United States Environmental Protection Agency
Office of Chemical Safety and Pollution Prevention

Proposed Designation of *o*-Dichlorobenzene (CASRN 95-50-1) as a High-Priority Substance for Risk Evaluation

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Acronyms and Abbreviations

Term	Definition
ATSDR	Agency for Toxic Substances and Disease Registry
BCF	Bioaccumulation factor
BOD	Biological 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
CPDat	Chemical and Products Database
ECHA	European Chemicals Agency
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
GC	Gas 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
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
NR	Not Reported
OECD	Organisation for Economic Cooperation and Development
·OH	Hydroxyl radical
PEL	Permissible Exposure Limit
POTW	Publicly Owned Treatment Works
SARA	Superfund Amendments and Reauthorization Act of 1986
SIDS	Screening Information Data Sets
SMILES	Simplified Molecular-Input Line-Entry System
TBD	To be determined

Term	Definition
TG	Test Guideline
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)). Final designation of the chemical substance as a high-priority chemical 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].

o-Dichlorobenzene 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 *o*-dichlorobenzene is a suitable candidate for the proposed designation as a high-priority chemical substance. The proposed designation is based on results of the review against the aforementioned criteria and considerations as well as review of the reasonably available information on *o*-dichlorobenzene, including relevant information received from the public and other information as appropriate.

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[1] 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 *o*-dichlorobenzene. The docket number for providing comments on *o*-dichlorobenzene is EPA-HQ-OPPT-2018-0444 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 the 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 *o*-dichlorobenzene 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
***o*-Dichlorobenzene (95-50-1)**	>10M to 50M	>50M to 10M	>10M to 50M	>50M to 100M	>10M to 50M	10M to <50M	500K to 1M	100K to 500M	100K to 500K	100K to 500K	100K to 500K

K = thousand, M = million

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

Production volume of *o*-dichlorobenzene in 2015, as reported to EPA during the 2016 CDR reporting period, was 100,000 to 500,000 pounds (Table 1). National aggregate production volume of *o*-dichlorobenzene as reported to EPA has generally decreased over time. Between 1986 and 2006, aggregate production was either 10 million to 50 million pounds [reporting years (RY) 1986, 1994, 2002, and 2006) or 50 million to 100 million pounds (RY 1990 and 1998). Aggregate production volume of *o*-dichlorobenzene was between 500,000 and 1 million pounds in 2011, and between 100,000 and 500,000 pounds from 2012 to 2015.

[3] Over time, the requirements for reporting frequency, production volume thresholds, and chemical substance 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 burdens 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 *o*-dichlorobenzene 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 pounds per site, except if certain TSCA actions apply (in which case the reporting requirement is greater than 2,500 pounds 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. *o*-Dichlorobenzene (CASRN 95-50-1) 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)
	Import	Import	U.S. EPA (2019a)
Processing	Processing - incorporating into formulation, mixture or reaction product	Intermediates in: – all other basic organic chemical manufacturing	U.S. EPA (2019a)
	Processing - incorporating into formulation, mixture or reaction product	Solvents (which become part of product formulation or mixture) in: – Plastic material and resin manufacturing	U.S. EPA (2019a)
	Processing - incorporating into formulation, mixture or reaction product	Pigments in: – Printing ink manufacturing – Paint and coating manufacturing – Synthetic dye and pigment.	U.S. EPA (2019a)
	Recycling	CBI[7]	U.S. EPA (2019a)
Distribution in Commerce [a, b]	Distribution in Commerce		
Commercial	Ink, toner, and colorant products	Ink and toners	U.S. EPA (2019a)
	Paints and coatings	Coatings and paints, thinners, paint removers	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.

[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.
[7] 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. *o*-Dichlorobenzene (CASRN 95-50-1) Categories and Subcategories of Conditions of Use[8] (2012 CDR reporting cycle)

Life Cycle Stage	Category	Subcategory	Reference
Manufacture	Import	Import	U.S. EPA (2019a)
Processing	Processing - incorporating into formulation, mixture or reaction product	Solvents (which become part of a product formulation or mixture): – All Other Basic Organic Chemical Manufacturing	U.S. EPA (2019a)
Processing	Processing as a reactant	All Other Chemical Product and Preparation Manufacturing	U.S. EPA (2019a)
Processing	Recycling	CBI[9]	U.S. EPA (2019a)
Distribution in commerce [a,b]	Distribution in Commerce		
Commercial/Consumer	NKRA	NKRA	U.S. EPA (2019a)
Disposal [a]	Disposal		

[a] CDR includes information on the manufacturing, processing, and use of chemicals. 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.

Notes: CBI=Confidential business information; NKRA= Not known or reasonably ascertainable

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 *o*-Dichlorobenzene, Reporting Year 2011

Activity Type	Activity	Industry Group	NAICS Code
Manufacture	Produce	Basic Chemical Manufacturing	3251
		Plastics Product Manufacturing	3261
	Produce or import for on-site use/processing	Basic Chemical Manufacturing	3251
	Produce or import as a byproduct	Plastics Product Manufacturing	3261
Process	Process as a reactant	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Process – repackaging	Waste Treatment and Disposal	5622

[8] Certain other uses that are excluded from TSCA are not captured in this table.
[9] 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.

Activity Type	Activity	Industry Group	NAICS Code
Otherwise Use	Otherwise use – as a chemical processing aid	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Otherwise use – as a manufacturing aid	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Otherwise use – ancillary or other use	Waste Treatment and Disposal	5622
Waste Management	Disposal/releases	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Waste Treatment and Disposal	5622
	Energy Recovery	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Waste Treatment and Disposal	5622
	Recycling	Basic Chemical Manufacturing	3251
	Treatment	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Plastics Product Manufacturing	3261
		Waste Treatment and Disposal	5622

Reference: U.S. EPA, 2019b

Table 5. Activities and Uses Reported to TRI for *o*-Dichlorobenzene, 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
	Produce or import for on-site use/processing	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Produce or import as a byproduct	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
Process	Process as a reactant	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Process as an article component	Waste Treatment and Disposal	5622
	Process – repackaging	Basic Chemical Manufacturing	3251
		Waste Treatment and Disposal	5622
		Basic Chemical Manufacturing	3251

Activity Type	Activity	Industry Group	NAICS Code
Otherwise Use	Otherwise use – as a chemical processing aid	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Otherwise use – ancillary or other use	Cement and Concrete Product Manufacturing	3273
		Waste Treatment and Disposal	5622
Waste Management	Disposal/releases	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Cement and Concrete Product Manufacturing	3273
		Waste Treatment and Disposal	5622
	Energy Recovery	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		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
	Treatment	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Waste Treatment and Disposal	5622

Reference: U.S. EPA, 2019b

Table 6. Activities and Uses Reported to TRI for *o*-Dichlorobenzene, Reporting Year 2017

Activity Type	Activity	Industry Group	NAICS Code
Manufacture	Produce	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Produce or import as a byproduct	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
Process	Process as a reactant	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Process – repackaging	Waste Treatment and Disposal	5622
Otherwise Use	Otherwise use – as a chemical processing aid	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
	Otherwise use – ancillary or other use	Basic Chemical Manufacturing	3251
		Cement and Concrete Product Manufacturing	3273
		Waste Treatment and Disposal	5622
	Disposal/releases	Basic Chemical Manufacturing	3251

Activity Type	Activity	Industry Group	NAICS Code
Waste Management		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Cement and Concrete Product Manufacturing	3273
		Waste Treatment and Disposal	5622
	Energy Recovery	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Cement and Concrete Product Manufacturing	3273
	Recycling	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Waste Treatment and Disposal	5622
	Treatment	Basic Chemical Manufacturing	3251
		Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3252
		Waste Treatment and Disposal	5622

Reference: U.S. EPA, 2019b

CDR and TRI Summary and Additional Information on Conditions of Use

For the 2012 CDR, several sites reported domestic manufacture/import of *o*-dichlorobenzene. For the 2016 CDR, domestic manufacture/import of *o*-dichlorobenzene was claimed CBI. Reported uses varied for processing uses or processing/industrial uses that were reported between 2012 and 2016. In 2012, one site reported use of *o*-dichlorobenzene in processing - incorporating into a formulation, mixture or reaction product in solvents in all other basic organic chemical manufacturing. The same use was not reported in 2016. In 2012, one site reported use of *o*-dichlorobenzene in processing as a reactant in all other chemical product and preparation manufacturing; no sites reported that use in 2016. In 2016, one site reported use of *o*-dichlorobenzene in processing – incorporating into formulation, mixture or reaction product – as intermediates in all other basic organic chemical manufacturing. No sites reported that use in 2012. In 2016, one site reported the use of the chemical in processing – incorporating into formulation, mixture or reaction product in solvents in plastic material and resin manufacturing, and no sites reported the use in 2012. In 2016, one site reported use of *o*-dichlorobenzene in processing – incorporating into formulation, mixture or reaction product - in pigments in printing ink manufacturing, paint and coating manufacturing and synthetic dye and pigment. No sites reported that use in 2012. Due to CBI, EPA cannot disclose whether *o*-dichlorobenzene is recycled.[10]

For commercial and consumer uses, one site reported commercial/consumer uses in 2012 as not known or reasonably ascertainable (NKRA). In 2016, one site reported commercial uses in ink, toner and colorant products, inks and toners. Consumer uses were also identified in additional databases, which are included in the Exposure Potential section (Section 8).

[10] 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.

There were no reports to CDR of any use of *o*-dichlorobenzene in children's products.

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, 2015, and 2017. RY 2011, 2015, and 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. Table 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 o-dichlorobenzene.

During the first public comment period for the draft high priority designation of o-dichloro-benzene, EPA received information about uses of the chemical in the aerospace industry including in the manufacture, operation and maintenance of aerospace products and as a constituent in inks and oils.

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, workers, consumers or the elderly. EPA analyzed processing and use information included on the CDR Form U that indicates whether the chemical substance is used in products and articles subject to TSCA and are intended for children. These data provide an indication about whether children or other susceptible subpopulation may be potentially exposed (e.g., workers, women of reproductive age). EPA also used human health hazard information to identify potentially exposed or susceptible subpopulations.

Results and Discussion

At this stage, EPA identified children, women of reproductive age, consumers and workers as subpopulations who may be potentially exposed or susceptible subpopulations for *o*-dichlorobenzene.

Children

EPA used data reported to the 2012 and 2016 CDR to identify uses in products and articles intended for children over time for o-dichlorobenzene. The 2012 and 2016 CDR did not report any use in children's products (U.S. EPA, 2019a). In the existing assessments reviewed, there was no discussion on the susceptibility of children to o-dichlorobenzene. However, EPA identified potential developmental hazards that would impact any stage of children's development.

Women of reproductive age (e.g., pregnant women per TSCA statute)
EPA identified studies that observed developmental and reproductive effects following exposure to *o*-dichlorobenzene (Section 7, Table 9). Thus, women of reproductive age were identified as a potentially exposed or susceptible subpopulation.

Consideration of women of reproductive age as a potentially exposed or susceptible subpopulation was also based on exposure because women of reproductive age are potential workers in the manufacturing, processing, distribution in commerce, use, or disposal of the chemical substance.

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 *o*-dichlorobenzene'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 *o*-dichlorobenzene, respectively.

Table 7. Physical and Chemical Properties of *o*-Dichlorobenzene

Property or Endpoint	Value[a]	Reference
Molecular Formula	$C_6H_4Cl_2$	CRC Handbook (Rumble, 2018)
Molecular Weight	147.002 g/mole	CRC Handbook (Rumble, 2018)
Physical State	Liquid	CRC Handbook (Rumble, 2018)
Physical Form	Colorless to pale-yellow liquid	HSDB (2014) citing NIOSH (2005)
Purity	≥98.0% active ingredient (high purity grade); 80–90% active ingredient (technical grade) Impurities include <0.2% 1,2,4-trichlorobenzene and <0.005% monochlorobenzene (high purity grade) or <19.0% other dichlorobenzenes isomers,	HSDB (2014) citing IARC (1982)

Property or Endpoint	Value[a]	Reference
	<1.0% trichlorobenzenes and <0.05% monochlorobenzene (technical grade)	
Melting Point	−16.7 ºC	ATSDR (2006); Physprop (2012); HSDB (2014) citing O'Neil (2006); OECD (2001)
Boiling Point	180 ºC[b]	ATSDR (2006); Physprop (2012); HSDB (2014) citing O'Neil (2006)
	180.3 ºC	OECD (2001)
Density	1.3059 g/mL at 20 ºC	ATSDR (2006); HSDB (2014) citing O'Neil (2006)
	1.3007 at 25 ºC[b]	OECD (2001)
Vapor Pressure	1.36 mmHg at 25 ºC	ATSDR (2006); Daubert and Danner (1989); HSDB (2014); OECD (2001)
Vapor Density	5.05 (air = 1)	HSDB (2014) citing Lewis (1999); OECD (2001)
Water Solubility	156 mg/L at 25 ºC	ATSDR (2006); Banerjee et al. (1980); HSDB (2014) citing Yalkowsky et al. (2003)
	130 mg/L at 20 ºC	OECD (2001)
Log K_{OW}	3.43[b]	ATSDR (2006); Hansch et al. (1995); HSDB (2014); OECD (2001)
	3.49	OECD (2001)
	3.56	OECD (2001)
Henry's Law Constant	1.92×10^{-3} atm-m^3/mole at 25 ºC[b]	Atkinson (1989); ATSDR (2006)
	1.5×10^{-3} atm-m^3/mole at 20 ºC	HSDB (2014) citing Staudinger and Roberts (1996)
Flash Point	68.33 ºC (open cup), 65.56 ºC (closed cup)	HSDB (2014); Clayton and Clayton (1993)
	28 ºC (closed cup)	ATSDR (2006)
	74 ºC (open cup), 68 ºC (closed cup)	HSDB (2014); ACGIH (2007)
	66 ºC (closed cup), 68 ºC (closed cup)	OECD (2001)
Auto Flammability	648 ºC[b]	HSDB (2014); ACGIH (2007); OECD (2001)
	640 ºC	ATSDR (2006)
Viscosity	1.324 mPa second at 25 ºC	HSDB (2014) citing Lide (2005)
Refractive Index	TBD	TBD
Dielectric Constant	12.12 at 293.2 ºK	HSDB (2014) citing Lide (2005)
Surface Tension	36.61 dyn/cm	HSDB (2014) citing Kirk-Othmer (1993)

[a] Measured unless otherwise noted

[b]Selected value

Notes: TBD = to be determined, if reasonably available. **EPA is particularly interested in information from the public on these properties or endpoints.**

Table 8. Environmental Fate Characteristics of *o*-Dichlorobenzene

Property or Endpoint	Value[a]	Reference
Direct Photodegradation	Not expected; does not contain chromophores that absorb at wavelengths >290 nm	HSDB (2014) citing Lyman et al. (1990); OECD (2001)
Indirect Photodegradation	$t_{1/2}$ = 38 days (12-hour day; 5×10^5 ·OH/cm^3) from OH rate constant 4.2×10^{-13} cm^3/molecule-second at 25 ºC[b]	HSDB (2014) citing Atkinson (1989); Physprop (2012)
	$t_{1/2}$ = 27 days (5×10^5 ·OH/cm^3); ·OH rate constant 3×10^{-13} cm^3/molecule-second	OECD (2001)
	$t_{1/2}$ = 53 days (1×10^5 ·OH/cm^3); ·OH rate constant 3×10^{-13} cm^3/molecule-second	OECD (2001)
Hydrolysis	*o*-dichlorobenzene is not expected to undergo hydrolysis in the environment due to the lack of hydrolysable functional groups	HSDB (2014) citing Lyman et al. (1990)
Biodegradation	0%/28 days of theoretical BOD (Japanese MITI test) with activated sludge (aerobic water)	HSDB (2014) citing CITI (1992)
	25%/300 days removed from an aerobic soil column (closed system) (aerobic soil)	OECD (2001)
	100%/4 months in aerobic Rhine River sediment column (closed system) after 60–100-day lag period (aerobic sediment)	ATSDR (2006)
	$t_{1/2}$ = 37 days (first-order biodegradation rate constant = 0.0188 days^{-1}) in acclimated anaerobic sediment slurry obtained from the Tsurumi River, Japan (anaerobic sediment)	HSDB (2014) citing Masunga et al. (1996)
	6.3%/10 weeks in an alkaline soil sample	HSDB (2014) citing Haider et al. (1974)
	$t_{1/2}$ = 117 days in a heterogeneous aquifer at the Columbus Air Force Base, Mississippi	HSDB (2014) citing Stauffer et al. (1994)
	$t_{1/2}$ = 12 days in pure culture laboratory batch microcosms following a 13-day lag period	HSDB (2014) citing Nielsen et al. (1996)
Wastewater Treatment	Elimination efficiencies from 15% to 53% during infiltration and soil percolation of *o*-dichlorobenzene containing wastewater from a wastewater treatment plant	OECD (2001)
	75% total removal (47% by biodegradation, 7% by sludge, 20% by volatilization to air; estimated)[b]	EPI Suite (2012)
Bioconcentration Factor	90–260 (carp) and 270–560 (rainbow trout)	HSDB (2014) citing CITI (1992) and Oliver and Niimi (1983)
	6,212–19,700 (*Selenastrum capricornutum*, algae)	HSDB (2014) citing Casserly et al. (1983); OECD (2001)
	66 (whole-body BCF measured in bluegill sunfish)	HSDB (2014) citing Barrows et al. (1980)
Bioaccumulation Factor	240 (estimated)[b]	EPI Suite (2012)
Soil Organic Carbon:Water	2.45 (in silt loam soil)	HSDB (2014) citing Chiou et al. (1979)

Property or Endpoint	Value[a]	Reference
Partition Coefficient (Log K_{OC})	2.5	ATSDR (2006); HSDB (2014) citing Chiou et al. (1979); OECD (2001)
	3.7 (in sediment) Ise Bay, Japan	HSDB (2014) citing Masunga et al. (1996)
	4.3 (in sediment) Lake Ketelmeer, the Netherlands	HSDB (2014) citing ten Hulscher et al. (1997)

[a]Measured unless otherwise noted
[b]EPI Suite™ physical property inputs: Log K_{OW} = 3.43, BP = 180 ºC, MP = −16.7 ºC, VP = 1.36 mm Hg, WS = 156 mg/L, HLC = 0.00192 atm-m^3/mole, BIOP = 40, BioA = 10 and BioS = 10 SMILES: c(c(ccc1)Cl)(c1)Cl
Notes:·OH = hydroxyl radical; OECD = Organisation for Economic Cooperation and Development; TG = test guideline; GC = gas chromatography; MITI = Ministry of International Trade and Industry; BCF = bioaccumulation factor; BOD = biochemical oxygen demand

Results and Discussion

o-Dichlorobenzene is a volatile, water-soluble liquid (156 mg/L). Measured Henry's Law constant (1.92×10^{-3} atm-m^3/mol) and vapor pressure (1.36 mm Hg) data indicate that this chemical is not likely to persist in surface water or soil as it will likely volatilize upon release. In the air, *o*-dichlorobenzene is expected to exist in the vapor phase where it may react with photochemically produced hydroxyl radicals at a rate corresponding to a half-life of 38 days. It is not expected to be susceptible to direct photodegradation. *o*-Dichlorobenzene is also not expected to be susceptible to hydrolysis in an aqueous environment due to a lack of hydrolysable functional groups.

In aerobic aquatic environments, *o*-dichlorobenzene is not readily biodegradable. In water, this chemical showed no biodegradation over a 28-day incubation period using activated sludge and the OECD 301C test method. However, *o*-dichlorobenzene may biodegrade slowly under certain environmental conditions in soils and aquatic sediments. Half-lives of 12 and 117 days have been reported for pure culture and field studies in an aquifer, respectively. In soil, it reached 25 percent degradation after 300 days using an aerobic soil, 6.3 percent degradation after 10 weeks using an alkaline soil, and 100 percent degradation after 4 months following a lag-phase using river sediment.

In anaerobic aquatic environments, *o*-dichlorobenzene is biodegradable. It has a reported half-life of 37 days using an acclimated anaerobic sediment slurry. These data suggest that *o*-dichlorobenzene may be moderately persistent in subsurface environments, groundwater, or enclosed pipes when volatilization is not an option. Furthermore, this chemical has low to high potential for bioaccumulation based on measured bioconcentration factors in carp (90–260), rainbow trout (270–560), bluegill sunfish (66), and algae (6,212–19,700), and an estimated bioaccumulation factor of 240.

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 (SDWA; 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

o-Dichlorobenzene is a designated toxic pollutant under Section 307(a)(1) of the CWA and as such is subject to effluent limitations. It is also a Priority Pollutant under the CWA and is included in the list of total toxic organics. EPA has established Ambient Water Quality Criteria for *o*-dichlorobenzene. The chemical is a designated hazardous substance under Section 311(b)(2)(A) of the Federal Water Pollution Control Act. *o*-Dichlorobenzene is also subject to the National Primary Drinking Water Regulations under the SDWA with a Maximum Contaminant Level Goal (MCLG) of 0.6 (mg/L) and an enforceable Maximum Contaminant Level (MCL) of 0.6 (mg/L).

o-Dichlorobenzene is subject to reporting requirements under EPCRA. It is also 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.

o-Dichlorobenzene is also subject to the Resource Conservation and Recovery Act (RCRA) [RCRA; hazardous waste number U070 (non-acute hazardous waste)]. 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. It is also listed on the Superfund Amendments and Reauthorization (SARA), an amendment to CERCLA and the CERCLA Priority List of Hazardous Substances.

7. Hazard potential

Approach

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

EPA/OPPT used the infrastructure of ECOTOXicology knowledgebase (ECOTOX) to identify single chemical toxicity data for aquatic and terrestrial life (U.S. EPA, 2018a). It uses a comprehensive chemical-specific literature search of the open literature that is conducted according to the Standard Operating Procedures (SOPs)[11]. The environmental hazard information was populated in ECOTOX and is available for 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 *o*-dichlorobenzene, if available, to fill in potential data gaps when there were no reported observed effects for specific taxa exposed to the *o*-dichlorobenzene (Table 10).

Potential Human Health and Environmental Hazard Tables

EPA identified potential human health and environmental hazards based on a review of the reasonable available information for *o*-dichlorobenzene (Tables 9 and 10, respectively).

Table 9. Potential Human Health Hazards Identified for *o*-Dichlorobenzene

Human Health Hazards	Tested for a Specific Effect	Specific Effect Observed	Data Source
Acute Toxicity	X	X	EPA (2009); Cal EPA (2009), ATSDR (2006); RIVM (2001); OECD (2001); NICNAS (2001); IARC (1999)
Repeated Dose Toxicity	X	X	EPA (2009); ATSDR (2006); RIVM (2001); OECD (2001); NICNAS (2001); IARC (1999)
Genetic Toxicity	X		EPA (2009); ATSDR (2006); OECD (2001); NICNAS (2001)
Reproductive Toxicity	X	X	EPA (2009); ATSDR (2006)
Developmental Toxicity	X		EPA (2009); OECD (2001); NICNAS (2001); IARC (1999)
Toxicokinetic	X		EPA (2009); ATSDR (2006); OECD (2001); NICNAS (2001)
Irritation/Corrosion	X	X	EPA (2009); ATSDR (2006); OECD (2001); NICNAS (2001)
Respiratory Sensitization			
Dermal Sensitization	X	X	OECD (2001); NICNAS (2001)

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

Carcinogenicity	X		EPA (2009); Cal EPA (2009); ATSDR (2006); RIVM (2001); NICNAS (2001); IARC (1999)
Neurotoxicity	X	X	ATSDR (2006)
Immunotoxicity	X	X	RIVM (2001); OECD (2001); NICNAS (2001)
Epidemiological Studies or Biomonitoring Studies	X	X	ATSDR (2006)

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 *o*-Dichlorobenzene

Media	Study Duration	Taxa Groups	High-Priority Chemical Candidate o-Dichlorobenzene (CASRN 95-50-1)		Isomers of o-Dichlorobenzene (CASRN 95-50-1) p-Dichlorobenzene (CASRN 0-64-67) m-Dichlorobenzene (CASRN 54-17-31) Dichlorobenzene (CASRN 2532-12-26)		Data Sources
			Number of Studies	Observed Effects	Number of Studies	Observed Effects	
Aquatic	Acute exposure	Vegetation	13	X	10	X	Altenburger et al. (2004); Casserly et al. (1983), Galassi and Vighi (1981); Tsai and Chen (2007); Figueroa and Simmons (1991); Figueroa (1990); Galassi and Vighi (1981); Tsai and Chen (2007); Kuhn and Pattard (1990); Nendza and Wenzel (2006); Ma et al. (1997); Wong et al. (1984); Zhang et al. (2016); Zhang et al. (2017)
		Invertebrate	16	X	13	X	Abernethy et al. (1986); Bobra et al. (1983); Bobra et al. (1985); Butler et al. (1960) Call et al. (1979a) Call et al. (1980a); Call et al. (1980b); Call et al. (1983); Curtis and Ward (1981); Curtis et al. (1979); Davis and Hidu (1969); Gersich et al. (1986); Kuhn et al. (1989); LeBlanc (1980); Lindley et al. (1999); Mortimer and Connell (1995); Radix et al. (1999), Roghair et al. (1994); Yoshioka et al. (1985)

Media	Study Duration	Taxa Groups	High-Priority Chemical Candidate o-Dichlorobenzene (CASRN 95-50-1)		Isomers of o-Dichlorobenzene (CASRN 95-50-1) p-Dichlorobenzene (CASRN 0-64-67) m-Dichlorobenzene (CASRN 54-17-31) Dichlorobenzene (CASRN 2532-12-26)		Data Sources
			Number of Studies	Observed Effects	Number of Studies	Observed Effects	
Aquatic	Acute exposure	Fish	16	X	22	X	Ahmad et al. (1984); Broderius and Kahl (1985); Buccafusco et al. (1981); Dow Chemical Co. (1982); Call et al. (1979a); Call et al. (1979b); Call et al. (1983); Carlson and Kosian (1987); Chaisuksant et al. (1997); Curtis and Ward (1981); Dow Chemical Co. (1987); Geiger et al. (1986); Curtis et al. (1978); Curtis et al. (1979); Furay and Smith (1995); Ganesan et al. (2013); Geiger et al. (1986); Heitmuller et al. (1981); Mayer and Ellersieck (1986); Mayes et al. (1983); Sijm et al. (1993); Smith et al. (1991), Tanneberger et al. (2010), Veith et al. (1983a,b), Versonnen et al. (2003), Weil et al. (2009)
		Non-Fish Vertebrates (i.e., amphibians, reptiles, mammals)	-		-		

Media	Study Duration	Taxa Groups	High-Priority Chemical Candidate o-Dichlorobenzene (CASRN 95-50-1)		Isomers of o-Dichlorobenzene (CASRN 95-50-1) p-Dichlorobenzene (CASRN 0-64-67) m-Dichlorobenzene (CASRN 54-17-31) Dichlorobenzene (CASRN 2532-12-26)		Data Sources
			Number of Studies	Observed Effects	Number of Studies	Observed Effects	
Aquatic	Chronic exposure	Vegetation	4	X	2	X	Ukeles (1962); Zhang et al. (2016); Zhang et al. (2017)
		Invertebrate	5	X	10	X	Calamari et al. (1983); Call et al. (1980a); Call et al. (1980b) Davis and Hidu (1969); Deneer et al. (1988); Kuhn et al. (1989); Mortimer and Connell (1994); Mortimer and Connell (1995); Olmstead and LeBlanc (2005); Radix et al. (1999); Tong et al. (2010); Van der Zandt et al. (1994); Zhang et al. (2012)
		Fish	7	X	13	X	Ahmad et al. (1984); Barrows et al. (1978); Black et al. (1982); Calamari et al. (1982); Call et al. (1979b); Call et al. (1983); Carlson and Kosian (1987); Dow Chemical Co. (1982); Ganesan et al. (2013); Mayes et al. (1988); Oliver and Niimi (1985); Qian et al. (2004); Smith et al. (1990); Smith et al. (1991); Syracuse Research Corp. (1978); Van Leeuwen et al. (1990); Versonnen et al. (2003)
		Non-Fish Vertebrates (i.e., amphibians, reptiles, mammals)	1	X	-		Black et al. (1982)

Media	Study Duration	Taxa Groups	High-Priority Chemical Candidate o-Dichlorobenzene (CASRN 95-50-1)		Isomers of o-Dichlorobenzene (CASRN 95-50-1) p-Dichlorobenzene (CASRN 0-64-67) m-Dichlorobenzene (CASRN 54-17-31) Dichlorobenzene (CASRN 2532-12-26)		Data Sources
			Number of Studies	Observed Effects	Number of Studies	Observed Effects	
Terrestrial	Acute exposure	Vegetation	-		-		
		Invertebrate	2	X	1	X	Boyd et al. (2016); Neuhauser et al. (1985)
		Vertebrates	15	X	12	X	Ariyoshi et al. (1975); Den Besten et al. (1991); Kato et al. (1988); Gunawardhana et al. (1993); Herr and Boyes (1997); Hoglen et al. (1998); Kato and Kimura (1997); Kimura et al. (1985); Kitchin et al. (1993); Mally and Chipman (2002); Miyagawa et al. (1995); Mizutani et al. (1994); Mohtashamipur et al. (1987); Poland et al. (1971); Stine et al. (1991); Umemura et al. (1996); Valentovic et al. (1993a); Valentovic et al. (1993b); Yang et al. (1979); Younis et al. (2000)

Media	Study Duration	Taxa Groups	High-Priority Chemical Candidate o-Dichlorobenzene (CASRN 95-50-1)		Isomers of o-Dichlorobenzene (CASRN 95-50-1) p-Dichlorobenzene (CASRN 0-64-67) m-Dichlorobenzene (CASRN 54-17-31) Dichlorobenzene (CASRN 2532-12-26)		Data Sources
			Number of Studies	Observed Effects	Number of Studies	Observed Effects	
Terrestrial	Chronic exposure	Vegetation	4	X	1	X	Bruns and Dawson (1959); Hulzebos et al. (1993); Meharg et al. (1998); Pfleeger et al. (1991)
		Invertebrate	-		2	X	Van Gestel et al. (1991)
		Vertebrates	4	X	8	X	Den Besten et al. (1991); Gustafson et al. (1998); Kulkarni et al. (1997); Mally and Chipman (2002); Shelby et al. (1993); Umemura et al. (1996); Umemura et al. (1998); Warnasuriya et al. (2010); 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 *o*-dichlorobenzene.

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 *o*-dichlorobenzene 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 ecological biomonitoring data to inform *o*-dichlorobenzene's exposure potential to the general population (Table 13).

Results and Discussion

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. An example is the release of a TRI chemical from a POTW as a result of incomplete destruction or removal of the chemical from the waste stream during wastewater treatment at the POTW.

Aggregated quantities of *o*-Dichlorobenzene released on-site to air, water, and land, and aggregated quantities of *o*-Dichlorobenzene transferred off-site to POTW and other wastewater treatment facilities (non-POTW) are presented in Table 11 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 *o*-dichlorobenzene 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 *o*-Dichlorobenzene 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	13	53,481	712	0	0	26
2015	17	59,958	250	17,269	3	0
2017	13	37,611	48	11,928	0	0

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

For RY 2017, 13 facilities submitted TRI reports for *o*-dichlorobenzene. The total quantities of o-Dichlorobenzene these facilities released on-site to air (as fugitive and stack emissions), surface water and land are: 37,611 pounds; 48 pounds; and 11,928 pounds, respectfully. These facilities reported zero pounds of the chemical transferred to POTW and zero 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 *o*-dichlorobenzene received by the non-POTW wastewater treatment facilities may have been released to surface waters or to air during treatment processes at the facilities.

o-Dichlorobenzene has a vapor pressure of approximately 1.36 mm Hg at 25 ºC. This chemical's vapor pressure indicates potential for air releases from volatilization during manufacturing, processing and use.

When chemical substances are used as a chemical intermediate, 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 an intermediate. It is

unknown the actual percentages, quantities, and media of releases of the reported chemical associated with this processing or use.

When chemical substances are incorporated into formulations, mixtures, or reaction products, the industrial releases may be a relatively low percentage of the production volume. Lower percentage releases occur when a high percentage of the volume is incorporated without significant process losses during its incorporation into a formulation, mixture, or product. The actual percentages, quantities, and media of releases of the reported chemical associated with this processing or use are not known.

When chemical substances have industrial use as solvents in product formulations or mixtures, the industrial and/or end use releases may be a relatively high percentage of the production volume. Higher percentage releases occur when the chemical's intended use is as a solvent that may evaporate into the atmosphere or may be collected and disposed to aqueous media. In some cases, some engineering controls or capture for recycle or reclamation may reduce these losses. The actual percentage and quantity of release of the reported chemical associated with this category are not known but could be high.

EPA anticipates releases of *o*-dichlorobenzene into the environment based on the conditions of use for *o*-dichlorobenzene particularly activities associated with the chemical substance's manufacturing (including import), processing, distribution in commerce, use, or disposal. Based on a review of monitoring data collected under EPA rules and statutes (e.g., CAA, CWA, SDWA, National Pollutant Discharge Elimination System), *o*-dichlorobenzene is detected in air, water and soil matrixes. EPA anticipates possible presence of *o*-dichlorobenzene in surface water and particularly groundwater based on fate properties, such as high-water solubility,

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.

o-Dichlorobenzene has an Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) (OSHA, 2019). The PEL is 50 parts per million (ppm) or 300 milligrams (mg)/cubic meter (m^3) Ceiling limit over an 8-hour work day, time weighted average (TWA). This chemical also has a National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) of 25 ppm TWA and 50 ppm Ceiling limit (NIOSH, 2005). The American Conference of Governmental Industrial Hygienists (ACGIH) set the Threshold Limit Value (TLV) at 25 ppm TWA and 50 ppm Ceiling limit.

o-Dichlorobenzene has a vapor pressure of approximately 1.36 mmHg at 25 ºC/77 ºF. o-Dichlorobenzene's vapor pressure indicates the potential for inhalation exposure to vapors generated by the liquid at ambient room temperature conditions. The extent of inhalation exposure could vary from facility to facility depending on many factors including but not limited to engineering control, type of facility and design.

o-Dichlorobenzene is indicated as being used in paints and coatings. Products used as paints and coatings may be applied via spray or roll application methods. These methods may generate mists to which workers may be exposed.

Consumer exposure

Consumer exposure to *o*-dichlorobenzene may occur because of its use in consumer products. While IUR data do not indicate uses in consumer products, other sources, including the Hazardous Substance Data Bank, National Institutes of Health Household Products Database, and Source Ranking Database indicate uses in consumer products (EPA 2009) (Table 12).

Table 12. Exposure Information for Consumers

Chemical Identity	Consumer Product Database
	Consumer Uses (List)
o-Dichlorobenzene (95-50-1)	Air freshener, building material, cleaner, colorant, filler, fluid property modulator, lubricant, paint, solvent, NOC*

Note: NOC = not otherwise categorized

*The active ingredient is no longer contained in any registered pesticide products; solvent for waxes, gums, resins, tars, rubbers, oils, asphalts, insecticide for termites and locust borers; for removing sulfur from illuminating gas; as intermediate in manufacture of dyes; as heat transfer medium; as degreasing agent for metals, leather, wool; as ingredient of metal polishes; herbicide, insecticide, and soil fumigant; and other uses, including potential consumer uses, e.g., ingredient in paint, overglaze, lubricants, polish and cleaners; deodorants, rubber molding (EPA 2009)

General population exposure

The general population may be exposed to *o*-dichlorobenzene by inhalation, ingestion, or dermal exposure. *o*-Dichlorobenzene was reported in air, water, and soil/sediment environmental concentrations, as well as in human blood and aquatic, non-mammalian ecological biomonitoring data.

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	no	yes	no	MDI (2002)
EPA Ambient Monitoring Technology Information Center – Air Toxics Data	no	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)
FDA Total Diet Study	no	no	no	FDA (1991)
Great Lakes Environmental Database	yes	no	no	U.S. EPA (2018b)

Information Platform for Chemical Monitoring Data	yes	no	no	EC (2018)
International Council for the Exploration of the Sea	yes	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	no	no	no	USGS (1991a)
USGS Monitoring Data –National Water Quality Monitoring Council, Air	no	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

Outdoor air levels have been measured and range from 0.01 to 0.1 ppb for *o*-dichloro-benzene (ATSDR 2006). The primary route of exposure for the general population is inhalation. Average intake values for the general population were estimated to be 1.8 µg/day, on the basis of ambient outdoor samples from seven large U.S. cities (ATSDR 2006). Several groups within the general population have potentially higher exposures (higher than background levels) to *o*-dichlorobenzene. These populations include individuals living near sites where *o*-dichloro-benzene is produced or used in manufacturing and disposal sites. Individuals living in proximity to hazardous waste sites may also be exposed to *o*-dichlorobenzene by contaminated groundwater. If residential wells are the primary source of drinking water, this may pose a risk to human health by consumption of contaminated water and by increased inhalation of and dermal contact during showering and bathing (ATSDR 2006). Additionally, the National Fish Tissue Study states potential exposure for the general population is likely to this chemical in fish tissue from lakes and reservoirs of the continental United States (EPA 2009).

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 *o*-dichlorobenzene may present an unreasonable risk of injury to health and/or the environment, including potentially exposed or susceptible subpopulations, (e.g., workers, consumers, women of reproductive age, children). This is based on the potential hazard and potential exposure of *o*-dichlorobenzene 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 *o*-dichlorobenzene 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, 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, reproductive toxicity, irritation/corrosion, dermal sensitization, neurotoxicity, immunotoxicity, and observations in epidemiological studies and biomonitoring studies).

11. References

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

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