI reported data used for AERMOD do not include source-specific stack parameters that can affect plume characteristics and associated dispersion of the plume. Thus, EPA used pre-defined stack parameters within IIOAC to represent stack parameters of all facilities modeled using each of these methodologies. Those stack parameters include a stack height 10 m above ground with a 2-meter inside diameter, an exit gas temperature of 300 K, and an exit gas velocity of 5 m/s (see Table 6 of the IIOAC User Guide). These parameters were selected because they represent a slow-moving, low-to-the-ground plume with limited dispersion that results in a more conservative estimate of concentrations at the distances evaluated. As such, these parameters may result in some overestimation of emissions for certain facilities modeled. Additionally, the assumption of a 10 × 10 m area source for fugitive releases may impact the concentration estimates very near a releasing facility (*i.e.*, 10 m from a fugitive release). This assumption places the 10-meter exposure point just off the release point that may result in either an over or underestimation of concentration depending on other factors like meteorological data, release heights, and plume characteristics. Contrary to the TRI-reported data, some of the data reported to the NEI that was used for modeling with AERMOD include source-specific stack parameters. Therefore, specific parameter values were used in modeling, when available. When parameters were not available, and/or values were reported outside of normal bounds, reported values were replaced using procedures outlined in Section 3.1.7.

AERMOD-modeled annual average concentrations of releases from TRI reporting facilities ranged from 0 to 3,680 µg/m^3 (Table 3-8) across all distances modeled, with the maximum modeled concentration being one order of magnitude higher than the maximum monitored concentration of 256 µg/m^3 from AMTIC (Table 3-7). However, due to the length of sampling events, the average daily concentration provides a better comparison to measured concentrations than the annual average concentration. As an example, Figure 7-1 shows the location of a 1,2-dichloroethane releasing facility as reported in TRI and six AMTIC ambient air monitoring sites located within 10 km of the facility. AERMOD TRI modeled concentrations of 1,2-dichloroethane and the corresponding years of monitoring data are listed in Table 7-1. The comparison shows that modeled concentrations are within approximately an order of magnitude of the monitored 1,2-dichloroethane concentrations. The instance for which there is the largest difference between modeled and measure concentrations occurs for a measured concentration that is 513 m from the facility, which is approximately halfway between the modeled concentration distances of 100 and 1,000 m. The modeled concentrations at 100 m and 1,000 m are 154 µg/m^3 and 3.39 µg/m^3, respectively. In comparison, the measured concentration of 1,2-dichloroethane at 513 m was 55.7 µg/m^3.

Additional monitoring was conducted by EPA's Office of Air at three sampling locations near the same facility from October 2020 to December 2021 (U.S. EPA, 2024a). The site with the highest measured

1,2-dichloroethane concentrations was located 370 m from the facility and reported concentrations ranging from 4.29×10^{-2} to 221 µg/m^3 with a detection frequency of 99 percent. The two other sampling sites were located approximately 1,900 and 2,500 m from the facility and had reported concentrations of 5.91×10^{-2} to 15.4 µg/m^3 (detection frequency of 93%) and 2.83×10^{-2} to 11.2 µg/m^3 (detection frequency of 96%). The modeled 95th percentile concentrations for this facility of 6.4 and 1.45 µg/m^3 at 1,000 and 2,500 m were on the same order of magnitude as the monitored concentrations at approximately the same distances. Based on the comparative analysis in this section, the 95th percentile ambient air concentrations are likely representative of actual concentrations near releasing facilities. Further based on the overall confidence in the use and applicability of AERMOD for modeling of 1,2-dichloroethane in addition to the comparative analysis, EPA has robust confidence in the modeled results from reported TRI and NEI releases.

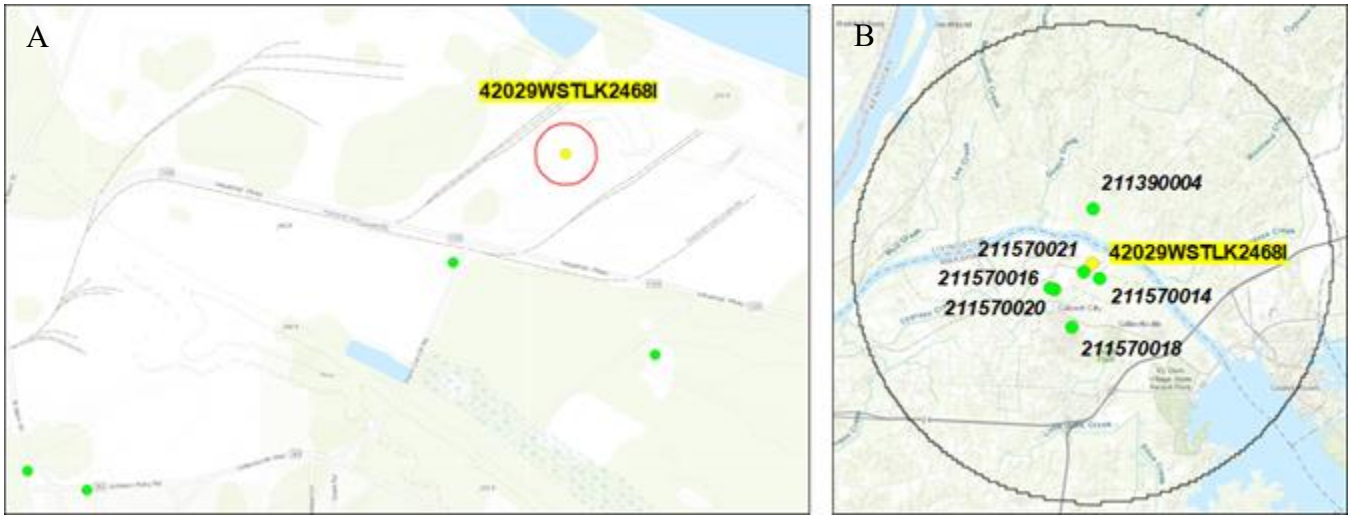

Figure 7-1. (A) Location of TRI Facility (TRI ID 42029WSTLK2468I, Yellow Dot) and (B) AMTIC Monitoring Sites (Green Dots) Within 10 km of the TRI Facility (Yellow Circle)

Table 7-1. Comparison of 1,2-Dichloroethane AERMOD Modeled Concentrations for a TRI Facility with 1,2-Dichloroethane Ambient Air Monitoring Data from Six AMTIC Monitoring Sites Within 10 km of the Facility from 2015–2020

Facility TRI ID	Year	95th Percentile Modeled Average Daily Concentration (µg/m^3)	Modeled Concentration Distance (m)	Max 1 Day Monitoring Concentration (µg/m^3)	Distance from TRI Facility to Monitoring Site (m)	Difference Between Modeled and Monitored Concentration (µg/m^3)
42029WSTLK2468I	2015	1.02	2,500	1.43	2,268	−0.41
42029WSTLK2468I	2015	4.58	1,000	5.95	719	−1.37
42029WSTLK2468I	2015	1.02	2,500	1.23	2,049	−0.21
42029WSTLK2468I	2016	1.06	2,500	11.3	2,268	−10.24
42029WSTLK2468I	2016	4.78	1,000	5.62	719	−0.84
42029WSTLK2468I	2016	1.06	2,500	2.91	2,049	−1.85
42029WSTLK2468I	2017	1.11	2,500	1.76	2,268	−0.65
42029WSTLK2468I	2017	4.96	1,000	26.3	719	−21.34
42029WSTLK2468I	2018	1.45	2,500	3.44	2,268	−1.99

Facility TRI ID	Year	95th Percentile Modeled Average Daily Concentration (µg/m^3)	Modeled Concentration Distance (m)	Max 1 Day Monitoring Concentration (µg/m^3)	Distance from TRI Facility to Monitoring Site (m)	Difference Between Modeled and Monitored Concentration (µg/m^3)
42029WSTLK2468I	2018	6.4	1,000	29	719	−22.6
42029WSTLK2468I	2019	0.644	2,500	2.04	2,268	−1.396
42029WSTLK2468I	2019	2.87	1,000	15.9	719	−13.03
42029WSTLK2468I	2020	0.241	5,000	1.65	2,813	−1.409
42029WSTLK2468I	2020	0.746	2,500	1.97	1,919	−1.224
42029WSTLK2468I	2020	3.39	1,000	55.7	513	−52.31
AERMOD = American Meteorological Society/Environmental Protection Agency Regulatory Model; AMTIC = Ambient Monitoring Technology Information Center; TRI = Toxic Release Inventory						

AERMOD was used to model daily (g/m^2/day) and annual (g/m^2/year) deposition fluxes from air to land and water from each TRI and NEI releasing facility. Based on physical and chemical properties of 1,2-dichloroethane (*Draft Chemistry and Fate and Transport Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025d)), EPA considered only gaseous deposition. The Agency used chemical-specific parameters as input values for AERMOD deposition modeling. EPA has moderate confidence in the deposition fluxes estimated from TRI and NEI release data using AERMOD.

7.2 Strengths, Limitations, Assumptions, and Key Sources of Uncertainty for Surface Water Pathway

Unlike the example given above correlating ambient air modeling/monitoring, the available measured surface water concentration data are poorly co-located with 1,2-dichloroethane facility release sites. EPA relied primarily on modeling to estimate aqueous concentrations resulting from releases to surface waters as reported in the EPA Pollutant Loading Tool. The tool compiles and makes public discharges as reported in DMRs required in NPDES permits and provides data on the amount of 1,2-dichloroethane in discharged effluent and the receiving water body. For those OESs releasing to surface water, confidence is rated as moderate to robust depending on the individual OES.

The modeling used, and the associated default and user-selected inputs can affect the overall strength in evaluating concentrations in surface waters. The facility-specific releases methodology described in Section *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g) and the results in Section 4.1 rely on a modeling framework that does not consider downstream fate. To reduce uncertainties, EPA incorporated an updated hydrologic flow network and flow data into this draft assessment that allowed a more site-specific consideration of release location and associated receiving water body flows. However, these releases are evaluated on a per facility basis that do not account for additional sources of 1,2-dichloroethane that may be present in the evaluated waterways.

For ambient surface water, data are limited geographically and temporally, with many states having no reported data and even those areas reporting measured values having limited samples over time. Monitored concentrations near modeled releases were rare, often making direct comparisons of modeled results unavailable. In most cases, monitoring data represented water bodies without identified releases of 1,2-dichloroethane nearby (thus relying only on reported facility-specific release).

7.3 Strengths, Limitations, Assumptions, and Key Sources of Uncertainty for Drinking Water Pathway

Due to the lack of measured concentrations of 1,2-dichloroethane in finished drinking water from the Office of Water databases, comparisons to 30Q5-based model estimates for individual PWSs where co-located data were not available. However, a comparison of published literature data of 225 µg/L and the highest drinking water estimate of 0.09 µg/L is available—although not comparable either spatially or temporally. That is, both the timing and location of release and sample collection must align to make a true comparison of the modeled versus measured results.

Drinking water exposures are not likely to occur from the receiving water body at the point of facility-specific releases. Specifically, the direct receiving water bodies may or may not be used as drinking water sources. To address this limitation, EPA evaluated the proximity of known 1,2-dichloroethane releases to known drinking water sources as well as known drinking water intakes as described in Section 5.1. Given EPA's high confidence in the release locations and the drinking water intake locations, the Agency has robust confidence in estimates of 1,2-dichloroethane drinking water concentrations as there is corroboration of the highest estimate of 0.09 µg/L that does not exceed the current drinking water standard of 5 µg/L.

7.4 Strengths, Limitations, Assumptions, and Key Sources of Uncertainty for Land Pathway

Because 1,2-dichloroethane is a chlorinated solvent with decades of use in U.S. chemical manufacturing, there is evidence that previous releases or disposal resulted in concentrations of 1,2-dichloroethane in groundwater. Uncertainties and limitations are inherent in the modeling of groundwater concentrations from disposing chemical substances into poorly managed RCRA Subtitle D landfills as well as those that are not regulated as closely. These uncertainties include but are not limited to (1) determining the total and leachable concentrations of waste constituents, (2) estimating the release of pollutants from the waste management units to the environment, and (3) estimating the transport of pollutants in a range of variable environments by process that often are not completely understood or are too complex to quantify accurately. To address some of these uncertainties and add strength to the assessment, EPA considered multiple loading rates and multiple leachate concentrations. These considerations add value to estimate exposure that falls at an unknown percentile of the full distribution of exposures. The DRAS Model is based on a survey of drinking water wells located downgradient from a waste management unit (U.S. EPA, 1988). Due to the age of the survey, it is unclear how the survey represents current conditions and proximity of drinking water wells to disposal units. Similarly, it is not clear whether the surveyed waste management units are representative of current waste management practices. Additionally, as discussed in the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g), it is unlikely that 1,2-dichloroethane in landfill leachate is connected to TSCA uses. EPA therefore has moderate confidence in the modeled estimates of 1,2-dichloroethane in groundwater from TSCA releases.

Monitoring data from the WQP shows that low levels of 1,2-dichloroethane are widespread in wells across the United States. Given that releases are not as geographically widespread, it is likely that the 1,2-dichloroethane detected in groundwater is resulting from the transformation of other contaminating chlorinated solvents in groundwater.

7.5 Conclusions

Based on the environmental release assessment presented in the *Draft Environmental Release Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025g), 1,2-dichloroethane is expected to be released to the environment via air, water, biosolids, and landfills. Environmental media concentrations were quantified in ambient air, soil from ambient air deposition, surface water, and sediment. In addition, concentrations of 1,2-dichloroethane in soil and groundwater from releases to biosolids and landfills were also quantitatively assessed.

Concentrations of 1,2-dichloroethane in ambient air are a major source of 1,2-dichloroethane in environmental media resulting from TSCA COUs releases. The general population will be exposed to 1,2-dichloroethane in ambient air but levels of exposure will depend on the proximity to the sources of releases as concentrations decrease with increasing distance from the source. Exposures to the general population and environmental receptors are quantified in the *Draft General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025h) and *Draft Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025f), respectively. The *Draft Risk Evaluation for 1,2-Dichloroethane* (U.S. EPA, 2025i) estimates the corresponding risks to general population and environmental receptors.

Concentrations of 1,2-dichloroethane in surface water is another source of 1,2-dichloroethane in environmental media resulting from TSCA COUs releases. Environmental receptors may be exposed and the subsequent *Draft Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025f) will quantify the levels of exposures and the *Draft Risk Evaluation for 1,2-Dichloroethane* (U.S. EPA, 2025i) to estimate the corresponding risks to aquatic species. 1,2-Dichloroethane in surface water may also be a source of exposure to the general population through drinking water and other surface water exposure scenarios that are quantified in the *Draft General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025h).

Concentrations of 1,2-dichloroethane in soil and groundwater resulting from TSCA COUs releases were estimated to be low. These media concentrations are not significant sources of 1,2-dichloroethane environmental nor general population exposures. EPA will qualitatively describe these media exposures and risks to environmental receptors and to the general population in the subsequent *Draft Environmental Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025f), *Draft General Population Exposure Assessment for 1,2-Dichloroethane* (U.S. EPA, 2025h), and *Draft Risk Evaluation for 1,2-Dichloroethane* (U.S. EPA, 2025i).

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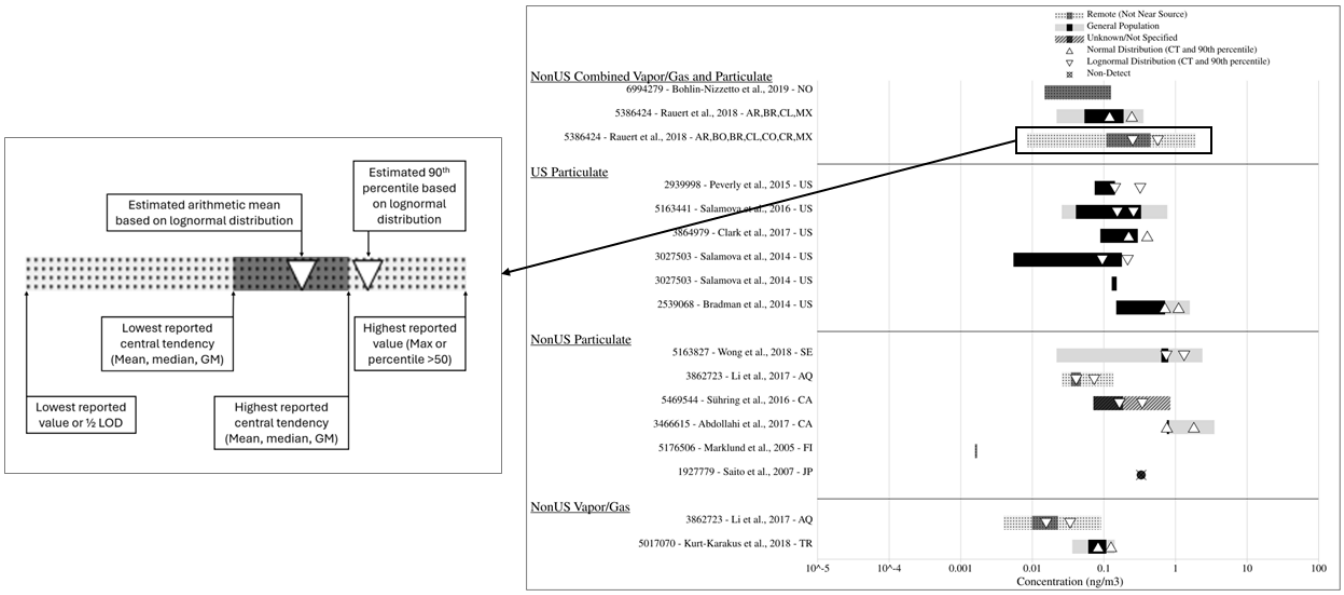
APPENDICES

Appendix A ENVIRONMENTAL MONITORING CONCENTRATIONS REPORTED BY MEDIA TYPE

A.1 Tornado Plot Interpretation and Methods



Figure_Apx A-1. Example Tornado Plot

Tornado plots display exposure data from studies identified during systematic review (see Figure_Apx A-1 for an example). As provided in previous sections of this draft TSD, there is one tornado plot for every media type with chemical concentrations plotted on a logarithmic scale.

The y-axis of the tornado plot is a list of each study aggregate representing a media sampled in a similar micro-environment and location and reported on the same unit/weight basis. A study may have more than one aggregate representation, depending on how it is reported data. For example, if a study reports exposure data collected at two different locations, the data would be plotted as two separate aggregates.

Exposure data are classified into a variety of location types that are discussed below.

Near Facility

Near Facility exposures are collected near buildings or activities that are industrial in nature (including manufacturing, mining, pulp and paper mill, wastewater treatment plants, fire training facilities, and ports), commercial activities known to use chemicals (such as dry cleaners, gas stations, and construction sites), residential areas near a facility (these areas may be referred to as “fenceline communities” or “highly-exposed communities”), or ocean samples from a port or contaminated area. Near facility samples are not strictly contaminated sites and may be site-specific or not site-specific.

General Population

General population exposures are ambient measurements taken in areas near residential populations with no known near facility sources nearby. The data often represent widely distributed releases to the environment.

Remote

Remote exposures are measurements taken in areas away from residential and industrial activity and have no known sources of contamination beyond long-range transport. Examples of remote exposures include samples collected from polar regions, samples from oceans (not including ports), and sample locations specifically described as remote.

Wastewater Classifications

Wastewater samples will indicate their sampling location at the wastewater processing facility.

Each study on the y-axis is reported with its HERO ID, a short citation, and the country abbreviation of data collection. Additional details on tissue type or metabolite might also be presented as part of the label depending on the media. The studies are grouped by unit/weight basis and sorted in descending order by latest data collection year.

Every study has a shaded bar stretching across the x-axis. The shade of the bar corresponds to the location type of the exposure data. The lighter bar represents the range of the reported concentrations, and the darker bar represents the range of reported central tendencies. A study with only dark bars indicates that the only data reported were a measure of central tendency.

Using the reported exposure data, there was an attempt to represent the arithmetic mean and 90th percentile. If sufficient central tendency and variance data were reported, the mean and 90th percentile were calculated directly from the study values where we could assume data were normally or lognormally distributed. When at least a central tendency and percentile value were provided, they were estimated by fitting the data to a lognormal distribution to all available data within the study aggregate. When fitting a lognormal distribution was not possible, a normal distribution was fit. The central tendency and 90th percentile of each distribution are plotted as triangles. Lognormal values are shown as upside-down triangles, while normal values are shown as right-side up. A study with no triangles indicates that there were insufficient data to fit a distribution.

Note that a study may not have reported concentrations because all data is below the limit of detection. In such circumstances, the plot shows a circle with an “X” through it plotted at half the reported limit of detection. The color of the symbol will correspond to the color of the data’s location type.

Appendix B SURFACE WATER MONITORING DATA RETRIEVAL AND PROCESSING

The complete set of 1,2-dichloroethane monitoring results stored in the WQP was downloaded in June 2025 (NWQMC, 2022) using the *dataRetrieval* package in R (R. Core Team, 2022) and imported directly into the R computing platform console. Specifically, the *readWQPdata* and *whatWQPsites* functions were used to acquire all WQP sample results and site data with a "1,2-Dichloroethane" characteristic name. No additional arguments were used with both functions. The downloaded dataset is large and comprehensive, where only certain data fields were desired for EPA's intended use in the 1,2-dichloroethane risk evaluation. The WQP dataset was subsequently filtered for only surface water sample types with the following "MonitoringLocationTypeName":

- Spring
- Stream
- Wetland
- Lake
- Great Lake
- Reservoir
- Impoundment
- Stream: Canal
- Stream: Ditch
- Facility Other
- Floodwater Urban
- River/Stream
- River/Stream Ephemeral
- River/Stream Intermittent
- River/Stream Perennial

Sample results identified as below the detection limit or non-detects (*i.e.*, "ResultMeasureValue" indicated with an N/A) were replaced with values at one-half the quantitation limit ("DetectionQuantitationLimitMeasure.MeasureValue" ÷ 2). All rows without a sample result value or reported detection quantitation limit were subsequently removed. The sample result values of any replicate samples collected on the same day at the same time were averaged. Rows with an "ActivityYear" between 2015 and 2020 were kept, representative samples collected during this time period. Samples flagged as QC blanks in the "ActivityTypeCode" column were removed. Only dissolved aqueous samples were kept as indicated by a "µg L^{-1}" or "mg L^{-1}" unit identifier in the "ResultMeasure.MeasureUnitCode" column. Sample units were adjusted to µg L^{-1} if needed. All sample results less than zero were forced to equal zero. Because one-half of the detection quantitation limit was used to replace below detection or non-detection sample result values, an appropriate detection quantitation limit cutoff was determined. The 95th quantile, 99th quantile, and max detection quantitation limits were examined to identify that less than or equal to 5 µg L^{-1} is a reasonable detection quantitation limit. Any adjusted sample result values exceeding 5 µg L^{-1} were removed.

Monitoring data from drinking water systems were acquired from the Third Unregulated Contaminant Monitoring Rule (UCMR3) database (U.S. EPA, 2017). The UCMR3 dataset includes PWSs serving more than 10,000 people and a sample of 800 of the nation's PWSs that serve 10,000 or fewer people. The complete history of 1,2-dichloroethane measurements in the UCMR3 finished drinking water dataset was acquired. Sample result values below the Minimum Reporting Limit (MRL), as indicated by a "<" sign in the "AnalyticalResultsSign" column, were replaced with the MRL. In this case, the highest

reported MRL for all 1,2-dichloroethane drinking water measurements is 0.03 $\mu g L^{-1}$, which is low enough where the full MRL as opposed to one-half of the MRL can be used. Sample details were reviewed and screened to remove those indicating that they were collected from groundwater (*i.e.*, those including "Well" in the "SamplePointName" column) and select for those only including surface water source types (*i.e.*, those including "SW" in the "FacilityWaterType").

Appendix C GROUNDWATER MONITORING DATA RETRIEVAL AND PROCESSING

The complete set of 1,2-dichloroethane monitoring results stored in the WQP was downloaded in June 2025 (NWQMC, 2022) using the *dataRetrieval* package in R (R. Core Team, 2022) and imported directly into the R computing platform console. Specifically, the *readWQPdata* and *whatWQPsites* functions were used to acquire all WQP sample results and site data with a "1,2-Dichloroethane" characteristic name. No additional arguments were used with both functions. The downloaded dataset is large and comprehensive, where only certain data fields were desired for EPA's intended use in the 1,2-dichloroethane risk evaluation. The WQP dataset was subsequently filtered for only groundwater sample types with the following "MonitoringLocationTypeName:"

- Well;
- Subsurface;
- Subsurface: Groundwater Drain; and
- Well: Multiple Wells.

Sample results identified as below the detection limit or non-detects (*i.e.*, "ResultMeasureValue" indicated with an N/A) were replaced with values at one-half the quantitation limit ("DetectionQuantitationLimitMeasure.MeasureValue" ÷ 2). All rows without a sample result value or reported detection quantitation limit were subsequently removed. The sample result values of any replicate samples collected on the same day at the same time were averaged. Rows with an "ActivityYear" between 2015 and 2020 were kept, representative of samples collected during this time period. Samples flagged as QC blanks in the "ActivityTypeCode" column were removed. Only dissolved aqueous samples were kept as indicated by a "µg L^{-1}" or "mg L^{-1}" unit identifier in the "ResultMeasure.MeasureUnitCode" column. Sample units were adjusted to µg L^{-1} if needed. All sample results less than zero were forced to equal zero. Because on-half the detection quantitation limit was used to replace below detection or non-detection sample result values, an appropriate detection quantitation limit cutoff was determined. The 95th quantile, 99th quantile, and max detection quantitation limits were examined to identify that less than or equal to 20 µg L^{-1} is a reasonable detection quantitation limit. Any adjusted sample result values exceeding 20 µg L^{-1} were removed.