United States
Environmental Protection Agency

Office of Chemical Safety and
Pollution Prevention

Proposed Designation of 1, 2-Dichloroethane (CASRN 107-06-2) as a High-Priority Substance for Risk Evaluation

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Acronyms and Abbreviations

Term	Description
ACGIH	American Conference of Governmental Industrial Hygienists
ATSDR	Agency for Toxic Substances and Disease Registry
Biomon.	Biomonitoring
BOD	Biochemical oxygen demand
BP	Boiling point
CAA	Clean Air Act
CASRN	Chemical Abstracts Service Registry Number
CBI	Confidential business information
CDR	Chemical Data Reporting
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Concen.	Concentration
CWA	Clean Water Act
CPDat	Chemical and Products Database
ECHA	European Chemicals Agency
FDA	U.S. Food and Drug Administration
FR	Federal Register
EPCRA	Emergency Planning and Community Right-to-Know Act
GC	Gas chromatography
HPLC	High performance liquid chromatography
IUR	Inventory Update Rule
IRIS	Integrated Risk Information System
K	Thousand
K_{OC}	Organic carbon-water partition coefficient
K_{OW}	Octanol-water partition coefficient
M	Million
MCL	Maximum contaminant level
MCLG	Maximum contaminant level goal
MITI	Ministry of International Trade and Industry
MP	Melting point
NAICS	North American Industry Classification System
NIH	National Institute of Health
NKRA	Not known or reasonably ascertainable
NPDES	National Pollutant Discharge Elimination System
NR	Not reported
OECD	Organisation for Economic Co-operation and Development
·OH	Hydroxyl radical
PEL	Permissible Exposure Limit

Term	Description
ACGIH	American Conference of Governmental Industrial Hygienists
ATSDR	Agency for Toxic Substances and Disease Registry
Biomon.	Biomonitoring
POTW	Publicly owned treatment works
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act of 1986
SMILES	Simplified molecular-input line-entry system
TG	Test guidance
TLV	Threshold Limit Value
TRI	Toxics Release Inventory
TSCA	Toxic Substances Control Act
VP	Vapor pressure
WS	Water solubility

1. Introduction

In section 6(b)(1)(B) of the Toxic Substances Control Act (TSCA), as amended, and in the U.S. Environmental Protection Agency's (EPA's) implementing regulations (40 CFR 702.3)[1], a high-priority substance for risk evaluation is defined as a chemical substance that EPA determines, without consideration of costs or other non-risk factors, may present an unreasonable risk of injury to health or the environment because of a potential hazard and a potential route of exposure under the conditions of use, including an unreasonable risk to potentially exposed or susceptible subpopulations identified as relevant by EPA.

Before designating prioritization status, under EPA's regulations at 40 CFR 702.9 and pursuant to TSCA section 6(b)(1)(A), EPA will generally use reasonably available information to screen the candidate chemical substance under its conditions of use against the following criteria and considerations:

- the hazard and exposure potential of the chemical substance;
- persistence and bioaccumulation;
- potentially exposed or susceptible subpopulations;
- storage near significant sources of drinking water;
- conditions of use or significant changes in the conditions of use of the chemical substance;
- the chemical substance's production volume or significant changes in production volume; and
- other risk-based criteria that EPA determines to be relevant to the designation of the chemical substance's priority.

This document presents the review of the candidate chemical substance against the criteria and considerations set forth in 40 CFR 702.9 for a may present risk finding. The information sources used are relevant to the criteria and considerations and consistent with the scientific standards of TSCA section 26(h), including, as appropriate, sources for hazard and exposure data listed in Appendices A and B of the *TSCA Work Plan Chemicals: Methods Document* (February 2012) (40 CFR 702.9(b)). EPA uses scientific information that is consistent with the best available science. Final designation of the chemical substance as a high-priority substance would immediately initiate the risk evaluation process as described in the EPA's final rule, *Procedures for Chemical Risk Evaluation Under the Amended Toxic Substances Control Act* (40 CFR 702)[1].

1,2-Dichloroethane is one of the 40 chemical substances initiated for prioritization as referenced in the March 21, 2019 notice (84 FR 10491)[2]. EPA has determined that 1,2-dichloroethane is a suitable candidate for the proposed designation as a high-priority chemical substance. The proposed designation is based on the results of the review against the aforementioned criteria and considerations as well as review of the reasonably available information on 1,2-dichloroethane, including relevant information received from the public and other information as appropriate.

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[1] NOTE: For all 40 CFR 702 citations, please refer to: https://www.govinfo.gov/content/pkg/CFR-2018-title40-vol33/xml/CFR-2018-title40-vol33-part702.xml and https://www.regulations.gov/document?D=EPA-HQ-OPPT-2016-0654-0108

[2] https://www.federalregister.gov/documents/2019/03/21/2019-05404/initiation-of-prioritization-under-the-toxic-substances-control-act-tsca

EPA will take comment on this proposed designation for 90 days before finalizing its designation of 1,2-dichloroethane. The docket number for providing comments on 1,2-dichloroethane is EPA-HQ-OPPT-2018-0427 and is available at www.regulations.gov.

The information, analysis and basis used for the review of the chemical is organized as follows:

- *Section 1 (Introduction):* This section explains the requirements of the amended TSCA and implementing regulations – including the criteria and considerations – pertinent to the prioritization and designation of high-priority chemical substances.

- *Section 2 (Production volume or significant changes in production volume):* This section presents information and analysis on national aggregate production volume of the chemical substance.

- *Section 3 (Conditions of use or significant changes in conditions of use):* This section presents information and analysis regarding the chemical substance's conditions of use under TSCA.

- *Section 4 (Potentially exposed or susceptible subpopulations):* This section presents information and analysis regarding potentially exposed or susceptible subpopulations, including children, women of reproductive age, and workers, with respect to the chemical substance.

- *Section 5 (Persistence and bioaccumulation):* This section presents information and analysis regarding the physical and chemical properties of the chemical substance and the chemical's fate characteristics.

- *Section 6 (Storage near significant sources of drinking water):* This section presents information and analysis considered regarding the risk from storage of the chemical substance near significant sources of drinking water.

- *Section 7 (Hazard Potential):* This section presents the hazard information relevant to the chemical substance.

- *Section 8 (Exposure Potential):* This section presents information and analysis regarding the exposures to the chemical substance.

- *Section 9 (Other risk-based criteria):* This section presents the extent to which EPA identified other risk-based criteria that are relevant to the designation of the chemical substance's priority.

- *Section 10 (Proposed designation)*: Based on the results of the review performed and the information and analysis presented, this section describes the basis used by EPA to support the proposed designation.

2. Production volume or significant changes in production volume

Approach

EPA considered current volume or significant changes in volume of the chemical substance using information reported by manufacturers (including importers). EPA assembled reported information for years 1986 through 2015 on the production volume for 1,2-dichloroethane reported under the Inventory Update Reporting (IUR) rule and Chemical Data Reporting (CDR) rule.[3]

Results and Discussion

The national aggregate production volume, which is presented as a range to protect individual site production volumes that are confidential business information (CBI), is presented in Table 1.

Table 1. 1986–2015 National Aggregate Production Volume Data (Production Volume in Pounds)

Chemical ID	1986	1990	1994	1998	2002	2006	2011	2012	2013	2014	2015
1,2-Dichloroethane (107-06-2)	>10M to 50M	>50M to 100M	>50M to 100M	>50M to 100M	>50M to 100M	≥1B	28,109,768, 185	20B to 30B	20B to 30B	20B to 30B	20B to 30B

M = million, B = billion

Reference: U.S. EPA (2013) and U.S. EPA (2017)

Production volume of 1,2-dichloroethane in 2015, as reported to EPA during the 2016 CDR reporting period, was between 20 and 30 billion lbs. National aggregate production volume for 1,2-dichloroethane has generally increased over time. In reporting year (RY) 1986, aggregate production volume was between 10 million and 50 million lbs, and from RY 1990 to RY 2002, it was between 50 million and 100 million lbs. In RY 2006, aggregate production volume was at least 1 billion lbs, and in 2011, 28.1 billion lbs of 1,2-dichloroethane were manufactured or imported. From 2011 to 2015, national aggregate production volume for this chemical was between 20 billion and 30 billion lbs (Table 1).

[3] Over time, the requirements for reporting frequency, production volume thresholds, and chemical substances under the Chemical Data Reporting (CDR) rule have changed. CDR was formerly known as the Inventory Update Rule (IUR). The first IUR collection occurred in 1986 and continued every four years through 2006. As part of two rulemakings in 2003 and 2005, EPA made a variety of changes to the IUR, including to change the reporting frequency to every five years to address burden associated with new reporting requirements. Additional changes to reporting requirements were made in 2011, including to suspend and replace the 2011 submission period with a 2012 submission period, return to reporting every four years, and require the reporting of all years beginning with 2011 production volumes. The reporting of production volumes for all years was added because of the mounting evidence that many chemical substances, even larger production volume chemical substances, often experience wide fluctuations in production volume from year to year. In addition, also as part of the 2011 IUR Modifications final rule (76 FR 50816, Aug 16, 2011), EPA changed the name of the regulation from IUR to CDR to better reflect the distinction between this data collection (which includes exposure-related data) and the TSCA Inventory itself (which only involves chemical identification information).

3. Conditions of use or significant changes in conditions of use

Approach

EPA assembled information to determine conditions of use or significant changes in conditions of use of the chemical substance. TSCA section 3(4) defines the term "conditions of use" to mean the circumstances, as determined by the Administrator, under which a chemical substance is intended, known, or reasonably foreseen to be manufactured, processed, distributed in commerce, used, or disposed of.

A key source of reasonably available information that EPA considered for determining the conditions of use for 1,2-dichloroethane was submitted by manufacturers (including importers) under the 2012 and 2016 CDR reporting cycles. CDR requires manufacturers (including importers) to report information on the chemical substances they produce domestically or import into the United States greater than 25,000 lbs per site, except if certain TSCA actions apply (in which case the reporting requirement is greater than 2,500 lbs per site). CDR includes information on the manufacturing, processing, and use of chemical substances. Based on the known manufacturing, processing and uses of this chemical substance, EPA assumes distribution in commerce. CDR may not provide information on other life-cycle phases such as distribution or chemical end-of-life after use in products (i.e., disposal). While EPA may be aware of additional uses, CDR submitters are not required to provide information on chemical uses that are not regulated under TSCA.

For chemical substances under review that are included on the Toxics Release Inventory (TRI) chemical list, information disclosed by reporting facilities in Part II Section 3 ("Activities and Uses of the Toxic Chemical at the Facility") of their TRI Form R reports was used to supplement the CDR information on conditions of use (Tables 4, 5 and 6). There is not a one-to-one correlation between conditions of use reported under CDR and information reported in Part II Section 3 of the TRI Form R because facilities are not required to disclose in their Form R submissions the specific uses of TRI chemical substances they manufactured on-site or imported. In addition to the information disclosed in Part II Section 3 of the TRI Form R, the information pertaining to waste management activities (i.e., disposal/releases, energy recovery, recycling, and treatment) disclosed in other sections of the Form R was also used to supplement the CDR information on conditions of use as shown in Tables 4, 5, and 6. For purposes of this proposed prioritization designation, EPA assumed end-of-life pathways that include releases to air, wastewater, and solid and liquid waste based on the conditions of use.

CDR and TRI Tables

Based on the publicly available[4] manufacturing information, industrial processing and use information, and consumer and commercial use information reported under CDR, EPA developed a list of conditions of use for the 2016 and 2012 reporting cycles (Tables 2 and 3, respectively).

[4] Some specific chemical uses may be claimed by CDR submitters as confidential business information (CBI) under section 14 of TSCA. In these cases, EPA has indicated that the information is CBI.

Table 2. 1,2-Dichloroethane (107-06-2) Categories and Subcategories of Conditions of Use[5] (2016 CDR Reporting Cycle)

Life Cycle Stage	Category	Subcategory	Reference
Manufacture	Domestic manufacture/Import	CBI[6]	U.S. EPA (2019a)
Manufacture	Domestic Manufacture	Domestic Manufacture	U.S. EPA (2019a)
Processing	Processing – incorporating into formulation, mixture or reaction product	Fuels and fuel additives in: – All other petroleum and coal products manufacturing	U.S. EPA (2019a)
Processing	Processing – incorporating into formulation, mixture or reaction product	Functional fluids: – Pharmaceutical and medicine manufacturing	U.S. EPA (2019a)
Processing	Processing as a reactant	Intermediate in: – Petrochemical manufacturing – Plastic material and resin manufacturing – All other basic organic chemical manufacturing	U.S. EPA (2019a)
Processing	Recycling	Recycling	U.S. EPA (2019a)
Distribution in Commerce [a,b]	Distribution	Distribution	U.S. EPA (2019a)
Industrial Uses	Laboratory chemicals	– Services – Wholesale and retail trade	U.S. EPA (2019a)
Commercial Uses	Fuels and related products	Fuels and related products	U.S. EPA (2019a)
Commercial Uses	Plastic and rubber products not covered elsewhere	Plastic and rubber products not covered elsewhere	U.S. EPA (2019a)
Consumer Uses	Plastic and rubber products not covered elsewhere	Plastic and rubber products not covered elsewhere	U.S. EPA (2019a)
Disposal [a]	Disposal		

[a] CDR includes information on the manufacturing, processing, and use of chemical substances. CDR may not provide information on other life-cycle phases such as distribution or chemical end-of-life after use in products (i.e., disposal). The table row is highlighted in gray to indicate that no information is provided for this life-cycle stage.

[b] EPA is particularly interested in information from the public on distribution in commerce.

CBI = confidential business information

[5] Certain other uses that are excluded from TSCA are not captured in this table.

[6] At this time, "CBI" indicates that a data element has been claimed CBI by the information submitter; it does not reflect the result of an EPA substantiation review.

Table 3. 1,2-Dichloroethane (107-06-2) Categories and Subcategories of Conditions of Use[7] (2012 CDR Reporting Cycle)

Life Cycle Stage	Category	Subcategory	Reference
Manufacture	Domestic manufacture	Domestic manufacture	U.S. EPA (2019a)
Manufacture	Import	Import	U.S. EPA (2019a)
Processing	Processing as a reactant	Intermediates in: All other basic organic chemical manufacturing Plastics material and resin manufacturing Petrochemical manufacturing	U.S. EPA (2019a)
Processing	Processing as a reactant	Other: Used to manufacture vinyl chloride in petrochemical manufacturing	U.S. EPA (2019a)
Processing	Processing - incorporating into formulation, mixture or reaction product	Processing aids, specific to petroleum production: Oil and gas drilling, extraction, and support activities	U.S. EPA (2019a)
Processing	Recycling	Recycling	U.S. EPA (2019a)
Distribution in Commerce [a,b]	Distribution	Distribution	U.S. EPA (2019a)
Commercial Uses	Plastic and rubber products not covered elsewhere		U.S. EPA (2019a)
Consumer Uses	Plastic and rubber products not covered elsewhere		U.S. EPA (2019a)
Disposal [a]	Disposal		

[a] CDR includes information on the manufacturing, processing, and use of chemical substances. CDR may not provide information on other life-cycle phases such as distribution or chemical end-of-life after use in products (i.e., disposal). The table row is highlighted in gray to indicate that no information is provided for this life-cycle stage.

[b] EPA is particularly interested in information from the public on distribution in commerce.

[7] Certain other uses that are excluded from TSCA are not captured in this table.

EPA used TRI data to identify additional conditions of use and to supplement CDR information about conditions of use. In addition, TRI information from 2017 is useful for demonstrating that a condition of use reported to CDR in 2015 is still ongoing.

Table 4. Activities and Uses Reported to TRI for 1,2-Dichloroethane, Reporting Year 2011

Activity Type	Activity	Industry Group	NAICS Code
Manufacture	Produce	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Other Chemical Product and Preparation Manufacturing	3259
		Plastics Product Manufacturing	3261
		Other Pipeline Transportation	4869
	Import	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Pipeline Transportation	4869
	Produce or import for on-site use/processing	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Chemical Product and Preparation Manufacturing	3259
		Plastics Product Manufacturing	3261
		Other Pipeline Transportation	4869
	Produce or import for sale/distribution	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Pipeline Transportation	4869
	Produce or import as a byproduct	Basic Chemical Manufacturing	3251
		Other Chemical Product and Preparation Manufacturing	3259
		Other Pipeline Transportation	4869
	Produce or import as an impurity	Basic Chemical Manufacturing	3251
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
Process	Process as a reactant	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Chemical Product and Preparation Manufacturing	3259
		Plastics Product Manufacturing	3261
		Other Pipeline Transportation	4869

Activity Type	Activity	Industry Group	NAICS Code
	Process as an article component	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Process as an impurity	Nonmetallic Mineral Mining and Quarrying	2123
		Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Waste Treatment and Disposal	5622
	Process as a formulation component	Basic Chemical Manufacturing	3251
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Other Chemical Product and Preparation Manufacturing	3259
		Other Pipeline Transportation	4869
	Process – repackaging	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Ship and Boat Building	3366
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622
Otherwise Use	Otherwise use – as a chemical processing aid	Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
	Otherwise use – ancillary or other use	Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Chemical Product and Preparation Manufacturing	3259
		Cement and Concrete Product Manufacturing	3273
		Other Nonmetallic Mineral Product Manufacturing	3279
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622
Waste Management	Disposal/releases	Nonmetallic Mineral Mining and Quarrying	2123
		Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253

Activity Type	Activity	Industry Group	NAICS Code
		Other Chemical Product and Preparation Manufacturing	3259
		Plastics Product Manufacturing	3261
		Cement and Concrete Product Manufacturing	3273
		Other Nonmetallic Mineral Product Manufacturing	3279
		Ship and Boat Building	3366
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622
	Energy recovery	Nonmetallic Mineral Mining and Quarrying	2123
		Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Chemical Product and Preparation Manufacturing	3259
		Cement and Concrete Product Manufacturing	3273
		Other Nonmetallic Mineral Product Manufacturing	3279
		Waste Treatment and Disposal	5622
	Recycling	Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Nonmetallic Mineral Product Manufacturing	3279
		Waste Treatment and Disposal	5622
	Treatment	Nonmetallic Mineral Mining and Quarrying	2123
		Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Other Chemical Product and Preparation Manufacturing	3259
		Plastics Product Manufacturing	3261
		Other Nonmetallic Mineral Product Manufacturing	3279
		Ship and Boat Building	3366
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622

Reference: U.S. EPA, 2019b

Table 5. Activities and Uses Reported to TRI for 1,2-Dichloroethane, Reporting Year 2015

Activity Type	Activity	Industry Group	NAICS Code
Manufacture	Produce	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Other Chemical Product and Preparation Manufacturing	3259
		Other Pipeline Transportation	4869
	Import	Basic Chemical Manufacturing	3251
		Other Pipeline Transportation	4869
	Produce or import for on-site use/processing	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Pipeline Transportation	4869
	Produce or import for sale/distribution	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Pipeline Transportation	4869
	Produce or import as a byproduct	Basic Chemical Manufacturing	3251
		Other Pipeline Transportation	4869
	Produce or import as an impurity	Basic Chemical Manufacturing	3251
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Other Chemical Product and Preparation Manufacturing	3259
Process	Process as a reactant	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Chemical Product and Preparation Manufacturing	3259
		Other Pipeline Transportation	4869
	Process as an article component	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Waste Treatment and Disposal	5622
	Process as an impurity	Nonmetallic Mineral Mining and Quarrying	2123
		Basic Chemical Manufacturing	3251
		Waste Treatment and Disposal	5622
	Process as a formulation component	Basic Chemical Manufacturing	3251
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Other Chemical Product and Preparation Manufacturing	3259
		Other Pipeline Transportation	4869
		Basic Chemical Manufacturing	3251

Activity Type	Activity	Industry Group	NAICS Code
	Process – repackaging	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Ship and Boat Building	3366
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622
Otherwise Use	Otherwise use – as a chemical processing aid	Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256
	Otherwise use – ancillary or other use	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Chemical Product and Preparation Manufacturing	3259
		Cement and Concrete Product Manufacturing	3273
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622
Waste Management	Disposal/releases	Nonmetallic Mineral Mining and Quarrying	2123
		Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256
		Other Chemical Product and Preparation Manufacturing	3259
		Cement and Concrete Product Manufacturing	3273
		Ship and Boat Building	3366
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622
	Energy recovery	Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256

Activity Type	Activity	Industry Group	NAICS Code
		Other Chemical Product and Preparation Manufacturing	3259
		Cement and Concrete Product Manufacturing	3273
		Waste Treatment and Disposal	5622
	Recycling	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256
	Treatment	Nonmetallic Mineral Mining and Quarrying	2123
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256
		Other Chemical Product and Preparation Manufacturing	3259
		Ship and Boat Building	3366
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622

Reference: U.S. EPA, 2019b

Table 6. Activities and Uses Reported to TRI for 1,2-Dichloroethane, Reporting Year 2017

Activity Type	Activity	Industry Group	NAICS Code
Manufacture	Produce	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Other Pipeline Transportation	4869
	Import	Basic Chemical Manufacturing	3251
		Other Pipeline Transportation	4869
	Produce or import for on-site use/processing	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Pipeline Transportation	4869
	Produce or import for sale/distribution	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Pipeline Transportation	4869
		Basic Chemical Manufacturing	3251

Activity Type	Activity	Industry Group	NAICS Code
	Produce or import as a byproduct	Other Pipeline Transportation	4869
	Produce or import as an impurity	Basic Chemical Manufacturing	3251
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
Process	Process as a reactant	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Chemical Product and Preparation Manufacturing	3259
		Other Pipeline Transportation	4869
	Process as an article component	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Process as an impurity	Nonmetallic Mineral Mining and Quarrying	2123
		Basic Chemical Manufacturing	3251
		Waste Treatment and Disposal	5622
	Process as a formulation component	Basic Chemical Manufacturing	3251
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Other Pipeline Transportation	4869
	Process – repackaging	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622
Otherwise Use	Otherwise use – as a chemical processing aid	Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256
	Otherwise use – as a manufacturing aid	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
	Otherwise use – ancillary or other use	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Cement and Concrete Product Manufacturing	3273

Activity Type	Activity	Industry Group	NAICS Code
		Other Nonmetallic Mineral Product Manufacturing	3279
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622
Waste Management	Disposal/releases	Nonmetallic Mineral Mining and Quarrying	2123
		Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256
		Other Chemical Product and Preparation Manufacturing	3259
		Cement and Concrete Product Manufacturing	3273
		Other Nonmetallic Mineral Product Manufacturing	3279
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622
	Energy recovery	Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256
		Other Chemical Product and Preparation Manufacturing	3259
		Cement and Concrete Product Manufacturing	3273
		Other Nonmetallic Mineral Product Manufacturing	3279
		Waste Treatment and Disposal	5622
	Recycling	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256
		Waste Treatment and Disposal	5622
	Treatment	Nonmetallic Mineral Mining and Quarrying	2123
		Petroleum and Coal Products Manufacturing	3241
		Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3253

Activity Type	Activity	Industry Group	NAICS Code
		Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3256
		Other Chemical Product and Preparation Manufacturing	3259
		Other Nonmetallic Mineral Product Manufacturing	3279
		Other Pipeline Transportation	4869
		Waste Treatment and Disposal	5622

Reference: U.S. EPA, 2019b

CDR and TRI Summary and Additional Information on Conditions of Use

For the 2016 CDR, five sites reported use of 1,2-dichloroethane as an intermediate reactant in plastic material and resin manufacturing, seven sites reported as an intermediate reactant in all other basic organic chemical manufacturing, one site reported as an intermediate reactant in petrochemical manufacturing, and three sites reported their industrial sector as CBI for use as an intermediate reactant. One site reported use of 1,2-dichloroethane as a fuel additive in all other petroleum and coal products manufacturing. One site reported use of 1,2-dichloroethane as a closed system functional fluid in pharmaceutical and medicine manufacturing. One site reported use of 1,2-dichloroethane as a laboratory chemical in the services and wholesale and retail trade sector.

In the 2016 CDR reports, one site reported use of 1,2-dichloroethane in plastic and rubber products for both commercial and consumer uses. One site reported use of 1,2-dichloroethane in fuels and related products for commercial use. Consumer uses were also identified in additional databases, which are included in the Exposure Potential section (Section 8).

For 1,2-dichloroethane there has not been a significant change in the conditions of use based on 2012 and 2016 CDR reports.

TRI data reported in Part II Section 3 of the TRI Form R ("Activities and Uses of the Toxic Chemical at the Facility") were compiled for RY 2011, RY 2015, and RY 2017. RY 2011, RY 2015, and RY 2017 reflect the chemical activities at reporting facilities in calendar years 2011, 2015, and 2017, respectively. Each facility filing a TRI Form R discloses activities that apply to the TRI chemical at the facility. The TRI data presented above are from the TRI dataset updated in April 2019. Tables 4, 5, and 6 present the activities and uses reported to TRI by industry group for 2011, 2015, and 2017. Waste management activity type include all industry groups that reported to TRI using each waste management activity for 1,2-dichloroethane.

During the first public comment period for the draft high-priority designation of 1,2-dichloroethane, one commenter stated that 1,2-dichloroethane is used for conversion to vinyl chloride, conversion to other chlorinated hydrocarbons, conversion to ethylene amines, as a pharmaceutical precursor, as a precursor for flame retardants, as a laboratory reagent, as a laboratory standard, and as an oxidation inhibitor in large scale controlled oxidative chemical reactions (EPA-HQ-OPPT-2018-0427-0006). Another public comment indicates that 1,2-dichloroethane is found as an impurity in some adhesives in amounts less than 0.1% (EPA-HQ-OPPT-2018-0421-0003).

One public comment states that specific aerospace industrial uses of that 1,2-dichloroethane include, but may not be limited to, heat resistant adhesives for primary and secondary structural and external metallic airframe parts, intermediates for the synthesis of organics, dispersants for plastics and elastomers, components of fumigants and insecticides, low friction and anti-knock coatings, bond primers, as a component in paint and varnish and paint removers, as a component of degreasing and cleaning solvents, and as a reagent (EPA-HQ-OPPT-2018-0421-0003). The commenter also stated that 1,2-dichloroethane can be used as a constituent in adhesives, intermediates, dispersants, fumigants and insecticides, coatings and paint, paint removers, solvents, and reagents (EPA-HQ-OPPT-2018-0427-0005). The use as a pesticide ingredient (fumigants and insecticides), however, was said by one commenter to have ceased (EPA-HQ-OPPT-2018-0427-0006).

Should the Agency decide to make a final decision to designate this chemical substance as a high-priority substance, further characterization of relevant TSCA conditions of use will be undertaken as part of the process of developing the scope of the risk evaluation.

4. Potentially exposed or susceptible subpopulations

Approach

In this review, EPA considered reasonably available information to identify potentially exposed or susceptible subpopulations, such as children, women of reproductive age, consumers, workers, or the elderly. EPA analyzed processing and use information included on the CDR Form U. These data provide an indication about whether children or other susceptible subpopulation may be potentially exposed. EPA also used human health hazard information to identify potentially exposed or susceptible subpopulations.

Results and Discussion

At this stage, EPA identified consumers and workers as subpopulations who may be potentially exposed or susceptible subpopulations for 1,2-dichloroethane assessment.

Children

EPA used data reported to the 2012 and 2016 CDR to identify uses in products and articles intended for children over time for 1,2-dichloroethane. The 2012 and 2016 CDR did not report any use in children's products.

Women of reproductive age (e.g., pregnant women per TSCA statute)

EPA identified developmental and reproductive toxicity studies following 1,2-dichloroethane exposure; however, no effects were observed in these studies. Therefore, women of reproductive age are not considered a susceptible subpopulation with respect to 1,2-dichloroethane at this time. During the scoping and risk evaluation process, the issue of potentially-exposed or susceptible subpopulations will be reconsidered following a systematic search of the relevant scientific literature.

Workers
Please refer to the Exposure Potential section (Section 8) for a summary of potential occupational exposures, which EPA indicates that workers are potentially exposed or susceptible subpopulations based on greater exposure.

Consumers
Please refer to the Exposure Potential section (Section 8) for a summary of potential consumer exposures, which EPA indicates that consumers are potentially exposed or susceptible subpopulations based on greater exposure.

5. Persistence and bioaccumulation

Approach
EPA reviewed reasonably available data, such as physical and chemical properties and environmental fate characteristics, to understand 1,2-dichloroethane's persistence and bioaccumulation.

Physical and Chemical Properties and Environmental Fate Tables
Tables 7 and 8 summarize the physical and chemical properties and environmental fate characteristics of 1,2-dichloroethane, respectively.

Table 7. Physical and Chemical Properties of 1,2-Dichloroethane

Property or Endpoint	Value[a]	Reference
Molecular Formula	$C_2H_4Cl_2$	CRC Handbook (Rumble, 2018)
Molecular Weight	98.959 g/mole	CRC Handbook (Rumble, 2018)
Physical State	Liquid	CRC Handbook (Rumble, 2018)
Melting Point	−35.6 ºC[b]	HSDB (2010); CRC Handbook (Rumble, 2018)
	−35.5 ºC	Physprop (2012)
	−35.5–36 ºC	OECD (2002)
Boiling Point	83.4 ºC [b]	HSDB (2010); CRC Handbook (Rumble, 2018)
	83.5 ºC	Physprop (2012)
	83.5–85.1 ºC	OECD (2002)
Density	1.2454 at g/cm^3 at 25 ºC[b]	HSDB (2010); CRC Handbook (Rumble, 2018)
	1.23 g/cm^3 at 20 ºC	ATSDR (2001) citing CRC Handbook (Lide, 1998)
Vapor Pressure	78.9 mm Hg at 25 ºC[b]	Physprop (2012); HSDB (2010) citing Daubert and Danner (1989)
	79.1 mm Hg at 25 ºC	ATSDR (2001) citing Daubert et al. (1989)
	79.96 mm Hg at 25 ºC	Mackay et al. (2006) citing McGovern (1943)
Vapor Density	3.42 (relative vapor density to air = 1)	NTP, 2016
Water Solubility	8,600 mg/L at 25 ºC[b]	Physprop (2012); HSDB (2010) citing Horvath et al. (1999)

Property or Endpoint	Value[a]	Reference
	8,690 mg/L at 20 ºC[b]	ATSDR (2001) citing Verschueren (1996)
	8,490–9,000 mg/L at 20 ºC	OECD (2002)
Log K_{OW}	1.48[b]	Physprop (2012); HSDB (2010); Mackay et al. (2006) citing Hansch et al. (1995)
	1.76	WHO IPCS (1995)
	1.45 at 23±1.5 ºC	OECD (2002)
Henry's Law Constant	1.18×10^{-3} atm-m^3/mol at 25 ºC[b]	Physprop (2012) citing Leighton and Calo (1981)
	1.1×10^{-3} atm-m^3/mol at 20 ºC	ATSDR (2001) citing Staudinger and Roberts (1996)
Flash Point	13 ºC (closed cup); 18 ºC (open cup)	ATSDR (2001) citing Budavari et al. (1989); HSDB (2010)
Auto Flammability	413 ºC	ATSDR (2001) citing Weiss (1980)
Viscosity	0.829 mPa·second at 20 ºC; 0.775 mPa·second at 25 ºC	ECHA 2019 citing Mumford and Phillips (1950)
Refractive Index	1.4449 at 20 ºC	WHO IPCS (1995); HSDB (2010); CRC Handbook (Rumble, 2018)
Dielectric Constant	10.45 at 20 ºC as liquid; 1.0048 at 120 ºC as vapor	HSDB (2010) citing Kirk-Othmer (Snedecor, 2004)

[a]Measured unless otherwise noted
[b]Selected value

Table 8. Environmental Fate Characteristics of 1,2-Dichloroethane

Property or Endpoint	Value[a]	Reference
Direct Photodegradation	Not expected to be susceptible to direct photolysis by sunlight because 1,2-dichloroethane does not contain chromophores that absorb at wavelengths >290 nm	HSDB (2010) citing Lyman (1990)
Indirect Photodegradation	$t_{1/2}$ = 65 days (based on ·OH reaction rate constant of 2.48×10^{-13} cm^3/molecule-second at 25 ºC)	HSDB (2010); Physprop (2012) citing Kwok and Atkinson (1994)
	$t_{1/2}$ = 73 days (based on ·OH reaction rate constant of 2.2×10^{-13} cm^3/molecule·second and an ·OH concentration of 5×10^5 ·OH/cm^3 at 25 ºC)	ATSDR (2001) citing Arnts (1989) and Atkinson (1989)
	Atmospheric degradation products: formyl chloride, chloroacetyl chloride, hydrogen chloride, and chloroethanol	ATSDR (2001) citing U.S. EPA (1993)
Hydrolysis	$t_{1/2}$ = 65 and 72 years (based on first order rate constant = 2.1×10^{-8} $second^{-1}$ and 1.8×10^{-8} $second^{-1}$, respectively, in neutral conditions at 25 ºC)	ATSDR (2001) citing Barbash and Reinhard (1989) and Jeffers et al. (1989)

Property or Endpoint	Value[a]	Reference
Biodegradation (Aerobic)	Water: 0%/21 days (modified shake-flask test)	HSDB (2010) citing Mudder and Musterman (1982)
	Water: 20–63%/7 days with 5–27% from volatilization after an unspecified acclimation period (static-flask method)	WHO IPCS (1995) citing Tabak (1981)
	Water: 1.6%/14 days based on BOD 1.1% after 14 days based on GC (Japanese MITI test)	NITE (2010)
	Water: $t_{1/2}$ = 100 days	ATSDR (2001) citing Capel and Larsen (1995)
Biodegradation (Anaerobic)	Groundwater: $t_{1/2}$ = 63–165 days	NICNAS (2014) citing Lawrence (2006)
	Water: $t_{1/2}$ = 400 days	ATSDR (2001) citing Capel and Larsen (1995)
	Sediment: $t_{1/2}$ = 52 days based on an observed 0.013/day	ATSDR (2001) citing Peijnenburg et al. (1998)
	Sediment: 0%/35 days	WHO IPCS (1995) citing Jafvert and Wolfe (1987)
Wastewater Treatment	45% total removal (16% by biodegradation, 1% by sludge and 28% by volatilization to air; estimated)[b]	U.S. EPA (2012)
Bioconcentration Factor	2 (*Lepomis macrochirus)*; $t_{1/2}$ = 2 days for clearance from tissues	WHO IPCS (1995) citing Barrows (1980)
Bioaccumulation Factor	3.8 (estimated)[b]	U.S. EPA (2012)
Soil Organic Carbon:Water Partition Coefficient (Log K_{OC})	1.28–1.62 (K_{OC} = 194–2)	ATSDR (2001) citing Chiou (1980), Sabljic (1995), and Borisover (1997)

[a]Measured unless otherwise noted
[b]EPI Suite™ (physical property inputs: Log K_{OW} = 1.48, BP = 83.4 °C, MP = -35.6 ºC, VP = 78.9 mm Hg, WS = 8600 mg/L, HLC = 1.18 × 10^{-3} atm-m^3/mole), BioP = 120, BioA = 30 and BioS = 30 SMILES: ClCCCl
·OH = hydroxyl radical; BOD = biochemical oxygen demand; OECD = Organisation for Economic Co-operation and Development; TG = test guideline; GC = gas chromatography; MITI = Ministry of International Trade and Industry

Results and Discussion

1,2-Dichloroethane is a volatile liquid and a halogenated hydrocarbon that is highly water soluble (8,600 mg/L). The measured Henry's Law constant (1.18 × 0-3 atm-m3/mol) and vapor pressure (78.9 mm Hg) suggest that this chemical will not be persistent in surface water and soil as it will likely volatilize upon release.

In air, 1,2-dichloroethane is not expected to be susceptible to direct photolysis by sunlight due to the absence of chromophores that absorb at wavelengths >290 nm. Additionally, hydrolysis is not expected to be an important fate process for 1,2-dichloroethane with the hydrolysis half-life being between 65 and 72 years. In the vapor phase, 1,2-dichloroethane is expected to react with photochemically produced hydroxyl radicals with a half-life between 65 and 73 days. The

degradation products that can form include formyl chloride, chloroacetyl chloride, hydrogen chloride, and chloroethanol.

In aerobic water using the modified shake-flask test, 0 percent of 1,2-dichloroethane degraded over 21 days. In a static-flask test, 20–63 percent degraded over 7 days, with 5–27 percent lost to volatilization. In anaerobic groundwater, 1,2-dichloroethane degraded with a half-life of 63–165 days. Therefore, this chemical may persist in subsurface environments, groundwater, or enclosed pipes when volatilization is not an option. The measured bioconcentration factor in *Lepomis macrochirus* was 2 with a half-life of 2 days for clearance from tissues and the estimated bioaccumulation factor is 3.8 indicating that 1,2-dichloroethane has low bioaccumulation potential.

6. Storage near significant sources of drinking water

Approach

To support the proposed designation, EPA screened each chemical substance under its conditions of use with respect to the seven criteria in TSCA section 6(b)(1)(A) and 40 CFR 702.9. The statute specifically requires the Agency to consider the chemical substance's storage near significant sources of drinking water, which EPA interprets as direction to focus on the chemical substance's potential human health hazard and exposure.

EPA reviewed reasonably available information, specifically looking to identify certain types of existing regulations or protections for the proposed chemical substances. EPA considered the chemical substance's potential human health hazards, including to potentially exposed or susceptible subpopulations, by identifying existing National Primary Drinking Water Regulations under the Safe Drinking Water Act (40 CFR Part 141) and regulations under the Clean Water Act (CWA) (40 CFR 401.15). In addition, EPA considered the consolidated list of chemical substances subject to reporting requirements under the Emergency Planning and Community Right-to-Know Act (EPCRA; Section 302 Extremely Hazardous Substances and Section 313 Toxic Chemicals), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; Hazardous Substances), and the Clean Air Act (CAA) Section 112(r) (Regulated Chemicals for Accidental Release Prevention). Regulation by one of these authorities is an indication that the substance is a potential health or environmental hazard which, if released near a significant source of drinking water, could present an unreasonable risk of injury to human health or the environment.

Results and Discussion

EPA has established a Maximum Contaminant Level Goal (MCLG) and Maximum Contaminant Level (MCL) for 1,2-dichloroethane due to potential health effects from long-term exposure above the MCL. 1,2-dichloroethane is also a Priority Pollutant under the CWA.

1,2-Dichloroethane is subject to reporting requirements under EPCRA (40 CFR 372.65). It is considered a CERCLA hazardous substance and releases in quantities equal to or greater than 100 pounds are subject to reporting to the National Response Center under CERCLA (40 CFR 302.4).

1,2-Dichloroethane is also subject to the Resource Conservation and Recovery Act [RCRA; hazardous waste numbers D028 (40 CFR 261.24), U077 (40 CFR 261.33), F024, F025 (40 CFR 261.31), K018, K029, K096 (40 CFR 261.32)]. RCRA directs EPA to develop and promulgate criteria for identifying the characteristics of hazardous waste, and for listing hazardous waste, taking into account toxicity, persistence, and degradability in nature, potential for accumulation in tissue and other related factors such as flammability, corrosiveness, and other hazardous characteristics.

One public comment looked at 15 sites that manufacture 1,2-dichloroethane and identified 90 1,2-dichloroethane storage tanks that hold pure or crude 1,2-dichloroethane. The comment states that fifty-seven percent of the tanks were located closest to freshwater rivers or tributaries, while the remaining 43% were located closest to brackish bays or tributaries. The comment also states that it is unclear whether any of these bodies of water (fresh and brackish) are used as drinking water sources. The comment further states that, overall, the identified 1,2-dichloroethane storage tanks were an average of 3,300 and 2,500 feet from freshwater and brackish water, respectively, and ranged from 100 to 8,000 feet between both types of water bodies (EPA-HQ-OPPT-2018-0427-0006).

7. Hazard potential

Approach

EPA considered reasonably available information from peer-reviewed assessments and databases to identify potential human health and environmental hazards for 1,2-dichloroethane (Tables 9 and 10, respectively).

Because, there are very few publicly available assessments for 1,2-dichloroethane with cited environmental hazard data, EPA used the infrastructure of ECOTOXicology knowledgebase (ECOTOX) to identify single chemical toxicity data for aquatic and terrestrial life (U.S. EPA, 2018). It uses a comprehensive chemical-specific literature search of the open literature that is conducted according to the Standard Operating Procedures (SOPs)[8]. The environmental hazard information was populated in ECOTOX and is available to the public. In comparison to the approach used to survey human health hazard data, EPA also used a read-across approach to identify additional environmental hazard data for isomers of 1,2-dichloroethane, if available, to fill in potential data gaps when there were no reported observed effects for specific taxa exposed to the 1,2-dichloroethane (Table 10).

Potential Human Health and Environmental Hazard Tables

EPA identified potential human health and environmental hazards based on a review of the reasonably available information for 1,2-dichloroethane (Tables 9 and 10, respectively).

[8] The ECOTOX Standard Operating Procedures (SOPs) can be found at: https://cfpub.epa.gov/ecotox/help.cfm?helptabs=tab4

Table 9. Potential Human Health Hazards Identified for 1,2-Dichloroethane

Human Health Hazards	Tested for a Specific Effect?	Specific Effect Observed	Data Source
Acute Toxicity	X	X	NICNAS (2013), U.S. EPA (2010), OECD (2002), ATSDR (2001), RIVM (2001), EnvCanada (1994)
Repeated Dose Toxicity	X	X	NICNAS (2013), U.S. EPA (2010), OECD (2002), ATSDR (2001), RIVM (2001), IARC (1999), EnvCanada (1994), NTP (1991), U.S. EPA (1987), NCI (1978)
Genetic Toxicity	X	X	NICNAS (2013), OECD (2002), RIVM (2001), ATSDR (2001), IARC (1999), NTP (1991)
Reproductive Toxicity	X		NICNAS (2013), U.S. EPA (2010), OECD (2002), ATSDR (2001)
Developmental Toxicity	X		NICNAS (2013), U.S. EPA (2010), OECD (2002), ATSDR (2001)
Toxicokinetic	X	X	NICNAS (2013), U.S. EPA (2010), OECD (2002), ATSDR (2001), RIVM (2001), CalEPA (2005), EnvCanada (1994)
Irritation/Corrosion	X	X	NICNAS (2013), U.S. EPA (2010), OECD (2002)
Dermal Sensitization	X		NICNAS (2013)
Respiratory Sensitization			
Carcinogenicity	X	X	NICNAS (2013), U.S. EPA (2010), OECD (2002), ATSDR (2001), RIVM (2001), IARC (1999), U.S. EPA (1987), NCI (1978)
Immunotoxicology	X	X	OECD (2002), ATSDR (2001), EnvCanada (1994), NTP (1991)
Neurotoxicity	X	X	NICNAS (2013), U.S. EPA (2010), OECD (2002), ATSDR (2001), CalEPA (2005), EnvCanada (1994)
Epidemiological Studies or Biomonitoring Studies	X	X	U.S. EPA (2010), CalEPA (2005), ATSDR (2001), IARC (1999)

Note: The "X" in the "Effect Observed" column indicates when a hazard effect was reported by one or more of the referenced studies. Blank rows indicate when information was not identified during EPA's review of reasonably available information to support the proposed designation.

Table 10. Potential Environmental Hazards Identified for 1,2-Dichloroethane

Media	Study Duration	Taxa Groups	High-Priority Chemical Candidate 1,2-Dichloroethane (CASRN 107-06-2)		Isomers of 1,2-Dichloroethane (CASRN 107-06-2) 1,1-Dichloroethane (CASRN 75-34-3) Dichloroethane (CASRN 1300-21-6)		Data Sources
			Number of Studies	Observed Effects	Number of Studies	Observed Effects	
Aquatic	Acute exposure	Vegetation	1	X	2	X	Tsai and Chen (2007); Wu et al. (2014)
		Invertebrate	12	X	3	X	Call et al. (1980); Foster and Tullis (1984); Foster and Tullis (1985); Freitag et al. (1984); Great Lakes Environment Center (2005); Kramer et al. (1983); LeBlanc (1980); Mayer and Ellersieck (1986); Price et al. (1974); Qureshi et al. (1982); Sanchez-Fortun et al. (1997); Sauvant et al. (1995a); Sauvant et al. (1995b); Sauvant et al. (1995c)
		Fish	5	X	1	X	Buccafusco et al. (1980); Geiger et al. (1985); Great Lakes Environment Center (2005); Heitmuller et al. (1981); Mayer and Ellersieck (1986); Walbridge et al. (1983)
		Non-Fish Vertebrates (i.e., amphibians, reptiles, mammals)	-		-		
	Chronic exposure	Vegetation	-		-		
		Invertebrate	1	X	-		Call et al. (1980)
		Fish	4	X	-		Ahmad et al. (1984); Barrows et al. (1978); Benoit et al. (1982); Black et al. (1982)
		Non-Fish Vertebrates (i.e., amphibians, reptiles, mammals)	2	X	-		Black et al. (1982)
Terrestrial		Vegetation	1	X	1	X	Crebelli (1988)

Media	Study Duration	Taxa Groups	High-Priority Chemical Candidate 1,2-Dichloroethane (CASRN 107-06-2)		Isomers of 1,2-Dichloroethane (CASRN 107-06-2) 1,1-Dichloroethane (CASRN 75-34-3) Dichloroethane (CASRN 1300-21-6)		Data Sources
			Number of Studies	Observed Effects	Number of Studies	Observed Effects	
	Acute exposure	Invertebrate	4	X	-		Bang and Telford (1966); Bhatia and Bansode (1971); Leesch (1984); Neuhauser et al. (1985)
		Vertebrates	4	X	-		Kitchin et al. (1993); Sasaki et al. (1998); Crebelli et al. (1999); Crebelli et al. (1995)
	Chronic exposure	Vegetation	-		3	X	Dietz and Schnoor (2001); Lewis et al. (1979)
		Invertebrate	15	X	-		Bang and Telford (1966); Jefferson (1942) Lindgren (1954); Punj (1970); Shivanandappa and Rajendran (1987)
		Vertebrates	1	X	-		Witt et al. (2000)

The dash indicates that no studies relevant for environmental hazard were identified during the initial review and thus the "Observed Effects" column is left blank. The X in the Observed Effects column indicates when a hazard effect was reported by one or more of the referenced studies. The N/A in the Observed Effects column indicates when a hazard effect was not reported by one of the referenced studies' abstract (full reference review has not been conducted).

8. Exposure potential

Approach

EPA considered reasonably available information to identify potential environmental, worker/occupational, consumer, and general population exposures to 1,2-dichloroethane.

Release potential for environmental and human health exposure

In addition to other required information, a submission of a TRI Form R report must include the quantities of a TRI chemical the facility released on-site to air, water, or land, and the quantities it transferred off-site to another facility for further waste management. On-site release quantities are reported in Part II Section 5 of the TRI Form R, and off-site transfers are reported in Part II Section 6. Waste management activities include: transfers of a TRI chemical in wastewater to a publicly owned treatment works (POTW) facility or to a non-POTW wastewater treatment facility for the purpose of treatment for destruction or removal; combustion for energy recovery; treatment (treatment includes treatment via incineration for destruction and waste stabilization); recycling; and release, including disposal. During treatment, combustion for energy recovery, or recycling activities, it is possible that some of the quantities of the TRI chemical will be released to the environment.

Worker/Occupational and consumer exposure

EPA's approach for assessing exposure potential was to review the physical and chemical properties, conditions of use reported in CDR, and information from the National Institutes of Health Consumer Product Database and the Chemical and Products Database (CPDat) for 1,2-dichloroethane to inform occupational and consumer exposure potential. The results of this review are detailed in the following tables.

General population exposure

EPA identified environmental concentration, human and environmental biomonitoring data to inform 1,2-dichloroethane's exposure potential to the general population (Table 13).

Results and Discussion

Release potential for environmental and human health exposure

Aggregated quantities of 1,2-dichloroethane released on-site to air, water, and land, and aggregated quantities of 1,2-dichloroethane transferred off-site to POTW and other wastewater treatment facilities (non-POTW) are presented in Table 12 for RY 2011, 2015, and 2017. The table does not include any of the reported quantities pertaining to other waste management activities (e.g., recycling, combustion for destruction) that occurred on-site or off-site during RY 2011, 2015, and 2017. The "Number of Facilities" is the count of unique facilities that filed a TRI Form R report for 1,2-dichloroethane for RY 2011, 2015, and 2017. The TRI data presented were obtained from the TRI dataset following its update in April 2019.

Table 11. The TRI Data on 1,2-Dichloroethane from Reporting Years 2011, 2015, and 2017 Used in this Document to Assess Exposure Potential

Year	Number of Facilities That Reported	Total Quantities Released On-Site to Air (lbs.)	Total Quantities Released On-Site to Water (lbs.)	Total Quantities Released (Disposed of) On-Site to Land (lbs.)	Total Quantities Transferred to POTW (lbs.)	Total Quantities Transferred to Other (non-POTW) Wastewater Treatment Facilities (lbs.)
2011	60	392,609	3,284	44,728	136	1,042
2015	57	415,471	2,554	34,028	263	22,280
2017	55	434,807	2,309	20,996	261	2,464

POTW = publicly owned treatment works
Reference: U.S. EPA, 2019b

For RY 2017, 55 facilities submitted TRI reports for 1,2-dichloroethane. The total quantities of 1,2-dichloroethane these facilities released on-site to air (as fugitive and stack emissions), surface water and land are: 434,807 pounds; 2,309 pounds; and 20,996 pounds, respectively. These facilities reported 261 pounds of the chemical transferred to POTW and 2,464 pounds transferred off-site to other non-POTW wastewater treatment facilities for the purpose of wastewater treatment. These transfer categories represent two types of off-site transfers for wastewater treatment that may lead to releases from the receiving facilities. They do not include quantities sent off-site for other types of waste management activities that include, or may lead to, releases of the chemical.

Quantities transferred off-site represent the amount of a toxic chemical a facility sent off-site prior to any waste management (e.g., treatment) at a receiving facility. Some of the quantities of 1,2-dichloroethane received by the non-POTW wastewater treatment facilities may have been released to surface waters or to air during treatment processes at the facilities.

1,2-Dichloroethane has a vapor pressure of around 79 mm Hg at 25 ºC/77ºF. This chemical's vapor pressure indicates potential for air releases from volatilization during manufacturing, processing and use.

When chemical substances are used as reactants and as intermediates, the industrial releases may be a relatively low percentage of the production volume. Lower percentage releases occur when a high percentage of the chemical reacts without excess loss during its use as a reactant or an intermediate. It is unknown the actual percentages, quantities, and media of releases of the reported chemical associated with this processing or use.

Worker/Occupational exposure
Worker exposures to this chemical may be affected by many factors, including but not limited to volume produced, processed, distributed, used and disposed of; physical form and concentration; processes of manufacture, processing, and use; chemical properties such as vapor pressure, solubility, and water partition coefficient; local temperature and humidity; and exposure controls such as engineering controls, administrative controls, and the existence of a personal protective equipment (PPE) program.

1,2-Dichloroethane has an Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) (OSHA, 2009). The PEL is 50 parts per million (ppm) over an 8-hour work day, time weighted average (TWA), with 100 ppm acceptable Ceiling limit and 200 ppm acceptable maximum peak above the acceptable ceiling limit for 5 min in any 3 hours period. This chemical also has a National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) of 1 ppm TWA, with short term exposure limit (STEL) of 2 ppm (NIOSH, 2005). The American Conference of Governmental Industrial Hygienists (ACGIH) set the Threshold Limit Value (TLV) at 10 ppm TWA.

1,2-Dichloroethane has a vapor pressure of approximately 79 mm Hg at 25 ºC/77 °F. 1,2-Dichloroethane's vapor pressure indicates the potential for inhalation exposure to vapors generated by the liquid at ambient room temperature conditions.

Consumer exposure
CDR reporting and information from the National Institutes of Health Consumer Product Database do not report on the use of 1,2-dichloroethane in consumer products. However, according to the Chemical and Products Database (CPDat), 1,2-dichloroethane may be present in consumer products such as fragrances, electronics, plastics, rubbers and solvents (Table 12).

Table 12. Exposure Information for Consumers

Chemical Identity	Consumer Product Database
	Consumer Uses (List)
1,2-Dichloroethane (107-06-2)	Electronics, fragrance, plastic, rubber, solvent

Reference: CPDat

General population exposure
Releases of 1,2-dichloroethane from certain conditions of use, such as manufacturing, disposal, or waste treatment activities, may result in general population exposures via drinking water ingestion, dermal contact, and inhalation from air releases. 1,2-Dichloroethane has been used in leaded gasoline (ATSDR 2011).

Table 13. Exposure Information for the Environment and General Population

Database Name	Env. Concen. Data Present?	Human Biomon. Data Present?	Ecological Biomon. Data Present?	Reference
California Air Resources Board	No	no	no	CARB (2005)
Comparative Toxicogenomics Database	Yes	no	no	MDI (2002)
EPA Ambient Monitoring Technology Information Center – Air Toxics Data	Yes	no	no	U.S. EPA (1990)
EPA Discharge Monitoring Report Data	Yes	no	no	U.S. EPA (2007)
EPA Unregulated Contaminant Monitoring Rule	Yes	no	no	U.S. EPA (1996)

Database Name	Env. Concen. Data Present?	Human Biomon. Data Present?	Ecological Biomon. Data Present?	Reference
FDA Total Diet Study	Yes	no	no	FDA (1991)
Great Lakes Environmental Database	Yes	no	no	U.S. EPA (2018)
Information Platform for Chemical Monitoring Data	Yes	no	yes	EC (2018)
International Council for the Exploration of the Sea	No	no	no	ICES (2018)
OECD Monitoring Database	No	yes	no	OECD (2018)
Targeted National Sewage Sludge Survey	No	no	no	U.S. EPA (2006)
The National Health and Nutrition Examination Survey	No	yes	no	CDC (2013)
USGS Monitoring Data –National Water Quality Monitoring Council	Yes	no	no	USGS (1991a)
USGS Monitoring Data –National Water Quality Monitoring Council, Air	Yes	no	no	USGS (1991b)
USGS Monitoring Data –National Water Quality Monitoring Council, Ground Water	Yes	no	no	USGS (1991c)
USGS Monitoring Data –National Water Quality Monitoring Council, Sediment	Yes	no	no	USGS (1991d)
USGS Monitoring Data –National Water Quality Monitoring Council, Soil	Yes	no	no	USGS (1991e)
USGS Monitoring Data –National Water Quality Monitoring Council, Surface Water	Yes	no	no	USGS (1991f)
USGS Monitoring Data –National Water Quality Monitoring Council, Tissue	No	no	yes	USGS (1991g)

[a] Concen.= concentration
[b] Biomon.= biomonitoring

EPA anticipates releases of 1,2-dichloroethane into the environment because of the conditions of use for 1,2-dichloroethane, particularly activities associated with the chemical's manufacturing. A review of monitoring data collected under EPA rules and statutes (e.g., CAA, CWA, SDWA, National Pollutant Discharge Elimination System), indicate that 1,2-dichloroethane is detected in air, water, soil, vegetation, and other matrices. EPA also found data indicating that 1,2-dichloroethane is used in commercial and industrial products (U.S. EPA 2014).

1,2-dichloroethane is known to be present in biomonitoring, drinking water, indoor environments, surface water, ambient air, groundwater, and soil (U.S. EPA 2014). Moreover, it has been reported to be released into the environment at high levels (U.S. EPA 2014).

1,2-dichloroethane is found in more than 570 hazardous waste sites on the National Priorities List (ATSDR 2001). An EPA survey found an average of 0.31 ppm 1,2-dichloroethane in

groundwater near hazardous waste sites (NTP 1993). EPA has found 1,2-dichloroethane to have moderate environmental persistence and a low bioaccumulation potential (U.S. EPA 2014).

9. Other risk-based criteria that EPA determines to be relevant to the designation of the chemical substance's priority

EPA did not identify other risk-based criteria relevant to the designation of the chemical substance's priority.

10. Proposed Designation and Rationale

Proposed Designation: High-priority substance

Rationale: EPA identified and analyzed reasonably available information for exposure and hazard and is proposing to find that 1,2-dichloroethane may present an unreasonable risk of injury to health and/or the environment, including potentially exposed or susceptible subpopulations (e.g., worker, consumers). This is based on the potential hazard and potential exposure of 1,2-dichloroethane under the conditions of use described in this document to support the prioritization designation. Specifically, EPA expects that the manufacturing, processing, distribution, use and disposal of 1,2-dichloroethane may result in presence of the chemical in surface water and groundwater, ingestion of the chemical in drinking water, inhalation of the chemical from air releases and exposure to workers, exposure to consumers and exposure to the general population, including exposure to children. In addition, EPA identified potential environmental (e.g. aquatic toxicity, terrestrial toxicity) and human health hazards (e.g., acute toxicity, repeated dose toxicity, genetic toxicity, irritation/corrosion, carcinogenicity, immunotoxicity, neurotoxicity, and observations in epidemiological studies).

11. References

Note: All hyperlinked in-text citations are also listed below

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