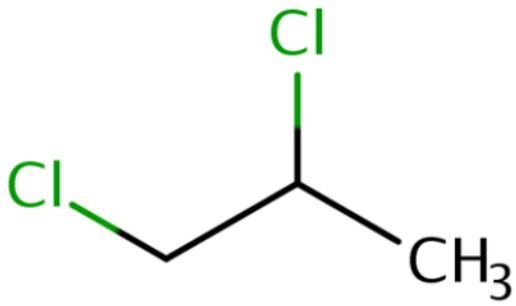
United States
Environmental Protection Agency

EPA Document# EPA-740-D-26-035
August 2026
Office of Chemical Safety and
Pollution Prevention

Draft Risk Evaluation for 1,2-Dichloropropane

CASRN 78-87-5



August 2026

TABLE OF CONTENTS

ACKNOWLEDGEMENTS **10**

EXECUTIVE SUMMARY **11**

1 INTRODUCTION **20**

1.1 Scope of the Risk Evaluation 20
1.1.1 Life Cycle and Production Volume 21
1.2 Conditions of Use Included in the Risk Evaluation 22
1.2.1 Conceptual Models 26
1.2.2 Populations and Durations of Exposures Assessed 31
1.2.2.1 Potentially Exposed or Susceptible Subpopulations 31
1.3 Systematic Review 31

2 CHEMISTRY AND FATE AND TRANSPORT **34**

2.1 Summary of Physical and Chemical Properties 34
2.2 Summary of Environmental Fate and Transport 35
2.2.1 Weight of Scientific Evidence Conclusions for Fate and Transport 36

3 RELEASES AND CONCENTRATIONS OF 1,2-DICHLOROPROPANE IN THE ENVIRONMENT **39**

3.1 Approach and Methodology 40
3.1.1 Crosswalk of Conditions of Use to Occupational Exposure Scenarios 40
3.1.2 Description of Role/Function of 1,2-Dichloropropane for Each OES 42
3.1.3 Distribution in Commerce 43
3.1.4 Estimating the Number of Release Days per Year for Facilities in Each OES 44
3.1.5 Daily Release Estimation 46
3.1.5.1 Facility-Reported Release Data 46
3.1.5.2 Mapping of Facility Release Data 46
3.1.5.3 Modeling to Estimate Releases 46
3.1.5.4 Facility Release Controls 47
3.1.5.5 Release Metrics 47
3.2 Summary of Environmental Releases 48
3.2.1 Industrial and Commercial 48
3.2.2 Weight of Scientific Evidence Conclusions for Environmental Releases from Industrial and Commercial Sources 52
3.3 Summary of Concentrations of 1,2-Dichloropropane in the Environment 60
3.3.1 Ambient Air Pathway 60
3.3.2 Surface Water and Aquatic Sediment Pathways 61
3.3.2.1 Surface Water 61
3.3.2.2 Aquatic Sediment 63
3.3.3 Land Pathway (Soils, Groundwater, and Biosolids) 64
3.3.4 Weight of Scientific Evidence Conclusions for Environmental Concentrations 65

4 ENVIRONMENTAL RISK ASSESSMENT **68**

4.1 Risk Assessment Approach 69
4.2 Summary of Environmental Exposures 69
4.2.1 Surface Water 70
4.2.2 Sediments 70

4.2.3 Ambient Air 71
4.2.4 Soils 71
4.3 Summary of Environmental Hazards 71
4.4 Environmental Risk Characterization 72
4.4.1 Risk Estimates for Aquatic Species 72
4.4.1.1 Risk Estimates for Aquatic Species for Surface Water Exposure 72
4.4.1.2 Risk Estimates for Benthic (Sediment-Dwelling) Organisms for Sediments and Sediment Pore Water 74
4.4.1.3 Confidence in Aquatic Species Risk Characterization 75
4.4.2 Risk Estimates for Terrestrial Species 75
4.4.2.1 Mammals and Birds via Inhalation 75
4.4.2.2 Mammals and Birds via Ingestion (Trophic Transfer) 75
4.4.2.3 Soil-Dwelling Invertebrates and Plants via Soil 76
4.4.2.4 Confidence in Terrestrial Species Risk Characterization 76
4.4.3 Overall Confidence and Weight-of-Evidence in Environmental Risk Characterization 76
5 HUMAN HEALTH RISK ASSESSMENT 77
5.1 Summary of Human Exposures 78
5.1.1 Occupational Exposures 78
5.1.1.1 Approach and Methodology 78
5.1.1.1.1 Identify and Describe Occupational Exposure Scenarios to Assess 79
5.1.1.1.2 Approaches Used to Estimate Inhalation Exposure for 1,2-Dichloropropane 82
5.1.1.1.3 Approaches Used to Estimate Dermal Exposure for 1,2-Dichloropropane 87
5.1.1.1.4 Exposure Frequency and Working Years 89
5.1.1.2 Summary of Inhalation and Dermal Exposure Assessment 90
5.1.1.3 Estimate the Number of Workers and Occupational Non-Users Potentially Exposed 98
5.1.1.4 Weight of Scientific Evidence Conclusions for Occupational Exposure 99
5.1.2 Consumer Exposures 107
5.1.2.1 Summary of Consumer COUs and Exposure Scenarios 107
5.1.2.2 Summary of Inhalation Exposure Assessment 109
5.1.2.3 Summary of Dermal Exposure Assessment 113
5.1.2.4 Weight of Scientific Evidence Conclusions for Consumer Exposure 115
5.1.3 General Population Exposures 116
5.1.3.1 Summary of Inhalation Exposure Assessment 117
5.1.3.2 Summary of Incidental Dermal Exposure via Swimming 119
5.1.3.3 Summary of Oral Exposures Assessment 120
5.1.3.3.1 Summary of Incidental Oral Exposures via Swimming 120
5.1.3.3.2 Summary of Drinking Water Exposures Assessment 120
5.1.3.3.3 Summary of Fish Ingestion Exposures 121
5.1.3.4 Weight of Scientific Evidence Conclusions for General Population Exposure 122
5.2 Summary of Human Health Hazard 122
5.2.1 Non-Cancer Human Health Hazards 123
5.2.2 Cancer Human Health Hazards 125
5.2.3 Weight of Scientific Evidence Conclusions and Overall Confidence in Human Health Hazards 126
5.2.4 Human Health Hazard Values 127
5.3 Human Health Risk Characterization 131
5.3.1 Risk Assessment Approach 131
5.3.1.1 Estimation of Non-Cancer Risks 133

5.3.1.2 Estimation of Cancer Risks 133
5.3.2 Risk Estimates for Workers 134
5.3.2.1 Occupational Inhalation Exposure Risk Characterization 134
5.3.2.1.1 OES #1 for Manufacture of 1,2-Dichloropropane 141
5.3.2.1.2 OES #2 for Import/Processing – Repackaging 145
5.3.2.1.3 OES #3 for Processing as a Reactant 146
5.3.2.1.4 OES #4 for Processing Aid – Non-Incorporative Activities 151
5.3.2.1.5 OES #5 for Commercial Use as a Laboratory Chemical 151
5.3.2.1.6 OES #6 for Commercial Use of Stone Waxes, Polishes, and Cleaners 152
5.3.2.1.7 OES #7 for Disposal to Incineration 153
5.3.2.1.8 OES #8 for Disposal to Landfill 154
5.3.2.1.9 OESs #9 and 10 for Disposal to POTW/Non-POTW WWT 155
5.3.2.1.10 OES #11 for Remediation 156
5.3.2.1.11 OES #12 for Distribution in Commerce 156
5.3.2.2 Occupational Dermal Exposure Risk Characterization 157
5.3.2.3 Overall Confidence in Occupational Risk Estimates 163
5.3.3 Risk Estimates for Consumers 165
5.3.3.1 Consumer Inhalation Risk Characterization 165
5.3.3.2 Consumer Dermal Risk Characterization 166
5.3.3.3 Overall Confidence in Consumer Risk Estimates 169
5.3.4 Risk Estimates for General Population 170
5.3.4.1 General Population Inhalation Risk Estimates 170
5.3.4.1.1 Estimated General Population Cancer Risks via Ambient Air Using HEM5.0 170
5.3.4.1.2 Estimated General Population Acute Non-Cancer Risks via Ambient Air Using HEM5.0 172
5.3.4.1.3 Estimated General Population Chronic Non-Cancer Risks via Ambient Air Using HEM5.0 173
5.3.4.1.4 Estimated General Population Cancer and Non-Cancer Risks for Generic Facilities/Sites Using IIOAC 174
5.3.4.1.5 Characterization and Summary of Risk via Inhalation of Ambient Air for the General Population 175
5.3.4.1.6 Overall Confidence in the Ambient Air Risk Estimates 178
5.3.4.2 General Population Oral Risk Estimates 181
5.3.4.3 General Population Dermal Risk Estimates 184
5.3.5 Risk Characterization for Potentially Exposed or Susceptible Subpopulations 184
5.3.6 Risk Characterization for Aggregate and Sentinel Exposures 188

6 UNREASONABLE RISK DETERMINATION 190

6.1 Unreasonable Risk to Human Health 192
6.1.1 Populations and Exposures Assessed for Human Health 193
6.1.2 Summary of Human Health Effects 193
6.1.3 Basis for the Unreasonable Risk to Workers 194
6.1.3.1 COUs Covered by 1,2-Dichloropropane Test Order Data 195
6.1.3.1.1 Manufacturing – Domestic Manufacture COU 196
6.1.3.1.2 Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing; and Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing COUs 199
6.1.3.2 COUs Covered by Analogous 1,2-Dichloropropane Test Order Data 202

6.1.3.2.1 Manufacturing – Import and Processing – Repackaging COUs 203
6.1.3.2.2 Industrial Use – Non-Incorporative Activities – Processing Aids COU 204
6.1.3.2.3 Commercial Use – Other Uses – Laboratory Chemicals COU 206
6.1.3.2.4 Disposal COU 208
6.1.3.3 COUs Covered by Modeling 210
6.1.3.3.1 Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes; – All-Purpose Liquid Cleaner and Polish; and – All-Purpose Liquid Spray Cleaner COUs 211
6.1.3.4 COUs Not Contributing to the Preliminary Unreasonable Risk 212
6.1.3.4.1 Distribution in Commerce 212
6.1.4 Basis for the Unreasonable Risk to Consumers 212
6.1.5 Basis for No Unreasonable Risk to the General Population 217
6.2 Unreasonable Risk to the Environment 219
6.2.1 Populations and Exposures Assessed for the Environment 220
6.2.2 Summary of Environmental Effects 220
6.2.3 Basis for No Unreasonable Risk to the Environment 220
6.2.3.1 Aquatic Species 220
6.2.3.2 Terrestrial Species 221
6.3 Additional Information Regarding the Basis for the Preliminary Risk Determination 221

REFERENCES 231

APPENDICES 240

Appendix A KEY ABBREVIATIONS AND ACRONYMS 240

Appendix B REGULATORY AND ASSESSMENT HISTORY 242

B.1 Federal Laws and Regulations 242
B.2 State Laws and Regulations 250
B.3 International Laws and Regulations 251
B.4 Assessment History 253

Appendix C LIST OF TECHNICAL SUPPORT DOCUMENTS AND SUPPLEMENTAL FILES 254

Appendix D CONDITIONS OF USE DESCRIPTIONS 256

D.1 Updates to the 1,2-Dichloropropane Conditions of Use Table 256
D.2 Descriptions of Conditions of Use 257
D.2.1 Manufacture – Domestic Manufacture 257
D.2.2 Manufacture – Import 257
D.2.3 Processing – As a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing 258
D.2.4 Processing – Incorporation into a Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing 258
D.2.5 Processing – Repackaging 258
D.2.6 Distribution in Commerce 258
D.2.7 Industrial Use – Non-Incorporative Activities – Processing Aids 259
D.2.8 Commercial Use – Other Uses – Laboratory Chemical 259
D.2.9 Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Spray Cleaner 259
D.2.10 Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes 259

D.2.11 Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polish ... 260
D.2.12 Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Spray Cleaner ... 260
D.2.13 Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes ... 260
D.2.14 Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polish ... 261
D.2.15 Disposal ... 261

Appendix E DRAFT OCCUPATIONAL EXPOSURE VALUE DERIVATION AND ANALYTICAL METHODS USED TO DETECT 1,2-DICHLOROPROPANE ... 262

E.1 Occupational Exposure Value Calculations ... 263
E.2 Summary of Air Sampling Analytical Methods Identified ... 265

Appendix F IIOAC AMBIENT AIR RISK ESTIMATES FOR GENERIC SCENARIOS ... 267

F.1 Inhalation Margin of Exposure ... 267
F.2 Inhalation Cancer Risk Estimate ... 267

Appendix G CONSUMER DERMAL SENSITIVITY ANALYSIS ... 271

G.1 All-Purpose Liquid Cleaner/Polish ... 271
G.2 All-Purpose Waxes and Polishes (Paste) ... 273
G.3 All-Purpose Liquid Spray Cleaner/Polish ... 275

LIST OF TABLES

Table ES-1. Preliminary Determination of Significant Contributions to Unreasonable Risk to Workers and ONUs for the Assessed Conditions of Use (COUs) of 1,2-Dichloropropane ... 16
Table ES-2. Preliminary Determination of Significant Contributions to Unreasonable Risk for Consumers and Bystanders for the Assessed Conditions of Use (COUs) of 1,2-Dichloropropane ... 17
Table 1-1. Categories and Subcategories of Conditions of Use (COUs) and Corresponding Occupational Exposure Scenario (OES) in the Draft Risk Evaluation for 1,2-Dichloropropane ... 24
Table 2-1. Physical and Chemical Properties of 1,2-Dichloropropane ... 34
Table 2-2. Summary of Environmental Fate Information for 1,2-Dichloropropane ... 37
Table 3-1. Crosswalk of Conditions of Use to Assessed Occupational Exposure Scenarios ... 40
Table 3-2. Description of the Function of 1,2-Dichloropropane for Each OES ... 42
Table 3-3. Receipt and Distribution in Commerce of 1,2-Dichloropropane per OES ... 44
Table 3-4. Generic Estimates of Number of Operating Days per Year for Each OES for Facilities Not Reporting to NEI or When Operating Days Were Not Reported to NEI ... 45
Table 3-5. Key Modeling Parameters Used to Model Environmental Releases ... 47
Table 3-6. Summary of Environmental Releases by Occupational Exposure Scenario for 1,2-Dichloropropane ... 48
Table 3-7. Qualitative Release Assessment by Occupational Exposure Scenario for 1,2-Dichloropropane ... 50
Table 3-8. 1,2-Dichloropropane TRI Release Trends for Reporting Years 2019–2023 ... 51
Table 3-9. 1,2-Dichloropropane NEI Release Trends for Reporting Years 2017 and 2020 ... 52
Table 3-10. 1,2-Dichloropropane DMR Release Trends for Reporting Years 2019–2023 ... 52
Table 3-11. Summary of Overall Confidence in Environmental Release Estimates by OES ... 53
Table 3-12. 1,2-Dichloropropane Surface Water Estimates per OES for Various Flow Metrics ... 62

Table 3-13. Point Source Calculator Water and Benthic Sediment Concentration Estimates in the Receiving Water Body, Applying a 7Q10 Flow 64
Table 4-1. Summary of 1,2-Dichloropropane Highest Environmental Exposure Concentrations by Occupational Exposure Scenarios, Release Medium, and Route of Exposure 70
Table 4-2. Highest Reported Estimated Ambient Air Environmental Exposure Concentrations 71
Table 4-3. Summary of Environmental Hazard Thresholds for 1,2-Dichloropropane 72
Table 4-4. Risk Characterization for Aquatic Species for 1,2-Dichloropropane 73
Table 4-5. Risk Characterization for Benthic (Sediment-Dwelling) Aquatic Species 75
Table 5-1. Hierarchy of Data and Approaches for Assessing Occupational Exposures to 1,2-Dichloropropane 79
Table 5-2. Similar Exposure Groups (SEGs) Assessed for 1,2-Dichloropropane 80
Table 5-3. Approaches Used to Estimate Inhalation Exposure for Each OES for 1,2-Dichloropropane 83
Table 5-4. Summary of Dermal Model Input Parameter Values 87
Table 5-5. Summary of OES Weight Fraction and Fraction Absorbed Values 88
Table 5-6. Summary of Dermal Model Input Values 89
Table 5-7. Summary of Occupational Inhalation and Dermal Exposure Estimates by Occupational Exposure Scenario (OES) 91
Table 5-8. Summary of Occupational Inhalation Exposure Metrics 94
Table 5-9. Summary of Occupational Dermal Exposure Metrics for Workers 96
Table 5-10. Total Number of Workers and ONUs Potentially Exposed to 1,2-Dichloropropane for Each OES 98
Table 5-11. Weight of Scientific Evidence Conclusions for Occupational Exposure 100
Table 5-12. Consumer Conditions of Use (COUs) 108
Table 5-13. Consumer Product Names, Descriptions, and Quantities 109
Table 5-14. Summary of Key Parameters for Products Modeled in CEM Version 3.2 111
Table 5-15. Acute Consumer Inhalation Exposures 112
Table 5-16. Chronic Consumer Inhalation Exposures 113
Table 5-17. Summary of All Dermal Inputs for Fractional Absorption Model 114
Table 5-18. Consumer Acute and Chronic Dermal Exposures 115
Table 5-19. Confidence Summary for Selection of Hazard Values for 1,2-Dichloropropane Human Health Hazard Assessment 129
Table 5-20. Use Scenarios, Populations of Interest, and Toxicological Endpoints Used for Acute and Chronic Exposures 131
Table 5-21. Assigned Protection Factors (APFs) for Respirators in OSHA Standard 29 CFR 1910.134 135
Table 5-22. Occupational Inhalation Risk Summary Table 136
Table 5-23. Occupational Dermal Risk Estimate Summary Table 158
Table 5-24. Consumer Acute and Chronic Inhalation Risk Estimates 165
Table 5-25. Consumer Dermal Risk Estimates 167
Table 5-26. Maximum Inhalation Cancer Risk Estimates at a Populated Census Block Estimated Using HEM5.0 for TRI Reported Releases from 2019–2023 170
Table 5-27. Maximum Inhalation Cancer Risk Estimates at a Populated Census Block Estimated Using HEM5.0 for NEI Reported Releases from 2017 and 2020 171
Table 5-28. Estimated Acute Inhalation Risk MOEs at Census Block Showing Most Risk Based on TRI and NEI Releases Using HEM5.0 173
Table 5-29. Estimated Chronic Non-Cancer Risk MOEs at Populated Census Block Showing Most Risk Based on TRI and NEI Releases Using HEM5.0 174
Table 5-30. Confidence in Each Line of Evidence and Overall Confidence for Each OES 179

Table 5-31. Chronic Non-Cancer Risk Estimates for Adults Exposed to Landfill Leachate-Impacted Groundwater (Benchmark MOE = 300) 183
Table 5-32. Chronic Non-Cancer Risk Estimates for Infants Exposed to Landfill Leachate-Impacted Groundwater (Benchmark MOE = 300) 183
Table 5-33. Cancer Risk Estimates for Adult Exposed to Landfill Leachate-Impacted Groundwater (Benchmark Cancer Risk = 1×10^{-6}) 183
Table 5-34. Summary of PESS Factors Incorporated into Risk Estimates 185
Table 6-1. Supporting Basis for the Manufacture – Domestic Manufacture COU 198
Table 6-2. Supporting Basis for Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing; and Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing COUs 201
Table 6-3. Supporting Basis for the Manufacturing – Import and Processing – Repacking COUs 204
Table 6-4. Supporting Basis for Industrial Use/Non-Incorporative Activities – Processing Aids COU 206
Table 6-5. Supporting Basis for the Commercial Use – Other Uses – Laboratory Chemical COU 208
Table 6-6. Supporting Basis for the Disposal COU 210
Table 6-7. Supporting Basis for Consumer and Commercial Worker Conditions of Use (COUs) 215
Table 6-8. Supporting Basis for the Preliminary Unreasonable Risk Determination for Human Health (Workers and ONUs) 223
Table 6-9. Supporting Basis for the Preliminary Unreasonable Risk Determination for Human Health (Consumers and Commercial Workers) 229

LIST OF FIGURES

Figure 1-1. Overview of TSCA Existing Chemical Risk Evaluation Process 20
Figure 1-2. Draft Risk Evaluation Document Summary Map for 1,2-Dichloropropane 21
Figure 1-3. 1,2-Dichloropropane Life Cycle Diagram 23
Figure 1-4. 1,2-Dichloropropane Conceptual Model for Industrial and Commercial Activities and Uses: Worker and Occupational Non-User Exposures and Hazards 27
Figure 1-5. 1,2-Dichloropropane Conceptual Model for Consumer Activities and Uses: Consumer and Bystander Exposures and Hazards 28
Figure 1-6. 1,2-Dichloropropane Conceptual Model for Environmental Releases and Wastes: General Population Exposures and Hazards 29
Figure 1-7. 1,2-Dichloropropane Conceptual Model for Environmental Releases and Wastes: Ecological Exposures and Hazards 30
Figure 1-8. Diagram of the Systematic Review Process 32
Figure 2-1. Transport, Partitioning, and Degradation of 1,2-Dichloropropane in the Environment 36
Figure 5-1. Overview of EPA's Approach to Estimate Occupational Exposure for 1,2-Dichloropropane 78
Figure 5-2. Human Exposure Pathways to 1,2-Dichloropropane for the General Population 117

LIST OF APPENDIX TABLES

Table_Apx B-1. Federal Laws and Regulations for 1,2-Dichloropropane 242
Table_Apx B-2. State Laws and Regulations 250
Table_Apx B-3. International Laws and Regulations 251
Table_Apx B-4. Assessment History of 1,2-Dichloropropane 253
Table_Apx D-1. Additions and Name Changes to Categories and Subcategories of Conditions of Use Based on CDR Reporting and Stakeholder Engagement 256

Table_Apx E-1. Limit of Detection (LOD) and Limit of Quantification (LOQ) Summary for Air Sampling Analytical Methods Identified 265
Table_Apx E-2. Summary of Occupational Exposure Limits for 1,2-Dichloropropane 266
Table_Apx F-1. Acute Margin of Exposure (MOE) Estimates – Generic Scenarios Stack Releases 269
Table_Apx F-2. Acute Margin of Exposure (MOE) Estimates – Generic Scenarios Fugitive Releases 269
Table_Apx F-3. Chronic Margin of Exposure (MOE) Estimates – Generic Scenarios Stack Releases. 269
Table_Apx F-4. Chronic Margin of Exposure (MOE) Estimates – Generic Scenarios Fugitive Releases 270
Table_Apx F-5. Lifetime Cancer Risk Estimates – Generic Scenarios Stack Releases 270
Table_Apx F-6. Lifetime Cancer Risk Estimates – Generic Scenarios Fugitive Releases 270

LIST OF APPENDIX FIGURES

Figure_Apx G-1. Sensitivity Analysis Matrix for Liquid Cleaner/Polish: Youth Aged 11–15 Years – Inside of Two Hands 273
Figure_Apx G-2. Sensitivity Analysis Matrix for Waxes and Polishes (Paste): Youth Aged 11–15 Years – Inside of Two Hands 275
Figure_Apx G-3. Sensitivity Analysis Matrix for Liquid Spray Cleaner/Polish: Youth Aged 11–15 Years 278

ACKNOWLEDGEMENTS

The Assessment Team gratefully acknowledges the participation, input, and review comments from U.S. Environmental Protection Agency (EPA or the Agency) Office of Pollution Prevention and Toxics (OPPT) and Office of Chemical Safety and Pollution Prevention (OCSPP) senior managers and science advisors as well as the Office of General Counsel. The Agency is also grateful for assistance from the following EPA contractors: Eastern Research Group (Contract No. GS-00F-979CA); General Dynamics Information Technology, Inc. (Contract Nos. HHSN316201200013W and 68HERD24A0001); ICF (Contract No. 68HERC23D0007); Spec Professional Services, LLC (Contract No. 68HERC20D0021); SpecPro Sustainable and Environmental, Inc. (Contract No. 68HERC25D0004); and SRC, Inc. (Contract No. 68HERH19D0022).

Docket
Supporting information can be found in the public docket, Docket IDs EPA-HQ-OPPT-2018-0428.

Disclaimer
Reference herein to any specific commercial products, process, or service by trade name, trademark, manufacturer, or otherwise does not constitute or imply its endorsement, recommendation, or favoring by the United States Government.

Authors: Aderonke Adegbule, Olivia Bailey, Albana Bega, Janet Burris, Vanessa De La Rosa, Lauren Housley, Clara Hull, Jonathan Philip Kaiser, Roger Kim, Ryan Klein, Kiet Ly, Greg Macek, Abigail McEwen, Andrew Middleton, Nerija Orentas, Seema Schappelle, Shawn Shifflett, Ali Shohatee, Kelley Stanfield, Jason Todd, and Susanna Wegner

Contributors: Azah Abdalla-Mohamed, Devin Alewel, Tyler Amrine, Sarah Au, Nicholas Castaneda, Jone Corrales, Ross Geredien, Brent Gilbertson, Bryan Groza, Keith Jacobs, June Kang, Grace Kaupas, Ed Lo, Yadi Lopez, Bethany Masten, Ganesh Pokhrel, Maxwell Sall, Cory Strope, Nicholas Suek, Ryan Sullivan, Leora Vegosen, Kevin Vuilleumier, and Jason Wight

Technical Support: Mark Gibson and Hillary Hollinger

EXECUTIVE SUMMARY

In December 2019, EPA designated 1,2-dichloropropane as a high-priority substance for Toxic Substances Control Act (TSCA) evaluation and in August 2020 released the *Final Scope of the Risk Evaluation for 1,2-Dichloropropane; CASRN 78-87-5* (U.S. EPA, 2020c). This draft risk evaluation assesses human health risk to workers, including occupational non-users (ONUs[1]); consumers, including bystanders; and the general population, including potentially exposed or susceptible subpopulations (PESS) such as fenceline communities, from environmental releases of 1,2-dichloropropane. It also assesses environmental risk. All supporting files, including draft technical support documents (TSDs), are being released for public comment. In addition, the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (also called the "draft hazard assessment [TSD] for 1,2-dichloropropane") (U.S. EPA, 2026u) underwent independent, expert peer review through the Science Advisory Committee on Chemicals (SACC) in August 2026. EPA will consider all public comments and peer reviewer recommendations and issue a final risk evaluation that includes the Agency's determination as to whether 1,2-dichloropropane presents unreasonable risk of injury to human health or the environment from the conditions of use (COUs).

EPA evaluated human health and environmental risks of 1,2-dichloropropane across its COUs under section 6 of TSCA, ranging from manufacturing to disposal. In this draft risk evaluation, 14 of 15 assessed COUs for 1,2-dichloropropane significantly contribute to a preliminary determination of unreasonable risk of injury to human health. Of these 15 COUs, 12 were assessed for workers and ONUs (Table ES-1). Eleven of these 12 COUs significantly contribute to a preliminary determination of unreasonable risk for workers, with inhalation exposures driving most COUs—including 4 COUs that significantly contribute to unreasonable risk for ONUs. In addition, eight COUs contribute to unreasonable risk for workers with dermal exposures. Of the 15 COUs, 3 were assessed for consumers and bystanders (Table ES-2). All three COUs significantly contribute to a preliminary determination of unreasonable risk for consumers, with acute inhalation exposures driving most COUs. Two COUs contribute unreasonable risk to bystanders based on acute non-cancer inhalation risk and one COU based on chronic non-cancer and cancer inhalation exposures.

EPA has preliminarily determined that no COU for 1,2-dichloropropane significantly contributes to unreasonable risk to the general population, including fenceline communities, or the environment.

1,2-Dichloropropane is a volatile, colorless liquid under normal (ambient) conditions with a sweet chloroform-like odor. Manufacturers, based on the 2024 Chemical Data Reporting (CDR) rule (U.S. EPA, 2026a), report the national aggregate production volume of 1,2-dichloropropane is between 100 and 250 million pounds (lb). 1,2-Dichloropropane may also be imported. Industrial and commercial uses of 1,2-dichloropropane include use in non-incorporative activities like transferring the chemical from transport containers into storage tanks, use as a laboratory chemical, and use in cleaning and furnishing care products (Section 1.2). Workers may be exposed to 1,2-dichloropropane through inhalation and dermal routes (Section 5.1.1). Manufacturing, processing, and industrial uses of 1,2-dichloropropane can lead to environmental releases to ambient air through stack and fugitive emissions, surface water, and landfills (Section 3).

The Agency's current understanding based on CDR data, the test order process, and other sources, is that manufacture of 1,2-dichloropropane occurs primarily or predominantly as a byproduct during the production of other chemicals—as opposed to manufacturing of 1,2-dichloropropane as a primary

[1] ONUs do not directly handle 1,2-dichloropropane but may be indirectly exposed to it in the workplace as part of their employment.

product. Chemical manufacturers will seek to refine the chemical up to 100% (neat) and reclaim value from byproduct streams. This byproduct is then later distributed to downstream users.

Consumer and commercial uses of 1,2-dichloropropane include three COUs identified as Cleaning and Furnishing Care Products (also referred to as "stone cleaning products"). EPA used a variety of data sources to inform the exposures estimates that could result from the intended consumer uses of stone cleaning products that contain 1,2-dichloropropane. Importantly, however, the Agency has consumer test order submission data (U.S. EPA, 2025c) that indicate current stone cleaning products do not contain 1,2-dichloropropane. EPA has preliminarily determined that the consumer use of these products containing 1,2-dichloropropane is reasonably foreseen for three reasons: (1) the products were reformulated to remove 1,2-dichloropropane only a few years ago, (2) products containing 1,2-dichloropropane are available outside of the United States, and (3) it is reasonable to assume there may be continued use of products that were purchased prior to reformulation. EPA is uncertain as to whether the future use of stone cleaning products containing 1,2-dichloropropane and associated exposure estimates are plausible or likely in the United States, which impacts the Agency's overall confidence in the consumer use scenario. Therefore, EPA welcomes comment on whether, based on these or other assumptions, it is reasonable to foresee a return to distribution or use of consumer products containing 1,2-dichloropropane in the United States.

Although volatile, 1,2-dichloropropane is soluble in water (up to its solubility limit of 2,740 mg/L) and is miscible in most organic solvents. 1,2-Dichloropropane is persistent in the environment and slowly degrades over months to years if released to air, water, soil, and sediment. Estimated bioconcentration and bioaccumulation factors indicate that 1,2-dichloropropane is not likely to bioaccumulate in aquatic or terrestrial organisms (Section 2). Exposure to the general population through surface water was assessed for oral and dermal exposures during swimming. Chronic exposure to the general population through drinking water was also assessed for facility-specific releases and through groundwater via releases from landfill or biosolids (Section 5.1.3.3). Additional assessment of exposure through fish consumption is also provided (Section 5.1.3.3.3).

The environmental assessment considered 1,2-dichloropropane surface water exposures to aquatic vertebrates, invertebrates, and plants (Section 5.1.1). Exposure to ecological taxa was also considered for sediments. EPA considered exposures to 1,2-dichloropropane through the ambient air pathway for terrestrial mammals and birds via inhalation as well as through soil for soil-dwelling invertebrates and plants post-biosolid application (Section 4.4).

Human or environmental exposure to 1,2-dichloropropane through uses that are not subject to TSCA (*e.g.,* use in cosmetics, medical devices, food additives) were not specifically evaluated by the Agency in reaching its preliminary determination. This is because such uses are excluded from TSCA's definition of a "chemical substance." Thus, conclusions in this draft risk evaluation cannot be extrapolated to form conclusions about uses of 1,2-dichloropropane that are not subject to TSCA and that EPA did not evaluate.

Determining Unreasonable Risk to Human Health

EPA must determine whether a chemical substance does or does not present unreasonable risk of injury to human health or the environment under the COUs. The unreasonable risk determination must be consistent with the best available science. The Agency, in determining whether 1,2-dichloropropane presents unreasonable risk to human health, considered risk-related factors as described in its risk evaluation framework rule and as required under TSCA (see TSCA section 6(b)(4)(F); 89 FR 37028, 37037 [May 3, 2024]). Risk-related factors include but are not limited to the type of health effect under

consideration; the reversibility of the health effect being evaluated; exposure-related considerations (*e.g.,* duration, magnitude, frequency of exposure); and population exposed (including any PESS). The Agency considers risk-related factors when determining whether each COU significantly contributes to unreasonable risk of injury to human health or the environment. EPA also considered confidence in the information used to inform the hazard and exposure values. If an estimate of risk for a specific scenario exceeded the standard risk benchmarks, then the determination of whether those risks significantly contribute to the unreasonable risk is both case-by-case and context-driven.

The human health hazard assessment for 1,2-dichloropropane was informed by a review of the available literature, including recent assessments by other authoritative bodies. EPA concluded that the weight of scientific evidence, based on animal studies, shows that exposure to 1,2-dichloropropane can lead to central nervous system depression (decreased respiration, movement, muscle tone, extensor thrust reflex, and increased salivation and lacrimation). In addition, the Agency has concluded that the weight of scientific evidence, based on animal studies, shows hematological effects (increased reticulocytes) after oral intermediate and chronic non-cancer exposures. No studies for the dermal route were suitable for deriving route-specific point of departures (PODs). Therefore, EPA used the acute, intermediate, and chronic oral PODs and benchmark margins of exposure (MOEs) to evaluate risks from dermal exposure to 1,2-dichloropropane.

The 1,2-dichloropropane oral cancer slope factor was based on liver tumors in mice reported in a 2-year bioassay (NTP, 1986). Reports of bile duct tumors in a cohort of Japanese print shop workers, chronic *in vivo* animal studies, and their amenability for dose-response analysis support robust confidence in the oral cancer hazard values. The oral cancer data from animal studies provide slight-to-moderate evidence of nasal and lung cancer following 1,2-dichloropropene exposure. The high-quality 1,2-dichloropropane inhalation cancer study by Umeda and colleagues (Umeda et al., 2010) served as the basis for the inhalation unit risk (IUR) based on nasal tumors in male rats. No studies were identified to inform the dermal cancer risks for 1,2-dichloropropane. A dermal cancer slope factor was derived using route-to-route extrapolation from the oral cancer slope factor based on liver tumors reported in NTP (1986).

EPA's assessment of 1,2-dichloropropane preliminarily shows significant contributions to unreasonable risks to workers and ONUs from non-cancer health effects for acute (8-hour duration), intermediate, and chronic inhalation exposures—as well as from cancer inhalation health effects for chronic exposures. In addition to these contributions, there are also acute non-cancer and cancer dermal health effects for their corresponding exposure durations for workers. The following 11 COUs for 1,2-dichloropropane significantly contribute to the preliminary risk determination for workers (and 4 for ONUs; see also Table ES-1):

- Manufacture – Domestic Manufacture [worker only – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as cancer dermal risk]
- Manufacture – Import [worker only – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks]
- Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing [worker only – acute, intermediate, and chronic non-cancer and cancer inhalation risks, as well as cancer dermal risk]
- Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing [worker only – acute, intermediate, and chronic non-cancer and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks]

- Processing – Repackaging [worker only – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks]
- Industrial Use – Non-Incorporative Activities – Processing Aids [worker only – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks]
- Commercial Use – Other Uses – Laboratory Chemicals [worker only – intermediate and chronic non-cancer inhalation risks]
- Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Spray Cleaner [worker – acute non-cancer, chronic non-cancer, and cancer inhalation risks, as well as chronic non-cancer and cancer dermal risks; ONU – chronic non-cancer and cancer inhalation risks]
- Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes [worker and ONU – acute non-cancer inhalation risk]
- Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polish [worker and ONU – acute non-cancer inhalation risk]
- Disposal [worker – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as cancer dermal risk; ONU – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks].

EPA's draft assessment of 1,2-dichloropropane preliminarily shows significant contributions to unreasonable risks to consumers and bystanders from non-cancer and cancer health effects from acute and chronic inhalation exposures as well as chronic dermal exposures driven by the following three COUs (Table ES-2; see also Section 6.1.4):

- Consumer Use – Cleaning and Furnishing Care Products – All-Purpose Liquid Spray Cleaner [consumer – acute non-cancer, chronic non-cancer, and cancer inhalation risks, as well as chronic non-cancer and cancer dermal risks; bystander – chronic non-cancer and cancer inhalation risks];
- Consumer Use – Cleaning and Furnishing Care Products – All-Purpose Waxes and Polishes [consumer and bystander – acute non-cancer inhalation risk]; and
- Consumer Use – Cleaning and Furnishing Care Products – All-Purpose Liquid Cleaner and Polish [consumer and bystander – acute non-cancer inhalation risk].

EPA has preliminarily determined that the following COU does not significantly contribute to unreasonable risk to human health (Table ES-1):

- Distribution in Commerce.

For the general population, the Agency has robust confidence that the inhalation risk estimates from ambient air represent the upper bound of exposures to actual exposed populations. The Agency also has robust confidence that oral and dermal risk estimates from other pathways (drinking water intake and incidental dermal and ingestion via swimming) are protective of highly exposed populations. EPA did not preliminarily identify significant contributions to unreasonable risk to the general population, including PESS such as fenceline communities, for 1,2-dichloropropane for any COU.

Determining Unreasonable Risk to the Environment

In preliminarily determining whether 1,2-dichloropropane presents unreasonable risk of injury to the environment, EPA considered the following groups of organisms in its assessment: aquatic vertebrates, invertebrates, plants, and algae; sediment-dwelling invertebrates; terrestrial mammals and plants; and soil invertebrates. Specifically, the Agency assessed 1,2-dichloropropane exposures to the environment through manufacturing as a byproduct, processing as a reactant, processing aid, use of laboratory chemical, repackaging, and waste handling, treatment, and disposal (see Table 1-1 and Table 3-1). For

aquatic organisms inhabiting the water column and benthic zone, EPA estimated exposures from surface water and sediment (including pore water). EPA also estimated exposure to algae from surface water. Inhalation exposure of terrestrial mammals to 1,2-dichloropropane via the ambient air pathway was conducted through modeling.

The Agency weighed the scientific evidence to determine confidence levels in underlying datasets and risk estimates for the environment. EPA has robust confidence that its environmental risk estimates represent levels of exposure at which ecologically relevant effects will occur, depending on the source of environmental release information for each COU. The Agency did not identify significant contributions to unreasonable risk to the environment for 1,2-dichloropropane for any COU.

Summary and Conclusions

Table ES-1 and Table ES-2 list all 15 COUs assessed for 1,2-dichloropropane (see also Table 1-1 and Appendix D). Table ES-1 shows the COUs that significantly contribute to the preliminary determination of unreasonable risk of injury to human health due to acute non-cancer, intermediate non-cancer, chronic non-cancer, or cancer inhalation risks, as well as acute, intermediate, and chronic non-cancer, or cancer dermal risks for workers and ONUs (11 COUs for workers; 4 of which also include ONUs). Note that Table ES-1 also shows the one COU that does not contribute to the preliminary risk determination for workers and ONUs. Table ES-2 shows the COUs that significantly contribute to the preliminary determination of unreasonable risk of injury to human health due to acute, chronic non-cancer, or cancer inhalation risks, as well as acute non-cancer, chronic non-cancer, or cancer dermal risks for consumers and bystanders (3 COUs).

EPA has preliminary determined that no COUs for 1,2-dichloropropane significantly contribute to any unreasonable risk for the general population, including fenceline communities, or the environment.

Table ES-1. Preliminary Determination of Significant Contributions to Unreasonable Risk to Workers and ONUs for the Assessed Conditions of Use (COUs) of 1,2-Dichloropropane

Condition of Use	Workers								ONUs			
	Inhalation				Dermal[a]				Inhalation			
	Non-Cancer			Cancer	Non-Cancer			Cancer	Non-Cancer			Cancer
	A	I	C		A	I	C		A	I	C	
Manufacturing – Domestic Manufacture		×	×	×				×				
Manufacturing – Import		×	×	×	×			×				
Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing	×	×	×	×				×				
Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing	×	×	×	×	×			×				
Processing – Repackaging		×	×	×	×			×				
Distribution in Commerce												
Industrial Use – Non-Incorporative Activities – Processing Aids		×	×	×	×			×				
Commercial Use – Other Uses – Laboratory Chemicals		×	×									
Commercial Use – Cleaning and Furnishing Care Products – All-Purpose Liquid Spray Cleaner[b]	×		×	×			×	×			×	×
Commercial Use – Cleaning and Furnishing Care Products – All-Purpose Waxes and Polishes[b]	×								×			
Commercial Use – Cleaning and Furnishing Care Products – All-Purpose Liquid Cleaner and Polish[b]	×								×			
Disposal		×	×	×				×		×	×	×

A = acute; C = chronic non-cancer; I = intermediate; ONU = occupational non-user

[a] Dermal exposure was not assessed for ONUs. EPA does not expect dermal exposure for ONUs because they do not directly handle 1,2-dichloropropane (see Section 5.1.1).

[b] The unreasonable risk determination for these COUs is based on the consumer assessment (see Section 5.3.3). ONUs were assumed to be equivalent to bystanders.

Shaded cells with × are COUs that significantly contribute to a preliminary determination of unreasonable risk of injury for workers and/or ONUs.

Table ES-2. Preliminary Determination of Significant Contributions to Unreasonable Risk for Consumers and Bystanders for the Assessed Conditions of Use (COUs) of 1,2-Dichloropropane

Condition of Use	Consumers						Bystanders		
	Inhalation			Dermal[a]			Inhalation		
	Non-Cancer		Cancer	Non-Cancer		Cancer	Non-Cancer		Cancer
	Acute	Chronic		Acute	Chronic		Acute	Chronic	
Consumer Use – Cleaning and Furnishing Care Products – All-Purpose Liquid Spray Cleaner	✕	✕	✕		✕	✕		✕	✕
Consumer Use – Cleaning and Furnishing Care Products – All-Purpose Waxes and Polishes[b]	✕						✕		
Consumer Use – Cleaning and Furnishing Care Products – All-Purpose Liquid Cleaner and Polish[b]	✕						✕		

[a] Dermal exposure was not assessed for bystanders.
[b] Chronic non-cancer and cancer were not assessed due to expected use patterns for these COUs (see Section 5.1.2.1).
Shaded cells with ✕ are COUs that significantly contribute to a determination of unreasonable risk of injury for consumers and/or bystanders.

Next Steps and Public Input

This draft risk evaluation and the accompanying TSDs and supplemental files (Appendix C) have been released for public comment. Although EPA seeks public comment on all aspects of this draft risk evaluation package, the Agency particularly seeks input on the following topics:

1. EPA is seeking comment on whether 1,2-dichloropropane is manufactured as a primary product or by other manufacturing processes not discussed in this assessment.
2. EPA is seeking comment on how 1,2-dichloropropane may be distributed for use as a laboratory chemical and in cleaning and furnishing care products.
3. EPA is requesting information on the amounts of 1,2-dichloropropane used by commercial laboratories (occupational exposure scenario [OES] #5) on a daily (kg/site-day) and yearly (kg/site-yr) basis and corresponding PPE (personal protective equipment) and engineering controls to reduce exposures.
4. EPA is seeking comment on the use of 1,2-dichloropropane in all-purpose liquid cleaner/polish or waxes and polishes—particularly for stone polishing and cleaning—including any information supporting this use as a reasonably foreseen use and any information regarding the use being reestablished in the United States. Information may include (1) the potential for 1,2-dichloropropane to be utilized in stone waxes, polishes, and cleaners, including but not limited to information on technological or economic factors that indicate this chemical may or may not be utilized in this type of product going forward; (2) any information on application of these products, including method and frequency of application, settings, surface area treated, and amounts applied; and (3) inhalation and dermal exposure measurements or alternative modeling approaches that would inform EPA's assessment of the commercial and consumer scenarios.
5. EPA is requesting information to inform and refine the occupational exposure assessment, including monitoring data, worker activities, concentration of 1,2-dichloropropane as it arrives at sites for these OESs, and information on exposure controls and PPE—in particular for the following OESs: Import/Processing – Repackaging (OES #2), Processing Aid (OES #4), Disposal to Incineration (OES #7), Disposal to Landfill (OES #8), and Disposal to POTW [publicly owned treatment works] and Non-POTW WWT [wastewater treatment] (OESs #9 and 10) (see also Table 3-1).
6. EPA is requesting information to inform whether the inhalation monitoring data from manufacturing/processing facilities that was used to evaluate occupational exposures for Disposal to Incineration (OES #7), Disposal to POTW/Non-POTW WWT (OESs #9 and 10), and Remediation (OES #11) is representative of these OESs—including information on worker activities (*e.g.,* typical working hours/day and days/year, PPE use), concentrations of 1,2-dichloropropane in waste streams, and other inhalation monitoring data that could be utilized to assess exposures for these OESs.
7. EPA is requesting additional information that can be used to inform or refine interpretation of occupational exposure estimates for similar exposure groups (SEGs) with large variation in occupational exposure concentrations (*e.g.,* the Marine Logistics Technician SEG evaluated under the Processing as a Reactant [OES #3]).
8. EPA is requesting additional information on exposure controls and PPE used for each of the COUs, including information on the use of gloves. Specifically, the Agency seeks information on prevalence of glove and respirator use, specific tasks for which each is used, glove material, and information on dermal protection programs.

9. EPA is requesting information on the effectiveness of glove types used for preventing exposures from 1,2-dichloropropane in the context of tasks performed under the COUs—including how workers and their exposure may be affected when using chemically resistant gloves, measured permeation testing of certain types of gloves, and temperature considerations (as identified in the Hand Protection section of OSHA's [Occupational Safety and Health Administration] Personal Protective Equipment Guidance and in alignment with the OSHA Hand Protection PPE Standard [29 CFR 1910.138]).
10. EPA is requesting other information on any relevant studies or other data sources that were not identified by the Agency.

Public comments on the draft risk evaluation, TSDs, supplemental files, and recommendations from the SACC will inform the final risk evaluation of 1,2-dichloropropane, including the Agency final determination of whether 1,2-dichloropropane presents unreasonable risk of injury to human health or the environment under the COUs. If in the final risk evaluation, the Agency determines that 1,2-dichloropropane presents unreasonable risk to human health or the environment, EPA will initiate regulatory action under TSCA section 6(a) to the extent necessary so that 1,2-dichloropropane no longer presents such risk.

1 INTRODUCTION

EPA has evaluated the conditions of use (COUs) of 1,2-dichloropropane (CASRN 78-87-5) under the Toxic Substances Control Act (TSCA) section 6(b). 1,2-Dichloropropane is used primarily in the manufacture of other chemicals.

Figure 1-1 describes the major inputs, phases, and outputs/components of the TSCA risk evaluation process, from chemical prioritization to scoping to releasing the final risk evaluation.

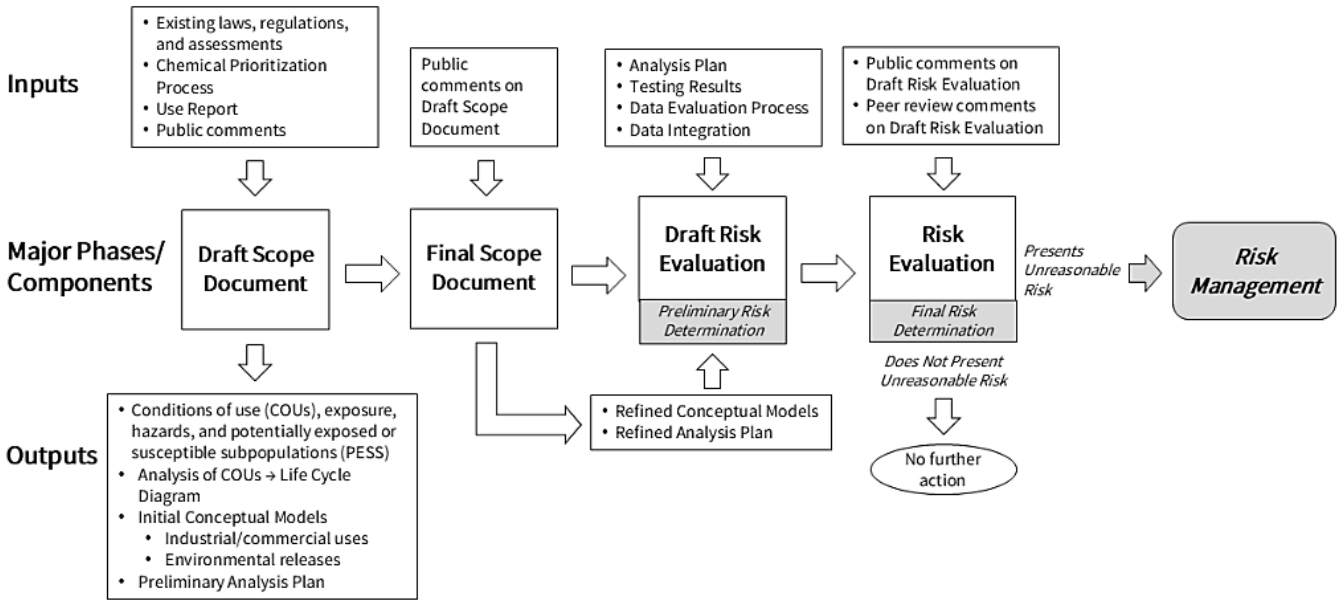


Figure 1-1. Overview of TSCA Existing Chemical Risk Evaluation Process

1.1 Scope of the Risk Evaluation

EPA evaluated risk to human and environmental populations for 1,2-dichloropropane. Specifically, for human populations, the Agency evaluated risk to (1) workers and occupational non-users (ONUs do not directly handle chemicals but may be indirectly exposed in the workplace) via inhalation as well as the dermal route to workers; (2) consumers via inhalation and dermal routes and to bystanders via the inhalation route; and (3) the general population, including potentially exposed or susceptible subpopulations (PESS; neurological, hematological and respiratory effects for pregnant women, infants, children and adolescents, men and women of reproductive age, subsistence and tribal fishers, and people in proximity to releasing facilities) via oral, dermal, and inhalation routes. For environmental populations, EPA evaluated risk to aquatic species via surface water and sediment and to terrestrial species via ambient air and soils (biosolids application).

This draft risk evaluation package for 1,2-dichloropropane comprises three technical support documents (TSDs)/assessments and multiple supplemental files. A basic diagram showing the relationship of these assessments is provided below in Figure 1-2 (see Appendix C for a list and citations for all draft TSDs and supplemental files). High-level summaries of each TSD are presented throughout this draft risk evaluation. Detailed information for each TSD can be found in the corresponding documents.

The TSDs leveraged the data and information sources already identified in *Final Scope of the Risk Evaluation for 1,2-Dichloropropane; CASRN 78-87-5* (also called the "final scope document" or "final scope") (U.S. EPA, 2020c). EPA's OPPT conducted an initial, comprehensive search in September 2019

for reasonably available information to identify relevant 1,2-dichloropropane data for use in this draft risk evaluation as required by TSCA. An update to the peer-reviewed literature search to capture information published since the initial search was performed in April 2025 and identified 14 additional data sources. The approach used to identify specific relevant risk assessment information was discipline-specific and is detailed in the *Draft Systematic Review Protocol for 1,2-Dichloropropane* (U.S. EPA, 2026ag) or as otherwise noted in relevant TSDs and supplemental files.

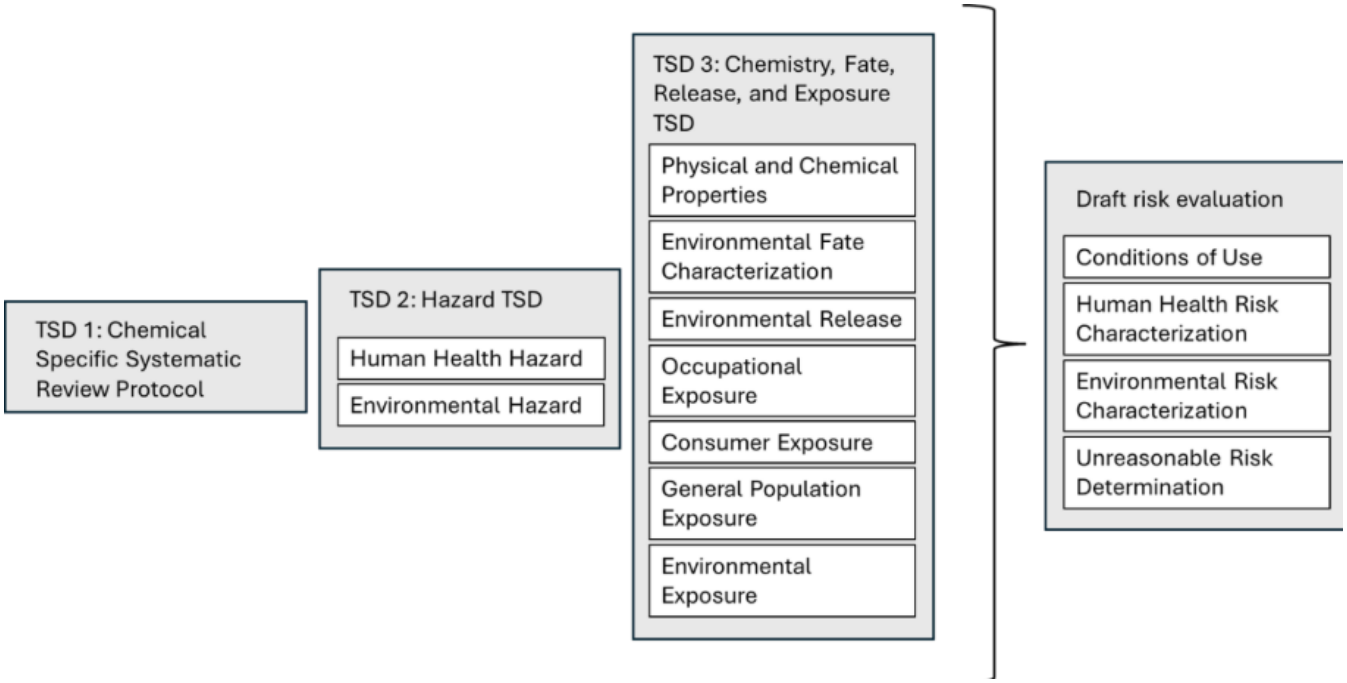


Figure 1-2. Draft Risk Evaluation Document Summary Map for 1,2-Dichloropropane

1.1.1 Life Cycle and Production Volume

The life cycle diagram (LCD) for 1,2-dichloropropane (Figure 1-3) depicts the COUs assessed in this draft risk evaluation during various life cycle stages, including Manufacturing, Processing, Distribution, Use (Industrial, Commercial, and Consumer), and Disposal. The information in the LCD is grouped according to the Chemical Data Reporting (CDR) processing codes and use categories (including functional use codes for industrial uses and product categories for industrial and commercial uses). The CDR Rule under TSCA (40 CFR part 711) requires U.S. manufacturers (including importers) to provide EPA with information on the chemicals they manufacture or import into the United States. The Agency collects CDR data approximately every 4 years with the latest collections occurring in 2012, 2016, 2020, and 2024.

The production volume for 1,2-dichloropropane in 2015 was between 20 and 30 billion pounds (lb), based on the 2016 CDR data. The range increased in the 2020 CDR data with a reported total production volume in 2019 ranging from 30 to 40 billion pounds (lb). A review of 2024 CDR data show that total production volume for the years 2020 to 2023 are similar to the previously reported range from the 2020 CDR. Note that production volume is described herein as a range to protect production volumes that were claimed as confidential business information (CBI). For the 2012, 2016, 2020, and 2024 CDR cycles, collected data included the company name, volume of each chemical manufactured/imported, the number of workers at each site, and information on whether the chemical was used in the commercial, industrial, and/or consumer sector(s).

1.2 Conditions of Use Included in the Risk Evaluation

The final scope document (U.S. EPA, 2020c) identified and described the life cycle stages, categories, and subcategories that comprise COUs for 1,2-dichloropropane that EPA planned to consider in the risk evaluation. The COUs included in this draft risk evaluation are reflected in the LCD (Figure 1-3) and conceptual models. These COUs are evaluated for acute, intermediate, chronic, and lifetime exposures, as applicable, based on reasonably available exposure and hazard data as well as the relevant study populations for each. Table 1-1 below presents all 15 COUs for 1,2-dichloropropane under TSCA—including the life cycle stage, category, and subcategory—and corresponding occupational exposure scenario (OES) (see also Table 3-1).

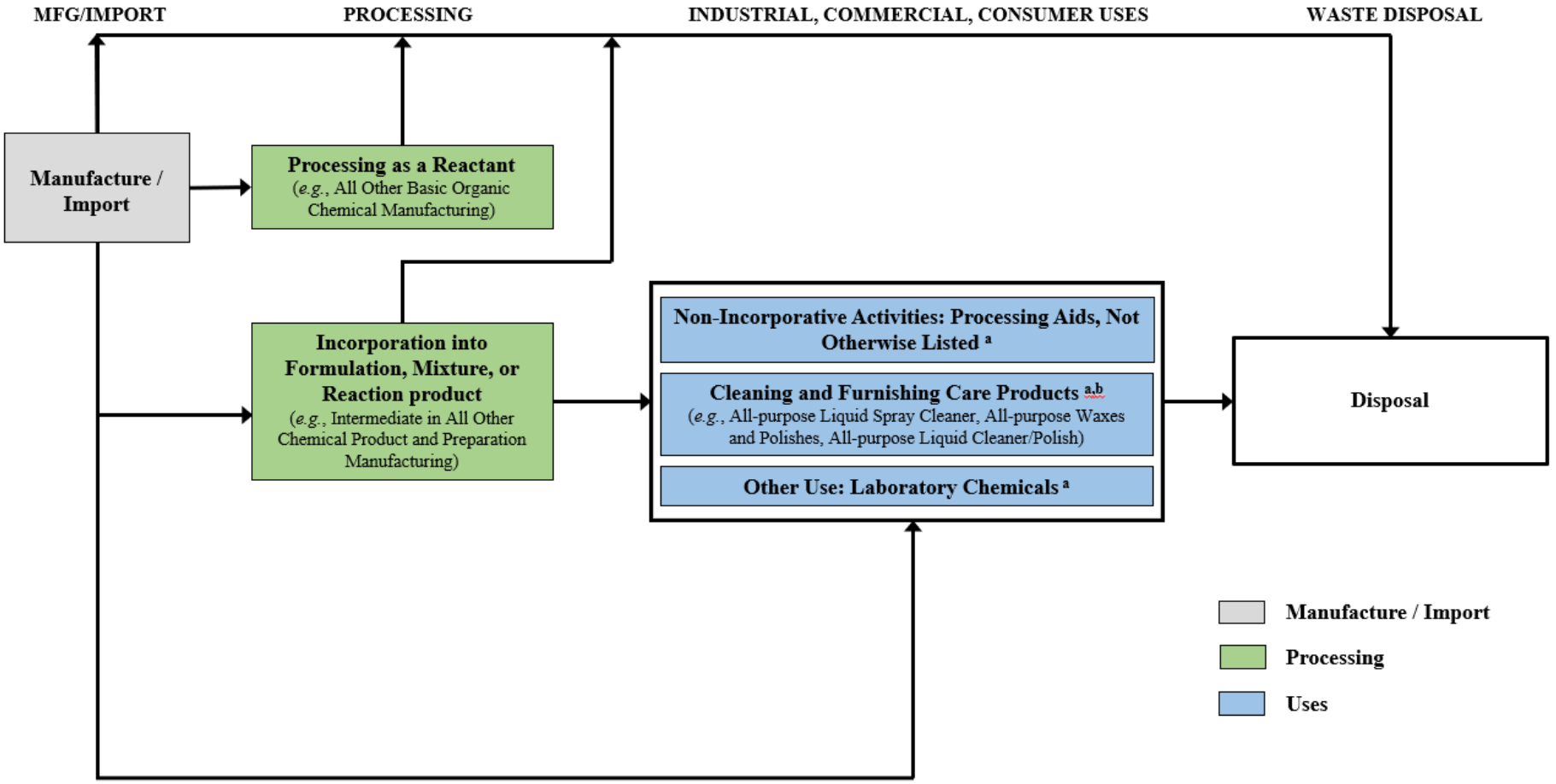


Figure 1-3. 1,2-Dichloropropane Life Cycle Diagram[a] [b] [c]

[a] See Table 1-1 for categories and subcategories of conditions of use (COUs). EPA considers the activities of loading and unloading of chemical product part of distribution in commerce; however, these activities were assessed as part of each COU's occupational exposure scenario.

[b] Industrial and/or Commercial Use.

[c] Consumer Use.

Table 1-1. Categories and Subcategories of Conditions of Use (COUs) and Corresponding Occupational Exposure Scenario (OES) in the Draft Risk Evaluation for 1,2-Dichloropropane

Condition of Use			Reference(s)	Occupational Exposure Scenarios for Assessment
Life Cycle Stage[a]	**Category[b]**	**Subcategory[c]**		
Manufacture	Domestic Manufacture	N/A	U.S. EPA (2019a), U.S. EPA (2024)	Manufacture (OES #1)
	Import	N/A	U.S. EPA (2019a), U.S. EPA (2024)	Import/Processing – Repackaging (OES #2)
Processing	Processing as a Reactant	Intermediate in All Other Basic Organic Chemical Manufacturing	U.S. EPA (2019a), U.S. EPA (2024)	Processing as a Reactant (OES #3)
	Incorporation into Formulation, Mixture, or Reaction Product	Intermediate in All Other Chemical Product and Preparation Manufacturing	U.S. EPA (2019a), U.S. EPA (2024)	
	Repackaging	N/A	(U.S. EPA, 2020b)	Import/Processing – Repackaging (OES #2)
Distribution in Commerce	N/A	N/A		Distribution in Commerce (OES #12) [d]
Industrial Use	Non-Incorporative Activities	Processing Aids	EPA-HQ-OPPT-2018-0428-0015	Processing Aid – Non-Incorporative Activities (OES #4)
Commercial Use	Other Uses	Laboratory Chemicals	(Service, 2018)	Laboratory Use (OES #5)
	Cleaning and Furnishing Care Product	All-Purpose Liquid Spray Cleaner	(Tenax Spa, 2015c)	Commercial Use of Stone Waxes, Polishes, and Cleaners (OES#6) [e]
	Cleaning and Furnishing Care Product	All-Purpose Waxes and Polishes	(Tenax Spa, 2015a, b, 2013a)	
	Cleaning and Furnishing Care Product	All-Purpose Liquid Cleaner and Polish	(Tenax Spa, 2019, 2013b)	

Condition of Use			Reference(s)	Occupational Exposure Scenarios for Assessment
Life Cycle Stage[a]	**Category[b]**	**Subcategory[c]**		
Consumer Use	Cleaning and Furnishing Care Product	All-Purpose Liquid Spray Cleaner	(Tenax Spa, 2015c)	N/A[f]
	Cleaning and Furnishing Care Product	All-Purpose Waxes, Polishes	(Tenax Spa, 2015a, b, 2013a)	
	Cleaning and Furnishing Care Product	All-Purpose Liquid Cleaner and Polish	(Tenax Spa, 2019, 2013b)	
Disposal	N/A	N/A	N/A	Disposal to Incineration (OES #7)
				Disposal to Landfill (OES #8)
				Disposal to Publicly Owned Treatment Works (POTW) (OES #9)
				Disposal to Non-POTW Wastewater Treatment (WWT) (OES #10)
				Remediation (OES #11)

"N/A" means not applicable where the category name, subcategory name, or both are duplicative and unnecessary for identifying the COU.

[a] Life cycle stage use definitions (40 CFR 711.3)
- "Industrial Use" means use at a site at which 1 or more chemicals or mixtures are manufactured (including imported) or processed.
- "Commercial Use" means the use of a chemical or a mixture containing a chemical (including as part of an article) in a commercial enterprise providing saleable goods or services.
- "Consumer Use" means the use of a chemical or a mixture containing a chemical (including as part of an article, such as furniture or clothing) when sold to or made available to consumers for their use.
- Although EPA has identified both industrial and commercial uses here for purposes of distinguishing scenarios in this document, the Agency interprets the authority over "any manner or method of commercial use" under TSCA section 6(a)(5) to reach both.

[b] These categories of conditions of use (COUs) appear in the preliminary life cycle diagram, reflect Chemical Data Reporting (CDR) codes, and broadly represent conditions of use of 1,2-dichloropropane in industrial, commercial, and/or consumer settings.

[c] These subcategories represent more specific activities within the life cycle stage and category of the potential COUs of 1,2-dichloropropane.

[d] Releases and exposures during distribution in commerce are not quantitatively assessed in this risk evaluation. EPA considers the activities of loading and unloading of chemical product part of distribution in commerce; however, these activities were assessed as part of each use's OES (Section 3.1.3).

[e] During the development of this draft risk evaluation, EPA identified updated safety data sheets (SDSs) (Tenax Spa, 2023a, b, c, 2020, 2017) from Tenax indicating that, as of 2017 for Quartz Toner, 2020 for Lustro Italiano, and 2023 for Cera Fluida, Cera TeWax, and Uniblack2, 1,2-dichloropropane is no longer present in the identified products. Products listed in the table containing 1,2-dichloropropane were assessed as reasonably foreseen.

[f] Consumer uses are not assigned to occupational exposure scenarios (OESs) but are assessed elsewhere in this draft risk evaluation; see also the *Draft Chemistry, Fate, Release and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

760

1.2.1 Conceptual Models

The conceptual model in Figure 1-4 presents the exposure pathways, exposure routes, and hazards to human populations from industrial and commercial activities and uses of 1,2-dichloropropane. There is potential for exposures to workers via inhalation and dermal contact. There is potential for exposures to ONUs via inhalation contact only because they are not expected to directly handle 1,2-dichloropropane. Although EPA considers the activities of loading and unloading of chemical products a part of Distribution in Commerce, these activities were assessed as part of each COU's corresponding OES (see Table 1-1).

Figure 1-5 presents the conceptual model for 1,2-dichloropropane exposure pathways, exposure routes, and hazards due to consumer activities and uses. Figure 1-6 presents general population exposure pathways, exposure routes, and hazards for environmental releases and wastes, whereas Figure 1-7 presents the conceptual model for ecological exposures and hazards from environmental releases and wastes.

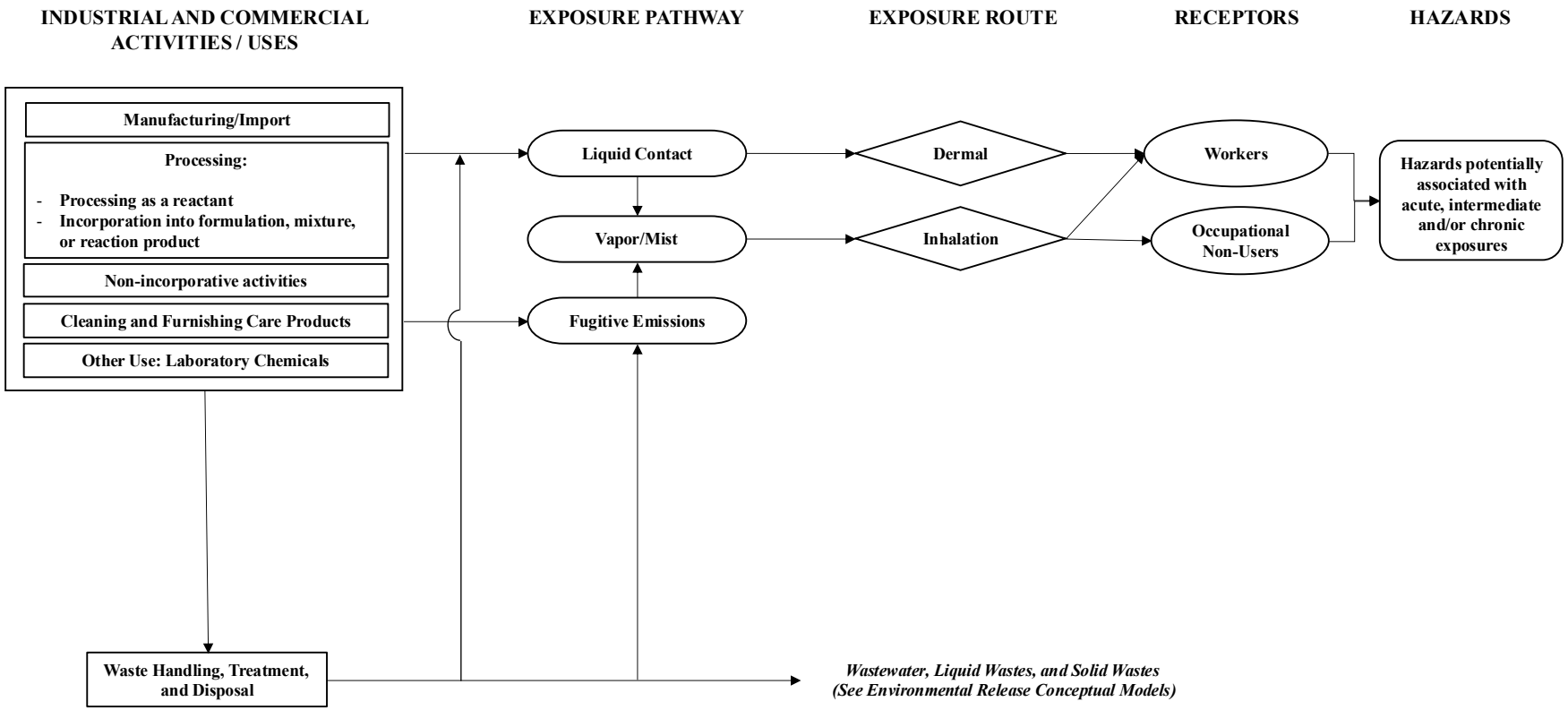


Figure 1-4. 1,2-Dichloropropane Conceptual Model for Industrial and Commercial Activities and Uses: Worker and Occupational Non-User Exposures and Hazards

See Table 1-1 for categories and subcategories of COUs.

Note, fugitive air emissions are not routed through a stack and include fugitive equipment leaks from valves, pump seals, flanges, compressors, sampling connections, and open-ended lines; evaporative losses from surface impoundment and spills; and releases from building ventilation systems.

Exposure can occur through mists that deposit in the upper respiratory tract; however, based on its physical and chemical properties, mists of 1,2-dichloropropane will likely be rapidly absorbed in the respiratory tract or evaporate and were evaluated as an inhalation exposure.

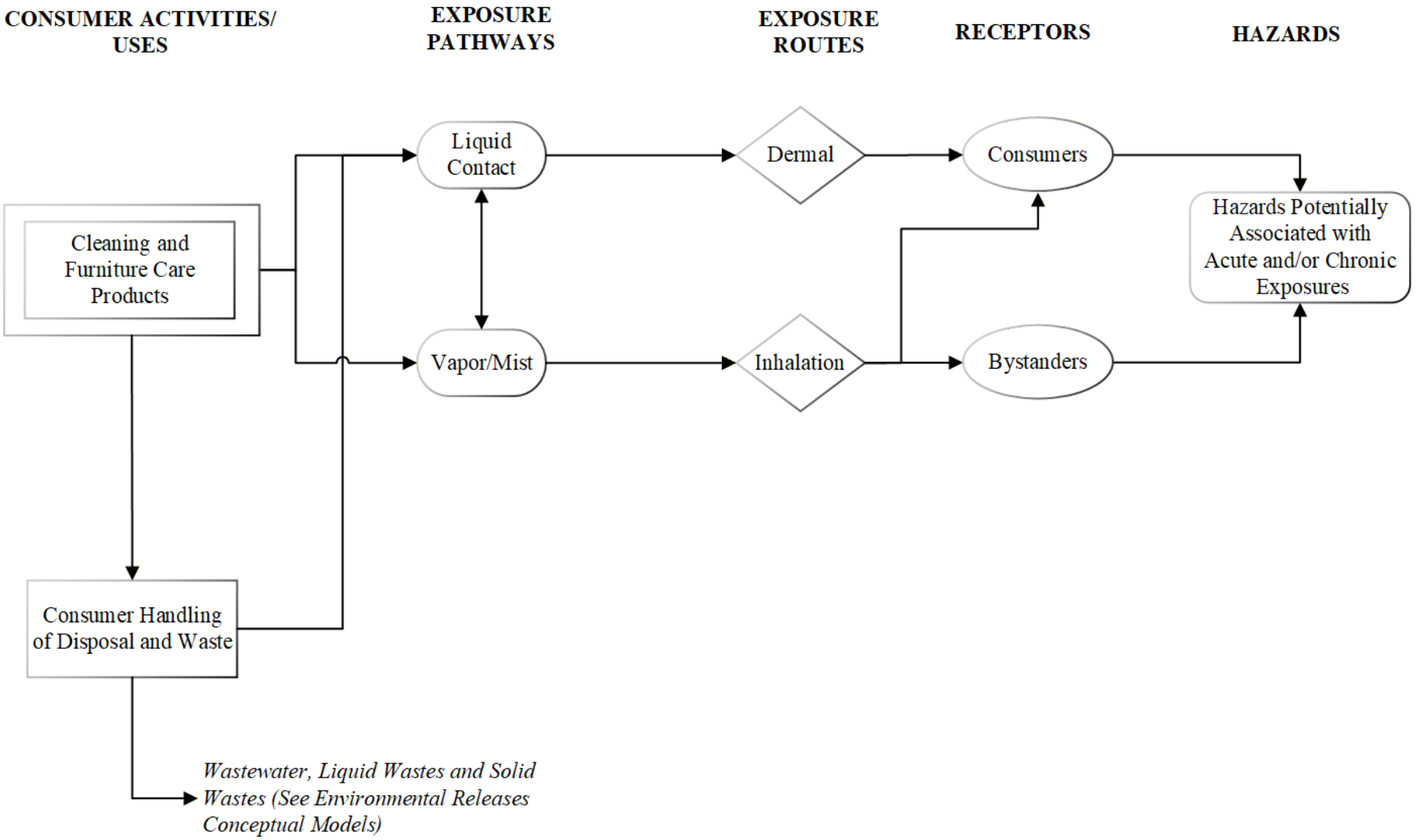


Figure 1-5. 1,2-Dichloropropane Conceptual Model for Consumer Activities and Uses: Consumer and Bystander Exposures and Hazards

The conceptual model presents the exposure pathways, exposure routes, and hazards to human populations from consumer activities and uses of 1,2-dichloropropane.

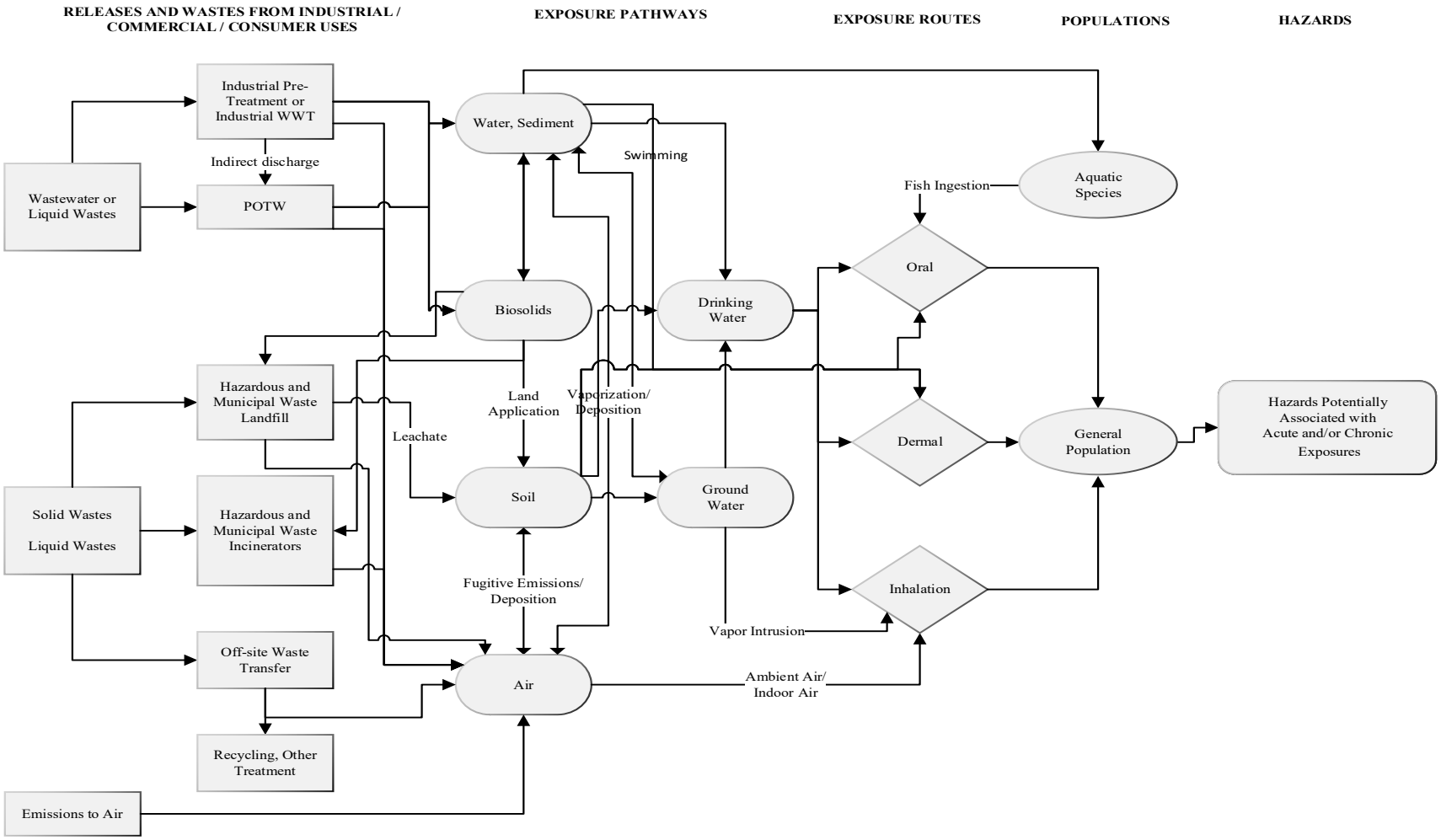


Figure 1-6. 1,2-Dichloropropane Conceptual Model for Environmental Releases and Wastes: General Population Exposures and Hazards

The conceptual model presents the exposure pathways, exposure routes, and hazards to human populations from releases and wastes from industrial, commercial, and consumer uses of 1,2-dichloropropane.

Notes: Industrial wastewater or liquid wastes may be treated on-site and then released to surface water (direct discharges) or pre-treated and released to a publicly owned treatment works (POTW) (indirect discharges). General population includes persons exposed to releases of 1,2-dichloropropane, including PESS such as infants exposed to drinking water from public drinking water treatment systems during formula bottle feeding; subsistence and tribal fishers; men and women of reproductive age; individuals with lifestyle factors such as smoking cigarettes or secondhand smoke; and fenceline communities who live near facilities that release 1,2-dichloropropane.

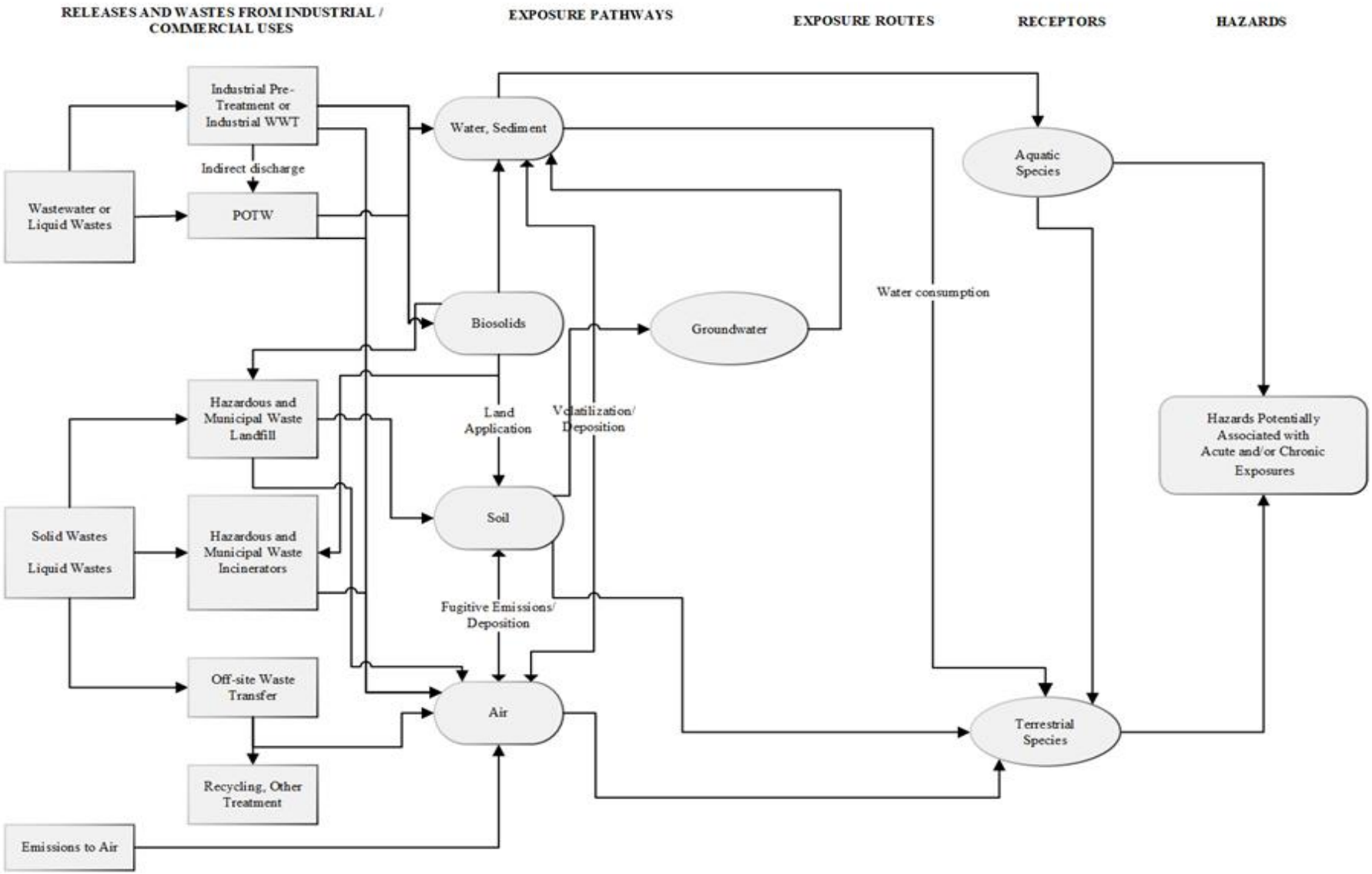


Figure 1-7. 1,2-Dichloropropane Conceptual Model for Environmental Releases and Wastes: Ecological Exposures and Hazards

The conceptual model presents the exposure pathways, exposure routes, and hazards to ecological populations from releases and wastes from industrial, commercial, and/or consumer uses of 1,2-dichloropropane.

Note: industrial wastewater or liquid wastes may be treated on-site and released to surface water (direct discharge) or pretreated and released to a publicly owned treatment works (POTW) (indirect discharge).

1.2.2 Populations and Durations of Exposures Assessed

Based on the conceptual models presented, EPA evaluated risk to environmental and human populations from 1,2-dichloropropane. Environmental risks were evaluated for acute and chronic exposure scenarios for aquatic and terrestrial species, as appropriate. Human health risks were evaluated for acute, intermediate, chronic, and lifetime exposure scenarios, as applicable based on reasonably available exposure and hazard data as well as the relevant populations for each.

Human populations assessed include the following:

- workers, including average adults and women of reproductive age;
- ONUs, including average adults;
- consumers, young teens (11–15 years), teenagers (16–20 years), and adults (21+ years);
- bystanders, including infants (<1 year), toddlers (1–2 years), and children (3–5 and 6–10 years); and
- general population, including infants, children, youths, and adults.

1.2.2.1 Potentially Exposed or Susceptible Subpopulations

TSCA section 6(b)(4)(A) requires that risk evaluations "determine whether a chemical substance presents an unreasonable risk of injury to health or the environment, without consideration of costs or other non-risk factors, including an unreasonable risk to a potentially exposed or susceptible subpopulation identified as relevant to the risk evaluation by the Administrator, under the conditions of use." TSCA section 3(12) states that "the term 'potentially exposed or susceptible subpopulation' (PESS) means a group of individuals within the general population identified by the Administrator who, due to either greater susceptibility or greater exposure, may be at greater risk than the general population of adverse health effects from exposure to a chemical substance or mixture, such as infants, children, pregnant women, workers, or the elderly."

This draft risk evaluation considers PESS throughout the human health risk assessment. Section 5.3.5 describes details on how PESS considerations were incorporated into preliminary risk estimates, when possible, along with any underlying uncertainties.

1.3 Systematic Review

EPA/OPPT applies systematic review principles in the development of risk evaluations under the amended TSCA. Section 26(h) of TSCA requires EPA to use scientific information, technical procedures, measures, methods, protocols, methodologies, and models consistent with the best available science and base decisions on the weight of scientific evidence.

Within the TSCA risk evaluation context, the weight of the scientific evidence is defined as "a systematic review method, applied in a manner suited to the nature of the evidence or decision, that uses a pre-established protocol to comprehensively, objectively, transparently, and consistently identify and evaluate each stream of evidence, including strengths, limitations, and relevance of each study and to integrate evidence as necessary and appropriate based upon strengths, limitations, and relevance" (40 CFR 702.33).

The systematic review process steps are briefly described below in Figure 1-8. Additional details regarding these steps are available in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances, Version 1.0: A Generic TSCA Systematic Review Protocol with Chemical-Specific Methodologies* (also called the 2021 "Draft Systematic Review Protocol") (U.S. EPA,

2021) and the *Draft Systematic Review Protocol for 1,2-Dichloropropane* (U.S. EPA, 2026ag)). The latter provides additional information on the steps in the systematic review process, including literature inventory trees and evidence maps for each discipline (*e.g.,* human health hazard) containing results of the literature search and screening as well as sections summarizing data evaluation, extraction, and evidence integration.

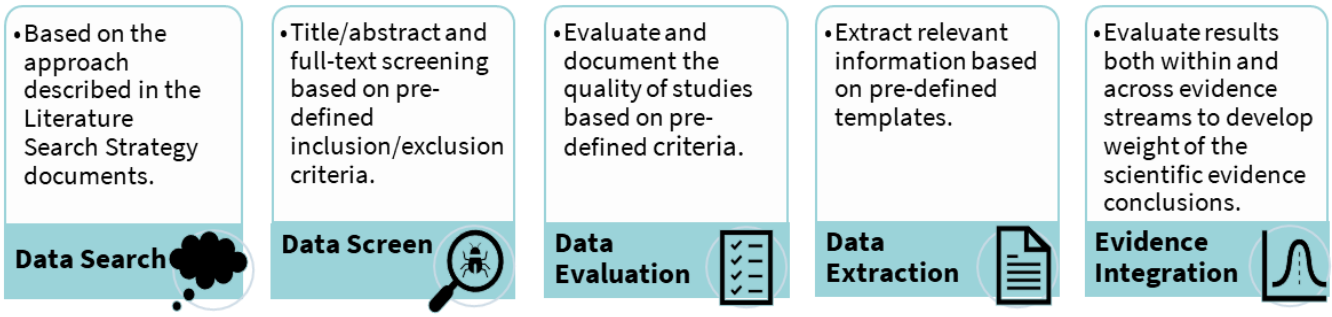


Figure 1-8. Diagram of the Systematic Review Process

For this draft risk evaluation, the initial literature search was conducted in September 2019 and as described in Section 4 of the 2021 Draft Systematic Review Protocol (U.S. EPA, 2021), where the peer-reviewed and gray literature search followed the approach outlined in Sections 4.2 and 4.3 of the 2021 Protocol, respectively (U.S. EPA, 2021).

An update to the peer-reviewed literature search to capture information published since the initial search in September 2019 was performed in April 2025 to identify any potential additional data sources available and relevant to environmental release and occupational exposure; general population, consumer, and environmental exposure; and environmental and human health hazards for 1,2-dichloropropane. EPA did not update its systematic review for information on physical and chemical properties as well as environmental fate and transport properties to support this draft risk evaluation because the Agency had sufficient information already for these disciplines. Of the new additional sources of data that EPA identified for 1,2-dichloropropane from the updated peer-reviewed literature search for environmental release and occupational exposure, 64 references went through screening (title and abstract screening followed by full-text screening). Upon completion of screening, EPA identified 4 references (Li et al., 2022; Mo et al., 2021; Park et al., 2020; Ravina et al., 2020) that met the full-text screening criteria and moved to the data evaluation and extraction step of the systematic review process for environmental release and occupational exposure information.

To identify new data sources for 1,2-dichloropropane from the updated peer-reviewed literature search for general population, consumer, and environmental exposure information, EPA prioritized any new additional information on chamber studies; however, no additional studies were identified. Of the additional sources of data that the Agency identified for 1,2-dichloropropane from the updated peer-reviewed literature search for environmental and human health hazard information, 59 references went through screening (title and abstract screening followed by full-text screening). Upon completion of full-text screening, EPA identified one reference (Jin et al., 2019) that met the full-text screening criteria and was moved to the data evaluation and extraction step of the systematic review process for environmental and human health hazard information. Additional details on data evaluation and extraction as well as evidence integration are described in Sections 5 and 6 of the *Draft Systematic Review Protocol for 1,2-Dichloropropane* (U.S. EPA, 2026ag).

EPA reviewed reasonably available information, defined in 40 CFR 702.33, in a fit-for-purpose approach to develop a draft risk evaluation that relies on the best available science and is based on the weight of scientific evidence in accordance with TSCA sections 6 and 26. The Agency reviewed reasonably available information and evaluated the quality of the methods and reporting of results of the individual studies using the evaluation strategies described in both the Draft Systematic Review Protocol (U.S. EPA, 2021) and the *Draft Systematic Review Protocol for 1,2-Dichloropropane* (U.S. EPA, 2026ag).

EPA also identified key assessments conducted by other Agency programs and other U.S. and international organizations. Depending on the source, these assessments may include information on COUs (or the equivalent), hazards, exposures, and PESS. Some of the most pertinent assessments that were consulted for this 1,2-dichloropropane draft risk evaluation include the following:

- U.S. Department of Human Health Services, Public Health Service, ATSDR 2021 *Toxicological Profile for 1,2-Dichloropropane* (accessed December 2025) (also called the "2021 ATSDR Tox Profile") (ATSDR, 2021);
- U.S. EPA Integrated Risk Information System (IRIS) Chemical Assessment of: 1,2-Dichloropropane (CASRN 78-87-5) (accessed December 2025) (U.S. EPA, 1991b); and
- U.S. EPA 2016 *Provisional Peer Reviewed Toxicity Values for 1,2-Dichloropropane; CASRN 78-87-5* (accessed December 2025) (U.S. EPA, 2016b).

2 CHEMISTRY AND FATE AND TRANSPORT

Physical and chemical properties determine the behavior and characteristics of a chemical that inform its condition of use, environmental fate and transport, potential toxicity, exposure pathways, routes, and hazards. Environmental fate and transport include environmental partitioning, accumulation, degradation, and transformation processes. Environmental transport is the movement of the chemical within and between environmental media, such as air, water, soil, and sediment. Understanding the environmental fate of 1,2-dichloropropane informs the specific exposure pathways as well as the potential human and environmental populations that EPA considered in this draft risk evaluation. For detailed information, see the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

2.1 Summary of Physical and Chemical Properties

1,2-Dichloropropane is a volatile organic compound (VOC; vapor pressure = 49.66 mmHg at 25 °C) and is a clear, colorless liquid at standard temperature and pressure. It has a water solubility of 2,740 mg/L at 25 °C, is readily soluble in organic solvents, and has Henry's Law constant of 2.82×10^{-3} atm·m^3/mol at 25 °C. EPA gathered and evaluated physical and chemical property data (U.S. EPA, 2026j) and information according to the process described in the *Draft Systematic Review Protocol for 1,2-Dichloropropane* (U.S. EPA, 2026ag). The Agency considered both measured and estimated physical and chemical property data/information as described in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). The selected values are summarized in Table 2-1, as applicable. Information on the full extracted dataset is available in the *Draft Data Quality Evaluation and Data Extraction Information for Physical and Chemical Properties for 1,2-Dichloropropane* (U.S. EPA, 2026j).

Table 2-1. Physical and Chemical Properties of 1,2-Dichloropropane[a]

Property	Selected Value(s)	Source(s)	Overall Data Quality Determination
Molecular formula	$C_3H_6Cl_2$	N/A	N/A
Molecular weight	112.99 g/mol	N/A	N/A
Physical form	Clear, colorless liquid at room temperature with a sweet, chloroform odor	NCBI (2020a); Rumble (2018d); NIOSH (1978)	High
Melting point	−100.4 °C	NLM (2019); DOE (2016); OECD (2006)	High
Boiling point	96.4 °C	NLM (2019); U.S. EPA (2019b); Rumble (2018b); DOE (2016); OECD (2006)	High
Density	1.159 g/cm^3 at 25 °C	NLM (2019); DOE (2016); O'Neil (2013); OECD (2006)	High
Vapor pressure	49.66 mmHg at 25 °C	Rumble (2018b)	High
Vapor density	3.9 (air = 1) (unitless)	Government of Canada (2022); NCBI (2020b); NLM (2019)	High
Water solubility	2,740 mg/L at 25 °C	Rumble (2018a)	High
Octanol:water partition coefficient (log K_{OW})	1.99 (unitless) at 25 °C	Elsevier (2019)	High

Property	Selected Value(s)	Source(s)	Overall Data Quality Determination
Henry's Law constant	2.82×10^{-3} atm·m^3/mol at 25 °C	NLM (2019); U.S. EPA (2019b)	High
Flash point	21 °C	Rumble (2018b); O'Neil (2013)	High
Autoflammability	557 °C	Rumble (2018b); Langer et al. (2011); OECD (2006)	High
Viscosity	0.85 centipoise (cP) at 20 °C	Langer et al. (2011)	Medium
Refractive index	1.439 (unitless) at 20 °C	NLM (2019); O'Neil (2013)	High
Dielectric constant	8.37 (unitless) at 20 °C	Rumble (2018c)	High
[a] Additional information on value selection can be found in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026j).			

2.2 Summary of Environmental Fate and Transport

Fate parameters including biotic and abiotic biodegradation rates, removal during wastewater treatment, volatilization from lakes and rivers, and organic carbon:water partition coefficient (log K_{OC}) are used throughout this draft risk evaluation. In assessing the environmental fate and transport of 1,2-dichloropropane, EPA considered the full range of results from data that were rated high and medium quality. Information on the fully extracted dataset is available in the *Draft Data Quality Evaluation and Data Extraction Information for Environmental Fate and Transport for 1,2-Dichloropropane* (U.S. EPA, 2026h) and *Draft Systematic Review Protocol for 1,2-Dichloropropane* (U.S. EPA, 2026ag). Other fate estimates were based on modeling results from EPI Suite™ (U.S. EPA, 2012b), a predictive tool for physical and chemical properties and environmental fate estimation. The fate, transport, partitioning, and degradation of 1,2-dichloropropane in the environment is depicted in Figure 2-1.

EPA evaluated the reasonably available information to characterize the environmental fate and transport of 1,2-dichloropropane. The key points of the fate assessment for 1,2-dichloropropane are summarized below and listed in Table 2-2. Given the consistent results from numerous high-quality studies, there is robust evidence that 1,2-dichloropropane

- Will not undergo direct photolysis
- Will undergo indirect photolysis by reacting slowly with hydroxyl radicals (•OH) in the atmosphere, with an estimated half-life of 24 days
- Will exist as a vapor in air and is not expected to partition to organic matter in the air
- Will hydrolyze very slowly in water at environmentally relevant pHs and temperatures
- Will be subject to low-to-moderate sorption to soil/sediments and therefore will undergo moderate to rapid migration to groundwater
- Will have low bioaccumulation potential in aquatic organisms
- Will be removed during wastewater treatment processes, mainly due to volatilization, with significant biodegradation occuring in some wastewater treatment plants (WWTPs)
- Is not readily biodegradable aerobic surface waters
- Will biodegrade slowly in anaerobic soils
- Can biodegrade to form 1- and 2-monochloropropane as well as propene under anaerobic conditions
- May volatilize from surface water and moist surface soil
- Has the potential to undergo long-range transport in the air due to slow indirect photodegradation.

As a result of limited studies identified, there is moderate confidence that 1,2-dichloropropane

- will have low removal rates from conventional drinking water systems but can be highly removed by advanced treatment technologies (*e.g.,* packed tower aeration); and
- Will have low bioaccumulation potential in terrestrial organisms.

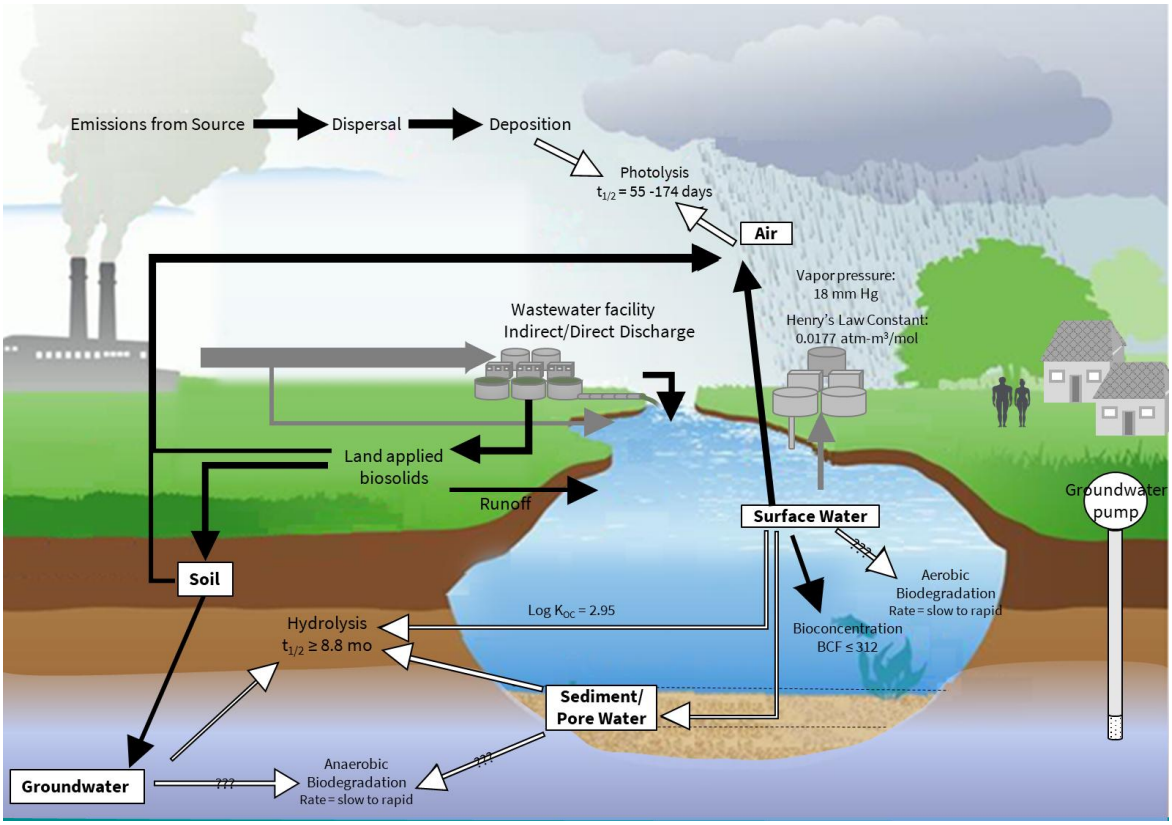


Figure 2-1. Transport, Partitioning, and Degradation of 1,2-Dichloropropane in the Environment

2.2.1 Weight of Scientific Evidence Conclusions for Fate and Transport

The Tier I and II partitioning analyses, which incorporate high-quality physical and chemical properties, provide robust evidence that air is likely to be the major medium of exposure for 1,2-dichloropropane.

When released to air, there is also strong evidence that 1,2-dichloropropane will exist as a vapor and will not partition to particulate matter. 1,2-Dichloropropane is expected to have a relatively long half-life in air (≈24 days). Modeling suggests that 1,2-dichloropropane can be subject to long-range transport given its long atmospheric half-life. Although EPA identified monitoring data showing 1,2-dichloropropane being consistently detected across the United States, the Agency did not identify monitoring data demonstrating its long-range atmospheric transport.

In aquatic environments, 1,2-dichloropropane is expected to volatilize from surface waters. The Agency did not identify any studies directly measuring volatilization rates and used EPI Suite™ to estimate a rate for a model lake and stream. Therefore, there is uncertainty in the volatilization rate because it can vary based on the characteristics of the water body. The Agency has strong evidence that 1,2-dichloropropane is not readily biodegradable in surface water and that hydrolysis is slow in environmentally relevant conditions. EPA identified limited monitoring data with measurable concentrations in surface water, but because monitoring locations are not necessarily spatially or

temporally aligned with releases from COUs, the available monitoring data might not be representative of actual release scenarios. The Agency also did not identify sediment monitoring data, but 1,2-dichloropropane could be present in sediment pore water given its solubility. EPA also identified only one study with a measured bioconcentration factor (BCF), meaning there is uncertainty in the actual value; however, the Agency has high confidence the bioaccumulation factor (BAF) and BCF values will be low given the overall evidence available.

In terrestrial environments, 1,2-dichloropropane can volatilize from surface soils; however, because EPA did not identify any studies measuring volatilization rates from soil, there is uncertainty in the exact rate as it will depend on the specific soil characteristics and local conditions (*e.g.,* temperature). Soil and groundwater biodegradation studies reported a large range of half-lives. Despite the uncertainty in the exact rate, the Agency generally expects biodegradation rates to be slow in both aerobic and anaerobic soils and groundwater (Table 2-2). EPA also has strong evidence demonstrating that 1,2-dichloropropane will migrate to groundwater when released to land, given the amount of data measuring it in groundwater across the United States.

Table 2-2. Summary of Environmental Fate Information for 1,2-Dichloropropane[a]

Parameter	Value	Source(s)	Overall Data Quality Determination
Direct photodegradation	Not expected to be susceptible because light absorption at wavelengths >290 nm was negligible	Cohen et al. (1984) as referenced in NCBI (2020b)	Medium
Indirect photodegradation	$t_{1/2}$ = 36 days (based on •OH rate constant of 4.42E−13 cm^3/mole-sec with [•OH] = 5.0E05 •OH/cm^3)	Meylan and Howard (1993) as referenced in NCBI (2020b)	Medium
	$t_{1/2}$ = 24.192 days (based on •OH rate constant of 4.42E−13 cm^3/mole-sec with [•OH] = 1.5E06 •OH/cm^3) [b]	U.S. EPA (2012b)	High
Hydrolysis half-life	$t_{1/2}$ = 15.1–16.6 years at pH 7–9 and 25 °C	Washington (1995); Mackay et al. (1993); U.S. EPA (1993) as referenced in Rathbun (1998)	Medium
	$t_{1/2}$ = 175 years at pH 7 and 10 °C	Washington (1995) as referenced in Rathbun (1998)	Medium
	$t_{1/2}$ = 16.6 years at pH 5.6 and 25 °C		
	$t_{1/2}$ = 175 years at pH 5.6 and 10 °C		
Aerobic biodegradation (aquatic)	0% over 2 weeks (Japanese MITI test using 100 mg/L of 1,2-dichloropropane and 30 mg/L of activated sludge inoculum)	OECD (2006)	High
	0% over 28 days (OECD 302B using 150 mg/L of 1,2-DCP and 1,000 mg/L of municipal activated sludge)		
Aerobic biodegradation (sediment)	42% over 7 days (when incubated with sewage seed)	Tabak et al. (1981) as referenced in NCBI (2020b)	Medium

Parameter	Value	Source(s)	Overall Data Quality Determination
Aerobic biodegradation (soil)	$t_{1/2}$ = 52 days (using fresh soil at 15 °C)	Van Dijk (1980) as referenced in NCBI (2020b)	Medium
Anaerobic biodegradation (aquatic)	No data identified.	N/A	N/A
Anaerobic biodegradation (sediment)	90% (when methanol and sodium acetate were used as co-substrates)	Hauck and Hegemann (2000)	High
Anaerobic biodegradation (soil)	>96% transformation in 608 days	Boesten et al. (1992)	High
Bioconcentration factor (BCF) (L/kg wet weight)	1.2–3.2 in carp when exposed to 0.4 mg/L; 0.5–6.9 in carp when exposed to 0.04 mg/L	OECD (2006)	High
	Upper trophic level = 7.414 [b]; Middle trophic level = 6.106 [b]; Lower trophic level = 5.664 [b]	U.S. EPA (2012b)	High
Bioaccumulation factor (BAF) (L/kg lipid weight, unless noted)	Upper trophic level = 7.414 [b]; Middle trophic level = 6.106 [b]; Lower trophic level = 5.664 [b]	U.S. EPA (2012b)	High
Removal in wastewater treatment	97.6% from a pilot activated sludge system in Norco, Louisiana	Shell Oil (1986)	High
	99% from a lab-scale study	Kincannon et al. (1983)	High
	>33–100% from U.S. POTWs	U.S. EPA (1982)	High
	53.67% [b]	U.S. EPA (2012b)	High

MITI = Ministry of International Trade and Industry (Japan); POTW = publicly owned treatment works
[a] Additional information on value selection can be found in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).
[b] Information was estimated using EPI Suite™ (U.S. EPA, 2012b).

1010

3 RELEASES AND CONCENTRATIONS OF 1,2-DICHLOROPROPANE IN THE ENVIRONMENT

EPA estimated environmental releases and concentrations of 1,2-dichloropropane.

Lifecycle Summary for 1,2-Dichloropropane

EPA assessed the manufacture of 1,2-dichloropropane. Information gathered by EPA indicates that 1,2-dichloropropane is manufactured as a byproduct in the manufacture of other chemicals (Integral Consulting, 2026; U.S. EPA, 2024b; ACC, 2021). Byproduct streams can be concentrated to greater than 90% (weight percent) of 1,2-dichloropropane (U.S. EPA, 2026a). Import and repackaging activities for 1,2-dichloropropane were also reported to CDR (U.S. EPA, 2026a).

Both imported and domestically manufactured chemicals may be repackaged by wholesalers for resale; for example, repackaging bulk packaging into drums or bottles. The type and size of the container will vary depending on customer requirements. Import and repackaging of 1,2-dichloropropane can occur at concentrations exceeding 90% (U.S. EPA, 2026a, 2022a).

Manufacturers reported processing of 1,2-dichloropropane as an intermediate in the manufacture of other basic organic chemicals (U.S. EPA, 2026a, 2022a). The concentration of 1,2-dichloropropane at these processing sites covers a wide range from 1 to 100% (U.S. EPA, 2026a, 2022a). One manufacturer reported that 1,2-dichloropropane is also used as a solvent in the production of a paper sizing agent (EPA-HQ-OPPT-2018-0428-0015). EPA assumed up to 100% concentration of 1,2-dichloropropane as supplied for this use (U.S. EPA, 2026a, 2022a). The Agency identified commercial use of 1,2-dichloropropane containing laboratory chemicals and commercial and consumer cleaning and furnishing care products in the final scope (U.S. EPA, 2020c). However, EPA did not find evidence that manufacturers directly sell 1,2-dichloropropane for these uses and assumes that supply of 1,2-dichloropropane for these commercial or consumer uses would come from chemical wholesalers or from imports. EPA seeks public comment on this, as noted in the Executive Summary ("Next Steps and Public Input"). For the laboratory chemical use, EPA assessed the use of 1,2-dichloropropane in a laboratory setting. Safety data sheets (SDSs) in literature indicated that 1,2-dichloropropane may be present at concentrations of up to 100% (U.S. EPA, 2020d; Service, 2018).

The Agency obtained specific evidence in 2020 that 1,2-dichloropropane was used in several stone polishing products. However, the stone polish products currently available for sale in the United States no longer contain 1,2-dichloropropane. The concentration of 1,2-dichloropropane in furnishing and cleaning products identified at the time of the final scope document (U.S. EPA, 2020c) varied from 1 to 54% (Tenax Spa, 2015a, b, c). Specifically, the products identified were cleaning and furnishing care products under the following three subcategories: (1) all-purpose liquid spray cleaner, (2) all-purpose waxes and polishes, and (3) all-purpose liquid cleaner/polish. Information in the draft scope was based on SDSs from 2015 or 2019. These same products were identified for consumer use (see Section 5.1.2 for further discussion of the consumer exposure assessment). As described in Section 5.1.2, EPA issued a consumer test order (U.S. EPA, 2025c) for the identified products. In response to the consumer test order, the American Chemistry Council (ACC) Propylene Dichloride (PDC) Consortium submitted a letter from the manufacturer, Tenax, noting that Tenax (and all of its related labels and products), stopped using 1,2-dichloropropane in product formulations in 2022 (ACC, 2023). EPA has not identified current 1,2-dichloropropane-containing cleaning and furnishing products available for sale in the United States; however, there is evidence of 1,2-dichloropropane-containing products overseas (Roff, 2026). Given the availability of products internationally and the short time frame (*i.e.,* 4 years since the cessation of formulations with 1,2-dichloropropane in the United States), EPA considers the commercial

and consumer uses of 1,2-dichloropropane-containing cleaning and furnishing products to be reasonably foreseen. A full explanation of this is provided in Section 5.1.2. EPA is seeking comment on this preliminary determination.

EPA also assessed OESs associated with the COU of Disposal. There was facility-reported release data for 1,2-dichloropropane that EPA mapped to incineration, landfills, wastewater treatment, POTWs, and remediation sites (U.S. EPA, 2026aj, 2024b, 2023a, 2020a).

Additional details and supporting information for this lifecycle summary can be found in the remainder of Section 3.1 as well as the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

3.1 Approach and Methodology

An overview of the approach and methodology EPA used to assess releases of 1,2-dichloropropane to the environment from manufacturing, processing, industrial and commercial uses is provided below.

3.1.1 Crosswalk of Conditions of Use to Occupational Exposure Scenarios

Table 3-1 provides a crosswalk between the COUs and OESs for 1,2-dichloropropane. Each OES is developed based on a set of occupational activities and conditions such that similar occupational exposures and environmental releases are expected from the use(s) covered under that OES. For each OES, the Agency provided occupational exposure and environmental release results, which are expected to be representative of the entire population of workers and sites for the given OES in the United States. In some cases, EPA defined only a single OES for multiple COUs, whereas in other cases the Agency developed multiple OESs for a single COU. EPA made this determination by considering variability in release and use conditions and whether the variability required discrete scenarios or could be captured as a distribution of exposures.

Table 3-1. Crosswalk of Conditions of Use to Assessed Occupational Exposure Scenarios

Conditions of Use (COUs)			Occupational Exposure Scenarios (OESs) for Assessment
Life Cycle Stage[a]	**Category[b]**	**Subcategory[c]**	
Manufacturing	Domestic Manufacture	Domestic Manufacture	Manufacture (OES #1)
	Import	Import	Import/Processing – Repackaging (OES #2)
Processing	As a Reactant	Intermediate in All Other Basic Organic Chemical Manufacturing	Processing as a Reactant (OES #3)
	Incorporation into Formulation, Mixture, Or Reaction Product	Intermediate in All Other Chemical Product and Preparation Manufacturing	
	Processing	Repackaging	Import/Processing – Repackaging (OES #2)
Distribution In Commerce	Distribution in Commerce	Distribution in Commerce	Distribution in Commerce (OES# 12) [d]
Industrial Use	Non-Incorporative Activities	Processing Aids	Processing Aid – Non-Incorporative Activities (OES #4)

Conditions of Use (COUs)			Occupational Exposure Scenarios (OESs) for Assessment
Life Cycle Stage[a]	**Category[b]**	**Subcategory[c]**	
Commercial Use	Other Use	Laboratory Chemicals	Commercial Use as a Laboratory Chemical (OES #5)
	Cleaning and Furnishing Care Product	All-Purpose Waxes and Polishes	Commercial Use of Stone Waxes, Polishes, and Cleaners (OES #6)
	Cleaning and Furnishing Care Product	All-Purpose Liquid Cleaner/Polish	
	Cleaning and Furnishing Care Product	All-Purpose Liquid Spray Cleaner	
Consumer Use	Cleaning and Furnishing Care Product	All-Purpose Liquid Spray Cleaner	N/A[e]
	Cleaning and Furnishing Care Product	All-Purpose Waxes and Polishes	N/A[e]
	Cleaning and Furnishing Care Product	All-Purpose Liquid Cleaner/Polish	N/A[e]
Disposal	Disposal	Disposal	Disposal to Incineration (OES #7)
			Disposal to Landfill (OES #8)
			Disposal to POTW (OES #9)
			Disposal to Non-POTW WWT (OES #10)
			Remediation (OES #11)

POTW = publicly owned treatment works; WWT = wastewater treatment

[a] Life cycle stage use definitions (40 CFR 711.3)
- "Industrial Use" means use at a site at which 1 or more chemicals or mixtures are manufactured (including imported) or processed.
- "Commercial Use" means the use of a chemical or a mixture containing a chemical (including as part of an article) in a commercial enterprise providing saleable goods or services.
- "Consumer Use" means the use of a chemical or a mixture containing a chemical (including as part of an article, such as furniture or clothing) when sold to or made available to consumers for their use.
- Although EPA has identified both industrial and commercial uses here for purposes of distinguishing scenarios in this document, the Agency interprets the authority over "any manner or method of commercial use" under TSCA section 6(a)(5) to reach both.

[b] These categories of conditions of use (COUs) appear in the life cycle diagram, reflect Chemical Data Reporting (CDR) codes, and broadly represent conditions of use of 1,2-dichloropropane in industrial and/or commercial settings and for consumer uses.

[c] These subcategories reflect more specific COUs of 1,2-dichloropropane.

[d] Releases and exposures during distribution in commerce are not quantitatively assessed in this draft risk evaluation.

[e] Consumer uses are not assigned to OESs but are assessed in Section 5.1.2 of this draft risk evaluation.

3.1.2 Description of Role/Function of 1,2-Dichloropropane for Each OES

An understanding of the role/function of 1,2-dichloropropane for each OES is important in mapping data to an OES and selecting appropriate modeling approaches to estimate releases and exposures. Brief summaries of the role/function of 1,2-dichloropropane for all OESs are presented in Table 3-2.

Table 3-2. Description of the Function of 1,2-Dichloropropane for Each OES

OES	Role/Function of 1,2-Dichloropropane
Manufacture (OES #1)	This OES captures the Domestic Manufacture COU category. 1,2-Dichloropropane is manufactured as a byproduct of propylene oxide manufacturing by the chlorohydrin reaction, as a byproduct of the reaction of propene and chlorine in epichlorohydrin manufacturing, and as a byproduct during the manufacture of propylene oxide and allyl chloride.
Import/Processing – Repackaging (OES #2)	This OES captures the Import and Processing – Repackaging COU categories. 1,2-Dichloropropane may be transported in liquid cargo barges, railcars, tank trucks, tank containers, intermediate bulk containers (IBCs)/totes, and drums. EPA expects that 1,2-dichloropropane is repackaged from import containers into smaller product containers for downstream use.
Processing as a Reactant (OES #3)	This OES captures the Processing as a Reactant and Incorporation into Formulation, Mixture, or Reaction Product COU categories. 1,2-Dichloropropane is used as an intermediate to manufacture chlorinated solvents, toluene diisocyanate, photographic film, and ion-exchange resins, and as a major feedstock in the manufacture of carbon tetrachloride, perchloroethylene and hydrochloric acid at a Per-Tet plant.
Processing Aid – Non-Incorporative Activities (OES #4)	This OES captures the Industrial Use – Non-Incorporative activities COU category. 1,2-Dichloropropane is used as a solvent in the production of alkyl ketene dimer (AKD), which is a chemical used as a paper sizing agent.
Commercial Use as a Laboratory Chemical (OES #5)	This OES captures the Commercial Use as a Laboratory Chemical COU category. 1,2-Dichloropropane is used in analytical standard, research, equipment calibration and sample preparation applications, including reference sample for analysis of terrestrial and extraterrestrial material samples.
Commercial Use of Stone Waxes, Polishes, and Cleaners (OES #6)	This OES captures the Commercial use of Cleaning and Furnishing Care Product COU category. 1,2-Dichloropropane is a potential component in several types of cleaning and furnishing care products, including stone waxes and polishes that may be applied via wiping, or using a rag, brush, or larger-scale cleaning equipment.
Disposal to Incineration (OES # 7)	This OES captures part of the Disposal COU category. Each of the OES may generate waste streams of 1,2-dichloropropane that are transferred to third-party sites for disposal or treatment and these cases are assessed under these OES. Waste containing 1,2-dichloropropane may be shipped in containers or piped directly to incineration sites. Incineration can result in releases of 1,2-dichloropropane to air or water through volatilization at loading and unloading points, incomplete combustion, or container cleaning

OES	Role/Function of 1,2-Dichloropropane
Disposal to Landfill (OES #8)	This OES captures part of the Disposal COU category. Each of the OES may generate waste streams of 1,2-dichloropropane that are collected and transported to third-party landfill sites for disposal and these cases are assessed under this OES. Waste containing 1,2-dichloropropane may be shipped in containers to landfill sites at various concentrations. 1,2-Dichloropropane is a U-listed hazardous waste under code U083 under RCRA; therefore, discarded, unused pure and commercial grades of 1,2-dichloropropane are regulated as a hazardous waste under RCRA (40 CFR 261.33(f)). Hazardous waste landfills are excavated or engineered sites specifically designed for the final disposal of non-liquid hazardous waste. Releases of 1,2-dichloropropane may occur through volatilization to air and leachate release to groundwater.
Disposal to POTW (OES #9)	This OES captures part of the Disposal COU category. Each of the OES may generate waste streams of 1,2-dichloropropane that are collected and transported to third-party POTW sites for disposal and these cases are assessed under this OES. Disposal to POTW refers to the collection and routing of 1,2-dichloropropane-containing wastes to third-party publicly owned treatment works which treat the wastes utilizing water treatment units. Releases of 1,2-dichloropropane to air or water may occur through volatilization during loading/unloading and wastewater treatment, fugitive leaks, or container cleaning.
Disposal to Non-POTW WWT (OES #10)	This OES captures part of the Disposal COU category. Each of the OES may generate waste streams of 1,2-dichloropropane that are collected and transported to third-party non-POTW WWT sites for disposal and these cases are assessed under this OES. Disposal to WWT refers to the collection and routing of 1,2-dichloropropane-containing wastes to third-party water treatment systems which treat the wastes utilizing water treatment units. Releases of 1,2-dichloropropane to air or water may occur through volatilization during loading/unloading and wastewater treatment, fugitive leaks, or container cleaning.
Remediation (OES #11)	This OES captures part of the Disposal COU category. Remediation refers to the removal of 1,2-dichloropropane from contaminated soil, water, or air. Thermal, biological, physical, and chemical treatment methods can be applied to contaminated media at the release site.
Distribution in Commerce (OES #12)	This OES captures the Distribution in Commerce COU. This OES refers to the transport of 1,2-dichloropropane from producing sites such as sites that manufacture 1,2-dichloropropane as an unintended byproduct, to receiving sites where 1,2-dichloropropane is further processed or used, such as sites that process 1,2-dichloropropane as a reactive intermediate. See Table 3-3 for more details.
AKD = alkyl ketene dimer; COU = condition of use; OES = occupational exposure scenario; POTW = publicly owned treatment works; RCRA = Resource Conservation and Recovery Act; WWT = wastewater treatment	

3.1.3 Distribution in Commerce

EPA expects that 1,2-dichloropropane and 1,2-dichloropropane-containing products are distributed throughout commerce from manufacturing sites to repackaging sites, processing as a reactant or formulation sites, and then to other downstream end use sites. Activities associated with loading and unloading chemical products were assessed as part of each COU's OES. It is possible that 1,2-

dichloropropane may go through a third party for temporary storage/warehousing before distribution to users. If repackaging takes place at these facilities involving transfer from larger to smaller containers, EPA assessed this under the OES of Repackaging. Transport containers are not expected to be opened during transport between producing and receiving sites. Speculative exposures that may result from irregular and unpredictable accidental spills during transport are not assessed by EPA in TSCA existing chemical risk evaluations.

Table 3-3 outlines how each OES receives the chemical and distributes for further processing or use.

Table 3-3. Receipt and Distribution in Commerce of 1,2-Dichloropropane per OES

OES	How the OES Receives the Chemical	How the OES Distributes the Chemical
Manufacture (OES #1)	N/A	Bulk transport from chemical manufacturing facilities via railcars, bulk marine vessels and barges to chemical manufacturing and processing facilities
Import/Processing – Repackaging (OES #2)	Import in large containers for repackaging	Transport to downstream uses
Processing as a Reactant (OES #3)	Bulk transport from chemical manufacturing facilities	N/A; 1,2-dichloropropane is reacted away
Processing Aid – Non-Incorporative Activities (OES #4)	Bulk transport from chemical manufacturing facilities	N/A; 1,2-dichloropropane is recovered and reused
Commercial Use as a Laboratory Chemical (OES #5)	Transport from importer-repackagers	N/A; no further distribution in commerce is expected after use
Commercial Use of Stone Waxes, Polishes, and Cleaners (OES #6)	Small volume commercial containers	N/A; 1,2-dichloropropane is removed during polishing or evaporates from the surface after application
Disposal (Incineration, Landfill, POTW, Non-POTW WWT, or Remediation) (OESs #7–11)	Transport from manufacturing, processing or use facilities	N/A
OES = occupational exposure scenario; POTW = publicly owned treatment works; WWT = wastewater treatment		

3.1.4 Estimating the Number of Release Days per Year for Facilities in Each OES

In this assessment, EPA estimated both an annual (kg/site-year) and a daily (kg/site-day) release rate for a facility. The annual release and average daily release of 1,2-dichloropropane are utilized in evaluating potential environmental concentrations, as discussed in Section 3.3 and 4.1. Data on the number of release days for a facility are not available from data sources such as Discharge Monitoring Reports (DMR), the TRI, or CDR. NEI includes a field for operating days per year (days/year). EPA uses facility-reported operating days from NEI whenever available and defaults to generic values only when this information is missing. For facilities that did not report to NEI or when operating days were not reported to NEI, the Agency uses generic estimates of the number of operating days (days/year) for facilities in each OES as presented in Table 3-4.

Table 3-4. Generic Estimates of Number of Operating Days per Year for Each OES for Facilities Not Reporting to NEI or When Operating Days Were Not Reported to NEI[a]

OES	Operating Days (days/year)	Basis
Manufacture (OES #1)	350	For the manufacture of the large-PV solvents, EPA assumes 350 days/year for release frequency. This assumes the plant runs 7 days/week and 50 weeks/year (with 2 weeks down for turnaround) and assumes that the plant is always producing the chemical.
Import/Processing – Repackaging (OES #2)	250	Based on a typical operating schedule of 5 days per week and 50 weeks per year.
Processing as a Reactant (OES #3)	350	EPA assumed the manufacture of commodity chemicals occurs 350 days per year such that the use of chemicals as a reactant to manufacture a commodity chemical would also occur 350 days per year.
Processing Aid – Non-Incorporative Activities (OES #4)	300	For chemical plants that use industrial processing aids, EPA assumed a value of 300 days/year based on the "SpERC fact sheet – Formulation & (re)packing of substances and mixtures – Industrial (Solvent-borne)" which uses a default of 300 days/year for the chemical industry (ESIG, 2012).
Commercial Use as a Laboratory Chemical (OES #5)	174–260	According to the Generic Scenario, facility operating days range from 174–260 days per year (U.S. EPA, 2023d). This is range is based on data from the U.S. Bureau of Labor Statistics employment data on yearly working hours and an assumed working duration of 8–12 hours/day.
Disposal to Incineration (OES #7)	250	It is unlikely that incineration facilities handle 1,2-dichloropropane every day; therefore, EPA assumes 250 days/year (5 days/week, 50 weeks/year).
Disposal to Landfill (OES #8)	250	It is unlikely that landfills handle 1,2-dichloropropane every day; therefore, EPA assumes 250 days/year (5 days/week, 50 weeks/year).
Disposal to POTW (OES #9)	365	POTWs are expected to operate continuously over 365 days/year; therefore, EPA assumes 365 days/year.
Disposal to Non-POTW WWT (OES #10)	250	It is unlikely that non-POTW disposal facilities handle 1,2-dichloropropane every day; therefore, EPA assumes 250 days/year (5 days/week, 50 weeks/year).
Remediation (OES #11)	365	Remediate sites are expected to operate continuously over 365 days/year; therefore, EPA assumed 365 days/year.

ESD = emission scenario document; OES = occupational exposure scenario; POTW = publicly owned treatment works; PV = production volume; WWT = wastewater treatment

[a] See Section 4 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) for more information on the number of days.

3.1.5 Daily Release Estimation

3.1.5.1 Facility-Reported Release Data

EPA collected facility release data for 1,2-dichloropropane from the TRI (years 2019–2023), DMR (years 2019–2023), and National Emissions Inventory (NEI; years 2017 and 2020). TRI provides facility-specific data on releases to air, water, and land; DMR includes data on water releases; and NEI provides process-level data (*i.e.,* contains data on air emissions).

3.1.5.2 Mapping of Facility Release Data

EPA developed the OES to group processes or applications with similar sources of release that occur at industrial and commercial workplaces within the scope of a risk evaluation. Data are available in the TRI, DMR, and NEI that can be utilized to map the facility to an OES. The full details of the methodology for mapping facilities from EPA reporting programs is described in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). In brief, mapping consists of using facility-reported industry sectors (typically reported as either North American Industry Classification System [NAICS] or Standard Industrial Classification [SIC] codes) and chemical activity, processing, and use information to assign the most likely OES to each facility.

3.1.5.3 Modeling to Estimate Releases

When releases are expected for an OES, but TRI, DMR, and/or NEI data or release data from systematic review are not available, EPA uses modeling to estimate releases. Modeling is also performed when there is limited facility release data available and the number of sites for the OES may be much higher than what is captured by the facility release data. Of the 11 OESs, facility release data were available for 10; however, for one of these, Commercial Use as a Laboratory Chemical, the data were limited and modeling was used to supplement release estimates.

The Agency identified model input parameters and equations from relevant literature sources, generic scenarios (GSs), or emission scenario documents (ESDs). For each modeled OES, a Monte Carlo simulation with 100,000 iterations was conducted to capture variability in input parameters and estimate total 1,2-dichloropropane releases by environmental media across all sources in each iteration. EPA selected the 50th and 95th percentile values to represent the central tendency and high-end releases, respectively. The key modeling parameters used for each OES are presented in Table 3-5. For a full list of input parameters used in release modeling, refer to the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Table 3-5. Key Modeling Parameters Used to Model Environmental Releases

OES (or OES Group)	Modeling Parameter	Variable Type	Value(s)	Source
All OESs that were modeled	Production volume of 1,2-Dichloropropane for this OES	Derived value	34,019.43 kg/yr	2024 CDR (U.S. EPA, 2026a)
Commercial Use as a Laboratory Chemical (OES #5)	Facility laboratory chemical throughput	Discrete distribution	0.50–4,000 mL/site-day	2023 Use of Laboratory Chemicals Revised Draft Generic Scenario (U.S. EPA, 2023d)
	Product concentration	Discrete distribution	0.02–100% by weight	Product-specific parameter[a]
	Container volume	Triangular distribution	2.6E−04 to 0.66 gallons	Product-specific parameter[a]

CDR = Chemical Data Reporting; OES = occupational exposure scenario
[a] Products used to derive laboratory chemical 1,2-dichloropropane concentration and container volume distributions include Sigma-Aldrich (2026); Supelco (2026); Restek Corporation (2026); and Fisher Scientific (2026).

3.1.5.4 Facility Release Controls

Reported facility release data from TRI, DMR, and NEI reflects the release amount after emission controls are applied at the facility.

For the modeled release estimates, release control efficiencies are applied to incineration and water release media. For the release estimates to incineration, a release control efficiency was applied based on the National Emission Standards for Hazardous Pollutants from Hazardous Waste Combustors (40 CFR part 63, subpart EEE) requirement that all hazardous waste combustors achieve a destruction removal efficiency of 99.99% for each principal organic hazardous constituent, including 1,2-dichloropropane. For the release estimates to water, a removal efficiency of 76.9% was applied based on the average removal efficiency for POTWs, which closely aligns with the measured data of a pilot scale system (70.8 ± 7.1%). Due to a lack of data, EPA did not apply a removal efficiency for air emissions controls in the modeled release estimates.

3.1.5.5 Release Metrics

EPA compiled the environmental releases by air, water, and disposal media for each OES. For facility releases, the Agency summed annual releases that were reported directly by facilities and then averaged across the corresponding number of years of release. For example, for fugitive air releases, EPA averaged the total yearly releases from 2019 through 2023 for TRI and 2017 and 2020 for NEI to develop an average annual release estimate. For modeled release estimates, the Agency selected the central tendency and high-end outputs per release media. Annual and daily release estimates are presented as 50th and 95th percentiles. Where available, EPA used NEI, GSs, or ESDs to estimate number of release days, which the Agency used to convert between annual release estimates and daily release estimates. The Agency used CDR (2016, 2020, 2024), TRI (2019–2023), DMR (2019–2023), NEI (2017, 2020), and Monte Carlo modeling data to estimate the number of sites using 1,2-dichloropropane within an OES.

For each OES, EPA develops a conclusion on the weight of scientific evidence supporting the environmental release estimates based on the strengths, limitations, and uncertainties associated with the release estimates. The Agency considers factors that increase or decrease the strength of the evidence

supporting the release estimate—including quality of the data/information, applicability of the release data to the COU (including considerations of temporal relevance, locational relevance), and the representativeness of the estimate across the industry.

The *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) describes EPA's approach and methodology for estimating daily releases and provides detailed facility-level results for each OES.

3.2 Summary of Environmental Releases

3.2.1 Industrial and Commercial

EPA combined its estimates for annual releases, release days, number of facilities, and hours of release per day to estimate a range of daily releases for each OES. Table 3-6 presents a summary of these ranges across facilities. See the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) for additional detail.

Table 3-6. Summary of Environmental Releases by Occupational Exposure Scenario for 1,2-Dichloropropane

OESs	Type of Discharge, [a] Air Emission, [b] or Transfer for Disposal [c]	Estimated Annual Release (kg/site-yr) [d]		Estimated Daily Release (kg/site-day) [e]		Number of Data Points [f]	Number of Facilities [g]	Source(s) [h]
		Central Tendency [i]	High-End	Central Tendency	High-End			
Manufacture (OES #1)	Surface water	92	2,240	0.26	6.4	16	4	2019–2023 TRI
	Surface water	1.6	5.4	4.7E−03	1.6E−02	5	1	2019–2023 DMR
	Fugitive air	159	1,701	0.46	4.9	19	3	2019–2023 TRI
	Fugitive air	291	1,178	0.80	3.2	8	4	2017 and 2020 NEI
	Stack air	65	2,761	0.19	7.9	19	4	2019–2023 TRI
	Stack air	75	2,417	0.21	6.6	8	4	2017 and 2020 NEI
	Land	0.91	109	2.6E−03	0.31	13	4	2019–2023 TRI
Import/ Processing – Repackaging (OES #2)	Surface water	9.7E−02	88	3.9E−04	0.35	17	4	2019–2023 DMR
	Fugitive air	10	126	2.9E−02	0.35	5	3	2017 and 2020 NEI
	Stack air	4.6E−02	50	1.3E−04	0.46	4	4	2017 and 2020 NEI
Processing as a Reactant (OES #3)	Surface water	0.41	9.8	1.2E−03	2.8E−02	161	43	2019–2023 DMR
	Fugitive air	44	268	0.12	0.77	15	3	2019–2023 TRI
	Fugitive air	10	113	2.8E−02	0.31	14	8	2017 and 2020 NEI
	Stack air	29	132	8.4E−02	0.38	15	3	2019–2023 TRI
	Stack air	24	632	6.6E−02	1.8	18	11	2017 and 2020 NEI
	Land	0.91	1.3	2.6E−03	3.8E−03	2	1	2019–2023 TRI
Processing Aid – Non-Incorporative Activities (OES #4)	Surface water	3.9	4.2	1.3E−02	1.4E−02	2	1	2019–2023 DMR
	Surface water	28	39	9.3E−02	0.13	5	1	2019–2023 TRI
	Fugitive air	1,497	1,686	5.0	5.6	5	1	2019–2023 TRI
	Fugitive air	1.8	19	5.9E−03	6.1E−02	20	13	2017 and 2020 NEI
	Stack air	228	1,686	0.76	5.6	5	1	2019–2023 TRI
	Stack air	3.7	24	1.2E−02	8.0E−02	71	44	2017 and 2020 NEI

OESs	Type of Discharge, [a] Air Emission, [b] or Transfer for Disposal [c]	Estimated Annual Release (kg/site-yr) [d]		Estimated Daily Release (kg/site-day) [e]		Number of Data Points [f]	Number of Facilities [g]	Source(s) [h]
		Central Tendency [i]	High-End	Central Tendency	High-End			
Commercial Use as a Laboratory Chemical (OES #5)	Surface water	4.1E−03	9.0E−03	1.6E−05	3.5E−05	3	1	2019–2023 DMR
	Fugitive air	2.5E−05		7.2E−08		2	1	2017 and 2020 NEI
	Fugitive Air or Stack Air	3.9E−02	18	1.7E−04	7.8E−02	–	–	Environmental release modeling [k]
	Uncertain Media (Total):	0.91	645	4.0E−03	2.8			
	If Uncertain is Incineration	9.1E−05	6.5E−02	4.0E−07	2.8E−04			
	If Uncertain is Landfill	0.91	645	4.0E−03	2.8			
Disposal to Incineration (OES #7)	Surface water	0.11	0.96	4.3E−04	3.8E−03	12	3	2019–2023 DMR
	Fugitive air	5.9E−02	0.78	2.4E−04	3.1E−03	9	5	2019–2023 TRI
	Fugitive air	5.7E−03	1.3	2.2E−05	5.1E−03	8	6	2017 and 2020 NEI
	Stack air	9.1E−03	0.14	3.6E−05	5.6E−04	9	4	2019–2023 TRI
	Stack air	1.3E−02	0.22	5.3E−05	8.5E−04	39	34	2017 and 2020 NEI
Disposal to Landfill (OES #8)	Surface water	5.9E−02	0.16	2.4E−04	6.4E−04	16	4	2019–2023 DMR
	Fugitive air	3.1	18	1.2E−02	6.7E−02	1,028	552	2017 and 2020 NEI
	Stack air	0.30	8.5	1.0E−03	3.4E−02	304	186	2017 and 2020 NEI
Disposal to POTW (OES #9)	Surface water	2.2	29	6.1E−03	7.9E−02	229	99	2019–2023 DMR
	Fugitive air	0.11	18	3.0E−04	5.0E−02	24	16	2017 and 2020 NEI
	Stack air	5.4E−04	8.2E−03	1.6E−06	2.2E−05	429	225	2017 and 2020 NEI
Disposal to Non-POTW WWT (OES #10)	Surface water	5.6E−02	1.5	2.2E−04	6.1E−03	48	9	2019–2023 DMR
	Fugitive air	37	40	0.11	0.14	6	3	2017 and 2020 NEI
	Stack air	8.1		2.2E−02		2	1	2017 and 2020 NEI
Remediation (OES #11)	Surface water	4.4E−02	0.60	1.8E−04	2.4E−03	23	5	2019–2023 DMR
	Fugitive air	1.4	8.1	5.7E−03	2.3E−02	5	4	2017 and 2020 NEI
Facilities Not Mapped to a COU/OES (Misc.) [j]	Surface water	4.0E−02	1.9	1.6E−04	7.5E−03	88	30	2019–2023 DMR
	Fugitive air	0.25	1,272	9.9E−04	5.1	6	4	2017 and 2020 NEI
	Stack air	3.7E−02	1,223	1.5E−04	4.9	11	7	2017 and 2020 NEI
Non-COU/OES (Impurity in Plastics) [j]	Surface water	0.36	7.3	1.0E−03	2.1E−02	46	13	2019–2023 DMR
	Surface water	11		3.2E−02		1	1	2019–2023 TRI
	Fugitive air	2.3	23	6.6E−03	6.2E−02	5	4	2017 and 2020 NEI
	Stack air	5.1E−02	33	1.4E−04	9.2E−02	12	7	2017 and 2020 NEI
Non-COU/OES (Combustion-Related) [j]	Fugitive air	1.8E−02	1.3	8.0E−05	4.1E−03	822	542	2017 and 2020 NEI
	Stack air	0.35	24	1.6E−03	9.0E−02	3,299	2,068	2017 and 2020 NEI

CDR = Chemical Data Reporting; COU = condition of use; DMR = Discharge Monitoring Report; ESD = emission scenario document; GS = generic scenario; NEI = National Emissions Inventory; OES = occupational exposure scenario; POTW = publicly owned treatment works; TRI = Toxics Release Inventory; WWT = wastewater treatment

[a] Direct discharge to surface water; indirect discharge to non-POTW WWT; indirect discharge to POTW

OESs	Type of Discharge, [a] Air Emission, [b] or Transfer for Disposal [c]	Estimated Annual Release (kg/site-yr) [d]		Estimated Daily Release (kg/site-day) [e]		Number of Data Points [f]	Number of Facilities [g]	Source(s) [h]
		Central Tendency [i]	High-End	Central Tendency	High-End			

[b] Emissions via fugitive air, stack air, or treatment via incineration
[c] Transfer to surface impoundment, land application, or landfills
[d] For modeled results, the presented central tendency and high-end are the 50th and 95th percentile values of the modeled distribution. For programmatic data, the presented central tendency is calculated from the median reported release amounts and high-end from the reported maximum release amounts. The specific central tendency and high-end values presented depends on the number of sites with programmatic data. For databases with 6 or more reporting facilities, EPA estimated central tendency and high-end releases using the 50th and 95th percentile values, respectively. For 3–5 facilities, EPA estimated the central tendency and high-end releases using the 50th percentile and maximum values, respectively. For 2 sites, EPA presented the midpoint and the maximum value. Finally, EPA presented sites with only 1 data point as-is from the programmatic database.
[e] Where available, EPA used peer-reviewed literature (*e.g.,* GSs or ESDs) to provide a basis to estimate the number of release days of 1,2-dichloropropane within a COU.
[f] Data points represent the total number of reports submitted during the years included in the assessment.
[g] Where available, EPA used the 2020 CDR (U.S. EPA, 2020b), NEI (U.S. EPA, 2023a), DMR (U.S. EPA, 2024c), and TRI databases (U.S. EPA, 2024b), 2020 U.S. County Business Practices (U.S. Census Bureau, 2022), and Monte Carlo models to estimate the number of sites that use 1,2-dichloropropane for each COU. Some modeled OES calculated the number of facilities/sites, presented as 50th and 95th percentiles. Other modeled OESs set the number of facilities deterministically, presented as one value.
[h] EPA used the 2017 and 2020 NEI (U.S. EPA, 2023a), 2019–2023 DMR (U.S. EPA, 2024c), and 2019–2023 TRI databases (U.S. EPA, 2024b).
[i] The central tendency values for NEI air were calculated using the median of the reported releases at each site.
[j] There were 2,485 facilities not mapped to an OES with 1,2-dichloropropane releases that EPA was unable to map due to the lack of information regarding the activity of 1,2-dichloropropane at the site. These sites do not fit in any of the 1,2-dichloropropane OESs because they are mainly hotels, businesses, and various chemical facilities where 1,2-dichloropropane use is unknown. See Section 4.2.13 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) for more details on non-COU/OES categories.
[k] There is uncertainty in the throughput amounts (kg/site-yr) for modeling of releases for use as a laboratory chemical which may be higher than at sites that reported release data.

EPA prepared qualitative release assessments for two of the OESs—Commercial Use of Stone Waxes, Polishes, and Cleaners; and Distribution in Commerce—which are presented below in Table 3-7.

Table 3-7. Qualitative Release Assessment by Occupational Exposure Scenario for 1,2-Dichloropropane

OES	Qualitative Release Assessment
Commercial Use of Stone Waxes, Polishes, and Cleaners (OES #6)	Due to the uncertainty and lack of evidence for the use of these types of products in the commercial setting, EPA is providing a qualitative release assessment for this OES. The Commercial Use of Cleaning and Furnishing Care Product COU includes three subcategories: (1) – All-Purpose Waxes and Polishes; (2) – All-Purpose Liquid Cleaner/Polish; and (3) – All-Purpose Liquid Spray Cleaner. For household application settings, the quantities of product used are relatively small. Compared with applications in commercial buildings, household applications are expected to involve smaller treatment areas and lower product throughput and therefore result in lower releases of 1,2-dichloropropane.

OES	Qualitative Release Assessment
	1,2-Dichloropropane is a volatile solvent and is not intended to remain on treated surfaces following application. Fugitive emissions to indoor air during and after application are expected to be the primary release pathway and may result in inhalation exposures for workers and occupational non-users (See Section 5.1.1.2). EPA assumes that essentially all of the 1,2-dichloropropane used is released to air. Minor releases may also occur from residual product remaining in containers, which are expected to be disposed of with general municipal waste. Limited releases to publicly owned treatment works (POTWs) may also occur from rinsing treated surfaces or from cleaning application materials (*e.g.*, rags or other equipment used to apply the product). EPA did not further assess general population and ecological exposures for this OES.
Distribution in Commerce (OES #12)	EPA expects that 1,2-dichloropropane and 1,2-dichloropropane-containing products are distributed throughout commerce from manufacturing sites to repackaging sites, processing as a reactant or formulation sites, and then to other downstream end use sites. Activities associated with loading and unloading chemical products were assessed as part of each COU's OES. It is possible that 1,2-dichloropropane may go through a third party for temporary storage/warehousing before distribution to users. If repackaging takes place at these facilities involving transfer from larger to smaller containers, EPA assessed this under the OES of repackaging. Transport containers are not expected to be opened during transport between producing and receiving sites.

Table 3-8, Table 3-9, and Table 3-10 provide data for release trends over the reporting years included in this draft risk evaluation.

Table 3-8. 1,2-Dichloropropane TRI Release Trends for Reporting Years 2019–2023

Reporting Year	Air (kg/yr)			Water (kg/yr)			Land (kg/yr)
	Fugitive	Stack	Fugitive and Stack	On-Site Discharge	Transfer to POTW	Transfer to WWT (Non-POTW)	
2023	3,310	2,527	5,837	–	–	1,124	218
2022	3,823	2,426	6,248	85	–	1,885	45
2021	4,755	3,533	8,288	99	–	573	5
2020	3,561	4,840	8,401	44	–	3,306	2
2019	4,018	4,124	8,141	540	–	488	6

POTW = publicly owned treatment works; TRI = Toxics Release Inventory (U.S. EPA, 2024b); WWT = wastewater treatment plant

Table 3-9. 1,2-Dichloropropane NEI Release Trends for Reporting Years 2017 and 2020

Reporting Year	Stack Air (kg/yr)	Fugitive Air (kg/yr)	Fugitive and Stack Air (kg/yr)
2020	6,851	16,915	23,767
2017	7,153	17,626	24,779
NEI = National Emissions Inventory (U.S. EPA, 2023a)			

Table 3-10. 1,2-Dichloropropane DMR Release Trends for Reporting Years 2019–2023

Reporting Year	Annual Releases to Surface Water (kg/yr)
2023	304
2022	715
2021	938
2020	532
2019	572
DMR = Discharge Monitoring Report (U.S. EPA, 2024c)	

3.2.2 Weight of Scientific Evidence Conclusions for Environmental Releases from Industrial and Commercial Sources

For each OES, the Agency considered the assessment approach, the quality of the data and models, and the uncertainties in the assessment results to determine a level of confidence for the environmental release estimates. Table 3-11 provides EPA's weight of scientific evidence rating for each OES.

Table 3-11. Summary of Overall Confidence in Environmental Release Estimates by OES

OES	Weight of Scientific Evidence Conclusion in Release Estimate	Confidence Rating
Manufacture (OES #1)	***Evidence Found:*** For this OES, EPA had release information from water, land, and air from TRI, water from DMR, and air from NEI. ***Strengths:*** Water releases are assessed using reported releases from 2019–2023 DMR and TRI. These databases received a medium to high data quality rating in systematic review. The primary strength of TRI data are that TRI compiles the best readily available release data for all reporting facilities. Based on reporting thresholds, TRI captures the highest throughput sites. Since releases are related to throughput, this increases confidence that the highest emitters are captured in this assessment. Air releases are assessed using reported releases from 2019–2023 TRI, and 2017 and 2020 NEI. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. ***Limitations/Assumptions/Uncertainties:*** Factors that decrease the overall confidence for the water estimates include the uncertainty in the accuracy of reported releases, and uncertainty in mapping sites in DMR and TRI to the Manufacturing OES. Most facilities only report NAICS or SIC codes; therefore, it is uncertain whether the site performs manufacturing or another chemical process, such as processing as a reactant. Factors that decrease the overall confidence for the air estimates include the uncertainty in the accuracy of reported releases, and the limitations in representativeness to all sites because TRI and NEI may not capture all relevant sites. In some cases, operating days were reported by facilities in NEI. Otherwise, EPA made assumptions on the number of operating days to estimate daily releases. Factors that decrease the overall confidence for the land release estimates include the uncertainty in the accuracy of reported releases, and the limitations in representativeness to all sites because TRI may not capture all relevant sites. ***Weight of Scientific Evidence Conclusion:*** Although there is uncertainty of whether the databases capture all sites releasing to each medium, the release data are rated medium to high in systematic review and provide releases directly from four manufacturing facilities. EPA has concluded that the weight of scientific evidence for this assessment provides robust confidence in the estimate of releases.	Robust
Import/Processing –Repackaging (OES #2)	***Evidence Found:*** For this OES, EPA had release information from nine reporting facilities. Water release data was available from DMR and air release data was available from NEI. Air, land, and water release information from TRI were not available. ***Strengths:*** Water releases are assessed using reported releases from 2019–2023 DMR, which received a medium data quality rating in systematic review. Air releases are assessed using reported releases from 2017	Moderate-to-Robust

OES	Weight of Scientific Evidence Conclusion in Release Estimate	Confidence Rating
	and 2020 NEI. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. ***Limitations/Assumptions/Uncertainties:*** There is uncertainty in mapping sites to DMR as most facilities only report NAICS or SIC codes; therefore, it is uncertain what type of chemical process the site performs (manufacturing, processing as a reactant, etc.). Based on other reporting databases (NEI), there are 5 additional sites that report releases to other media but do not report releases to water. ***Weight of Scientific Evidence Conclusion:*** EPA has concluded that the weight of scientific evidence for this assessment provides a moderate to robust confidence in the estimate of releases.	
Processing as a Reactant (OES #3)	***Evidence Found:*** For this OES, EPA had release information for air and land from TRI, water from DMR, and air from TRI and NEI. ***Strengths:*** Water releases are assessed using reported releases from 2019–2023 DMR, which has a medium overall data quality determination from the systematic review process. The water release assessment is based on 43 reporting sites. Air releases are assessed using reported releases from 2019–2023 TRI as well as 2017 and 2020 NEI. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. ***Limitations/Assumptions/Uncertainties:*** There is uncertainty in mapping sites to TRI and DMR as most facilities only report NAICS code; therefore, it is uncertain what type of chemical process the site performs (manufacturing, processing as a reactant, etc.). Based on other reporting databases (NEI and TRI), there are 14 additional sites that report releases to other media but do not report releases to water. Factors that decrease the overall confidence for this OES include the uncertainty in the accuracy of reported releases and the limitations in representativeness to all sites because TRI and NEI may not capture all relevant sites. Based on other reporting databases (DMR), there are 42 additional sites that report releases to other media but do not report releases to air. The primary limitation of the land release estimates is that the assessment is based on three reporting sites and EPA did not have additional sources to estimate land releases from this OES. Based on other reporting databases (DMR, NEI, TRI), there are 70 additional sites that report releases to other media but do not report releases to land. ***Weight of Scientific Evidence Conclusion:*** Although there is uncertainty of whether the databases capture all sites releasing to each medium, the release data are rated medium to high in systematic review and provide releases directly from a wide number of facilities (55 sites) that process 1,2-dichloropropane as a reactant, EPA	Moderate-to-Robust

OES	Weight of Scientific Evidence Conclusion in Release Estimate	Confidence Rating
	has concluded that the weight of scientific evidence for this assessment provides a moderate-to-robust estimate of releases.	
Processing Aid – Non-Incorporative Activities (OES #4)	***Evidence Found:*** For this OES, EPA had release information for air and water from TRI, water from DMR, and air from NEI. ***Strengths:*** Water releases are assessed using reported releases from 2019–2023 DMR, which has a medium overall data quality determination from the systematic review process. Air releases are assessed using reported releases from 2019–2023 TRI as well as 2017 and 2020 NEI and are based on 49 reporting sites. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. ***Limitations/Assumptions/Uncertainties:*** There is uncertainty in mapping sites to DMR as most facilities only report NAICS code; therefore, it is uncertain what type of chemical process the site performs (manufacturing, processing as a reactant, etc.). Based on other reporting databases (NEI and TRI), there are 48 additional sites that report releases to other media but do not report releases to water. Factors that decrease the overall confidence for this OES include the uncertainty in the accuracy of reported releases and the limitations in representativeness to all sites because TRI, DMR, and NEI may not capture all relevant sites. ***Weight of Scientific Evidence Conclusion:*** Although there is uncertainty of whether the databases capture all sites releasing to each medium, the release data are rated medium to high in systematic review and provide releases directly from a wide number of facilities (50 sites) that use 1,2-dichloropropane as a processing aid, EPA has concluded that the weight of scientific evidence for this assessment provides a moderate-to-robust estimate of releases.	Moderate-to-Robust
Commercial Use as a Laboratory Chemical (OES #5)	***Evidence Found:*** EPA identified two facilities reporting water and air releases of 1,2-dichloropropane potentially related to laboratory use. Based on the limited data, releases to the environment are also assessed using EPA/OPPT models combined with Monte Carlo modeling to estimate releases to the environment. ***Strengths:*** The Agency used assumptions and parameters from the GS on the Use of Laboratory Chemicals, which has a high data quality rating from the systematic review process (U.S. EPA, 2023d). A strength of the Monte Carlo modeling approach is that variation in model input values and a range of potential releases values is more likely than a discrete value to capture actual releases at sites. EPA has more certainty regarding the use of 1,2-dichloropropane for this OES from safety data sheets (SDSs) and combines that with the facility release data available and supporting evidence from the model.	Moderate

OES	Weight of Scientific Evidence Conclusion in Release Estimate	Confidence Rating
	Limitations/Assumptions/Uncertainties: The primary limitation is the uncertainty in the representativeness of values toward the true distribution of potential releases. In addition, EPA lacks 1,2-dichloropropane laboratory chemical throughput data; therefore, throughput estimates are based on stock solution throughputs from the GS on the Use of Laboratory Chemicals and on CDR reporting thresholds. EPA assumed that the media of release for disposal of laboratory waste is to hazardous waste landfill or incineration, per the GS. ***Weight of Scientific Evidence Conclusion:*** EPA concluded that the weight of scientific evidence for this assessment provides a moderate estimate of releases.	
Commercial Use of Stone Waxes, Polishes, and Cleaners (OES #6)	EPA did not identify any facility that reported environmental release data from TRI, DMR or NEI that could be mapped to this OES. Due to the uncertainty and lack of evidence for the commercial use of these types of products, EPA is providing a qualitative release assessment for this OES.	Not applicable
Disposal to Incineration (OES #7)	***Evidence Found:*** For this OES, EPA had release information for water from DMR and TRI, and for air from TRI and NEI. Overall, EPA had release information from 40 reporting sites. ***Strengths:*** Water releases for incineration sites are assessed using reported releases from 2019–2023 DMR. A strength of using DMR data and the Pollutant Loading Tool is that the tool calculates an annual pollutant load by integrating monitoring period release reports provided to the EPA and extrapolating over the course of the year. Air releases for incineration sites are assessed using reported releases from 2019–2023 TRI as well as the 2017 and 2020 NEI. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. Based on reporting thresholds, TRI captures the highest throughput sites. Since releases are related to throughput, this increases confidence that the highest emitters are captured in this assessment. ***Limitations/Assumptions/Uncertainties:*** The DMR approach assumes average quantities, concentrations, and hydrologic flows for a given period are representative of other times of the year. In some cases, operating days were reported by facilities in NEI. Otherwise, EPA made assumptions on the number of operating days to estimate daily releases. Factors that decrease the confidence for this OES include the uncertainty in the accuracy of reported releases, and the limitations in representativeness to all sites because TRI and NEI may not capture all relevant sites. ***Weight of Scientific Evidence Conclusion:*** EPA has concluded that the weight of scientific evidence for this assessment provides a moderate-to-robust estimate of releases.	Moderate-to-Robust

OES	Weight of Scientific Evidence Conclusion in Release Estimate	Confidence Rating
Disposal to Landfill (OES #8)	***Evidence Found:*** For this OES, EPA had release information for water from DMR and air from NEI. ***Strengths:*** Water releases for landfill sites are assessed using reported releases from 2019–2023 DMR. A strength of using DMR data and the Pollutant Loading Tool is that the tool calculates an annual pollutant load by integrating monitoring period release reports provided to the EPA and extrapolating over the course of the year. Air releases for landfill sites are assessed using reported releases from 2019–2023 TRI as well as the 2017 and 2020 NEI. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. ***Limitations/Assumptions/Uncertainties:*** The DMR approach assumes average quantities, concentrations, and hydrologic flows for a given period are representative of other times of the year. In some cases, operating days were reported by facilities in NEI. Otherwise, EPA made assumptions on the number of operating days to estimate daily releases. Factors that decrease the confidence for this OES include the uncertainty in the accuracy of reported releases, and the limitations in representativeness to all sites because NEI may not capture all relevant sites. ***Weight of Scientific Evidence Conclusion:*** Although there is uncertainty of whether the databases capture all sites releasing to each medium, the release data are rated medium to high in systematic review and provide releases directly from a wide number of landfill facilities (623 sites), EPA has concluded that the weight of scientific evidence for this assessment provides a moderate-to-robust estimate of releases.	Moderate-to-Robust
Disposal to POTW (OES #9)	***Evidence Found:*** For this OES, EPA had release information for air from 2017 and 2020 NEI and for water from 2019–2023 DMR. ***Strengths:*** A strength of using DMR data and the Pollutant Loading Tool is that the tool calculates an annual pollutant load by integrating monitoring period release reports provided to the EPA and extrapolating over the course of the year. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. ***Limitations/Assumptions/Uncertainties:*** The DMR approach assumes average quantities, concentrations, and hydrologic flows for a given period are representative of other times of the year. In some cases, operating days were reported by facilities in NEI. Otherwise, EPA made assumptions on the number of operating days to estimate daily releases. Factors that decrease the confidence for this OES include the uncertainty in the accuracy of reported releases, and the limitations in representativeness to all sites because NEI may not capture all relevant sites. ***Weight of Scientific Evidence Conclusion:*** Although there is uncertainty of whether the databases capture all sites releasing to each medium, the release data are rated medium to high in systematic review and provide	Moderate-to-Robust

OES	Weight of Scientific Evidence Conclusion in Release Estimate	Confidence Rating
	releases directly from a wide number of POTW facilities (338 sites). For POTW releases, EPA has concluded that the weight of scientific evidence for this assessment provides a moderate-to-robust estimate of releases.	
Disposal to Non-POTW WWT (OES #10)	***Evidence Found:*** For this OES, EPA had release information for air from 2017 and 2020 NEI and for water from 2019–2023 DMR. Overall, EPA had release information from 12 reporting sites. ***Strengths:*** A strength of using DMR data and the Pollutant Loading Tool is that the tool calculates an annual pollutant load by integrating monitoring period release reports provided to the EPA and extrapolating over the course of the year. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. ***Limitations/Assumptions/Uncertainties:*** The DMR approach assumes average quantities, concentrations, and hydrologic flows for a given period are representative of other times of the year. In some cases, operating days were reported by facilities in NEI. Otherwise, EPA made assumptions on the number of operating days to estimate daily releases. Factors that decrease the confidence for this OES include the uncertainty in the accuracy of reported releases, and the limitations in representativeness to all sites because NEI may not capture all relevant sites. ***Weight of Scientific Evidence Conclusion:*** Although there is uncertainty of whether the databases capture all sites releasing to each medium, the release data are rated medium to high in systematic review. For non-POTW WWT releases, EPA has concluded that the weight of scientific evidence for this assessment provides a moderate-to-robust estimate of releases.	Moderate-to-Robust
Remediation (OES #11)	***Evidence Found:*** For this OES, EPA had release information for air from 2017 and 2020 NEI and for water from 2019–2023 DMR. Overall, EPA identified nine reporting sites. ***Strengths:*** A strength of using DMR data and the Pollutant Loading Tool is that the tool calculates an annual pollutant load by integrating monitoring period release reports provided to the EPA and extrapolating over the course of the year. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. Factors that decrease the confidence for this OES include the uncertainty in the accuracy of reported releases, and the limitations in representativeness to all sites because NEI may not capture all relevant sites. ***Limitations/Assumptions/Uncertainties:*** The DMR approach assumes average quantities, concentrations, and hydrologic flows for a given period are representative of other times of the year. In some cases, operating days were reported by facilities in NEI. Otherwise, EPA made assumptions on the number of operating days to estimate daily releases.	Moderate-to-Robust

OES	Weight of Scientific Evidence Conclusion in Release Estimate	Confidence Rating
	Weight of Scientific Evidence Conclusion: EPA has concluded that the weight of scientific evidence for this assessment provides a moderate-to-robust estimate of releases.	

CDR = Chemical Data Reporting; COU = condition of use; DMR = Discharge Monitoring Report; GS = generic scenario; NEI = National Emissions Inventory; OES = occupational exposure scenario; POTW = publicly owned treatment works; TRI = Toxics Release Inventory; WWT = wastewater treatment

1217

3.3 Summary of Concentrations of 1,2-Dichloropropane in the Environment

Based on the environmental release assessment summarized in Section 3.2 and presented in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e), 1,2-dichloropropane is released to the environment via air, water, biosolids, and disposal to landfills. Environmental media concentrations of 1,2-dichloropropane were quantified in ambient air, soil from biosolids application, surface water, and sediment. Additional analysis of surface water used as drinking water was conducted for the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u).

Ambient air concentrations of 1,2-dichloropropane were estimated using the Integrated Indoor-Outdoor Air Calculator (IIOAC) and Human Exposure Model (HEM), as described in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). Soil concentrations resulting from land application of biosolids were estimated using a screening method that incorporated SimpleTreat 4.0 and a European Chemicals Agency (ECHA) guidance document (ECHA, 2016; RIVM, 2015). Soil pore water concentrations were calculated using a modified equilibrium partitioning methodology (Fuchsman, 2003). As described in Section 8.1 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e), air deposition to soil and water is not expected at levels of concern and therefore was not quantitatively assessed in this draft risk evaluation.

1,2-Dichloropropane is reported to be released to surface water a portion will remain in water due to its water solubility (2,740 mg/L) (U.S. EPA, 2026e). For estimates of 1,2-dichloropropane in surface water, EPA utilized facility-specific releases from TRI and DMR and site-specific receiving water flow data. The availability of reported facility releases provides EPA the data to conduct representative estimates of 1,2-dichloropropane surface water concentrations resulting from COUs.

EPA also conducted a literature search to identify concentrations of 1,2-dichloropropane reported in peer-reviewed and gray literature sources. Where applicable, the Agency compared relevant monitored and modeled concentrations to support the use of the modeled concentrations.

3.3.1 Ambient Air Pathway

The Agency estimated ambient air concentrations using releases from three separate datasets: (1) EPA-estimated releases from generic facilities/sites (*i.e.,* where there was no site-specific location data); (2) TRI facility-reported releases; and (3) NEI facility-reported releases. TRI provides annual facility aggregated release data. For this analysis, EPA considered TRI release data from the years 2019 to 2023 and used these data as inputs to HEM5.0. TRI reporters may report either with a Form R or a Form A. To use Form A, reporters must release less than 500 lb/year, and facilities do not need to report release quantities or uses/sub-uses on Form A. Due to uncertainties in the actual amount released by Form A-reporting facilities, EPA included only TRI reporting Form R submissions in this analysis. For NEI data, EPA considered releases from the years 2017 and 2020 in this analysis and used these data as inputs to HEM5.0. For some facilities, release data from TRI and NEI can be the same, but there are often differences between the two datasets due to differences in reporting requirements. Additionally, NEI has a lower reporting threshold than TRI and therefore might capture more facilities and OESs (Section 3.2.1). The results of the modeling of TRI and NEI data were used as two separate lines of evidence in conjunction to inform the overall preliminary risk characterization.

Based on the ambient air exposure analysis performed for the *Risk Evaluation for 1,1-Dichloroethane* (U.S. EPA, 2025b) and *Risk Evaluation for 1,2-Dichloroethane* (U.S. EPA, 2026ak), EPA did not

perform a tiering analysis for 1,2-dichloropropane. For both 1,1-dichloroethane and 1,2-dichloroethane, the tiering analysis resulted in the Agency using the most refined approach available at the time because cancer risk estimates above 1×10^{-6} were found in the lower-tier analyses. Because 1,2-dichloropropane has a similar inhalation unit risk (IUR) as 1,1-dichloroethane and 1,2-dichloroethane, and because reported releases of 1,2-dichloropropane to air are similar to those of 1,1-dichloroethane, EPA only performed the highest-tier of exposure analysis available. Therefore, for this analysis, the Agency estimated ambient air concentrations of 1,2-dichloropropane for TRI- and NEI-releasing facilities using HEM5.0. For EPA-estimated releases for OESs where facility-specific data were either not available or limited, the Agency ran the Integrated Indoor-Outdoor Air Calculator (IIOAC) Model.

In this draft risk evaluation, EPA used HEM5.0 to estimate ambient air concentrations from all modeled reported releases. HEM5.0 is the highest tier model currently used by the Agency for estimating ambient air concentrations from industrial point and area sources. For each release, EPA calculated the 10th, 50th, and 95th percentile annual average ambient air concentrations at distances from 10 to 50,000 m from the release location. Where available, EPA used site-specific data associated with the releasing facility, as reported in TRI and/or NEI for which data sources were available for each OES (see the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) for a full description of the HEM5.0 methodology).

For OESs where there were no site-specific location or limited facility-reported data (*i.e.,* OESs where EPA used estimated releases from generic facilities/sites as inputs for modeling of ambient air concentrations), EPA used IIOAC to estimate ambient air concentrations. EPA ran IIOAC using one set of meteorological data (Lake Charles, Louisiana) and two land use settings: urban (for modeling stack releases) and rural (for modeling fugitive releases). This was based on the recommendations within the IIOAC User Guide (U.S. EPA, 2019c) for conservative high-end modeled concentration. See the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) for more details.

EPA also modeled ambient air concentrations for OESs where there were no reported releases (see the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) for a full description of the modeled releases where there were no site-specific location data).

3.3.2 Surface Water and Aquatic Sediment Pathways

For the evaluation of surface water and aquatic sediment, EPA considered two lines of evidence: (1) results of modeling of facility-specific releases to surface water, and (2) review of available monitoring data. The Agency modeled 1,2-dichloropropane concentrations in surface water and aquatic sediment resulting from facility-specific releases from COUs (COUs presented in Table 1-1). Twelve OESs supporting the COUs had facility-specific release information in DMR databases that were used for the facility-specific modeling.

3.3.2.1 Surface Water

As described in detail in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e), EPA collected facility-reported releases of 1,2-dichloropropane to surface receiving water bodies as reported to TRI and DMR databases for the years 2019 to 2023. For the water pathway, different hydrological flow rates were used to estimate 1,2-dichloropropane surface water concentrations for different exposure scenarios (Table 3-12).

The surface water concentrations based on 30Q5 flows (lowest 30-day average flow that occurs in a 5-year period) are used to estimate acute, incidental human exposure through swimming or recreational

contact. The surface water concentration based on harmonic mean flows provide a more conservative estimate as compared to annual average flows and are therefore preferred for assessing potential chronic human exposure via drinking water. The harmonic mean is also used for estimating human exposure through fish ingestion because it takes time for chemical concentrations to accumulate in fish. Lastly, for aquatic or ecological exposure, a 7Q10 flow (lowest 7-day average flow that occurs [on average] in a 10-year period) is used to estimate exceedances of concentrations of concern for aquatic life (U.S. EPA, 1991c). EPA estimated surface water concentrations per facility and mapped it to its corresponding OES.

The Agency followed a tiered approach for estimating surface water concentrations. The criteria for tiering were based on the specific needs of estimating exposures to environmental biota. These tiers are described in more detail in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) for facility-specific data and generally required the estimation of provisional risk estimates to determine if these estimates were below benchmark for aquatic species and therefore informed whether refined analysis were necessary.

Table 3-12. 1,2-Dichloropropane Surface Water Estimates per OES for Various Flow Metrics

Scenario/OES	Reported Release (kg/yr)	Release Scenario (days)	Release Estimate (kg/day)	7Q10 Flow (mld)	30Q5 Flow (mld)	Harmonic Mean Flow (mld)	7Q10 Conc. (µg/L)	30Q5 Conc. (µg/L)	Harmonic Mean Conc. (µg/L)
Manufacture [a] (WV0002496)	6.0	21	0.29	6.0E04	7.5E04	1.6E05	4.8E−03	3.8E−03	1.8E−03
		350	1.7E−02				2.9E−04	2.3E−04	1.1E−04
Processing as a Reactant [c] (IL0000141)	7.0	21	0.34	N/A	N/A	N/A	5	5	5
		350	2.0E−02				5	5	5
Processing as a Reactant [b] (KY0003701)	8.2	21	0.39	5.1	5.1	5.1	77	77	77
		350	2.3E−02				4.6	4.6	4.6
Processing Aid [a] (NY0001643)	4.3	21	0.20	1,530	2,190	4,395	1.3E−01	9.3E−02	4.6E−02
		300	1.4E−02				9.3E−03	6.5E−03	3.2E−03
Use of Laboratory Chemical [b] (LA0108936)	9.6E−03	21	4.6E−04	1.9	1.9	1.9	2.4E−01	2.4E−01	2.4E−01
		260	3.7E−05				2.0E−02	2.0E−02	2.0E−02
Repackaging [a] (IL0005126)	427.4	21	20	438	654	949	46	31	21
		250	1.7				3.9	2.6	1.8
Waste Handling, Treatment, and Disposal [a] (POTW) (PA0046426)	358.7	21	17	57	91	187	300	187	91
		365	0.98				17	11	5.3

Scenario/OES	Reported Release (kg/yr)	Release Scenario (days)	Release Estimate (kg/day)	7Q10 Flow (mld)	30Q5 Flow (mld)	Harmonic Mean Flow (mld)	7Q10 Conc. (µg/L)	30Q5 Conc. (µg/L)	Harmonic Mean Conc. (µg/L)
Waste Handling, Treatment, and Disposal [a] (Non-POTW WWT) (NV0022888)	0.67	21	3.2E−02	3.3	3.3	3.3	9.8	9.8	9.8
		250	2.7E−03				0.82	0.82	0.82
Waste Handling, Treatment, and Disposal [a] (Landfill) (MO0099503)	4.8E−02	21	2.3E−03	1.3	2.3	3.1	1.8	1.0	0.74
		250	1.9E−04				0.16	8.5E−02	6.2E−02
Waste Handling, Treatment, and Disposal [a] (Incineration) (MO0111686)	0.929	21	4.4E−02	0.56	1.1	1.8	79	42	25
		250	3.7E−03				6.7	3.6	2.1
Waste Handling, Treatment, and Disposal [c] (Remediation) (NV0024232)	4.5E−02	21	2.2E−03	N/A	N/A	N/A	0.50	0.50	0.50
		250	1.8E−04						
Not mapped to OES [b] (NN0030343)	0.111	21	5.3E−03	4.9E−02	4.9E−02	4.9E−02	108	108	108
		250	4.5E−04				9.1	9.1	9.1

7Q10 = the modeled lowest consecutive 7 days flow over 10 years, in MLD (million L per day); 30Q5 = the lowest monthly average flow from NHD, in MLD; OES = occupational exposure scenario; POTW = publicly owned treatment works; WWT = wastewater treatment

[a] Concentration calculations based on flows in NHDPlus (receiving water body flows) (Tier 1).

[b] Concentration calculations based on facility effluent/plant flow that were greater than receiving water body flows that were reported in NHDPlus (Tier 1).

[c] Concentration from ECHO measured effluent (Tier 2).

3.3.2.2 Aquatic Sediment

EPA used a higher tier model, the U.S. EPA's Variable Volume Water Model with Point Source Calculator tool (VVWM-PSC), to estimate concentrations of 1,2-dichloropropane within water column and sediment for the COU/OES resulting in the highest surface water concentration (Disposal/Waste Handling, Treatment, and Disposal [POTW]) associated with the 7Q10 hydrologic flow metric. 7Q10 flow metric and the corresponding surface water concentrations are utilized for the aquatic species assessment. Selecting the highest surface water concentration across all facilities releasing 1,2-dichloropropane to surface waters from 2019 to 2023 identifies the highest exposures and provides a screening analysis for sediment-dwelling organisms. These receiving water body concentrations and corresponding sediment and pore water concentrations represented an upper bound of 1,2-dichloropropane concentrations in these media (Table 3-13).

Table 3-13. Point Source Calculator Water and Benthic Sediment Concentration Estimates in the Receiving Water Body, Applying a 7Q10 Flow

COU	Scenario/OES	Release Estimate (kg/day)	Release Days	7Q10 Conc. (µg/L)	7Q10 Flows (m^3/day)	Benthic Pore Water Conc. (µg/L)	Sediment Conc. (µg/kg)
Disposal	Waste handling, Treatment, and Disposal [a] (POTW) (PA0046426)	0.98	365	PSC water column: 17.3	6.0E04	11	5.0
Disposal	Waste Handling, Treatment, and Disposal [a] (POTW) (PA0046426)	17	21	PSC water column at 21 days: 300	6.0E04	73	32

7Q10 = lowest consecutive 7 days flow over 10 years in MLD (million L per day); 30Q5 = the lowest monthly average flow from NHD, in MLD; Conc. = concentration; COU = condition of use; OES = occupational exposure scenario; POTW = publicly owned treatment works
In PSC: added 21 days in user-defined ecotox scenario to estimate 1,2-dichloropropane concentrations in water column, pore water, and sediment at 21 days.
[a] Concentration calculations based on flows in NHDPlus

3.3.3 Land Pathway (Soils, Groundwater, and Biosolids)

There were limited measured concentration data for 1,2-dichloropropane in biosolids. The 1998 National Sludge Survey (NSSS) did not identify concentrations of 1,2-dichloropropane in sludge (U.S. EPA, 1996). Estimates of 1,2-dichloropropane concentrations in biosolids were made using the SimpleTreat 4.0 wastewater treatment plant model (RIVM, 2015) based on maximum reported releases for 1,2-dichloropropane in its DMR. A concentration of 2.14 mg/kg in combined sludge was predicted for 1,2-dichloropropane (see Sections 8.2.2 and 8.4.2 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)).

Measured concentrations of 1,2-dichloropropane from surface water, groundwater, sediment and soil samples were retrieved from the Water Quality Portal (WQP) (available at: www.waterqualitydata.us; accessed August 27, 2026) to characterize the distribution of 1,2-dichloropropane levels found in each media across the nation, The WQP dataset included 20,406 groundwater samples collected in the United States between 2015 and 2025 with concentrations ranging from non-detect (ND) to 3.62 µg/L, with a detection frequency of less than 2% and limit of detection ranging from 1.49×10^{-4} to 2,500 µg/L. Higher concentrations of up to 190 and 20,000 µg/L were reported in state databases for Washington and California, respectively; however, the majority of the entries from California were a part of the Water Board Cleanup and Permitted Sites dataset suggesting that much of the 1,2-dichloropropane present in groundwater in California is likely due to releases from legacy contamination sites and not ongoing uses. Detection frequencies for the Washington and California data were 1.51 and 1.19% respectively, and the detection limit ranges were 1.9×10^{-4} to 50.8 µg/L and 1.0×10^{-3} to 10,000 µg/L.

To address some of the uncertainties around the source of 1,2-dichloropropane in groundwater (*i.e.,* current uses versus legacy uses), EPA ran the DRAS Model under varying waste loading rates based on reported TRI releases of 1,2-dichloropropane to land. Screening-level estimates for landfill-impacted groundwater were predicted to be less than 5.62×10^{-5} mg/L based on the maximum reported TRI releases of 1,2-dichloropropane to landfills between 2019 and 2023 (see Section 8.3.2 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)).

The WQP database contained only 24 soil samples collected between 2015 and 2025. All the samples were reported to be below detection limit for 1,2-dichloropropane. The method detection limits (MDLs) for the samples ranged from 1.5×10^{-4} to 0.14 mg/kg. To assess the site-specific impacts of releases especially with the limited soil concentration data available, EPA modeled soil concentrations from biosolids application. The modeled concentration of 1,2-dichloropropane in soil receiving an annual application of biosolids was estimated to be 3.15×10^{-3} mg/kg for agricultural soil and 6.29×10^{-3} mg/kg for pastureland.

3.3.4 Weight of Scientific Evidence Conclusions for Environmental Concentrations

Ambient Air Monitored and Modeled Concentrations

The Agency modeled ambient air concentrations from TRI- and NEI facility-reported releases using HEM5.0. Concentrations of 1,2-dichloropropane due to EPA estimated releases from generic facilities/sites were estimated using IIOAC. The TRI and NEI data are reported by facilities and state/government entities and provide EPA with data on the level of 1,2-dichloropropane being released into ambient air.

The TRI coordinates of each facility were visually examined using satellite imagery. If it was determined that the coordinates were not at the facility, then the Federal Registry System query system[2] was used to identify coordinates that better represented the facility location. If the TRI coordinates appeared to at the facility, but not near the facility operations (*e.g.,* the TRI coordinates were at the facility entrance of administrative office), the Federal Registry System query system was used to identify more representative coordinates. Substitution coordinates were made for four facilities (U.S. EPA, 2026e). Because TRI releases are reported on a facility level, there is some uncertainty associated with the modeled distances from each release point and the associated exposure concentrations to which the general population living in proximity to releasing facilities might be exposed. The TRI-reported data used for HEM5.0 do not include source-specific stack parameters that can affect plume characterization and associated dispersion of the plume. Therefore, EPA used pre-defined stack parameters within the IIOAC to represent stack parameters of all TRI-reporting facilities modeled using HEM5.0. Those stack parameters include a stack height of 10 m above the ground with a 2-meter inside diameter, an exit gas temperature of 300 K, and an exit gas velocity of 5 m/s (see Table 6 of the IIOAC User Guide). These pre-defined stack parameters were selected because they represent a slow-moving, low-to-the-ground plume with limited dispersion that results in a more conservative estimate of exposure concentrations at the distances evaluated. As such, these parameters might result in some overestimation of emissions for certain modeled facilities. Additionally, the assumption of a 10 m by 10 m area source for fugitive releases might impact the exposures estimates very near a releasing facility (*i.e.,* 10 m from a fugitive release). This assumption places the 10 m exposure points just off the release point that might result in either an over or underestimation depending on other factors like meteorological data, release heights, and plume characteristics. Facility-specific stack parameters were used in the modeling of NEI releases, when reported.

The Agency also used meteorology data for Lake Charles, Louisiana, and Sioux Falls, South Dakota, for OESs that had EPA-estimated releases for generic facilities/sites where facility-specific data were not available. Sioux Falls and Lake Charles were chosen as two meteorological stations because they represent meteorological datasets that tend to provide central tendency and high-end concentration estimates relative to the other stations within IIOAC based on a sensitivity analysis of the average concentration and deposition predictions conducted in support of IIOAC development (see the *Draft*

[2] EPA's Federal Registry Service query system: https://www.epa.gov/frs/frs-query (accessed August 26, 2026).

Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane (U.S. EPA, 2026e) for more details).

Contrary to TRI-reported data, NEI-reported data used for HEM5.0 include source-specific stack parameters. Therefore, site-specific parameter values were used in modeling, when available. When parameters were not available, and/or values were reported outside of normal bounds, reported values were replaced using procedures outlined in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

EPA has robust confidence in the use of HEM5.0 to model ambient air concentrations because they have been peer-reviewed and are fit for the purposes of this draft risk evaluation. EPA also has robust confidence in the use of facility-reported release data from TRI and NEI as model inputs. Furthermore, the use of both datasets ensures that high-end releases were likely captured in this analysis and the two databases, which have different reporting requirements, can be used in conjunction with each other to strengthen the overall confidence in modeled concentrations of 1,2-dichloropropane. Overall, EPA has robust confidence in the ambient air concentrations modeled using HEM5.0 when either NEI- or TRI-reported releases were used as model inputs. The robust confidence is supported by the analysis showing the agreement of modeled and measured data as discussed in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

In contrast, the Agency has moderate confidence in the concentrations modeled using EPA-estimated releases from generic facilities/sites. The lower confidence for EPA-estimated releases is due to the uncertainty associated with the estimated releases and the lack of site-specific data available for generic facilities/sites; however, the estimated concentrations that are based on EPA-estimated releases are representative of high-end exposures.

Surface Water and Sediment Pathways

EPA estimated 1,2-dichloropropane surface water concentrations based on facility-specific releases as reported to TRI and DMR from 2019 to 2023. EPA utilized National Hydrography Dataset Plus (NHDPlus) flow database to provide site-specific receiving water body flow metrics. The Agency utilized facility-specific effluent monitoring data as a Tier 2 analysis of surface water concentrations thereby providing refinement for concentrations of 1,2-dichloropropane in surface water.

Measured concentrations of 1,2-dichloropropane from surface waters were retrieved from the WQP (available at: www.waterqualitydata.us; accessed August 27, 2026) to characterize the distribution of 1,2-dichloropropane levels found in ambient surface water across the nation, as well as to provide context for the modeled surface water concentrations of 1,2-dichloropropane. WQP downloaded in April 2026 for samples collected between 2015 to 2025, resulting in 1,116 data points. Of the 1,116 samples of 1,2-dichloropropane, only 8 were above the detection limit in the WQP and the maximum was 0.2591 µg/L. The overall detection frequency was 0.72%. The detection limits ranged from 4.0×10^{-3} to 25 µg/L.

EPA also reviewed peer-reviewed literature and technical reports submitted to the Agency through TSCA section 8(d) through the systematic review process for 1,2-dichloropropane surface water monitoring data. Of the 39 studies identified, 15 were international monitoring studies and the remaining 24 studies were all over 15 years old and were studies of contaminated industrial sites. EPA has concluded from the review of both the WQP and the peer-reviewed literature that because these data are not associated temporally or spatially with current COU activities, the Agency has relied on the facility-specific release data as reported to TRI and DMR to estimate surface water concentrations.

EPA is confident that the surface water concentration estimates at the point of release are representative of site-specific conditions for environmental and human exposure estimates.

Land Pathway (Soils, Groundwater, and Biosolids)

Current reported releases to landfills are not anticipated to result in measurable 1,2-dichloropropane groundwater concentrations because modern landfills are highly regulated and engineered (*e.g.,* use of liners, leachate collection, and monitoring). Nevertheless, EPA estimated 1,2-dichloropropane groundwater concentrations based on landfill releases reported to TRI between 2019 and 2023 using the DRAS Model. Uncertainties and limitations are inherent in the modeling of groundwater concentrations from disposing chemical substances into poorly managed Resource Conservation and Recovery Act (RCRA) Subtitle D landfills as well as those that are not regulated as closely. These uncertainties include but are not limited to (1) determining the total and leachable concentrations of waste constituents, (2) estimating the release of pollutants from the waste management units to the environment, and (3) estimating and transport of pollutants in a range of variable environments by processes that often are not completely understood or are too complex to quantify accurately. To address some of these uncertainties and add strength to the assessment, EPA ran the DRAS Model under multiple scenarios, varying waste loading rates, and assumed leachate concentrations. These considerations add value to estimate exposure that falls at an unknown percentile of the full distribution of exposures. The DRAS Model is based on a survey of drinking water wells located downgradient from a waste management unit (U.S. EPA, 1988). Due to the age of the survey, it is unclear how well the survey represents current conditions and proximity of drinking water wells to disposal units. Similarly, it is not clear if the surveyed waste management units are representative of current waste management practices. EPA therefore has slight confidence in the accuracy of modeled estimates of 1,2-dichloropropane in groundwater from TSCA releases but has robust confidence that the modeled estimates are protective of human health.

Monitoring data from the WQP shows that low levels of 1,2-dichloropropane are widespread in wells across the United States. However, data from EPA sources such as CDR, TRI, and DMR, indicate that land releases are not as geographically widespread; accordingly, the broad pattern of detections is most consistent with legacy influences as a result of direct historical disposal (*e.g.,* landfill related pathways).

EPA identified few soil monitoring results and those reported levels of 1,2-dichloropropane were below the detection limits—aligning with its properties that suggest it will not persist in soil. Because of limited monitoring data, the Agency modeled soil concentrations via land application of biosolids from POTWs. EPA used SimpleTreat 4.0, a modified equilibrium partitioning model, and an ECHA guidance document to estimate concentrations of 1,2-dichloropropane in biosolids (ECHA, 2016; RIVM, 2015). Although there is considerable uncertainty about the accuracy of the estimates of 1,2-dichloropropane concentrations in biosolids, the Agency believes the estimates are conservative. Coupled with other conservative assumptions made in estimating soil concentration from biosolids application, the Agency has robust confidence that the low estimated concentrations of 1,2-dichloropropane in biosolids when combined with no detections of 1,2-dichloropropane in EPA's national biosolids monitoring data result in a conclusion of negligible presence of 1,2-dichloropropane in biosolids applied to soil.

4 ENVIRONMENTAL RISK ASSESSMENT

1,2-Dichloropropane – Environmental Risk Assessment: Key Points

EPA evaluated the reasonably available information for environmental exposures of 1,2-dichloropropane to aquatic and terrestrial species.

Environmental Exposure

- 1,2-Dichloropropane is expected to be released to air, water, and land. Based on the fate and transport and environmental media analyses (U.S. EPA, 2026e) the main environmental exposure pathways for 1,2-dichloropropane are surface water, sediments, ambient air, and biosolids application to soils.

Environmental Hazard

- *Aquatic Species*
  - The acute aquatic concentration of concern (COC) of 10,350 µg/L was derived from the lower bound of the 95th percentile confidence interval (CI) of the hazard concentration protective of 95% of the population (HC05) based on a species sensitivity distribution (SSD), including supplemental predicted data from Web-ICE.
  - The chronic aquatic COC of 812 µg/L was derived from the chronic value (ChV) of the 32-day exposure of juvenal *Pimephales promelas* and represents the geometric mean of the no-observed-effect concentration (NOEC) and lowest-observed-effect concentration (LOEC) for growth.
  - The algal COC of 1,000 µg/L was derived from a study with the marine diatom (*Skeletonema costatum*) for effects on growth. A geometric mean was calculated from a reported NOEC and LOEC of 10,000 µg/L and a ChV was derived by dividing an assessment factor (AF) of 10.
  - Due to the lack of reasonably available chronic toxicity data for benthic organisms for 1,2-dichloropropane, EPA identified data from a 1,1,2-trichloroethane sediment test to use as analog data. EPA derived the benthic chronic COC using growth and development data from a two-generation *Chironomus riparius* study (from a test order for 1,1,2-trichloroethane).
  - ChV values of 93 mg/L and 29 mg/kg in sediment pore water and sediment, respectively, were each assessed with an AF of 10 to account for uncertainties associated with inter- and intra-species variability as well as laboratory-to-field variability. This resulted in chronic benthic COCs of 9.3 mg/L and 2.9 mg/kg-sediment.
- *Terrestrial Species*
  - The mammalian inhalation chronic toxicity reference value (TRV) of 50 ppm was derived from the geometric mean of reported no-observed-adverse-effect levels (NOAELs) for reproduction and growth for four species (rats, mice, hamsters, and rabbits).
  - The soil-dwelling terrestrial invertebrate soil hazard threshold of 38.8 mg/kg soil was derived from the lowest reported lethal concentration to 50% of the test population (LC50) value from 2-week artificial soil tests for four earthworm species at 3,880 mg/kg-soil and dividing by an AF of 10 to account for acute-to-chronic effects.

Environmental Risk

- *Aquatic Species*
  - All risk quotient (RQ) values calculated for each OES are less than the benchmark of 1 for aquatic invertebrates and vertebrates, benthic invertebrate sediment-dwelling species, or aquatic plants (algae) exposed to 1,2-dichloropropane.
- *Terrestrial Species*
  - The RQ values calculated for mammalian inhalation exposure to modeled ambient air concentrations at either 30 or 100 m from the release point were all less than the benchmark of 1.
  - The RQ values for soil-dwelling invertebrates are less than the benchmark of 1.

4.1 Risk Assessment Approach

Environmental risk was characterized by calculating risk quotients (RQs) (U.S. EPA, 1998; Barnthouse et al., 1982). The RQ is defined in Equation 4-1.

Equation 4-1. Calculating Risk Quotient

$$RQ = \frac{Predicted\ Environmental\ Concentration}{Hazard\ Threshold}$$

Environmental exposure concentrations (*i.e.*, surface water, air, and soil) were based on concentrations of 1,2-dichloropropane measured and/or modeled.

The COCs used to calculate the RQs for aquatic organisms were derived from hazard values for 1,2-dichloropropane and its analog 1,1,2-trichloroethane (for sediment-dwelling invertebrates), and are listed below in Table 4-3. 1,1,2-Trichloroethane was selected as an analog based on an analysis that evaluated the structural, physical, chemical, environmental fate and transport, and toxicological similarities to 1,2-dichloropropane. For more details on these environmental hazard thresholds and the analog selection process, see the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u).

The benchmark value for RQs in environmental risk characterization was 1. If the RQ was above 1, the exposure was greater than the concentration of concern (COC) or hazard threshold concentration, providing evidence of potential adverse effects on populations of animals or plants. If the RQ was below 1, the exposure was less than the hazard concentration. An RQ equal to 1 indicated that the exposures were the same as the concentration that caused effects. EPA further characterized risk estimates with the number of days of exceedance when the RQ values exceeded 1 to describe and align the estimated durations of 1,2-dichloropropane exposure to the acute or chronic exposure durations that lead to adverse population effects. However, EPA considered all of the available weight of scientific evidence for determinations of risk. Risk estimates for aquatic species are assessed in Section 4.4.1 and terrestrial species in Section 4.4.2.

4.2 Summary of Environmental Exposures

EPA assessed environmental concentrations of 1,2-dichloropropane in air, water, and land for use in environmental exposure. The environmental exposures are described in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). A summary of how EPA assessed environmental concentrations of 1,2-dichloropropane is provided in Section 3.3.2.1 for surface water, Section 3.3.2.2 for sediments, Section 3.3.1 for ambient air, and Section 3.3.3 for soils. Table 4-1 provides a summary of the highest environmental exposure concentrations by OES, release media, route of exposure, and high-end environmental exposure concentrations. EPA has robust confidence that the measured and modeled concentrations are high-end and conservative estimations of actual exposure scenarios. Exposures to aquatic biota followed a tiered structure whereby if risk was identified using higher-end release information, those aquatic exposure concentrations were refined using more location-specific data. EPA's robust confidence comes from the use of multiple data sources from measured values, modeled values from facility-specific TRI and DMR release data and modeled generic scenario values for COU-related risk estimates. Exposure confidence is detailed in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Table 4-1. Summary of 1,2-Dichloropropane Highest Environmental Exposure Concentrations by Occupational Exposure Scenarios, Release Medium, and Route of Exposure

OES	Release Medium	Route of Exposure	Estimated 1,2-Dichloropropane Concentration
Highest facility-specific release OES (Waste Handling, Treatment, and Disposal[a] [POTW]) (PA0046426)	Water (21 days)	Surface water	300 µg/L
Highest facility-specific release OES (Waste Handling, Treatment, and Disposal[a] [POTW]) (PA0046426)	Water (21 days)	Sediment	4.95–31.7 to µg/kg
		Sediment Pore Water	11.3–72.8 µg/L
Processing Aid – Non-Incorporative Activities	Air	Inhalation	74 µg/m^3
Waste Handling, Treatment, and Disposal	Land	Soil	3.15E−03 to 6.29E−03 mg/kg-soil

COU = condition of use; OES = occupational exposure scenario; POTW = publicly owned treatment works
[a] Concentration calculations based on flows in NHDPlus (receiving water body flows) (Tier 1)
[b] Maximum estimated ambient air concentrations from combined fugitive and stack releases across all COUs/OESs at either 30 or 100 m from point of release (see Table 4-2).

4.2.1 Surface Water

EPA conducted modeling with Exposure and Fate Assessment Screening Tool Version 2014 (E-FAST) methodologies (U.S. EPA, 2014) to estimate concentrations of 1,2-dichloropropane in surface water. The methodology is summarized in Section 3.3.2.1 with further details provided in EPA's *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). A tiering approach based on the chronic aquatic COC was used to identify facility-associated surface water concentrations needing refinement. Two facilities associated with two OESs (Processing as a Reactant; and Waste Handling, Treatment, and Disposal ([Remediation]) were identified for refinement and required a Tier 2 assessment. For these facilities, the facility monitoring data as submitted to EPA via National Pollutant Discharge Elimination System (NPDES) permit requirements was reviewed and 1,2-dichloropropane concentrations in effluent were found to be lower than estimates based on facility release patterns and E-FAST estimates.

4.2.2 Sediments

EPA used the VVWM-PSC, to estimate concentrations of 1,2-dichloropropane within water column and sediment for the COU/OES resulting in the highest surface water concentration (Disposal/Waste Handling, Treatment, and Disposal [POTW]) associated with the 7Q10 hydrologic flow metric. 7Q10 flow metrics and the corresponding surface water concentrations are utilized for the draft aquatic species risk assessment. Selecting the highest surface water concentration across all facilities releasing 1,2-dichloropropane to surface waters across 2019 to 2023 identifies the highest exposures and provides a screening analysis for sediment-dwelling organisms. These receiving water body concentrations and corresponding sediment and sediment pore water concentrations represented an upper bound of 1,2-dichloropropane concentrations in these media ranging from 11.3 to 72.8 µg/L in sediment pore water and 4.95 to 31.7 µg/kg in sediment (see Table 3-13 and Table 4-1). The methodology is summarized in

Section 3.3.2.2 with further details provided in EPA's *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

4.2.3 Ambient Air

In this draft risk evaluation, EPA used HEM5.0 or IIOAC to estimate ambient air concentrations depending on the availability of TRI or NEI data and the need to use generic scenarios. 1,2-Dichloropropane exposures for terrestrial species from fugitive and stack releases to ambient air (terrestrial soil invertebrates and plants by direct contact and mammals via inhalation) was assessed for each OES using either modeled estimates at 30 m from the source (for both TRI and NEI releases using HEM5.0) and at 100 m for fugitive and stack releases (using IIOAC). Table 4-2 provides a summary of the estimated ambient air environmental exposure concentrations. Detailed data are provided in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Table 4-2. Highest Reported Estimated Ambient Air Environmental Exposure Concentrations

OES	Model	Reporting Data	Distance (m)	Statistic	Conc. ($\mu g/m^3$)	Source
Processing Aid – Non-Incorporative Activities	HEM5.0	TRI	30	Maximum 95th Percentile	74	Table 5-2 (U.S. EPA, 2026e)
Disposal to Non-POTW	HEM5.0	NEI	30	Maximum 95th Percentile	4.9	Table 5-3 (U.S. EPA, 2026e)
Commercial Use as a Laboratory Chemical (OES #5) (Large Containers) High-End Release	IIOAC Fugitive	Generic Scenario	100	Maximum 95th Percentile	0.14	Table 5-4 (U.S. EPA, 2026e)
	IIOAC Stack	Generic Scenario	100	Maximum 95th Percentile	7.03E−03	Table 5-5 (U.S. EPA, 2026e)

HEM = Human Exposure Model; IIOAC = Integrated Indoor-Outdoor Air Calculator; NEI = National Emissions Inventory; OES = occupational exposure scenario; POTW = publicly owned treatment works; TRI = Toxics Release Inventory

4.2.4 Soils

To estimate soil concentrations of 1,2-dichloropropane after application of biosolids, EPA used Equation 60 of the European Commission Technical Guidance Document Part II (TGD) on Risk Assessment (ECB, 2003). The application of biosolids is estimated to result in concentrations of 3.15×10^{-3} and 6.29×10^{-3} mg/kg of 1,2-dichloropropane in agricultural soil and pastureland, respectively (see Sections 8.2.2 and 8.4.2 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)).

4.3 Summary of Environmental Hazards

EPA evaluated the reasonably available information for environmental hazard endpoints associated with 1,2-dichloropropane exposure to ecological receptors in aquatic and terrestrial ecosystems. COCs were derived for acute and chronic 1,2-dichloropropane exposures in water and sediment ((U.S. EPA, 2026u); see Tables 3-1 and 3-2 in that TSD). Hazard Values (HV) were derived for chronic terrestrial exposures to mammals, invertebrates, and birds ((U.S. EPA, 2026u); see Tables 3-5 and Table 3-6 in that TSD). Confidence in hazard thresholds ranged from moderate-to-robust based on the quality of the database, consistency, strength and precision, dose-response, and relevance of the available data for each ecological receptor group (see Table 3-7 in that TSD). The results of the evaluation of environmental hazards from the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u) are summarized in Table 4-3.

Table 4-3. Summary of Environmental Hazard Thresholds for 1,2-Dichloropropane

Environmental Toxicity Thresholds	Analog	Hazard Value (Units)	Assessment Factor (AF)	COC (Units)	Assessment Medium	Confidence Rating
Acute aquatic exposure	N/A	10.35 (mg/L) (lower bound of the 95th percentile CI of the HC05) 13.15 (HC05)	N/A[a]	10.35 (mg/L)	Water column	Robust
Acute sediment-dwelling invertebrate exposure	N/A	10.35 (mg/L) (Lower 95% CI of HC05 from SSD) 13.15 (HC05)	N/A	10.35 (mg/L)	Sediment pore water	Robust
Chronic aquatic exposure: fish ChV	N/A	8.12 (mg/L)	10	0.812 (mg/L)	Water column	Moderate
Chronic benthic sediment-dwelling invertebrate exposure: midge ChV	1,1,2-Trichloroethane	93 (mg/L)	10	9.3 (mg/L)	Sediment pore water	Moderate
Chronic benthic exposure: midge ChV	1,1,2-Trichloroethane	29 (mg/kg-sediment)	10	2.9 (mg/kg-sediment)	Sediment	Moderate
Aquatic plant exposure	N/A	10 (mg/L)	10	1.0 (mg/L)	Water column	Robust
Terrestrial soil-dwelling invertebrate exposure	N/A	3,880 (mg/kg-soil)	10	38.8 (mg/kg-soil)	Soil	Moderate
Chronic TRV for mammals for inhalation (ppm)	N/A	50 ppm (ppm in air) 231.06 µg/m^3	N/A	50 ppm 231.06 µg/m^3	Air	Robust

ChV = chronic value; CI = confidence interval; COC = concentration of concern; HC05 = 5th percentile of the SSD; SSD = species sensitivity distribution; TRV = toxicity reference value
[b] EPA used the lower 95% CI of the HC05 to account for uncertainties rather than an assessment factor (AF).

4.4 Environmental Risk Characterization

4.4.1 Risk Estimates for Aquatic Species

4.4.1.1 Risk Estimates for Aquatic Species for Surface Water Exposure

RQ values were determined for surface water exposure to aquatic organisms for 12 OESs releases using DMR-reported data modeling of 1,2-dichloropropane concentrations in surface water (Table 4-4). RQs

were calculated for invertebrate and vertebrate aquatic species and for aquatic plants (for 1,2-dichloropropane, all aquatic plant species for which hazard data were available were algae).

Table 4-4. Risk Characterization for Aquatic Species for 1,2-Dichloropropane

Scenario/OES	Reported Release (kg/yr)	Release Scenario (days)	Release Estimate (kg/day)	7Q10 Conc. (µg/L)	Risk Quotient		
					Acute COC 10,350 (µg/L)	Chronic COC 812 (µg/L)	Algae COC 1,000 (µg/L)
Manufacturing as a Byproduct [a] (WV0002496)	6.0	21	0.29	4.8E−03	<1	<1	<1
		350	1.7E−02	2.9E−04	<1	<1	<1
Processing as a Reactant [c] (IL0000141)	7.0	21	0.34	5	<1	<1	<1
		350	2.0E−02	5	<1	<1	<1
Processing as a Reactant [b] (KY0003701)	8.2	21	0.39	77	<1	<1	<1
		350	2.3E−02	4.6	<1	<1	<1
Processing Aid [a] (NY0001643)	4.3	21	0.20	0.13	<1	<1	<1
		300	1.4E−02	9.3E−03	<1	<1	<1
Use of Laboratory Chemical [b] (LA0108936)	9.6E−03	21	4.6E−04	0.24	<1	<1	<1
		260	3.7E−05	2.0E−02	<1	<1	<1
Repackaging [a] (IL0005126)	427	21	20	46	<1	<1	<1
		250	1.7	3.9	<1	<1	<1
Waste Handling, Treatment, and Disposal [a] (POTW) (PA0046426)	359	21	17	**300**	<1	<1	<1
		365	0.98	17	<1	<1	<1
Waste Handling, Treatment, and Disposal [a] (Non-POTW WWT) (NV0022888)	0.67	21	3.2E−02	9.8	<1	<1	<1
		250	2.7E−03	0.82	<1	<1	<1
Waste Handling, Treatment, and Disposal [a] (Landfill) (MO0099503)	4.8E−02	21	2.3E−03	1.8	<1	<1	<1
		250	1.9E−04	0.16	<1	<1	<1
Waste Handling, Treatment, and Disposal [a] (Incineration) (MO0111686)	0.93	21	4.4E−02	79	<1	<1	<1
		250	3.7E−03	6.7	<1	<1	<1

Scenario/OES	Reported Release (kg/yr)	Release Scenario (days)	Release Estimate (kg/day)	7Q10 Conc. (µg/L)	Risk Quotient		
					Acute COC 10,350 (µg/L)	Chronic COC 812 (µg/L)	Algae COC 1,000 (µg/L)
Waste Handling, Treatment, and Disposal [c] (Remediation) (NV0024232)	4.5E−02	21	2.2E−03	0.5	<1	<1	<1
		250	1.8E−04		<1	<1	<1
Not Mapped to OES [b] (NN0030343)	0.11	21	5.3E−03	108	<1	<1	<1
		250	4.5E−04	9.1	<1	<1	<1

7Q10 = the modeled lowest consecutive 7 days flow over 10 years, in MLD (million liters per day); 30Q5 = the lowest monthly average flow from NHD, in MLD; COC = concentration of concern
Scenario/Occupational Exposure Scenarios (OESs) are listed in Table 3-2.
[a] Concentration calculations based on flows in NHDPlus (receiving water body flows).
[b] Concentration calculations based on facility effluent/plant flow that were greater than receiving water body flows that were reported in NHDPlus.
[c] Concentration from ECHO measured effluent.

4.4.1.2 Risk Estimates for Benthic (Sediment-Dwelling) Organisms for Sediments and Sediment Pore Water

For screening, EPA selected the facility releases resulting in the highest estimated 7Q10 water concentrations from the surface water analysis to estimate concentrations in sediment and the associated pore water. The selected facility and the resultant benthic pore water and sediment concentration from the PSC estimates for a release scenario of 21 days as well as the corresponding facilities' operating days (*i.e.*, 365 days for POTWs and 350 days for Processing as a Reactant activities) are shown in Table 4-5. The highest sediment pore water and bulk sediment concentrations were associated with the OES of Processing as a Reactant. The estimation of benthic sediment pore water and whole phase sediment concentrations is summarized in Section 3.3.2.2.

Table 4-5. Risk Characterization for Benthic (Sediment-Dwelling) Aquatic Species

Scenario/OES	Release Estimate (kg/day)	Release Days	7Q10 Conc. (µg/L)	Benthic Pore Water Conc. (µg/L)	Sediment Conc. (µg/kg)	Risk Quotient	
						Benthic Pore Water COC 9,300 (µg/L)	Benthic Sediment COC 2,900 (µg/kg)
Waste Handling, Treatment, and Disposal [a] (POTW) (PA0046426)	0.98	365	PSC water column: 17	11	5.0	<1	<1
Waste Handling, Treatment, and Disposal [a] (POTW) (PA0046426)	17	21	PSC water column: 300	73	32	<1	<1

7Q10 = lowest consecutive 7 days flow (on average) over 10 years, in MLD (million L per day); 30Q5 = lowest monthly average flow from NHD, in MLD; COC = concentration of concern; Conc. = concentration; OES = occupational exposure scenario; POTW = publicly owned treatment works
In PSC: added 21 days in user defined ecotox scenario to estimate 1,2-dichloropropane concentrations in water column, pore water and sediment at 21 days
[a] Concentration calculations based on flows in NHDPlus

4.4.1.3 Confidence in Aquatic Species Risk Characterization

Comparisons of surface water exposure concentrations to respective COCs for acute and chronic toxicity to aquatic invertebrates and vertebrates and benthic sediment-dwelling species do not indicate risks for any group of aquatic species as all RQ values are less than the benchmark of 1. EPA has robust confidence in the protective nature of this risk assessment for acute exposure to aquatic invertebrates, vertebrates, and aquatic plants (algae). The Agency has moderate confidence in the chronic aquatic and benthic COCs because there were limited studies available that covered a limited number of species. EPA has moderate-to-robust confidence in the protective nature of this risk assessment for chronic exposure to aquatic invertebrates and vertebrates and benthic sediment-dwelling invertebrates.

4.4.2 Risk Estimates for Terrestrial Species

4.4.2.1 Mammals and Birds via Inhalation

All modeled ambient air concentrations at 30 and 100 m from Tables 5-2, 5-3, 5-4 and 5-5 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) are lower than the mammalian inhalation chronic toxicity reference value (TRV) of 231.06 µg/m^{3}. All RQs are less than the benchmark of 1, indicating no risk for mammalian wildlife resulting from inhalation of 1,2-dichloropropane. A chronic TRV for avian wildlife could not be calculated as hazard data for 1,2-dichloropropane for avian species were not available (U.S. EPA, 2026u).

4.4.2.2 Mammals and Birds via Ingestion (Trophic Transfer)

EPA did not characterize risks for mammals by dietary exposures through bioaccumulation because trophic transfer was not identified as a relevant pathway for quantitative analyses due to both the physical and chemical properties of 1,2-dichloropropane and the lack of risk found in other chlorinated solvent assessments for trophic transfer (U.S. EPA, 2026e).

4.4.2.3 Soil-Dwelling Invertebrates and Plants via Soil

The application of biosolids to soils result in estimated soil concentrations of 3.15×10^{-3} and 6.29×10^{-3} mg/kg of 1,2-dichloropropane in agricultural soil and pastureland, respectively (see Sections 8.2.2 and 8.4.2 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)). These concentrations are less than the hazard threshold (COC) for 1,2-dichloropropane for soils for soil-dwelling invertebrates at 38.8 mg/kg-soil (Section 4.3). RQs equal to 8.1×10^{-5} and 1.6×10^{-4}, respectively for agricultural soil and pastureland are less than the benchmark of 1. A risk characterization for terrestrial plants could not be completed as 1,2-dichloropropane hazard data were not available.

4.4.2.4 Confidence in Terrestrial Species Risk Characterization

The highest modeled concentrations of 1,2-dichloropropane in air indicate that RQ values did not exceed the RQ benchmark of 1 for inhalation exposure to terrestrial mammals. EPA has robust confidence in the inhalation hazard threshold because it is based on 21 studies using the geometric mean of the NOAELs for reproduction and growth from a dataset—including behavior, growth, reproduction, and survival effects in mice, rats, rabbits, and hamsters, which are considered ecologically relevant apical effects in mammalian receptors. EPA has robust confidence in the exposure modeling inputs and estimates for ambient air exposure and the modeling of soil concentrations resulting from the application of biosolids to soils. The resulting RQ of 1.6×10^{-4} for soil-dwelling invertebrates and RQs for mammalian wildlife inhalation less than 1 indicates robust confidence that this scenario provides a protective screening conclusion. Based on monitoring data, physical and chemical properties, and release data, EPA has robust confidence in the risk characterization results for 1,2-dichloropropane. Additional confidence comes from the conservative and protective COCs for terrestrial species.

4.4.3 Overall Confidence and Weight-of-Evidence in Environmental Risk Characterization

EPA conducted an assessment that compared the highest modeled or measured concentrations for water, air, and soil pathways to conservative protective hazard thresholds that were derived from multiple studies. Using this approach, the Agency has robust confidence that exposure concentrations do not exceed hazard thresholds.

A strength of this risk characterization is the context of multiple data sources from measured values, modeled values from facility-specific TRI and DMR release data, and modeled generic scenario values, which collectively result in more confidence in the low exposure estimates being representative of most COU-related risk estimates. Additional confidence comes from protective COCs that describe adverse effects to populations of aquatic species.

The overall confidence in the environmental risk characterization synthesizes confidence from both environmental exposures and environmental hazards. Exposure confidence is detailed in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). Environmental hazard confidence is detailed in the *Draft Human Health and Environmental Hazard Assessment for 1-2 Dichloropropane* (U.S. EPA, 2026u). Risk characterization confidence is described by receptor group as discussed in Sections 4.4.1.3 and 4.4.2.4.

5 HUMAN HEALTH RISK ASSESSMENT

1,2-Dichloropropane – Human Health Risk Assessment: Key Points

EPA evaluated all reasonably available information to support human health risk characterization of 1,2-dichloropropane for workers and ONUs, consumers and bystanders, and the general population exposed to 1,2-dichloropropane released to the environment.

Human Exposure

- Exposure to workers was assessed through inhalation and dermal exposure and to ONUs through inhalation exposure.
- Exposure to consumers through dermal and inhalation exposure and to bystanders through inhalation exposure.
- Exposure to the general population through inhalation of ambient air, dermal and oral exposure to surface water through swimming and drinking water**,** and fish ingestion.

Human Health Hazard

- EPA identified the effect of maternal central nervous system (CNS) depression in pregnant rats as the most robustly supported hazard associated with oral exposure for the acute exposure duration scenario.
  - Increased reticulocytes in pregnant rabbits, an indicator of hemolytic anemia, was the most robustly supported hazard associated with oral exposure for intermediate and chronic scenarios. A total uncertainty factor (UF) of 30 was selected for acute, intermediate, and chronic exposure durations.
- The acute oral human equivalent dose (HED) underwent route-to-route extrapolation to inform the acute inhalation human exposure concentration (HEC) based on maternal CNS depression.
  - EPA identified the effect of nasal lesions in male rats as the most robustly supported hazard associated with inhalation exposure for intermediate and chronic exposure scenarios. A total UF of 30 was selected for acute, intermediate, and chronic exposure durations.
- Under the *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005), 1,2-dichloropropane is considered "Likely to Be Carcinogenic to Humans" based on evidence of carcinogenicity at several tissue sites in two species and both sexes of animals in high-quality cancer bioassays (Matsumoto et al., 2013; Umeda et al., 2010; NTP, 1986).
  - A review of genotoxicity and cancer data as well as mechanistic mode of action (MOA) analysis determined uncertainties exist surrounding two proposed MOAs for 1,2-dichloropropane. In accordance with the 2005 Cancer Guidelines, EPA determined a linear low-dose approach was appropriate for carcinogenic dose-response assessment.
- The 1,2-dichloropropane oral cancer slope factor was based on liver tumors in mice reported in a 2-year bioassay (NTP, 1986). The 1,2-dichloropropane inhalation cancer study by (Umeda et al., 2010) served as the basis for the inhalation unit risk (IUR) based on nasal tumors in male rats.

Human Health Risk

- Risk estimates were below the non-cancer benchmark margin of exposure (MOE) and above the cancer benchmark for several OESs and similar exposure groups (SEGs).
- Inhalation risk estimates for the general population found one census block centroid (population of 232) for which the estimated cancer risk was above 1 in 1,000,000 based on NEI release data. No estimated acute or non-cancer risks below the benchmark MOEs were identified at populated census blocks.
- No general population estimated risks were below the non-cancer benchmark for exposures to 1,2-dichloropropane in surface water via incidental dermal contact and ingestion via swimming or through fish ingestion. No general population estimated risks were above cancer benchmark for drinking water exposure.
- EPA estimates indicate risk below the non-cancer benchmarks for inhalation exposures from the Agency's determination of the reasonably foreseen use of 1,2-dichloropropane-containing consumer products and above the cancer benchmark for one consumer product.
- EPA considered PESS throughout the exposure assessment, hazard identification, and dose-response analysis supporting this draft risk evaluation.

5.1 Summary of Human Exposures

EPA evaluated all reasonably available information for occupational and general population human exposures, including consideration of increased exposure across PESS.

5.1.1 Occupational Exposures

The following sections briefly describe EPA's approach to assessing occupational exposures and estimating inhalation and dermal exposure for each COU. For additional details on the development of approaches and results refer to the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). Based on its volatility, EPA anticipates that workers and ONUs will be exposed primarily to 1,2-dichloropropane vapor via the inhalation route. The Agency expects worker exposure to liquids via the dermal route but not for ONUs.

Where there was sufficient detail in the monitoring data, EPA assessed exposure to similar exposure groups (SEGs). For example, EPA received inhalation monitoring data for 1,2-dichloropropane manufacturing as a byproduct where specific worker SEGs were identified and monitored. Where information on specific SEGs was not available from the monitoring data or was not able to be assessed from the modeling approach used, the Agency assessed exposure to the general exposure groups of (1) workers (*i.e.,* workers in close proximity to or who may handle and have direct contact with 1,2-dichloroproane); and (2) ONUs who do not directly handle 1,2-dichloropropane but may be indirectly exposed to it as part of their employment. EPA identified tasks performed by the workers for each OES.

5.1.1.1 Approach and Methodology

Figure 5-1 shows the steps EPA followed in assessing occupational exposure to 1,2-dichloropropane.



Figure 5-1. Overview of EPA's Approach to Estimate Occupational Exposure for 1,2-Dichloropropane

EPA followed the hierarchy established in Table 5-1 in selecting data and approaches for assessing occupational exposures (CEB, 1991).

Table 5-1. Hierarchy of Data and Approaches for Assessing Occupational Exposures to 1,2-Dichloropropane

Type of Approach	Description
1. Monitoring data	a) Personal and directly applicable
	b) Area and directly applicable
	c) Personal and potentially applicable or similar (analogous)
	d) Area and potentially applicable or similar (analogous)
2. Modeling approaches	a) Fundamental modeling approaches

5.1.1.1.1 Identify and Describe Occupational Exposure Scenarios to Assess

As discussed in Section 3.1.1, EPA has identified OESs from the COUs to group scenarios with similar sources of exposure at industrial and commercial workplaces within the scope of this draft risk evaluation. The Agency identified exposure groups for each OES as presented below in Table 5-2. Additional details on worker activities performed by the exposure groups for each OES can be found in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Table 5-2. Similar Exposure Groups (SEGs) Assessed for 1,2-Dichloropropane

OES	SEGs Assessed by OES
Manufacture (OES #1)	The final study report published by the ACC PDC Consortium (Integral Consulting, 2026) detailed worker activities per SEG that occurred at 1,2-dichloropropane manufacturing (as a byproduct) sites. The SEGs of Process Operators, Maintenance Technicians, Logistics Technicians, Laboratory Technicians, and ONUs were identified and monitored for inhalation exposure. Process Operators at facilities that manufacture 1,2-dichloropropane were reported to conduct production unit inspections and permitting rounds; collect daily quality assurance samples; conduct occasional sample analysis; perform maintenance preparation tasks, including line and equipment opening; and perform occasional equipment filter changes. Routine tasks performed by Maintenance Technicians include equipment maintenance and repair; line breaks; and other preventative maintenance tasks. Additionally, maintenance technicians change pump oil and grease injectors and seals. Logistics Technicians at manufacturing facilities connect and disconnect transfer hoses involving the clearing of lines with a nitrogen purge, load railcars, open valves to collect quality assurance samples, and perform spill clean-up. Laboratory Technicians at manufacturing facilities conduct chemical and physical laboratory tests to assist with quality control. Routine tasks performed by Laboratory Technicians include collection of quality assurance and control samples, performing laboratory testing on liquid samples, and handling samples. ONUs at facilities that manufacture 1,2-dichloropropane include operators, health and safety technicians, and advisors. Routine tasks include monitoring operations from inside control rooms and offices, perform check-ins with Process Operators, issue permits, perform inspections, deliver samples to the laboratory, and perform routine office work.
Import/Processing – Repackaging (OES #2)	EPA assessed the general SEG categories of Workers and ONUs. Workers are potentially exposed to 1,2-dichloropropane when transferring 1,2-dichloropropane from bulk containers into smaller containers or connecting/disconnecting hoses. Workers may also be exposed via inhalation of vapor or dermal contact with liquids when cleaning transport containers following emptying. ONUs include supervisors, managers, and other employees that work at sites that import or repackage 1,2-dichloropropane but do not directly handle the chemical, who are expected to have lower inhalation exposures and no dermal exposure.
Processing as a Reactant (OES #3)	The final study report published by the ACC PDC Consortium (Integral Consulting, 2026) detailed worker activities per SEG that occurred at sites that process 1,2-dichloropropane as a reactant. The SEGs of Process Operators, Maintenance Technicians, Logistics Technicians, Marine Logistics Technicians, Laboratory Technicians, and ONUs were identified and monitored for inhalation exposure. General worker activities described for the SEGs in this OES were previously described for the Manufacture OES (with the exception of the Marine Logistics Technician), and additional information on worker tasks and activities was provided in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

OES	SEGs Assessed by OES
	The Marine Logistics Technician SEG includes workers with various job titles, including Outside Operator, Marine Rover, MOD, and Ship Shack Operator/Person In Charge. These workers assist with marine vessel chemical unloading, perform dockside and shipside activities, make rounds in the marine terminal tank farm, clear equipment for maintenance, and issue permits.
Processing Aid – Non-Incorporative Activities (OES #4)	EPA assessed exposures for several worker SEGs (Laboratory Technicians, Logistics Technicians, Processing Operators, and Maintenance Technicians) as well as ONUs. Workers are potentially exposed to 1,2-dichloropropane via inhalation of 1,2-dichloropropane vapors when transferring the chemical from transport containers into storage tanks. ONUs include supervisors, managers, and other employees who work at the site but do not directly handle 1,2-dichloropropane. Therefore, EPA expects the ONUs to have lower inhalation exposures and no dermal exposure.
Commercial Use as a Laboratory Chemical (OES #5)	EPA assessed the general SEG categories of Workers and ONUs. Workers are potentially exposed to the chemical during the following activities: transferring 1,2-dichloropropane from transport containers to labware, sampling/analyses, and container/equipment cleaning. ONUs are expected to have lower inhalation exposures and no dermal exposure.
Commercial Use of Stone Waxes, Polishes, and Cleaners (OES #6)	EPA performed a qualitative assessment of exposures to the general SEG categories of Workers and ONUs. Based on the available information, the Agency assumes that commercial workers will utilize stone waxes, polishes, and cleaners in the same manner as described in the consumer exposure assessment (see Section 5.1.2). ONUs are expected to have lower inhalation exposures and no dermal exposure. Based on test order information, products are currently formulated without 1,2-dichloropropane. EPA believes use of 1,2-dichloropropane containing products in this OES is reasonably foreseen. As noted in the executive summary, the Agency seeks public comment to address uncertainty in this analysis.
Disposal to Incineration (OES #7)	EPA assessed the general SEG categories of Workers and ONUs. Workers are potentially exposed to 1,2-dichloropropane via inhalation of vapors or dermal contact with liquids during the unloading and cleaning of transport containers. ONUs are expected to have lower inhalation exposures and no dermal exposure.
Disposal to Landfill (OES #8)	EPA assessed the general SEG categories of Workers and ONUs. Workers are potentially exposed to 1,2-dichloropropane via inhalation of vapors or dermal contact with liquids during the unloading and cleaning of transport containers. ONUs are expected to have lower inhalation exposures and no dermal exposure.
Disposal to POTW and Non-POTW WWT (OESs #9, 10)	EPA assessed the general SEG categories of Workers and ONUs. Workers are potentially exposed to 1,2-dichloropropane via inhalation of vapors or dermal contact with liquids during the unloading and cleaning of transport containers. ONUs are expected to have lower inhalation exposures and no dermal exposure.
Remediation (OES #11)	EPA assessed the general SEG categories of Workers and ONUs. Workers are potentially exposed to 1,2-dichloropropane via inhalation of vapors or dermal contact with liquids containing 1,2-dichloropropane. ONUs are expected to have lower inhalation exposures and no dermal exposure.
ACC = American Chemistry Council; EPA = Environmental Protection Agency; OES = occupational exposure scenario; ONU = occupational non-user; PDC = propylene dichloride; POTW = publicly owned treatment works; SEG = similar exposure group; WWT = wastewater treatment	

1736

5.1.1.1.2 Approaches Used to Estimate Inhalation Exposure for 1,2-Dichloropropane

EPA followed the exposure assessment hierarchy depicted in Table 5-1 and used the best available data for each OES. A summary of the approaches used to estimate inhalation exposure for each OES for 1,2-dichloropropane is presented below in Table 5-3. Additional details on worker activities performed by the exposure groups for each OES can be found in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Table 5-3. Approaches Used to Estimate Inhalation Exposure for Each OES for 1,2-Dichloropropane

OES	Approach Used to Estimate Inhalation Exposure [a]
Manufacture (OES #1)	***1,2-Dichloropropane Personal Breathing Zone (PBZ) Monitoring Data from Test Order:*** Inhalation exposures were assessed based on inhalation monitoring data provided to EPA via a test order submission from the ACC PDC Consortium (Integral Consulting, 2026). The monitoring was conducted according to an EPA-approved study plan and exposures were monitored for three worker SEGs (as well as ONUs, described below). The test order monitoring study includes 18 full-shift PBZ worker samples across 2 manufacturing facilities where 1,2-dichloropropane was manufactured as a byproduct. All samples were above the limit of detection (LOD). Additionally, the test order provided a task-based sample for maintenance technicians. EPA converted this sample into an 8-hour TWA and identified 3 additional full-shift PBZ samples from maintenance contractors in facilities that manufactured 1,2-dichloropropane as a byproduct (ACC, 2021). For each SEG, EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures. ***ONUs:*** The 1,2-dichloropropane dataset included 12 ONU full-shift PBZ samples from the same study described above; all samples were above the LOD. EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures.
Import/Processing – Repackaging (OES #2)	***1,2-Dichloropropane PBZ Monitoring Data from Test Order (Logistics Technicians) Used as an Analogous Scenario:*** EPA used worker exposure data to 1,2-dichloropropane during Manufacturing as a Byproduct and Processing as a Reactant for Logistics Technicians as an analogous scenario for handling 1,2-dichloropropane during import and repackaging. The test order provided 11 samples for Logistics Technicians; all samples were above the LOD (Integral Consulting, 2026). EPA selected this worker SEG, as their job activities are expected to be similar to tasks performed at import and repackaging facilities, such as loading/unloading tasks performed by Logistics Technicians. EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures. ***ONUs:*** EPA used ONU samples collected from the marine terminal and railcar areas during manufacturing as a byproduct and processing as a reactant as an analogous scenario for ONUs. EPA identified 11 ONU samples from the test order that reflect work in these areas; 2 samples were below the LOD (4.4E−05 to 4.7E−05 ppm). EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures.
Processing as a Reactant (OES #3)	***1,2-Dichloropropane PBZ Monitoring Data from Test Order:*** Inhalation exposures were assessed based on inhalation monitoring data provided to EPA via a test order submission (Integral Consulting, 2026). The monitoring was conducted according to an EPA-approved study plan and exposures were monitored for 4 worker SEGs (as well as ONUs, described below). The test order monitoring study includes 87 full-shift PBZ worker samples across 3 facilities where 1,2-dichloropropane is processed as a reactant. All full-shift worker samples were above the LOD. Twelve task-length samples (15 to 68 minutes in duration) were provided for Maintenance Technicians; EPA utilized these samples to estimate 8-hour TWAs for this SEG. Two task-length samples were below the LOD (0.59–0.61 ppb). For each SEG, EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures.

OES	Approach Used to Estimate Inhalation Exposure [a]
	ONUs: The 1,2-dichloropropane dataset included 32 ONU full-shift PBZ samples from the same study described above. Two samples were below the LOD (4.4E−05 to 4.7E−05 ppm). EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures.
Processing Aid – Non-Incorporative Activities (OES #4)	***1,2-Dichloropropane PBZ Monitoring Data from Test Order (Processing Operator, Laboratory Technician, Logistics Technician, Maintenance Technician, and ONU) Used as an Analogous Scenario:*** To assess inhalation exposure, EPA used worker exposure data from the ACC PDC Consortium test order submission at sites that process 1,2-dichloropropane as a reactant as an analogous scenario for exposures during use as a processing aid. EPA identified 4 relevant worker SEGs (as well as ONUs, described below): Processing Operator, Laboratory Technician, Logistics Technician, and Maintenance Technician. The Agency assumes the tasks described for these workers in a reactant processing setting would be similar to tasks performed by workers in a processing aid setting. The test order inhalation monitoring study provided 59 full-shift personal breathing zone samples across worker SEGs; all worker samples were above the LOD (Integral Consulting, 2026). EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures. ***ONUs:*** The 1,2-dichloropropane dataset included 32 ONU full-shift PBZ samples from the same study described above. Two samples were below the LOD (4.4E−05 to 4.7E−05 ppm). EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures.
Commercial Use as a Laboratory Chemical (OES #5)	***1,2-Dichloropropane PBZ Monitoring Data from Test Order (Laboratory Technicians) Used as an Analogous Scenario:*** To assess inhalation exposure, EPA used worker exposure data for 1,2-dichloropropane at on-site QA/QC laboratories at sites that manufacture and process 1,2-dichloropropane (Integral Consulting, 2026). Data for Laboratory Technicians was used as an analogous scenario for commercial use of 1,2-dichloropropane as a laboratory chemical. The Agency assumes the tasks described for Laboratory Technicians in manufacturing and processing settings would be similar to tasks performed by Laboratory Technicians in a commercial laboratory setting. The test order inhalation monitoring study provided 11 full-shift PBZ samples for Laboratory Technician workers; all samples were above the LOD (Integral Consulting, 2026). EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures. ***ONUs:*** EPA used analytical technologist ONU samples collected during manufacturing where 1,2-dichloropropane is produced as a byproduct of the reaction, as an analogous scenario for commercial laboratory ONUs. EPA identified 2 relevant samples from the test order data (all above the LOD). EPA used the midpoint of the 2 samples to represent the central tendency exposure and the maximum sample value to represent the high-end exposure.
Commercial Use of Stone Waxes, Polishes, and Cleaners (OES #6)	Based on the available information, EPA assumes that commercial workers will utilize stone waxes, polishes, and cleaners in the same manner as described throughout the consumer exposure assessment (Section 5.1.2). EPA has performed a qualitative assessment of occupational inhalation and dermal exposures to this OES, which is based on the consumer exposure assessment presented in Section 5.1.2. The settings would be the same as both commercial workers and consumers would apply the product containing 1,2-dichloropropane in the same household settings. The application amounts for commercial workers and consumers in a household setting based on surface area treated may be higher for the commercial worker than the consumer as the commercial applicator may treat more surfaces. Daily exposures are expected to be at least at the same level as the consumer if not higher. Use by consumers and use by commercial workers at household settings would differ in the frequency

OES	Approach Used to Estimate Inhalation Exposure [a]
	of exposure (exposure days/yr), which would be higher for commercial workers as they may apply in multiple household settings throughout the year. Based on test order information, products are currently formulated without 1,2-dichloropropane. EPA believes use of 1,2-dichloropropane containing products in this OES is reasonably foreseen. As noted in the executive summary, EPA seeks public comment to address uncertainty in this analysis.
Disposal to Incineration (OES #7)	***1,2-Dichloropropane PBZ Monitoring Data from Test Order (Logistics Technicians) Used as an Analogous Scenario:*** EPA used worker exposure data to 1,2-dichloropropane during Manufacturing as a Byproduct and Processing as a Reactant for Logistics Technicians, as an analogous scenario for handling 1,2-dichloropropane during disposal to incineration. The test order provided 11 samples for Logistics Technicians (all above the LOD) (Integral Consulting, 2026). EPA selected these worker SEGs as their job activities (such as loading/unloading activities) are expected to be similar to tasks performed at incineration facilities. EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures. ***ONUs:*** EPA used ONU samples collected from the marine terminal and railcar areas during Manufacturing as a Byproduct and Processing as a Reactant as an analogous scenario for ONUs for the Disposal to Incineration OES. EPA identified 11 ONU samples from the test order that reflect work in these areas; 2 samples were below the LOD (4.4E−05 to 4.7E−05 ppm). EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures.
Disposal to Landfill (OES #8)	***Area Monitoring Data for 1,2-Dichloropropane:*** EPA did not identify any PBZ monitoring data but did identify area data from a hazardous waste landfill study in Italy (Ravina et al., 2020). The number of samples was not specified. There was no information about the limit of detection or if any samples were below the limit of detection. EPA used the data to estimate exposure to the Workers SEG. ***ONUs:*** EPA did not identify data applicable to estimation of ONU exposure at landfills. EPA expects exposures for the ONUs to be lower than the exposure to the workers and in the absence of data, uses the central tendency from the exposure to workers was used to assess ONU exposures.
Disposal to POTW and Non-POTW WWT (OES #9, 10)	***1,2-Dichloropropane PBZ Monitoring Data from Test Order (Logistics Technicians) Used as an Analogous Scenario:*** EPA used worker exposure data to 1,2-dichloropropane during Manufacturing as a Byproduct and Processing as a Reactant for Logistics Technicians, as an analogous scenario for handling 1,2-dichloropropane during Disposal to POTW and Non-POTW WWT. The test order provided 11 samples for Logistics Technicians (all above the LOD) (Integral Consulting, 2026). EPA selected these worker SEGs as their job activities, such as loading and unloading activities, are expected to be similar to tasks performed at import and repackaging facilities, EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures. ***ONUs:*** EPA used ONU samples collected from the marine terminal and railcar areas during Manufacturing as a Byproduct and Processing as a Reactant as an analogous scenario for ONUs for Disposal to POTW and Non-POTW WWT. EPA identified 11 ONU samples from the test order that reflect work in these areas; 2 samples were below the LOD (4.4E−05 to 4.7E−05 ppm). EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures.

OES	Approach Used to Estimate Inhalation Exposure [a]
Remediation (OES #11)	***1,2-Dichloropropane PBZ Monitoring Data from Manufacturing as a Byproduct (Remediation Contractors) Used as an Analogous Scenario:*** EPA identified PBZ inhalation monitoring data for remediation contractors at facilities that manufacture 1,2-dichloropropane as a byproduct (ACC, 2021). The study provided full-shift four worker samples; 1 sample was below the LOD (2.2E−02 ppm). EPA selected samples from these workers due to their specificity to remediation work, as this work is expected to be similar to tasks performed at other remediation sites. EPA estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures. ***ONUs:*** EPA expects exposures for the ONUs to be lower than the exposure to the workers and in the absence of ONU-specific data, uses the central tendency from the exposure to workers to assess ONU exposures.

ACC = American Chemistry Council; EPA = Environmental Protection Agency; LOD = limit of detection; OES = occupational exposure scenario; ONU = occupational non-user; PBZ = personal breathing zone; PDC = propylene dichloride; POTW = publicly owned treatment works; SEG = similar exposure group; WWT = wastewater treatment

[a] Values below the limit of detection were replaced with LOD ÷ 2, unless otherwise noted.

1743

5.1.1.1.3 Approaches Used to Estimate Dermal Exposure for 1,2-Dichloropropane

EPA did not identify any dermal exposure monitoring data for any OES through systematic review or through other reasonably available sources (*e.g.,* public comments). Therefore, to assess dermal exposure, the Agency used the EPA Dermal Exposure to Volatile Liquids Model (DEVL) to estimate the acute absorbed dose rate (AADR) for each OES. Additional information on the DEVL Model and all parameters utilized is provided below, and in the *Draft Chemistry, Fate, Release and Exposure Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026e). EPA utilized information on fraction absorption data that was developed from a TSCA section 4 Test Order (Charles River Laboratories, 2024), and is further described in the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u).

EPA did not assess dermal exposures to ONUs because the Agency does not expect ONUs to directly handle 1,2-dichloropropane as part of their employment duties. Therefore, ONUs are not expected to have dermal exposures during the course of their work.

Dermal Exposure to Volatile Liquids (DEVL) Model

The DEVL Model (see Equation 5-1) modifies the EPA/OPPT Dermal Exposure to Liquids Model (peer-reviewed) by incorporating a fraction absorbed (f_{abs}) parameter to account for the evaporation of volatile chemicals to estimate the AADR (mg/day):

Equation 5-1.

$$AADR = S \times Q_u \times f_{abs} \times Y_{derm} \times FT$$

Where:

S = Surface area of skin in contact with the chemical formulation (cm^2)
Q_u = Dermal load (*i.e.,* the quantity of the chemical formulation on the skin after the dermal contact event, mg/cm^2-event)
f_{abs} = Fractional absorption, (*i.e.,* the portion of chemical formulation absorbed systemically, accounting for evaporation of the chemical from the dermal load, Q_u (unitless, $0 \leq f_{abs} \leq 1$)
Y_{derm} = Weight fraction of chemical of interest in the liquid (unitless, $0 \leq Y_{derm} \leq 1$)
FT = Frequency of events (integer number/day)

Parameter Values

A summary of the dermal model input parameters utilized in this draft risk evaluation for 1,2-dichloroprane is provided in Table 5-4.

Table 5-4. Summary of Dermal Model Input Parameter Values

Input Parameter	Symbol	Value(s)	Unit	Reference
Dermal load	Q_u	0.7 (lower bound) 1.4 (mid-range) 2.1 (upper bound)	mg/cm^2-event	(U.S. EPA, 1992)
Surface area	S	0 (lower bound) 1,070 (upper bound)	cm^2	(U.S. EPA, 2011)
Weight fraction of chemical	Y_{derm}	OES-dependent	Unitless	–
Frequency of events	FT	1	dermal exposure events/workday	–

Input Parameter	Symbol	Value(s)	Unit	Reference
Fractional absorption	$f_{abs, a}$	1.8% (neat 1,2-dichloropropane sample)	Unitless	(Charles River Laboratories, 2024)
	$f_{abs, b}$	1.6% (50% 1,2-dichloropropane in HHN sample)	Unitless	
	$f_{abs, c}$	1.1% (10% 1,2-dichloropropane in HHN sample)	Unitless	
	$f_{abs, d}$	1.2% (1% 1,2-dichloropropane in HHN sample)	Unitless	

The weight fraction is determined based on EPA's review of currently available products and formulations containing 1,2-dichloropropane. The weight fraction and fraction absorbed used for each OES are summarized in Table 5-5.

Table 5-5. Summary of OES Weight Fraction and Fraction Absorbed Values

OES	Approach Used to Estimate Dermal Exposure
Manufacture (OES #1)	EPA applied a uniform distribution of 90–100% concentration by weight based on 2020 and 2024 CDR reported concentrations of >90% (U.S. EPA, 2026a, 2022a). Facilities in CDR were identified as byproduct manufacturing facilities based on information submitted by the PDC Consortium in response to the EPA test order. Based on the concentration, EPA applied a fraction absorbed value of 1.8%.
Import/Processing – Repackaging (OES #2)	EPA applied a uniform distribution of 90–100% concentration by weight based on 2020 and 2024 CDR reported concentrations of >90% for import and repackaging (U.S. EPA, 2026a, 2022a). Based on the concentration, EPA applied a fraction absorbed value of 1.8%.
Processing as a Reactant (OES #3)	EPA applied a uniform distribution of 90–100% concentration by weight based on the expected concentration received from manufacturing and import facilities (U.S. EPA, 2026a, 2022a). Based on the expected concentration, EPA applied a fraction absorbed value of 1.8%.
Processing Aid – Non-Incorporative Activities (OES #4)	EPA applied a uniform distribution of 90–100% concentration by weight based on the expected concentration received from manufacturing and import facilities (U.S. EPA, 2026a, 2022a). Based on the expected concentration, EPA applied a fraction absorbed value of 1.8%.
Commercial Use as a Laboratory Chemical (OES #5)	EPA applied a discrete distribution of 0.02–100% by weight based on product safety data sheets for laboratory chemicals containing 1,2-dichloropropane (Fisher Scientific, 2026; Restek Corp, 2026; Sigma-Aldrich, 2026; Supelco, 2026). EPA applied fraction absorbed values of 1.2, 1.1, 1.6, and 1.8%.
Disposal to Incineration, Landfills, POTW, Non-POTW WWT, and Remediation) (OESs #7–11)	The concentration range evaluated for these OES is a uniform distribution from 0.02–100% based on the range of expected upstream concentrations. EPA expects that the waste will most likely be received in diluted form; however, the extent of dilution is unknown. EPA assumed that the weight fraction of 1,2-dichloropropane in waste streams sent for disposal would correspond to the range of weight fractions in the chemical's lifecycle. EPA applied fraction absorbed values of 1.2, 1.1, 1.6, and 1.8%.

Probabilistic Modeling with Monte Carlo

EPA used a Monte Carlo simulation with 100,000 iterations and the Latin Hypercube sampling method using the DEVL Model. A summary of the dermal model input parameters is provided in Table 5-6. Specific details of the dermal exposure assessment for each OES can be found in the *Draft Chemistry, Fate, Release and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Table 5-6. Summary of Dermal Model Input Values

Input Parameter	Symbol	Deterministic Values	Uncertainty Analysis Distribution Parameters			Unit	Reference
			Lower Bound	Upper Bound	Distribution Type		
Dermal load	Q_u	2.1 (HE); 1.4 (CT)	0.7	2.1	Uniform	mg/cm^2-event	(U.S. EPA, 1992)
Surface area	S	1,070	0	1,070	Uniform	cm^2	(U.S. EPA, 2011)
Frequency of events	FT	1	–	–	–	Events/day	–
CT = central tendency; HE = high-end							

5.1.1.1.4 Exposure Frequency and Working Years

Exposure Frequency

EPA estimated worker exposure frequency as the number of days per year that workers are potentially exposed to 1,2-dichloropropane. In some cases, it may be reasonable to assume a worker is exposed to the chemical on each working day. Alternatively, it may be more appropriate to estimate a worker's exposure to the chemical occurs during a subset of the worker's annual working days. In general, the exposure frequency is the same as the number of operating days per year for a given OES. However, if the number of operating days exceeded 250 days per year, the Agency assumed that a single worker would not work more than 250 days per year such that the maximum exposure days per year was still 250.

The test order submission provided exposure frequencies for Logistics Technicians, Maintenance Technicians, and Marine Logistics Technicians of 156, 24, and 72 days per year, respectively. For all other SEGs, EPA assumed an exposure frequency of up to 250 days per year, based on assumptions that each SEG could have tasks that needed to be performed on a daily basis as well as 50 weeks per year and 5 days per week.

Working Years

For all OESs, EPA used worker tenure data from the Bureau of Labor Statistics (BLS) and the U.S. Census Bureau. Based on these sources, the Agency selected 31 years as the central tendency estimate and 40 years as the high-end estimate for working years. These values were estimated using worker tenure data specific to tenure with current employer and lifetime working years. The derivation of these estimates are described in full detail in Appendix A.2.3.6 of the *Draft Chemistry, Fate, Release and Exposure Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026e).

Exposure frequency and working years are parameters used to estimate chronic exposure and risks, which are presented in Section 5.3.2. While working years is a parameter in calculating chronic, non-cancer exposures (*e.g.,* average daily concentration [ADC] and chronic absorbed dose [CAD]), the

exposure dose over the working years is averaged over the working years. Because the working years are included in both the numerator and denominator in the calculations, they cancel each other out. For cancer effects, the exposure dose over the working years is averaged over the lifetime years, which includes the years with no exposure. EPA uses a default of 78 years for lifetime years. For additional details on the parameters and equations used to calculate acute, intermediate, and chronic exposures, see the *Draft Chemistry, Fate, Release and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

5.1.1.2 Summary of Inhalation and Dermal Exposure Assessment

Table 5-7 presents a summary of full-shift inhalation exposure results based on reasonably available monitoring data and exposure modeling for each OES. This table provides a summary of the 8-hour TWA) inhalation exposure estimates for workers and ONUs, including additional information. Table 5-7 also presents a summary of dermal exposure estimates. The *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) provides additional details regarding EPA's approach and methodology for estimating inhalation and dermal exposures.

Table 5-7. Summary of Occupational Inhalation and Dermal Exposure Estimates by Occupational Exposure Scenario (OES)

OES	SEG Description	Exposure Days (day/yr)	Number of Samples	Number of Non-Detect Samples	Inhalation Estimates (8-hour TWA) (ppm)		Worker Dermal Exposure Estimates (mg/day)		Sources for Inhalation Data [a]
					Central Tendency	High-End	Central Tendency	High-End	
Manufacture (OES #1)	Laboratory Technician	250	3	0	5.0E−03	2.6E−02	11	28	(Integral Consulting, 2026)
	Laboratory Technician – Pooled Samples [b]	250	12	0	2.9E−02	0.10			
	Logistics Technician	156	3	0	0.19	0.35			
	Logistics Technician – Pooled Samples [b]	156	11	0	3.8E−02	0.28			
	Processing Operator	250	12	0	2.4E−03	6.7E−02			
	Maintenance Technician	24	4	3 [c]	2.5E−02	2.9E−02			
	ONU	250	12	0	4.9E−04	1.8E−03			
Import/Processing – Repackaging (OES #2)	Worker	250	11	0	3.8E−02	0.28	11	28	(Integral Consulting, 2026)
	ONU	250	11	2 [d]	9.7E−05	5.4E−03			
Processing as a Reactant (OES #3)	Process Operator	250	31	0	1.8E−02	0.44	11	28	(Integral Consulting, 2026)
	Logistics Technician	156–250	8	0	2.0E−02	0.10			
	Marine Logistics Technician	72	40	0	1.2E−02	3.3			
	Laboratory Technician	250	8	0	4.1E−02	0.11			
	Maintenance Technician	24	12	2	3.0E−04	0.43			
	ONUs	250	32	2 [d]	1.5E−03	7.4E−02			
Processing Aid – Non-Incorporative Activities (OES #4)	Processing Operator	250	31	0	1.8E−02	0.44	11	28	(Integral Consulting, 2026)
	Logistics Technician	250	8	0	2.0E−02	0.10			
	Laboratory Technician	250	8	0	4.1E−02	0.11			
	Maintenance Technician	250	12	2	3.0E−04	0.43			
	ONU	250	32	2 [d]	1.0E−03	5.0E−02			
Commercial Use as a Laboratory Chemical (OES #5)	Worker	250	11	0	2.9E−02	0.10	2.2E−02	18	(Integral Consulting, 2026)
	ONU	250	2	0	1.3E−03	1.5E−03			
Disposal to Incineration (OES #7) [e]	Worker	250	11	0	3.8E−02	0.28	4	18	(Integral Consulting, 2026)
	ONU	250	11	2 [d]	9.7E−05	5.4E−03			

OES	SEG Description	Exposure Days (day/yr)	Number of Samples	Number of Non-Detect Samples	Inhalation Estimates (8-hour TWA) (ppm)		Worker Dermal Exposure Estimates (mg/day)		Sources for Inhalation Data [a]
					Central Tendency	High-End	Central Tendency	High-End	
Disposal to Landfill (OES #8)	Worker	250	Not specified	–	6.2E−05	1.3E−04	4.0	18	(Ravina et al., 2020)
	ONU	250	–	–	6.2E−05				
Disposal to POTW and Non-POTW WWT (OES #9 and 10) [e]	Worker	250	11	0	3.8E−02	0.28	4.0	18	(Integral Consulting, 2026)
	ONU	250	11	2 [d]	9.7E−05	5.4E−03			
Remediation (OES #11)	Worker	250	4	1 [f]	4.3E−02	8.7E−02	4.0	18	(ACC, 2021)
	ONU	250	–	–	4.3E−02	4.3E−02			

LOD = limit of detection; ND = non-detect; OES = occupational exposure scenario; ONU = occupational non-user; POTW = publicly owned treatment works; SEG = similar exposure group TWA = time-weighted average; WWT = wastewater treatment

[a] Additional information on the sources for the inhalation data can be found in Table 5-3.

[b] Pooled samples include those from the Manufacture OES, as well as those from the same SEG in the Processing as a Reactant OES. Additional information on this analysis is included in Section 10.2.1.2 of *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026e) as well as Section 5.3.2.1.1 of this draft risk evaluation.

[c] Includes 1 maintenance technician sample from the test order Consortium (Integral Consulting, 2026) and three historical maintenance contractor samples (ACC, 2021). All 3 historical samples were below the LOD, which ranged from 0.025–0.029 ppm. Non-detects (NDs) were assessed at the full LOD. Additional information is provided in 10.2.1.2 of *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) as well as Section 5.3.2.1.1 of this draft risk evaluation

[d] LOD ranged from 4.4E−05 to 4.7E−05 ppm. NDs assessed at LOD ÷ 2.

[e] Inhalation exposure estimates based on analogous monitoring data from manufacturers and processers, as described in Table 5-3.

[f] LOD was 3.2E−02 ppm. ND assessed at LOD ÷ $\sqrt{2}$ because the geometric standard deviation of the dataset was <3.0.

1841

Using the information in Table 5-7, EPA then calculated acute, intermediate, and chronic (non-cancer and cancer) exposure metrics, which are used in the estimation of risk calculations described in Section 5.3.1. Table 5-8 provides the 8-hour inhalation TWA exposure estimates, as well as the following inhalation exposure metrics: acute concentration (AC), intermediate average daily concentration ($ADC_{intermediate}$), average daily concentration (ADC), and lifetime average daily concentration (LADC) for inhalation exposures. Table 5-9 provides a summary of the dermal worker exposure estimates (presented as the AADR) as well as the following dermal exposure metrics: acute absorbed doses (AAD), intermediate absorbed doses (IAD), CADs, and lifetime chronic absorbed doses (LCAD). The *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) and *Draft Occupational Risk Calculator for 1,2-Dichloropropane* (U.S. EPA, 2026y) provide more detail on the estimation of the inhalation and dermal exposure metrics, including the equations used to calculate these metrics.

1854 **Table 5-8. Summary of Occupational Inhalation Exposure Metrics**

OES	SEG Description	Inhalation Exposure Estimate [a]		Acute, Non-Cancer Exposures [b]		Intermediate, Non-Cancer Exposures [b]		Chronic, Non-Cancer Exposures [b]		Chronic, Cancer Exposures [b]	
		8-Hour TWA (ppm)		$AC_{8\text{-hour TWA}}$ (ppm)		$ADC_{intermediate,\ 8\text{-hour TWA}}$ (ppm)		$ADC_{8\text{-hour TWA}}$ (ppm)		$LADC_{8\text{-hour TWA}}$ (ppm)	
		CT	HE	CT	HE	CT	HE	CT	HE	CT	HE
Manufacture (OES #1)	Laboratory Technician	5.0E−03	2.6E−02	3.4E−03	1.8E−02	2.5E−03	1.3E−02	2.3E−03	1.2E−02	9.2E−04	6.3E−03
	Laboratory Technician – Pooled Samples [c]	2.9E−02	0.10	2.0E−02	7.0E−02	1.4E−02	5.2E−02	1.3E−02	4.8E−02	5.3E−03	2.5E−02
	Logistics Technician	0.19	0.35	0.13	0.24	5.7E−02	0.10	5.6E−02	0.10	2.2E−02	5.2E−02
	Logistics Technician – Pooled Samples [c]	3.8E−02	0.28	2.6E−02	0.19	1.1E−02	8.2E−02	1.1E−02	8.1E−02	4.4E−03	4.2E−02
	Processing Operator	2.4E−03	6.7E−02	1.6E−03	4.5E−02	1.2E−03	3.3E−02	1.1E−03	3.1E−02	4.5E−04	1.6E−02
	Maintenance Technician –	2.5E−02	2.9E−02	1.7E−02	2.0E−02	1.1E−03	1.3E−03	1.1E−03	1.3E−03	4.4E−04	6.6E−04
	ONU	4.9E−04	1.8E−03	3.3E−04	1.2E−03	2.5E−04	8.9E−04	2.3E−04	8.3E−04	9.1E−05	4.3E−04
Import/Processing – Repackaging (OES #2)	Worker	3.8E−02	0.28	2.6E−02	0.19	1.9E−02	0.14	1.8E−02	0.13	7.0E−03	6.7E−02
	ONU	9.7E−05	5.4E−03	6.6E−05	3.7E−03	4.8E−05	2.7E−03	4.5E−05	2.5E−03	1.8E−05	1.3E−03
Processing as a Reactant (OES #3)	Laboratory Technician	4.1E−02	0.11	2.8E−02	7.3E−02	2.0E−02	5.3E−02	1.9E−02	5.0E−02	7.6E−03	2.6E−02
	Logistics Technician	2.0E−02	0.10	1.3E−02	7.0E−02	5.8E−03	5.1E−02	5.7E−03	4.8E−02	2.3E−03	2.4E−02
	Marine Logistics Technician	1.2E−02	3.3	8.2E−03	2.3	1.6E−03	0.45	1.6E−03	0.44	6.4E−04	0.23
	Processing Operator	1.8E−02	0.44	1.2E−02	0.30	8.9E−03	0.22	8.3E−03	0.20	3.3E−03	0.10
	Maintenance Technician – Infrequent Work Schedule	3.0E−04	0.43	2.1E−04	0.29	1.4E−05	2.0E−02	1.3E−05	1.9E−02	5.4E−06	9.9E−03
	ONU	1.5E−03	7.4E−02	1.0E−03	5.0E−02	7.4E−04	3.7E−02	6.9E−04	3.4E−02	2.7E−04	1.8E−02

OES	SEG Description	Inhalation Exposure Estimate [a]		Acute, Non-Cancer Exposures [b]		Intermediate, Non-Cancer Exposures [b]		Chronic, Non-Cancer Exposures [b]		Chronic, Cancer Exposures [b]	
		8-Hour TWA (ppm)		$AC_{8\text{-hour TWA}}$ (ppm)		$ADC_{intermediate,\ 8\text{-hour TWA}}$ (ppm)		$ADC_{8\text{-hour TWA}}$ (ppm)		$LADC_{8\text{-hour TWA}}$ (ppm)	
		CT	HE	CT	HE	CT	HE	CT	HE	CT	HE
Processing Aid – Non-Incorporative Activities (OES #4)	Laboratory Technician	4.1E−02	0.11	2.8E−02	7.3E−02	2.0E−02	5.3E−02	1.9E−02	5.0E−02	7.6E−03	2.6E−02
	Logistics Technician	2.0E−02	0.10	1.3E−02	7.0E−02	9.8E−03	5.1E−02	9.1E−03	4.8E−02	3.6E−03	2.4E−02
	Processing Operator	1.8E−02	0.44	1.2E−02	0.30	8.9E−03	0.22	8.3E−03	0.20	3.3E−03	0.10
	Maintenance Technician	3.0E−04	0.43	2.1E−04	0.29	1.5E−04	0.22	1.4E−04	0.20	5.6E−05	0.10
	ONU	1.4	3.0	0.96	2.1	0.71	1.5	0.66	1.4	0.26	0.73
Commercial Use as a Laboratory Chemical (OES #5)	Worker	2.9E−02	0.10	2.0E−02	7.0E−02	1.4E−02	5.2E−02	1.3E−02	4.8E−02	5.3E−03	2.5E−02
	ONU	1.3E−03	1.5E−03	8.6E−04	1.0E−03	6.3E−04	7.5E−04	5.9E−04	7.0E−04	2.3E−04	3.6E−04
Disposal to Incineration (OES #7) [d]	Worker	3.8E−02	0.28	2.6E−02	0.19	1.9E−02	0.14	1.8E−02	0.13	7.0E−03	6.7E−02
	ONU	9.7E−05	5.4E−03	6.6E−05	3.7E−03	4.8E−05	2.7E−03	4.5E−05	2.5E−03	1.8E−05	1.3E−03
Disposal to Landfill (OES #8)	Worker	6.2E−05	1.3E−04	4.2E−05	8.8E−05	3.1E−05	6.5E−05	2.9E−05	6.1E−05	1.1E−05	3.1E−05
	ONU	6.2E−05		4.2E−05		3.1E−05		2.9E−05		1.1E−05	1.5E−05
Disposal to POTW and Non-POTW WWT (OES #9, 10) [d]	Worker	3.8E−02	0.28	2.6E−02	0.19	1.9E−02	0.14	1.8E−02	0.13	7.0E−03	6.7E−02
	ONU	9.7E−05	5.4E−03	6.6E−05	3.7E−03	4.8E−05	2.7E−03	4.5E−05	2.5E−03	1.8E−05	1.3E−03
Remediation (OES #11)	Worker	4.3E−02	8.7E−02	2.9E−02	5.9E−02	2.2E−02	4.4E−02	2.0E−02	4.1E−02	8.0E−03	2.1E−02
	ONU	4.3E−02		2.9E−02		2.2E−02		2.0E−02		8.0E−03	1.0E−02

CT = central tendency; HE = high-end; OES = occupational exposure scenario; ONU = occupational non-user; POTW = publicly owned treatment works; SEG = similar exposure group; TWA = time-weighted average; WWT = wastewater treatment

[a] Inhalation exposure estimates, expressed as 8-hour TWAs, are the same as those presented in Table 5-7 (column title "Inhalation Estimates").

[b] Inhalation exposure metrics calculated using 8-hour TWAs; additional information, including the underlying calculations, are described in more detail in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) and the *Draft Occupational Risk Calculator for 1,2-Dichloropropane* (U.S. EPA, 2026y).

OES	SEG Description	Inhalation Exposure Estimate [a]		Acute, Non-Cancer Exposures [b]		Intermediate, Non-Cancer Exposures [b]		Chronic, Non-Cancer Exposures [b]		Chronic, Cancer Exposures [b]	
		8-Hour TWA (ppm)		$AC_{8\text{-hour TWA}}$ (ppm)		$ADC_{intermediate, 8\text{-hour TWA}}$ (ppm)		$ADC_{8\text{-hour TWA}}$ (ppm)		$LADC_{8\text{-hour TWA}}$ (ppm)	
		CT	HE	CT	HE	CT	HE	CT	HE	CT	HE

[c] Pooled samples include those from the Manufacture OES, as well as those from the same SEG in the Processing as a reactant SEG. Additional information on this analysis is included in Section 10.2.1.2 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) as well as Section 5.3.2.1.1 of this draft risk evaluation.
[d] Inhalation exposure estimates based on analogous monitoring data from manufacturers and processers, as described in Table 5-3.

Table 5-9. Summary of Occupational Dermal Exposure Metrics for Workers

OES	Dermal Exposure Estimate (Acute Absorbed Dose Rate) [a]		Acute Absorbed Dose[b]		Intermediate Absorbed Dose, Non-Cancer[b]		Chronic Absorbed Dose, Non-Cancer[b]		Chronic Absorbed Dose, Cancer[b]	
	AADR (mg/day)		AAD (mg/kg-day)		IAD (mg/kg-day)		CAD (mg/kg-day)		LCAD (mg/kg-day)	
	CT	HE	CT	HE	CT	HE	CT	HE	CT	HE
Manufacture (OES #1)	11	28	0.14	0.35	0.10	0.26	0.24	9.7E−02	3.6E−02	0.10
Import/Processing – Repackaging (OES #2)	11	28	0.14	0.35	8.3E−02	0.22	0.20	7.8E−02	2.9E−02	8.4E−02
Processing as a Reactant (OES #3)	11	28	0.14	0.35	0.10	0.26	0.24	9.7E−02	3.6E−02	0.10
Processing Aid – Non-Incorporative Activities (OES #4)	11	28	0.14	0.35	0.10	0.26	0.24	9.7E−02	3.6E−02	0.10
Commercial Use as a Laboratory Chemical (OES #5)	2.2E−02	18	2.2E−02	0.22	1.6E−04	0.13	0.12	1.5E−04	5.6E−05	4.8E−02
Disposal to Incineration (OES #7)	4.0	18	4.0	0.23	3.7E−02	0.17	0.15	3.4E−02	1.3E−02	6.2E−02
Disposal to Landfill (OES #8)										
Disposal to POTW and Non-POTW WWT (OES #9, 10)										
Remediation (OES #11)										

OES	Dermal Exposure Estimate (Acute Absorbed Dose Rate) [a]		Acute Absorbed Dose[b]		Intermediate Absorbed Dose, Non-Cancer[b]		Chronic Absorbed Dose, Non-Cancer[b]		Chronic Absorbed Dose, Cancer[b]	
	AADR (mg/day)		AAD (mg/kg-day)		IAD (mg/kg-day)		CAD (mg/kg-day)		LCAD (mg/kg-day)	
	CT	HE	CT	HE	CT	HE	CT	HE	CT	HE

CT = central tendency; HE = high-end; OES = occupational exposure scenario; POTW = publicly owned treatment works; WWT = wastewater treatment

[a] Dermal exposure estimates, expressed the acute absorbed dose rate (AADR), are the same as those presented in Table 5-7 (column header "Worker Dermal Exposure Estimates").

[b] Dermal exposure metrics for workers were calculated using the AADR values; additional information, including the underlying calculations, are described in more detail in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) and the *Draft Occupational Risk Calculator for 1,2-Dichloropropane* (U.S. EPA, 2026y).

1858

5.1.1.3 Estimate the Number of Workers and Occupational Non-Users Potentially Exposed

Where available, EPA used CDR data to provide a basis to estimate the number of workers and ONUs. The Agency supplemented the available CDR data using available market data; NAICS and SIC code data from TRI, DMR, and NEI sites identified for each COU; U.S. BLS and U.S. Census data; and GSs and ESDs.

Methodology

Data were available from the 2016, 2020, and 2024 CDR for manufacturing sites; however, the Agency determined this was not sufficient to determine the total number of workers for that OES because CDR data may not capture the full range of manufacturing sites or workers associated with the OES. Therefore, EPA supplemented the available CDR data using the methodology described in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). Where market penetration data and site-specific NAICS/SIC codes from TRI/DMR/NEI were not available, EPA estimated the number of workers using data from GSs and ESDs. For additional details on development of estimates of number of workers refer to the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Results

Table 5-10 provides a summary for the number of workers and ONUs potentially exposed to 1,2-dichloropropane per facility. The estimates are provided for a facility within each OES. For OES estimates that use modeled site counts, the number of sites is derived from production volume estimates based on EPA CDR reporting thresholds. Because these estimates rely on reporting thresholds rather than actual production volume data, the resulting site counts may be significantly overestimated.

Table 5-10. Total Number of Workers and ONUs Potentially Exposed to 1,2-Dichloropropane for Each OES

OES	Potential Number of Sites (Facility Data)	Potential Number of Sites (Modeled Data)	Potential Number of Workers per Site [a]	Potential Number of ONUs per Site [a]
Manufacture (OES #1)	4	–	33	16
Import/Processing – Repackaging (OES #2)	9	–	1	1
Processing as a Reactant (OES #3)	56	–	27	15
Processing Aid – Non-Incorporative Activities (OES #4)	50	–	127	35
Commercial Use as a Laboratory Chemical (OES #5)	2	36,873 [b]	6	10
Disposal to Incineration (OES #7)	40	–	10	11
Disposal to Landfill (OES #8)	623	–	1	5
Disposal to POTW and Non-POTW WWT (OESs #9, 10)	350	–	1	1
Remediation (OES #11)	9	–	5	1

CDR = Chemical Data Reporting; DMR = Discharge Monitoring Report; NEI = National Emissions Inventory; OES = occupational exposure scenario; ONU = occupational non-user; TRI = Toxics Release Inventory

OES	Potential Number of Sites (Facility Data)	Potential Number of Sites (Modeled Data)	Potential Number of Workers per Site [a]	Potential Number of ONUs per Site [a]

[a] Number of workers and ONUs estimates based on U.S. Census Bureau Data, U.S. BLS data, CDR, DMR, TRI, and NEI (U.S. BLS, 2023; U.S. Census Bureau, 2017)
[b] In cases where the number of sites was modeled via Monte Carlo Analysis, the 50th percentile number of sites is presented. Section 4.2.5 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) includes discussion of EPA's uncertainties on the production volume (kg/yr) and 1,2-dichloropropane throughputs (kg/site-yr) for this OES, which factor into the estimates of number of sites.

5.1.1.4 Weight of Scientific Evidence Conclusions for Occupational Exposure

EPA considered the assessment approach, the quality of the data, and uncertainties in assessment results to determine a weight of scientific evidence conclusion for the occupational exposure estimates. In Table 5-11, EPA summarizes the weight of scientific evidence ratings for the occupational inhalation exposures for each OES. Table 5-11 also summarizes the weight of scientific evidence rating for the dermal assessment approach, which was utilized across all OESs. For more detail on the weight of scientific evidence determinations, see the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Table 5-11. Weight of Scientific Evidence Conclusions for Occupational Exposure

OES or Assessment	Weight of Scientific Evidence Conclusion in Occupational Inhalation Exposure Estimates
Manufacture (OES #1)	***Evidence Found:*** For this OES, EPA used inhalation monitoring data from facilities that manufacture 1,2-dichloropropane as a byproduct provided in a test order submission from the ACC PDC Consortium (Integral Consulting, 2026). ***Strengths:*** The primary strengths of the inhalation occupational exposure estimates for this OES include the use of PBZ samples directly applicable to this OES, which are preferrable to other assessment approaches such as modeling or the use of OELs, and the high number of samples available for workers and ONUs. EPA used full-shift PBZ air concentration data to assess inhalation exposures, with the data source having a high data quality rating from the systematic review process. Another strength is that the data used from the test order were 1,2-dichloropropane-specific from two facilities that manufacture the chemical as a byproduct; the data included 18 worker and 12 ONU full-shift (8–12 hour) PBZ samples. Out of the 30 full-shift samples, none were measured below the LOD. Another strength is that the monitoring data was collected in accordance with sampling plan that has been reviewed and approved by EPA and includes all the agreed upon metadata. The study also provided information on number of exposure days/year for specific SEGs, EPA incorporated this into the exposure estimates. Additionally, this monitoring information captures a range of 1,2-dichloropropane concentrations in the process streams associated with worker activities (10.2–100%). ***Limitations/Assumptions/Uncertainties:*** While the overall study provided a high number of samples for workers, there were fewer samples for certain SEGs, such as laboratory technicians. EPA has less certainty in exposure estimates where few samples (<6) were collected. Additionally, for the Maintenance Technician SEG, no full shift samples were collected. EPA estimated full-shift TWAs for this SEG using current task-length and historical full-shift data. Task-length samples are more appropriate for characterization of peak, short-term exposures, and there is greater uncertainty in application of such samples to calculate full-shift exposures. Additionally, EPA relied on historical data for this SEG, for which all samples were below the limit of detection (n = 3). The limit of detection reported in this study was high (2.5E−02 to 2.9E−02 ppm) relative to more recent sampling, adding to increased uncertainty in use of this data. EPA has lower confidence in the analysis of the maintenance technician SEG. ***Weight of Scientific Evidence Conclusion:*** Based on these strengths and limitations, EPA has concluded that the weight of scientific evidence for this assessment is robust for Worker Laboratory Technician, Logistics Technician, and Process Operator SEGs and ONUs. For Maintenance Technicians, EPA has slight-to-moderate confidence, due to the uncertainties described above.

OES or Assessment	Weight of Scientific Evidence Conclusion in Occupational Inhalation Exposure Estimates
Import/Processing – Repackaging (OES #2)	***Evidence Found:*** For this OES, EPA used analogous inhalation data from the Manufacturing and Processing as a Reactant OESs, which were provided by a test order submission from the ACC PDC Consortium (Integral Consulting, 2026). Data from the worker description "logistics technician" were used in this assessment for workers, and a subset of the ONUs data (relevant to logistics and marine terminal areas) were utilized for ONUs. ***Strengths:*** The primary strength of the inhalation exposure estimates for this OES is that it used high-quality monitoring data from the test order process; more information on the strengths of this data are provided in the WOSE sections for the Manufacturing and Processing as a Reactant OESs. Personal breathing zone inhalation monitoring data utilized was collected from multiple facilities across manufacturing and processing sites and captures a variety of tasks expected to occur during repackaging operations. The use of analogous data are preferred over other approaches, such as modeling. All worker samples were above the limit of detection, 2 out of 11 ONU samples were below the LOD (4.4E−05 to 4.7E−05 ppm). ***Limitations/Assumptions/Uncertainties:*** The primary limitation is that the data are for Logistics Technicians in manufacturing and processing settings, rather than a repackaging setting, and so the dataset may contain exposure from activities or environments that would not occur in a commercial setting. Additionally, EPA assumed 250 exposure days/year based on 1,2-dichloropropane exposure each working day for a typical worker schedule; it is uncertain whether this captures actual worker schedules and exposures. ***Weight of Scientific Evidence Conclusion:*** Based on these strengths and limitations, EPA has concluded that the weight of scientific evidence for this assessment is moderate for workers and ONUs.
Processing as a Reactant (OES #3)	***Evidence Found:*** For this OES, EPA used inhalation monitoring data from facilities that process 1,2-dichloropropane as a reactant provided via a test order submission from the ACC PDC Consortium (Integral Consulting, 2026). ***Strengths:*** The primary strengths of the inhalation occupational exposure estimates for this OES include the use of PBZ samples directly applicable to this OES, which are preferrable to other assessment approaches such as modeling or the use of OELs, and the high number of samples available for workers and ONUs. EPA used full-shift PBZ air concentration data to assess inhalation exposures, with the data source having a high data quality rating from the systematic review process. Another strength is that the data used from the test order were 1,2-dichloropropane-specific from three facilities in this OES; the data included 87 worker and 32 ONU full-shift (8–12 hour) PBZ samples. Out of the 119 total full-shift samples, 2 ONU samples were below the LOD (4.4E−05 to 1.3−03 ppm). All worker samples were above the LOD. Another strength is that the monitoring

OES or Assessment	Weight of Scientific Evidence Conclusion in Occupational Inhalation Exposure Estimates
	data was collected in accordance with sampling plan that has been reviewed and approved by EPA and includes all of the agreed upon metadata. Another strength is that the monitoring data was collected in accordance with sampling plan that has been reviewed and approved by EPA and includes all of the agreed upon metadata. The study also provided information on number of exposure days/year for specific SEGs within this area, EPA incorporated this into the exposure estimates. Additionally, this monitoring information captures a range of 1,2-dichloropropane concentrations in the process streams associated with worker activities (<1–100%). ***Limitations/Assumptions/Uncertainties:*** For the Maintenance Technician SEG, no full-shift samples were collected. EPA estimated full-shift TWAs for this SEG using task-length data. Task-length samples are more appropriate for characterization of peak, short-term exposures, and there is greater uncertainty in application of such samples to calculate full-shift exposures. As such, EPA has lower confidence in the analysis of the Maintenance Technician SEG. ***Weight of Scientific Evidence Conclusion:*** Based on these strengths and limitations, EPA has concluded that the weight of scientific evidence for this assessment is robust for Laboratory Technician, Logistic Technician, Process Operator, and Marine Logistics Technician SEGs and ONUs. For Maintenance Technicians, EPA has moderate confidence, due to the uncertainties described above.
Processing Aid – Non-Incorporative Activities (OES #4)	***Evidence Found:*** For this OES, EPA used analogous inhalation data from the Processing as a Reactant OES, which were provided by a test order submission from the ACC PDC Consortium (Integral Consulting, 2026). ***Strengths:*** The primary strength of the inhalation exposure estimates for this OES is that it used high-quality monitoring data from the test order process; more information on the strengths of this data are provided in the WOSE section for the Manufacturing and Processing as a Reactant OESs. Personal breathing zone inhalation monitoring data utilized was collected from multiple facilities across processing sites and captures a variety of tasks expected to occur for this OES. The use of analogous data are preferred over other approaches, such as modeling. All worker samples were above the limit of detection (n = 59). Additionally, EPA identified and considered 32 samples for ONUs during processing as a reactant for an analogous ONU scenario. Two ONU samples were below the LOD (4.4E−05 to 1.3E−03 ppm). ***Limitations/Assumptions/Uncertainties:***. The primary limitations is that the data are for the Processing as a reactant scenario rather than the use of 1,2-dichloropropane as a processing aid. However, EPA assumes the worker activities and sources of exposure to be similar. Additionally, EPA assumed 250 exposure days/year based on 1,2-dichloropropane exposure each working day for a typical worker schedule; it is uncertain whether this captures actual worker schedules and exposures.

OES or Assessment	Weight of Scientific Evidence Conclusion in Occupational Inhalation Exposure Estimates
	Weight of Scientific Evidence Conclusion: Based on these strengths and limitations, EPA has concluded that the weight of scientific evidence for this assessment is moderate for Laboratory Technicians and Processing Operator SEGs and ONUs. For Maintenance Technicians, EPA has slight-to-moderate confidence, due to the use of short-term exposure data (as described in the Processing as a Reactant OES).
Commercial Use as a Laboratory Chemical (OES #5)	***Evidence Found:*** For this OES, EPA used analogous inhalation data from the Manufacturing and Processing as a Reactant OESs, which were provided by a test order submission from the ACC PDC Consortium (Integral Consulting, 2026). Inhalation data from the worker description "Laboratory Technicians" were used in this assessment; a subset of ONU data for Analytical Technologists who worked in laboratory settings was utilized to assess ONUs. ***Strengths:*** The primary strength of the inhalation exposure estimates for this OES is that it used high-quality monitoring data from the test order process; more information on the strengths of this data are provided in the WOSE sections for the Manufacturing and Processing as a Reactant OES. The PBZ inhalation monitoring data utilized was collected from multiple facilities across manufacturing and processing sites and captures a variety of tasks expected to occur during laboratory work. Additionally, EPA identified and considered 2 samples for ONUs that were relevant to laboratory work. The use of analogous data are preferred over other approaches, such as modeling. All samples were above the limit of detection (n = 13). ***Limitations/Assumptions/Uncertainties:*** The primary limitation is that the data are for laboratory technicians in a manufacturing/processing setting, rather than a commercial setting, and so the dataset may contain exposure from activities or environments that would not occur in a commercial setting. For example, information from the test order indicates that some of the inhalation monitoring data includes collection of samples from process areas. EPA has considered how the inclusion of these samples may affect the overall exposure and risk estimates in the Risk Characterization section of this document. Additionally, EPA assumed 250 exposure days/year based on 1,2-dichloropropane exposure each working day for a typical worker schedule; it is uncertain whether this captures actual worker schedules and exposures. ***Weight of Scientific Evidence Conclusion:*** Based on these strengths and limitations, EPA has concluded that the weight of scientific evidence for this assessment is moderate for workers and ONUs.
Disposal to Incineration (OES #7)	***Evidence Found:*** For this OES, EPA used analogous inhalation data from the Manufacturing and Processing as a Reactant OESs, which were provided by a test order submission from the ACC PDC Consortium (Integral Consulting, 2026). Data from the worker description "Logistics Technician" were used in this assessment for

OES or Assessment	Weight of Scientific Evidence Conclusion in Occupational Inhalation Exposure Estimates
	workers, and a subset of the ONUs data (relevant to logistics and marine terminal areas) were utilized for ONUs. ***Strengths:*** The primary strength of the inhalation exposure estimates for this OES is that it used high-quality monitoring data from the test order process; more information on the strengths of this data are provided in the WOSE sections for the Manufacturing and Processing as a Reactant OESs. Personal breathing zone inhalation monitoring data was collected from multiple facilities across manufacturing and processing sites and captures a variety of tasks expected for workers at incineration sites. The use of analogous data are preferred over other approaches, such as modeling. All worker samples were above the LOD, 2 out of 11 ONU samples were below the LOD (4.4E−05 to 4.7E−05 ppm). ***Limitations/Assumptions/Uncertainties:*** The primary limitation is that the data are for workers in a manufacturing setting, rather than an incineration facility, and so the dataset may contain exposure from activities or environments that would not occur in an incineration facility. Additionally, EPA assumed 250 exposure days/year based on 1,2-dichloropropane exposure each working day for a typical worker schedule; it is uncertain whether this captures actual worker schedules and exposures. ***Weight of Scientific Evidence Conclusion:*** Based on these strengths and limitations, EPA has concluded that the weight of scientific evidence for this assessment is moderate for workers and ONUs.
Disposal to Landfill (OES #8)	***Evidence Found:*** For this OES, EPA identified area samples from a hazardous waste landfill study in Italy (Ravina et al., 2020) that were used in this assessment. ***Strengths:*** The Agency inhalation data had a medium data quality rating from systematic review. The primary strength of these data are that they are directly applicable concentration data that portray the concentration of 1,2-dichloropropane in the air at a landfill. ***Limitations/Assumptions/Uncertainties:*** The primary limitations of these data are: (1) only area samples were available as opposed to PBZ air concentration data; (2) only summary statistics were available in the study as opposed to discrete measurements; and (3) data were collected from one site in Italy. The study reported a detection limit of 0.2 µg/m^3 and described non-detect values were assessed at LOD ÷ 2; the number of non-detect values was not provided. Information on analytical methods and protocols, including analytical quality assurance and control, was not provided for the study. Additionally, EPA assumed 250 exposure days/year based on 1,2-dichloropropane exposure each working day for a typical worker schedule; it is uncertain whether this captures actual worker schedules and exposures. For ONUs, EPA did not identify data or modeling

OES or Assessment	Weight of Scientific Evidence Conclusion in Occupational Inhalation Exposure Estimates
	approaches applicable to estimation of ONU exposure for disposal by landfill and used a default assumption of the central tendency from the workers inhalation exposures to represent ONU inhalation exposures. ***Weight of Scientific Evidence Conclusion:*** Based on these strengths and limitations, EPA has concluded that the weight of scientific evidence for this assessment is slight for both workers and ONUs.
Disposal to POTW and Non-POTW WWT (OESs #9, 10)	***Evidence Found:*** For this OES, EPA used analogous inhalation data from the Manufacturing and Processing as a Reactant OESs, which were provided by a test order submission from the ACC PDC Consortium (Integral Consulting, 2026). Data from the worker description "Logistics Technician" were used in this assessment for workers, and a subset of the ONUs data (relevant to logistics and marine terminal areas) were utilized for ONUs. ***Strengths:*** The primary strength of the inhalation exposure estimates for this OES is that it used high-quality monitoring data from the test order process; more information on the strengths of this data are provided in the WOSE sections for the Manufacturing and Processing as a Reactant OESs. Personal breathing zone inhalation monitoring data was from multiple facilities across manufacturing and processing sites and captured a variety of tasks expected for workers at POTW and non-POTW WWT sites. The use of analogous data are preferred over other approaches, such as modeling. All worker samples were above the limit of detection, 2 out of 11 ONU samples were below the LOD (4.4E−05 to 4.7E−05 ppm). ***Limitations/Assumptions/Uncertainties:*** The primary limitation is that the data are for workers in a manufacturing setting, rather than a POTW/WWT facility, and so the dataset may contain exposure from activities or environments that would not occur in a POTW/WWT facility. Additionally, EPA assumed 250 exposure days/year based on 1,2-dichloropropane exposure each working day for a typical worker schedule; it is uncertain whether this captures actual worker schedules and exposures. ***Weight of Scientific Evidence Conclusion:*** Based on these strengths and limitations, EPA has concluded that the weight of scientific evidence for this assessment is moderate for workers and ONUs.
Remediation (OES #11)	***Evidence Found:*** For this OES, EPA used analogous inhalation data from facilities that manufactured 1,2-dichloropropane as a byproduct, which was provided by the ACC PDC Consortium (ACC, 2021). Data from the worker description "Remediation Contractor" were used in this assessment. EPA did not identify data specific to ONUs and therefore used the central tendency from workers to represent ONU exposures. ***Strengths:*** The primary strength of the inhalation exposure estimates for this OES is that it used PBZ monitoring data, which is preferable to other approaches, such as the use of area monitoring data or modeling.

OES or Assessment	Weight of Scientific Evidence Conclusion in Occupational Inhalation Exposure Estimates
	Limitations/Assumptions/Uncertainties: The primary limitations include: (1) the data are for remediation contractors in a manufacturing setting, rather than a remediation site, and so the dataset may contain exposure from activities or environments that would not occur in a remediation site; and (2) the lack of data for ONUs. There were a low number of samples (n = 4), and one sample was below the limit of detection (2.2×10^{-2} ppm). Additionally, these data were historical monitoring values from 2014, and may not be representative of current remediation sites. Additionally, EPA assumed 250 exposure days/year based on 1,2-dichloropropane exposure each working day for a typical worker schedule; it is uncertain whether this captures actual worker schedules and exposures. ***Weight of Scientific Evidence Conclusion:*** Based on these strengths and limitations, EPA has concluded that the weight of scientific evidence for this assessment is slight-to-moderate for workers and slight for ONUs.
Dermal Exposure	***Evidence Found:*** EPA estimated dermal exposures for all OES using modeling methodologies, which are supported by moderate evidence. The Agency used the EPA DEVL Model combined with Monte Carlo modeling to calculate the dermal absorbed dose. EPA used test order data on 1,2-dichloropropane for the fraction absorption parameter (Charles River Laboratories, 2024) and OES-specific data for the weight percent parameter in the model. ***Strengths:*** A strength of the Monte Carlo modeling approach is that variation in model input values and a range of potential exposure values is more likely than a discrete value to capture actual exposure at sites. ***Limitations/Assumptions/Uncertainties:*** The primary limitation is the uncertainty in the representativeness of values toward the true distribution of potential dermal exposures. ***Weight of Scientific Evidence Conclusion:*** The weight of scientific evidence for the modeling methodologies for all OES is moderate. Note that EPA did not assess dermal exposures to ONUs as EPA does not expect ONUs to directly handle 1,2-dichloropropane as part of their duties. Depending on the COU, ONUs may have incidental dermal exposures due to surface contamination, but EPA did not consider these exposures to be significant and were not assessed.
ACC = American Chemistry Council; COU = condition of use; DEVL = Dermal Exposure to Volatile Liquids); EPA = Environmental Protection Agency; LOD = limit of detection; PBZ = personal breathing zone; PDC = propylene dichloride; POTW = publicly owned treatment works; OES = occupational exposure scenario; ONU = occupational non-user; SEG = similar exposure group; TWA = time-weighted average; WWT = wastewater treatment	

1894

5.1.2 Consumer Exposures

EPA evaluated reasonably available information for consumer products containing 1,2-dichloropropane. The information regarding the presence of 1,2-dichloropropane in consumer products has changed during the risk evaluation timeframe from the time of the publication of the final scope (U.S. EPA, 2020c) to current evidence that product formulations no longer contain 1,2-dichloropropane.

EPA identified 1,2-dichloropropane containing products in the final scope document (U.S. EPA, 2020c) from a market search for products containing 1,2-dichloropropane. All products were categorized as cleaning and furnishing care products and were found as polishes/waxes or liquid spray cleaners. EPA identified six SDSs (Tenax Spa, 2019, 2015a, b, c, 2013a, b) within the Consumer Use – Cleaning and Furniture Care Products COU. At the time, the SDSs indicated the presence of the chemical and the weight fraction at which it was present in the product. On June 21, 2022, EPA issued a consumer test order under TSCA for source characterization of 1,2-dichloropropane in the identified products (*i.e.,* a measure of weight fraction) and to measure the emission rate from use of cleaning and furnishing care products—specifically stone polish/sealer containing 1,2-dichloropropane in the form of wax and/or paste, liquid, and spray through chamber testing (U.S. EPA, 2025c).

Since the publication of the final scope document (U.S. EPA, 2020c) and issuance of the consumer test order, ACC and Tenax (the manufacturer of these products) provided submissions in response stating that the tested products no longer contained 1,2-dichloropropane (ACC, 2023) (see Section 5.1.2.1 below for updated SDSs). However, the Agency has identified the formulation containing 1,2-dichloropropane may still be available internationally (Roff, 2026). Because the formulation of these products is a recent change and given the availability of these products containing 1,2-dichloropropane outside of the United States, EPA believes that the consumer use of cleaning and furnishing care products containing 1,2-dichloropropane is reasonably foreseen and, thus, conducted the consumer exposure analysis on the 1,2-dichloropropane-containing product use.

Technical specifications alongside manufacturer information allowed for the creation of low-, medium-, and high-intensity use scenarios for inhalation exposures that included sensitivity analysis with the parameters of weight fraction, mass of product used, and duration of use being the primary parameters. EPA quantitatively estimated inhalation exposure (mg/m^3) and dermal exposures (mg/kg/day) to 1,2-dichloropropane. Given the products identified and the use patterns of the products, it was reasonable to conclude that ingestion by mouthing would not be an appropriate pathway of exposure to quantitatively assess. The following subsections describe EPA's approach for assessing consumer exposures and provides assessment results for the consumer COUs of stone cleaners/polishers containing 1,2-dichloropropane. The *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) provides additional details on the development of approaches and the exposure assessment results. The dermal modeling used the delivery-limited fractional absorption approach based on the test order experiments as the most appropriate choice for the consumer COUs.

5.1.2.1 Summary of Consumer COUs and Exposure Scenarios

Consumer products containing 1,2-dichloropropane were identified through the EPA's CDR database and from searches of all reasonably available sources as presented in the final scope document (U.S. EPA, 2020c) (Table 5-12).

During the development of this draft risk evaluation, EPA identified updated SDSs (Tenax Spa, 2023a, b, c, 2020, 2017) from Tenax indicating that, as of 2017 for Quartz Toner, 2020 for Lustro Italiano, and 2023 for Cera Fluida, Cera TeWax, and Uniblack2, 1,2-dichloropropane is no longer present in the

identified products, differing from the previously identified reasonably available SDSs (Tenax Spa, 2019, 2015a, b, c, 2013a, b) that EPA relied on in the final scope. The Agency has used the reasonably available SDSs and technical data sheets (TDSs) specific to the formulations of the previously available 1,2-dichloropropane-containing products to inform each products' weight fraction, density, and use patterns.

Table 5-12. Consumer Conditions of Use (COUs)

COUs			Reference(s)[c]
Life Cycle Stage[a]	**Category**	**Subcategory[b]**	
Consumer Use	Cleaning and Furnishing Care Product	All-Purpose Liquid Cleaner/Polish	(Tenax Spa, 2019, 2013b)
	Cleaning and Furnishing Care Product	All-Purpose Waxes and Polishes	(Tenax Spa, 2015a, b, 2013a)
	Cleaning and Furnishing Care Product	All-Purpose Liquid Spray Cleaner	(Tenax Spa, 2015c)

[a] "Consumer Use" means the use of a chemical or a mixture containing a chemical (including as part of an article, such as furniture or clothing) when sold to or made available to consumers for their use.
[b] These subcategories reflect more specific conditions of use (COUs) of 1,2-dichloropropane.
[c] Products as identified EPA's *Final Scope of the 1,2-Dichloropropane Risk Evaluation; CASRN 78-87-5* (U.S. EPA, 2020c)

For the products containing 1,2-dichloropropane in each of the consumer COU subcategories; that is, for All-Purpose Liquid Cleaner/Polish (referred to as "liquid polish"), All-Purpose Wax and Polish Products (referred to as "waxes") and All-Purpose Liquid Spray Cleaner Products (referred to as "daily spray cleaner") the 1,2-dichloropropane content was identified using reasonably available information—largely via previously available SDSs. Products with similar content and expected patterns of use were grouped together for modeling purposes. Thus, though six products were identified, two products, Cera Distaccante (Tenax Spa, 2015a) and the Quartz Toner (Tenax Spa, 2013a) were sufficiently similar (*i.e.,* waxes with the same weight fraction and use patterns) that they were assessed under a single scenario. Thus, five liquid polish and wax products were quantitively assessed for both inhalation and dermal exposure. As mentioned above, exposures via ingestion were not anticipated from the use of any of the assessed products because the surface would be dry after the application and buffing and it is assumed that 1,2-dichloropropane will have evaporated/volatilized. Each of the five assessed products represent one of three different product types based on quantity of 1,2-dichloropropane in the product, the quantity and duration of use, and align with the product types. Table 5-13 presents more details on each product including product quantity, weight fraction, and a description of the product.

Table 5-13. Consumer Product Names, Descriptions, and Quantities

COU Subcategory	Product Name	Product Type	Description of Product	Product Quantity	1,2-Dichloropropane (Weight %)	Form
All-Purpose Liquid Cleaner/Polish	Cera Fluida Classic Liquid Wax (relative density = 1.1 kg/L)	Liquid polish	Solution waxes to protect and brighten	1 quart	54.1	Liquid
	UniBlack2 black granite treatment (Treats 215-323 ft^2) (specific gravity = 0.91 kg/L)	Liquid polish	Wax for natural stones	1 quart	30–50	Liquid
All-Purpose Waxes and Polishes	Cera TeWax (relative density = 1.1 kg/L)	Waxes	Wax for natural stones	1 quart	30–50	Paste
	Cera Distaccante (relative density = 0.8 kg/L)	Waxes	Wax	250 mL	1–3.5	Paste
	Quartz Toner (specific gravity = 0.880 kg/L)					
All-Purpose Liquid Spray Cleaner	Lustro Italiano (relative density = 0.8 kg/L)	Daily spray cleaner	All-purpose liquid daily spray cleaner/ polish	32 fl oz	1–3.5	Liquid

5.1.2.2 Summary of Inhalation Exposure Assessment

CEM Version 3.2 (U.S. EPA, 2023b) was selected to estimate 1,2-dichloropropane inhalation exposures under the Consumer Use COU and cleaning and furnishing care subcategory as empirical indoor air monitoring data were not available. CEM Version 3.2 (U.S. EPA, 2023b) was selected to model consumer inhalation exposures to 1,2-dichloropropane emitted from the use of the identified products. The advantages of using CEM to assess exposures to consumers and bystanders are as follows:

- CEM has been peer-reviewed (ERG, 2016);
- CEM accommodates the distinct inputs available for the products and articles containing 1,2-dichloropropane, such as weight fractions, product density, room of use, and frequency and duration of use.

CEM Version 3.2 is deterministic, generating point estimates of exposure and dose based on user-provided input parameters and various assumptions (or defaults). The model contains a variety of pre-populated scenarios for specific product and article categories and allows the user to define custom scenarios in instances where the pre-populated scenarios are not adequate. User inputs for physical and chemical properties are used to calculate emission profiles of semi-volatile organic compounds (SVOCs).

This assessment utilizes the acute dose rates (ADR) and chronic average daily doses (CADD) generated by CEM Version 3.2 for the inhalation pathway. Acute exposures are for an exposure duration of 1 day, and chronic exposures are for an exposure duration of 1 year.

CEM Version 3.2 generates exposure estimates based on user-provided input parameters and various assumptions (or defaults). The model contains a variety of pre-populated scenarios for specific product

and article categories and allows the user to define generic categories for any product or article where the prepopulated scenarios are not adequate. User inputs for physical and chemical properties of products and articles are utilized to calculate emission profiles of SVOCs and is assumed to be applicable to volatile organic carbons (VOCs). 1,2-Dichloropropane is considered a VOC, therefore it would be appropriate to assess inhalation exposure concentrations via CEM modeling. There are six emission calculation profiles within CEM (E1–E6) that represent specific use conditions and properties of various products and articles. A description of these models is summarized in the CEM User Guide and associated appendices (U.S. EPA, 2023b).

CEM Version 3.2 was used to estimate maximum air concentrations of 1,2-dichloropropane for acute inhalation exposures and average daily concentrations for chronic inhalation exposures resulting from the use of each of the stone polishes/waxes/cleaner products.

Higher concentrations of 1,2-dichloropropane in air increase inhalation exposure. This can result from product formulations or use patterns that provide greater emissions, as well as environment-specific characteristics such as smaller room volume and lower ventilation rates. In CEM Version 3.2, key parameters influencing emission rates include weight fraction of 1,2-dichloropropane in the product, duration of product use, mass of product used, and frequency of product use. Any increase in these parameters results in higher chemical exposure from product use. To capture a range of potential exposure levels, these inputs were varied to create high-, medium-, and low-intensity use scenarios. Other parameters such as chemical properties, building volume, air exchange rate, and user and bystander activity patterns (*i.e.,* movements around the home) were held constant across all intensities. Detailed descriptions on the derivation of these inputs are provided below in Table 5-14 and in the supplemental file (U.S. EPA, 2026f).

Table 5-14. Summary of Key Parameters for Products Modeled in CEM Version 3.2

COU Category/ Subcategory	Product	Exposure Scenario Level	Weight Fraction (%) [a]	Density (g/cm^3) [b]	Duration of Use (mins) [c]	Product Mass Used (g) [c]	Use Environment and Volume (m^3) [d e]	Air Exchange Rate, Zone 1 and Zone 2 (hour^{-1}) [e]	Interzone Ventilation Rate (m^3/h) [e]	Reference (SDS)
Cleaning and Furnishing Care Product; All-Purpose Liquid Cleaner/Polish	Cera Fluida Classic Liquid Wax	Low	54.12	1.1	60	154	Kitchen	0.45	109	(Tenax Spa, 2019)
		Medium			90	204				
		High			120	308				
	Uniblack2	Low	30	0.91	60	120				(Tenax Spa, 2013b)
		Medium	40		90	160				
		High	50		120	240				
Cleaning and Furnishing Care Product; All-Purpose Waxes and Polishes	CeraTeWax	Low	30	1.1	60	154	Kitchen	0.45	109	(Tenax Spa, 2015b)
		Medium	40		90	204				
		High	50		120	308				
	Quartz Toner	Low	1	0.88	60	106				(Tenax Spa, 2013a)
		Medium	2.25		90	141				
		High	3.5		120	211				
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner	Lustro Italiano	Low	1	0.8	5	5	Kitchen	0.45	109	(Tenax Spa, 2015c)
		Medium	2.25		10	6				
		High	3.5		15	10				

CEM = Consumer Exposure Model; COU = condition of use; SDS = safety data sheet; TDS = technical data sheet
Granite countertop square footage ranges from 30–60 ft^2; see supplemental file (U.S. EPA, 2026f).
[a] Weight fraction from SDS.
[b] Product density from SDS.
[c] Duration and product mass calculated for high, medium, and low exposure scenario levels and correspond to square footage (low: 30 ft^2, medium: 40 ft^2, and high: 60 ft^2) and product information for coverage/use (in m^2). Higher product mass and duration of use are described in product information for use on marble floors and is assessed under commercial exposure scenarios. See supplemental file (U.S. EPA, 2026f).
[d] Frequencies of use based on product claims in TDS of once every 18 months for all but the Lustro Italiano cleaner; thus, only acute scenario assessed for those products. For the Lustro Italiano, a daily cleaner, chronic as well as acute exposures were assessed.
[e] Use environment (kitchen) based on product marketing/TDS for use on granite and marble. Kitchen air exchange rate and interzonal ventilation rates are based on CEM defaults specific for a single-family home.

Each of the stone cleaners were estimated to be used in the kitchen for cleaning or treating granite countertops. One of the key parameters in estimating consumer use of granite cleaners is the size of the granite countertops. EPA reviewed a number of online sources that support a range of 30 to 60 square feet of countertops. Although kitchens in the United States also frequently include islands that range from 8, 18, and 32 ft^2 for small, medium and large islands (U.S. EPA, 2026f), the Agency assumed that islands are included in the total countertop square footage. EPA therefore used 30 ft^2 for a small kitchen, 40 ft^2 for a medium kitchen, and 60 ft^2 for a large kitchen (see Table 5-14).

The differences in exposures are dependent on the input parameters; however, the weight fraction, duration, and amount of product used are the three major factors affecting the level of exposures. The first four products listed in Table 5-15 are stone polishes that the manufacturer notes will only need to be applied once annually to 18 months (depending on the product). Thus, for these products only acute exposures associated with a single use were assessed.

The Lustro Italiano product is a daily spray cleaner and its use for 1 day was assessed as an acute exposure and for multiple days as a chronic exposure.

Table 5-15. Acute Consumer Inhalation Exposures

Category/ Subcategory	Product	Exposure Scenario Level[a]	User (Adult/Youth) Peak 1,2-Dichloropropane Exposure Concentration (Zone 1)		Bystander (All Age Groups/ Life Stages) Peak 1,2-Dichloropropane Exposure Concentration (Zone 2)	
			mg/m³	ppm	mg/m³	ppm
Cleaning and Furnishing Care Product; All-Purpose Liquid Cleaner/Polish	Cera Fluida Classic Liquid Wax	Low	594	129	88	19
		Medium	720	156	139	30
		High	854	185	194	42
Cleaning and Furnishing Care Product; All-Purpose Liquid Cleaner/Polish	Uniblack2	Low	329	71	49	11
		Medium	417	90	81	18
		High	615	133	140	30
Cleaning and Furnishing Care Product; All-Purpose Waxes and Polishes (Paste)	CeraTe Wax	Low	422	91	63	14
		Medium	532	115	103	22
		High	789	171	179	39
Cleaning and Furnishing Care Product; All-Purpose Waxes and Polishes (Paste)	Quartz Toner	Low	10	2.1	1.4	0.31
		Medium	21	4.5	4.0	0.87
		High	38	8.2	8.6	1.9
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner/Polish	Lustro Italiano	Low	1.6	0.33	6.6E−02	1.4E−02
		Medium	3.6	0.78	0.19	4.0E−02
		High	8.2	1.8	0.51	0.11

[a] The differences in input parameters for the low/med/high exposure scenarios can be found in Table 5-14.

Table 5-16 below presents the chronic exposures for consumers and bystanders associated with the use of the Lustro Italiano daily spray cleaner product across the low-, medium-, and high-intensity use scenarios.

Table 5-16. Chronic Consumer Inhalation Exposures

Category/ Subcategory	Product	Exposure Scenario Level[a]	User Chronic 1,2-Dichloropropane Exposure Concentration (Zone 1)		Bystander Chronic 1,2-Dichloropropane Exposure Concentration (Zone 2)	
			mg/m^3	ppm	mg/m^3	ppm
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner/Polish	Lustro Italiano	Low	8.4E−03	6.7E−02	2.3E−03	7.1E−03
		Medium	4.5E−02	2.0E−02	1.3E−02	2.2E−03
		High	0.14	3.4E−03	4.2E−02	4.0E−04
[a] Differences in input parameters for the low/med/high exposure scenarios can be found in Table 5-14.						

5.1.2.3 Summary of Dermal Exposure Assessment

EPA used dermal absorption data from a test order that performed experiments under different conditions: (1) infinite dose experiments to determine the permeability coefficient appropriate for a flux-limited modeling approach, and (2) finite dose experiments to determine the fraction absorbed appropriate for delivery-limited modeling. The Agency used the fractional absorption dermal model applicable to liquid and paste products (Charles River Laboratories, 2024). The fractional absorption dermal method was identified as the most appropriate for liquids and pastes as the direct dermal contact exposure is expected to be finite and transient (*e.g.,* rag applications) and where instantaneous deposition onto the skin is expected.

See the Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane (U.S. EPA, 2026e) Section 11 for the dermal exposure assessment detailed description and equations and the Draft Consumer Exposure Analysis and Risk Calculator spreadsheet for calculations and results (U.S. EPA, 2026f). Briefly, four of the products (Cera Fluida, UniBlack2, Cera TeWax, and Quartz Toner) were modeled for acute dermal exposures only because their use and application are expected in the range of once every 1.5 to 2 years. The Lustro Italiano spray was modeled for acute and chronic dermal exposures because application and use can range from several times per week to daily. The fraction absorbed model for liquid products equations were obtained from the Dermal Exposure Assessment: A Summary of EPA Approaches (U.S. EPA, 2007). The acute daily dose and chronic average daily dose were calculated for age groups that are expected to be users of the products. The populations expected to be users of the polishes and waxes products identified for this assessment were adults, teenagers, and young teens (*i.e.,* 15+ years). Bystander dermal exposures are not expected to occur during product application. Table 5-17 summarizes the input values and sources of the inputs used in the calculation of dermal exposures; Table 5-18 summarizes acute and chronic dermal exposure doses per COU and product example.

Table 5-17. Summary of All Dermal Inputs for Fractional Absorption Model

COU and Subcategory	Product	Exposure Level	Fraction Absorbed (Unitless) [a]	Acute Frequency (Day) [b]	Chronic Frequency (Year) [b]	Amount retained on skin (*Qu*) (mg/cm^2-event) [c]	Weight Fraction (Decimal) [d]
Cleaning and Furnishing Care Product; All-Purpose Liquid Cleaner/Polish	Cera Fluida Classic Liquid Wax	Low	1.6E−02	1	1	0.7	0.5412
		Medium				1.4	0.5412
		High				2.1	0.5412
	UniBlack2 black granite treatment	Low	1.6E−02			0.7	0.3
		Medium				1.4	0.4
		High				2.1	0.5
Cleaning and Furnishing Care Product; All-Purpose Waxes and Polishes (Paste)	Cera TeWax	Low	1.6E−02	1	1	0.7	0.3
		Medium				1.4	0.4
		High				2.1	0.5
	Quartz Toner	Low	1.2E−02			0.7	1.0E−02
		Medium				1.4	2.3E−02
		High				2.1	3.5E−02
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner	Lustro Italiano	Low	1.2E−02	1	185 [e]	0.7	1.0E−02
		Medium			300 [e]	1.4	2.3E−02
		High			365 [e]	2.1	3.5E−02

[a] Empirically obtained from test order
[b] Based on specific product information from online retailers, do-it-yourself (DYI) websites, and product-specific technical data sheets (TDSs) and safety data sheets (SDSs).
[c] From U.S. EPA (1992) experiments to obtain amount of liquid retained from common scenarios including rag handling and direct dermal contact with liquids.
[d] Parameter found in SDS of products containing 1,2-dichloropropane.
[e] Based on CEM recommendations values for spray cleaners (Westat Inc., 1987).

Table 5-18. Consumer Acute and Chronic Dermal Exposures

Condition of Use	Subcategory	Product	Exposure Level	Adults (21+ years) Dermal Dose (mg/kg-day)	Youths (16–20 years) Dermal Dose (mg/kg-day)	Youths (11–15 years) Dermal Dose (mg/kg-day)
Acute dermal dose						
Cleaning and Furnishing Care Product	All-Purpose Liquid Cleaner/Polish	Cera Fluida Classic Liquid Wax	Low	1.8E−02	1.7E−02	1.9E−02
			Medium	3.6E−02	3.4E−02	3.7E−02
			High	0.11	0.10	0.11
		UniBlack2 black granite treatment	Low	1.0E−02	9.4E−03	1.0E−02
			Medium	2.7E−02	2.5E−02	2.8E−02
			High	0.10	9.4E−02	0.10
	All-Purpose Waxes and Polishes (Paste)	Cera TeWax	Low	1.0E−02	9.4E−03	1.0E−02
			Medium	2.7E−02	2.5E−02	2.8E−02
			High	0.10	9.4E−02	0.10
Cleaning and Furnishing Care Product		Quartz Toner	Low	2.5E−04	2.4E−04	2.6E−04
			Medium	1.1E−03	1.1E−03	1.2E−03
			High	5.3E−03	4.9E−03	5.4E−03
	All-Purpose Liquid Spray Cleaner/Polish	Lustro Italiano[a]	Low	2.5E−04	2.4E−04	2.6E−04
			Medium	1.1E−03	1.1E−03	1.2E−03
			High	5.3E−03	4.9E−03	5.4E−03
Chronic dermal dose						
Cleaning and Furnishing Care Product	All-Purpose Liquid Spray Cleaner/Polish	Lustro Italiano[a]	Low	4.7E−02	4.4E−02	4.8E−02
			Medium	0.34	0.32	0.35
			High	1.9	1.8	2.0

[a] Lustro Italiano is a spray product modeled for acute and chronic dermal exposures because application and use can range from daily to several times per week.

5.1.2.4 Weight of Scientific Evidence Conclusions for Consumer Exposure

EPA used a variety of data sources to inform the exposures estimates that could result from the intended consumer uses of stone cleaning products that contain 1,2-dichloropropane. Although the Agency has consumer test order submission data that indicate current cleaning and furnishing care products do not contain 1,2-dichloropropane, EPA believes that the consumer use of these products containing 1,2-dichloropropane is reasonably foreseen for three reasons: (1) the products were reformulated to remove 1,2-dichloropropane only a few years ago, (2) products containing 1,2-dichloropropane are available outside of the United States, and (3) it is reasonable to assume there may be continued use of products that were purchased prior to reformulation. However, EPA is uncertain as to whether the future use of products containing 1,2-dichloropropane and associated exposure estimates are plausible or likely in the United States, which impacts the Agency's overall confidence in the consumer use scenario. Therefore, EPA welcomes comment on whether, based on these or other assumptions, it is reasonable to foresee a return to distribution in U.S. commerce of consumer products containing 1,2-dichloropropane.

Inhalation

EPA has robust confidence in the inputs used to define the reasonably foreseen scenarios, including the selection of kitchen countertop surface areas, the duration and amount of product used, and the corresponding 1,2-dichloropropane weight fractions for the assumed use of products that contain 1,2-

dichlorpropane or future reformulation of products to contain 1,2-dichloropropane. EPA has robust confidence in the consumer inhalation exposures estimates from the use of 1,2-dichloropropane-containing products due to availability of product-specific data. Exposure estimates are provided for a range of exposures corresponding to low-, medium-, and high-intensity use for each product and are based on the manufacturer or retailer's product-specific data regarding amount (mass) or product used, the weight fraction and density of each product. Duration of use is based on cited data for range of surface treated (*i.e.,* is the square footage of stone counter tops).

Dermal

EPA has robust confidence in the consumer dermal exposure estimates from the use of 1,2-dichloropropane-containing products. These estimates relied on consumer product technical data to inform the range of exposure scenarios. EPA also relied on dermal absorption data from a test order that affected how much of the product actually becomes systemically absorbed. Based on the test order results, and as presented in Table 5-18, the amount absorbed is dependent on the concentration of 1,2-dichloropropane in the liquid and EPA used absorption of 1.55% for products containing 30% or more 1,2-dichloropropane and 1.16% absorption for products containing between 1 to 3.5% 1,2-dichloropropane.

5.1.3 General Population Exposures

General population exposures occur when 1,2-dichloropropane is released into the environment and the media is then a pathway for exposure. Figure 5-2 provides a graphic representation of where and in which media 1,2-dichloropropane is estimated to be found and the corresponding route of exposure. As described in Section 3.2, releases of 1,2-dichloropropane are expected in air, water, and disposal to landfills. Section 3.3 provides a summary of the monitoring, database, and modeled data on concentrations of 1,2-dichloropropane in the environment. EPA considers both modeling and monitoring information when evaluating general population exposures and associated risk estimates in this draft risk evaluation. Details on all the approaches and methodologies used are presented in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

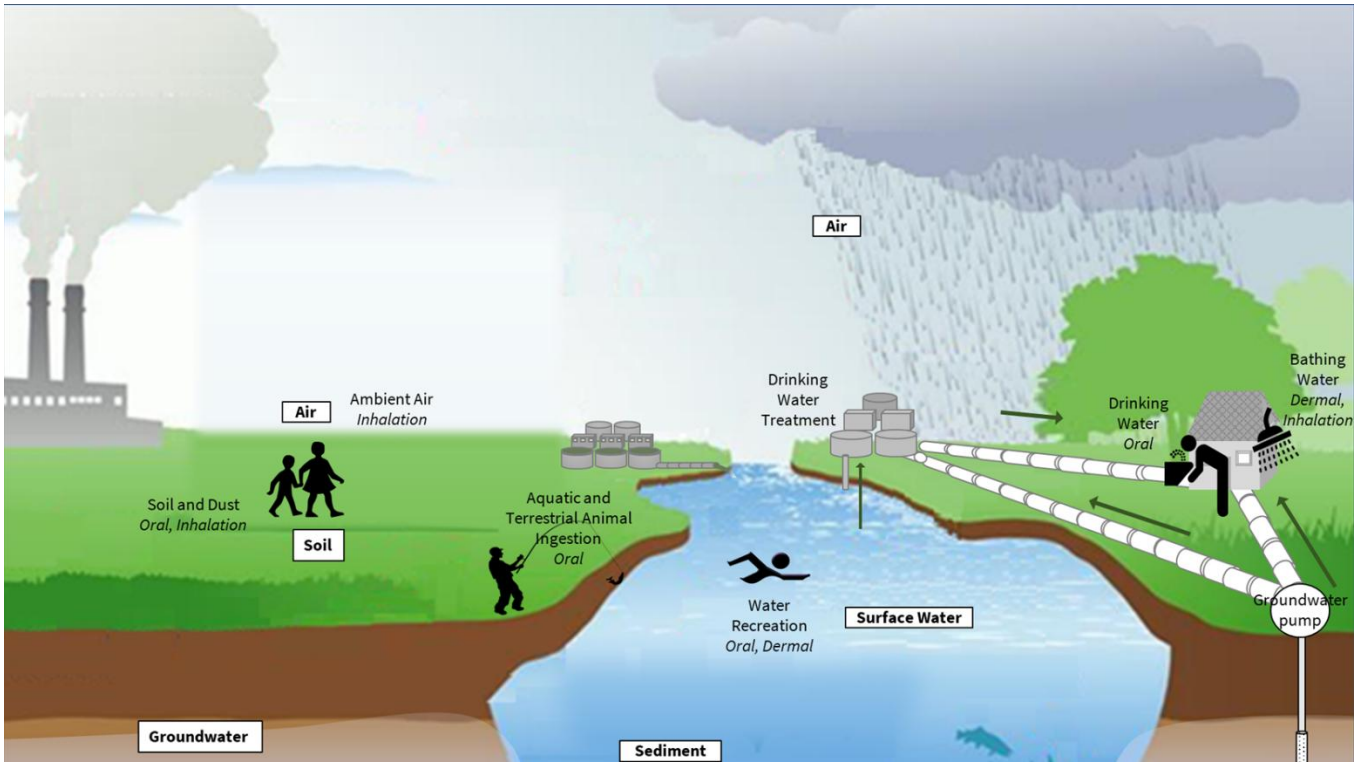


Figure 5-2. Human Exposure Pathways to 1,2-Dichloropropane for the General Population
Potential routes of exposure are shown in italics under each potential pathway of exposure.

5.1.3.1 Summary of Inhalation Exposure Assessment

Inhalation exposures of the general population to 1,2-dichloropropane are primarily due to industrial releases of 1,2-dichloropropane to the ambient air from manufacturing as an unintended byproduct, processing, use, and disposal activities. Industrial releases of 1,2-dichloropropane from each of these activities are evaluated for inhalation exposures of the general population in this *Draft Risk Evaluation for 1,2-Dichloropropane* (U.S. EPA, 2026ab).

EPA relied upon modeling described in detail in the *Draft, Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026e) to assess inhalation exposure of the general population to 1,2-dichloropropane attributable to COUs via the ambient air pathway. The Agency estimated ambient air concentrations of 1,2-dichloropropane using IIOAC and HEM5.0. For this analysis, HEM5.0 was used to estimate exposures using releases from TRI reporting facilities (2019–2023) and NEI reporting facilities (2017 and 2020). IIOAC was used to estimate exposures for EPA estimated releases from generic facilities/sites; that is, Commercial Use as a Laboratory Chemical (OES #5). HEM5.0 combines 2010 U.S. Census data with estimated ambient air concentrations to calculate maximum individual risks (MIR) and the number of people within each census block with a cancer risk estimate exceeding 1×10^{-6}, 1×10^{-5}, and 1×10^{-4}. Based on the ambient air exposure analysis performed for the *Risk Evaluation for 1,1-Dichloroethane* (U.S. EPA, 2025b) and *Risk Evaluation for 1,2-Dichloroethane* (U.S. EPA, 2026ak), EPA did not perform a tiering analysis for 1,2-dichloropropane. For both 1,1-dichloroethane and 1,2-dichloroethane, the tiering analysis resulted in the Agency using the most refined approach available at the time because cancer risk estimates above 1×10^{-6} were found in the lower-tier analyses. Because 1,2-dichloroproane has a similar IUR as 1,1-dichloroethane and 1,2-dichloroethane, and because reported releases of 1,2-dichloropropane to air are similar to those of 1,1-dichloroethane, EPA only performed the highest-tier of exposure analysis available.

The Agency also compared modeled data to monitored data reported to the EPA's Ambient Monitoring Technology Information Center (AMTIC; a collection of data from air monitoring networks located across the United States) archive to ground truth modeling results. Monitoring data from AMTIC were not used to estimate exposures or derive risk estimates because monitoring data cannot be attributed to a specific COU. Full details on the models used, approach applied, results, and monitoring data are provided in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Releases Used as Modeling Inputs for HEM5.0

For modeling, OESs fell into one of the following categories:

- OESs for which there were only facility-reported releases (Manufacture; Import – Repackaging; Processing as a Reactant; Processing Aid – Non-Incorporative Activities; Disposal to Incineration; Disposal to Landfill; Disposal to POTW; Disposal to Non-POTW WWT; Remediation); and
- OESs for which there were both modeled releases from generic facilities/sites and reported releases (Commercial use as a Laboratory Chemical).

EPA considered TRI release data from the years 2019 to 2023 as well as NEI release data from the years 2017 and 2020 for this analysis. The Agency used facility-reported emissions as inputs to HEM5.0. TRI reporters may report either with a Form R or a Form A. To use Form A, reporters must release less than 500 lb/year, and facilities do not need to report release quantities or uses/sub-uses on Form A. Due to uncertainties in the actual amount released by Form A reporting facilities, EPA included only TRI reporting Form R submissions in this analysis. Detailed descriptions of the modeling efforts using HEM with full model inputs are provided in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Calculation of Exposures via Ambient Air Based on Results from HEM5.0

HEM5.0 was used to estimate exposures and risks at centroids of census blocks up to 50,000 m from TRI-/NEI-reporting facilities. When using HEM5.0 to estimate exposures to ambient air, EPA used the default chronic exposure scenario, which assumes that an individual breathes the ambient air at a given receptor site (*i.e.,* census block centroid) 24 hours per day over a 70-year lifetime (SC&A, 2023). Additionally, the 10th, 50th, and 95th percentile concentrations were calculated for the annual average concentrations at each radial distance. At each radial distance there were 16 modeled receptors. The 10th, 50th, and 95th percentiles for these 16 receptors at each modeled distance were calculated for TRI- (U.S. EPA, 2026ad) and NEI-reporting facilities (U.S. EPA, 2026ac), respectively.

Results of Exposure from HEM5.0 Modeling

Lifetime average daily concentrations, which are equivalent to the annual average concentrations, modeled using HEM5.0 for TRI and NEI reporting facilities based on the 95th percentile of the annual average exposures across all facilities ranged from 0 to 74 $\mu g/m^3$ and 0 to 6.4 $\mu g/m^3$, at 30 m from the releasing facility, respectively. Analysis using HEM5.0 showed that the nearest census block centroids to releasing facilities reporting to TRI ranged from 182 to 3,214 m, with a median of 571 m. See *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e), *Draft Supplemental Information on HEM TRI Exposure and Risk Analysis for 1,2-Dichloropropane* (U.S. EPA, 2026ad), and *Draft Supplemental Information on HEM NEI Exposure and Risk Analysis for 1,2-Dichloropropane* (U.S. EPA, 2026ac) for more information.

Calculation of Exposures via Ambient Air Based on Results from IIOAC for EPA Estimated Releases from Generic Facilities/Sites

IIOAC was used to model ambient air concentrations from EPA-modeled high-end (95th percentile) and central tendency (50th percentile) releases for generic facilities/sites (*i.e.,* for the Commercial Use as a Laboratory Chemical OES) and estimate associated exposures (see Section 4.1.3 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) for more details on EPA estimated releases for generic scenario OESs). For all IIOAC modeling, daily-average, and annual-average high-end (95th percentile) as well as mean (50th percentile) ambient air concentrations were calculated at two finite distances (100 and 1,000 m) and one area distance (between 100–1,000 m) from releasing facilities. The IIOAC modeling methodology and results are presented in Section 5.4.2 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). When calculating exposures to ambient air using results from IIOAC, EPA assumed that a person is exposed to ambient air at the modeled distance for 24 hours per day. For lifetime exposures, the Agency assumed a lifetime and exposure duration of 78 years. These assumptions represent a high-end exposure scenario that do not account for the potential mobility (*e.g.,* people going to work, spending time indoors, moving residences over a lifetime) of people living near 1,2-dichloropropane-releasing facilities.

Results of Exposure Modeling from IIOAC

For generic facilities/sites that were modeled using IIOAC and EPA-estimated releases (*i.e.,* for the Commercial Use as a Laboratory Chemical OES [OES #5]) and based on high-end releases modeled as fugitive releases: (1) the 95th percentile daily ambient air modeled concentrations ranged from 6.43×10^{-3} to 0.14 µg/m^3; and (2) the 95th percentile annual ambient air modeled concentrations ranged from 4.55×10^{-3} to 9.92×10^{-2} µg/m^3, with the highest concentrations modeled at 100 m. When modeling as stack releases, the ambient air modeled concentrations were lower overall compared to when modeling as fugitive releases. For full IIOAC modeling results see the supplemental file *Draft Integrated Indoor Outdoor Air Calculator (IIOAC) Generic Releases Exposure and Risk Analysis for 1,2 -Dichloropropane* (U.S. EPA, 2026v).

Comparison of Modeled Ambient Air Exposures Using HEM to Monitored Data

To support the modeled ambient air exposures, the Agency extracted and summarized monitoring data for 1,2-dichloropropane from EPA's AMTIC database (U.S. EPA, 2026e. The Agency also identified and summarized measured data from peer-reviewed literature, gray literature, and databases that were included in EPA's systematic review process and as detailed in the *Systematic Review Protocol for 1,2-Dichloropropane* (U.S. EPA, 2026ag). As described in Section 5.5 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026e), EPA compared modeled to measured concentrations from monitoring as reported in the AMTIC archive. Across all OESs, 95th percentile HEM5.0-modeled annual average concentrations of releases from NEI reporting facilities ranged from 0 to 6.4 µg/m^3 across all distances modeled, with the maximum modeled concentration being one order of magnitude lower than the maximum monitored concentration of 48 µg/m^3 from AMTIC. The comparison shows that the 95th percentile HEM5.0-modeled annual average concentrations of releases from TRI and NEI reporting facilities are likely representative of actual concentrations near releasing facilities.

5.1.3.2 Summary of Incidental Dermal Exposure via Swimming

EPA assessed possible incidental dermal exposures to 1,2-dichloropropane while swimming in water bodies that are receiving facility-specific releases identified in TRI/DMR from TSCA COUs/OESs. Acute dermal exposures for facility-specific releases are fully described in Section 6.4.1 of *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e), with

presented acute doses for adults (21+ years); youths (11–15 years); and children (6–10 years). For facility-specific releases, each OES is represented by the facility within that OES with the highest estimated 1,2-dichloropropane surface water concentration. These estimated surface water concentrations are combined with high-end, default short-term exposure durations as well as age-group specific body weights and surface area exposed for each evaluated age group to arrive at potential doses. Correspondingly, these estimated exposures are anticipated to be higher-end estimates across OESs.

Facility-specific release modeling resulted in acute dermal doses ranging from 6.8×10^{-8} to 8.6×10^{-6} mg/kg-day across age groups with the highest doses modeled for Waste Handling, Treatment, and Disposal (POTW) OES (see also Section 6.4.1 of *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)).

5.1.3.3 Summary of Oral Exposures Assessment

The general population can be exposed to 1,2-dichloropropane orally via incidental ingestion from swimming in and/or from drinking water ingestion from water bodies receiving releases of 1,2-dichloropropane from facility-specific COUs.

5.1.3.3.1 Summary of Incidental Oral Exposures via Swimming

EPA relied on modeled estimates as a basis for the assessment of incidental oral exposures to the general population while swimming in surface waters containing 1,2-dichloropropane resulting from the COUs. Surface water concentrations were modeled for facility-specific releases as described in Section 4.2.1. As a higher-end estimation of exposure resulting from facility-specific releases, the facility in each OES resulting in the highest estimated surface water concentration for that OES was used as a higher-end estimate of potential concentrations across the entire OES because any facilities with lower surface water concentrations would result in lower general population exposures.

Surface water concentrations were estimated using the receiving water body 30Q5 flow for each facility. Following estimation of surface water concentrations for each OES, acute doses (ADRs) were calculated for all potential age groups—though results are presented for adults (21+ years); youths (11–15 years); and children (6–10 years) within the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Acute doses associated with facility-specific releases ranged from 8.8×10^{-10} to 5.8×10^{-5} mg/kg-day across age groups with the highest doses modeled for Waste Handling, Treatment and Disposal (POTW) OES from a 30Q5 surface water concentration of 10.8 µg/L.

5.1.3.3.2 Summary of Drinking Water Exposures Assessment

EPA conducts drinking water monitoring on 1,2-dichloropropane because it is a regulated drinking water contaminant (U.S. EPA, 2024a). Monitoring data for 1,2-dichloropropane in drinking water is presented in Section 1.1.1 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). However, monitoring data from drinking water systems is not specific to the COUs and 1,2-dichloropropane measured in drinking water cannot be apportioned to specific facilities. Therefore, EPA considered the direct impacts of 1,2-dichloropropane facility releases to surface water that is a potential source of drinking water through modeling (see Section 6.5.3.1 of *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)).

EPA estimated drinking water exposures resulting from 1,2-dichloropropane facility releases to surface water. However, instead of considering drinking water exposures at the point of the discharge, the receiving water body concentrations that were at or above 5 µg/L—the maximum contaminant level

(MCL) for drinking water—underwent a downstream dilution analysis as described in Section 6.3.2 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) to estimate 1,2-dichloropropane concentrations at the point of drinking water treatment system intakes within 250 km. Depending on the size of the receiving water body, the extent of connecting streams or rivers, and the distance to the drinking water intake, evaluated releases of 1,2-dichloropropane had modeled downstream concentrations dilute to levels below 0.28 µg/L (releases from the Processing as a Reactant OES), with the majority below 0.01 µg/L. Of the various life stages from infants to adults, drinking water exposures are greatest for infants. The acute drinking water exposures for infants corresponding is 4.0×10^{-5} mg/kg-day, chronic is 1.1×10^{-7} mg/kg-day, and lifetime is 1.4×10^{-9} mg/kg-day. The drinking water exposures based on the downstream analysis are conservative in that these concentrations are prior to drinking water system treatment; however, they are more realistic exposures than those at the point of discharge as they consider downstream dilution.

Groundwater

For evaluation of leachate impacted groundwater exposures to the general population, chronic non-cancer and chronic cancer doses are calculated from modeled groundwater concentrations. The average daily dose is used for evaluating chronic non-cancer drinking water exposures while the lifetime average daily dose is used for evaluating chronic cancer drinking water exposures. Calculated doses were used to calculate potential risks and inform whether additional tiers of analysis were warranted.

Based on the concentrations of 1,2-dichloropropane estimated from the Hazardous Waste Delisting Risk Assessment Software (DRAS), EPA conducted a screening-level assessment of general population exposure based on a release scenario an order of magnitude above the highest TRI-reported releases and a leachate concentration an order of magnitude above what was reported in the literature. Chronic drinking water doses were calculated for adults (21+ years) and infants (birth to <1 month) because infants have the highest body-weight-normalized water intake (health-protective, upper bound) and adults represent long-term population exposure. At the highest assessed loading rate and leachate concentration, estimated average daily doses across age groups were 1.11×10^{-4} to 2.83×10^{-4} mg/kg-day while estimated lifetime average daily doses ranged from 7.43×10^{-13} to 6.18×10^{-6} mg/kg-day—based on a groundwater concentration of 5.62×10^{-4} mg/L. Discussion and characterization of potential risk associated with these exposures is in Section 5.3.4.1.6.

5.1.3.3.3 Summary of Fish Ingestion Exposures

EPA conducted a screening analysis to assess possible exposures from the ingestion of fish from waters receiving 1,2-dichloropropane discharges. The Agency used the highest 1,2-dichloropropane surface water concentration for the Disposal to POTW OESs to estimate the high-end oral exposures via fish ingestion for general population across several life stages as well as subsistence fishing populations. In addition, EPA also estimated tribal fish ingestion exposures for facility discharges on tribal lands.

Calculations and estimates are presented in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) and in the supplemental file, *Draft General Population Fish Ingestion Estimates for 1,2-Dichloropropane* (U.S. EPA, 2026r). EPA also presents the highest surface water concentrations on tribal lands, specifically the Navajo Nation. For subsistence fishers the highest acute dose was 1.33×10^{-4} mg/kg/day and chronic exposures were 2.21×10^{-5} mg/kg/day. For tribal fishers the acute dose was 1.69×10^{-4} mg/kg/day from releases specifically on tribal lands.

5.1.3.4 Weight of Scientific Evidence Conclusions for General Population Exposure

Ambient Air

The weight of scientific evidence for inhalation exposure estimates is determined by several different evidence streams, including evidence supporting the exposure scenarios (Section 5.1.3.1), release data used as model input data (Section 3.2.2), and agreement between modeled and monitored ambient air concentrations (U.S. EPA, 2026e). The Agency has higher confidence in exposure estimates that are based on facility-reported releases than those based on EPA-estimated releases of 1,2-dichloropropane from generic facilities/sites.

The Agency has higher confidence in the physical source specifications used as inputs for modeling of reported releases than those used for modeling of EPA-estimated releases from generic facilities/sites (U.S. EPA, 2026e). There are additional uncertainties when using HEM5.0 to characterize populations living near manufacturing/releasing facilities. (HEM5.0 estimates exposures for the census block centroid, as defined by the U.S. Census Bureau.) Values calculated for centroids are not representative of the range of values over the entire block and might not represent where most people reside within a census block. Therefore, estimated exposures using HEM5.0 can over- or underestimate actual exposures depending on the geographic population distribution within the block. These uncertainties do not decrease confidence in the applicability of the model or the risks calculated at census block centroids. These uncertainties could impact the estimated number of people that are exposed; however, the use census block-level data via HEM5.0 does present a highly refined analysis. Overall confidence in inhalation exposure estimates resulting from modeled ambient air concentrations are dependent on the OES and range from moderate-to-robust.

Drinking Water

EPA has robust confidence that the drinking water concentrations and estimated exposures at the point of drinking water intake locations downstream of facility-specific releases are below 0.28 µg/L and acute infant doses below 4.0×10^{-5} mg/kg-day. The basis of the analysis is the location data of the facility discharges, the known amount of discharges, and EPA's known location of drinking water intake, which provides the information to estimate concentration based on dilution. Other fate properties such as volatilization were not considered because that varies with stream dynamics. Again, 1,2-dichloropropane is water-soluble and remains in water when released to surface waters.

There are uncertainties and limitations associated with estimating leachate-impacted groundwater concentrations using DRAS (Section 3.3.3). EPA made conservative assumptions that are likely to result overestimations modeled groundwater concentrations (loading rates and leachate concentrations far above reported values) and therefore has slight confidence in the accuracy of the modeled groundwater estimates for 1,2-dichloropropane; however, the Agency has moderate confidence that the modeled concentrations are representative of high-end exposure scenarios.

5.2 Summary of Human Health Hazard

This section summarizes the relevant human health hazards of 1,2-dichlorpropane. Additional information on the human health hazards and characterization for 1,2-dichlorpropane are provided in the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u), *Draft Data Quality Evaluation Information for Human Health Hazard Epidemiology for 1,2-Dichloropropane* (U.S. EPA, 2026o), and *Draft Data Quality Evaluation Information for Human Health Hazard Animal Toxicology for 1,2-Dichloropropane* (U.S. EPA, 2026n).

EPA quantitatively evaluated hazards via the inhalation, oral, and dermal exposure routes for acute, intermediate, and chronic exposures through systematic review of reasonably available animal

toxicology data. The Agency also qualitatively considered human evidence. EPA rated the data quality of each individual study as described in the Draft Systematic Review Protocol (U.S. EPA, 2021) and *Draft Systematic Review Protocol for 1,2-Dichloropropane* (U.S. EPA, 2026ag). The Agency considered studies that received medium or high overall quality determinations for hazard identification, integration evidence streams (animal, human, mechanistic), and dose-response analysis. Information from studies of low or uninformative for dose-response quality were discussed qualitatively on a case-by-case basis for hazard identification and evidence integration for the weight of scientific evidence.

The toxicokinetic profile for 1,2-dichloropropane is derived from oral and inhalation studies with no dermal studies located that evaluated the toxicokinetics of 1,2-dichloropropane. The primary metabolic pathways for 1,2-dichloropropane, elucidated from *in vitro* data and *in vivo* studies in rats, include oxidative metabolism via CYP2E1 followed by glutathione (GSH) conjugation via glutathione-S-transferase theta (GST T1-1); (Toyoda et al., 2016; Yanagiba et al., 2016; Gi et al., 2015; Sato et al., 2014; Gonzalez and Gelboin, 1994; Guengerich et al., 1991; Bartels and Timchalk, 1990) as cited in (ATSDR, 2021; U.S. EPA, 2016b)). Three mercapturic acid metabolites (*N*-acetyl-*S*-[2-hyroxypropyl]-*L*-cysteine; *N*-acetyl-*S*-([-ocopropyl]-*L*-cysteine; and *N*-acetyl-*S*-[1-carboxyethyl]-*L*-cysteine) were identified as the primary urinary metabolites of 1,2-dichloropropane in the rat. (Timchalk et al., 1991; Bartels and Timchalk, 1990; Jones and Gibson, 1980). Oxidative dechlorination of 1,2-dichloropropane produces free chlorines (which form 2 molecules of hydrochloric acid) and lactate leading to the formation of CO_2 and acetyl coenzyme A (acetyl-CoA), which can enter the tricarboxylic acid (TCA) cycle (Timchalk et al., 1991). A reactive sulfonium cation intermediate and a chlorinated aldehyde are also formed in these reactions. 1,2-Dichloropropane is rapidly metabolized via oxidative metabolism and eliminated as CO_2 in expired air following oral and inhalation exposure, usually within 24-hours (Timchalk et al., 1991).

EPA did not identify reasonably available studies that provide toxicokinetic data for the dermal route of exposure, therefore the Agency utilized test order data to evaluate 1,2-dichloropropane toxicokinetics for the dermal route (Charles River Laboratories, 2024). Various fractional absorption and flux-based dosing conditions were conducted and considered in assessing the 1,2-dichloropropane dermal absorption profile (see Section 5.1.1.1.3). Details on conditions and results are described in the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026u).

5.2.1 Non-Cancer Human Health Hazards

Evaluation of the toxicological database suggests that effects of 1,2-dichloropropane may be attenuated across durations of exposure. Specifically, acute and short-term exposures were generally more sensitive than chronic studies. Section 5.2.4 presents a summary of the endpoints and points of departure (PODs) selected for use in this draft risk evaluation based on the weight of scientific evidence.

In evaluating toxicity relevant to acute exposure durations, EPA considered available acute exposure studies as well as developmental toxicity studies that provide evidence of acute exposure effects in the dams. Overall, the available oral exposure acute duration studies for 1,2-dichloropropane were not considered appropriate for identifying an acute POD. EPA determined that evidence from developmental toxicity studies in rats indicated neurological effects—specifically maternal CNS depression was selected as the POD for the acute exposure duration scenario. Maternal CNS depression effects were observed within 1 hour on the first day of dosing (GD6) after a single gavage exposure and is relevant to the acute exposure scenario. Maternal CNS depression endpoints were not amenable to BMD modeling given that responses were only seen at the highest dose tested (125 mg/kg/day). Therefore, a NOAEL of 30 mg/kg/day was identified as a POD for acute oral exposure. Acute

neurotoxicity is common to other chlorinated solvents such as 1,1,2- trichloroethane, which adds confidence to this endpoint and a similar POD (U.S. EPA, 2026t). The Agency performed ¾-body weight scaling to yield the HED of 7.2 mg/kg-day and applied the animal-to-human extrapolation factor (*i.e.,* interspecies extrapolation; UF_A) of 3 and a within human variability extrapolation factor (*i.e.,* intraspecies extrapolation; UF_H) of 10. Thus, a total UF of 30 is applied for use as the benchmark margin of exposure (MOE).

EPA identified increased reticulocytes in pregnant rabbits, an indicator of hemolytic anemia, as the most robust endpoint to inform the POD for the oral intermediate and chronic exposure duration scenarios (Kirk et al., 1995). The hematological endpoint was selected from a high-quality, short-term developmental study and identified from the best available science—including short-term, subchronic, and chronic inhalation and oral studies in rats, mice, and rabbits (Bruckner et al., 1989; Dow Chemical, 1988; NTP, 1986). EPA conducted benchmark dose (BMD) modeling consistent with EPA's *Benchmark Dose Technical Guidance* (U.S. EPA, 2012a) and derived a $BMDL_{1SD}$ of 27 mg/kg-day based on the hematological endpoint of increased reticulocytes. Additional non-cancer endpoints for liver, neurological, and developmental toxicity were also identified and considered but were not selected for POD derivation. The full details on all evaluated hazards and POD selection are described in the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u).

Hematological effects were also identified among the most robust non-cancer effects following oral exposure to 1,2-dichloropropane in a recent assessment by the Agency for Toxic Substances and Disease Registry (ATSDR, 2021; U.S. EPA, 2016b). EPA performed ¾-body weight scaling to yield the HED of 11.4 mg/kg-day and is applying the animal-to-human extrapolation factor (*i.e.,* interspecies extrapolation; UF_A) of 3 and a within human variability extrapolation factor (*i.e.,* intraspecies extrapolation; UF_H) of 10. The Agency applied a total UF of 30 for use as the benchmark MOE. EPA determined that short-term studies are appropriate for deriving hazard values across durations that are supported by the evidence and health-protective; thus, a duration uncertainty factor (UF_S) was not applied to the hematological POD for the chronic duration. Additional details on uncertainty factors are described in the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u).

There were limited studies appropriate for informing the POD for the acute inhalation exposure scenario. EPA extrapolated an acute inhalation POD based on maternal CNS depression from an oral NOAEL of 30 mg/kg/day (Kirk et al., 1995) for a no-observe-adverse-effect concentration (NOAEC) of 39 mg/m^3. This selection is supported by the toxicological database for CNS depression, including acute occupational exposure in humans and CNS depression in mice as reported in (Dow Chemical, 1983). Liver effects were also considered for POD identification; however, the Dow Chemical (1983) study observed mortality at doses causing liver necrosis, introducing uncertainty regarding hepatic effects being primary or secondary effects of exposure. In addition, that study did not identify an NOAEC, introducing the potential that effects could be occuring at below the lowest concentration tested. EPA applied the animal-to-human extrapolation factor (*i.e.,* interspecies extrapolation; UF_A) of 3 and a within human variability extrapolation factor (*i.e.,* intraspecies extrapolation; UF_H) of 10. Thus, EPA applied a total UF of 30 for use as the benchmark MOE for the acute inhalation scenario.

EPA identified robust evidence from high-quality short-term, subchronic, and chronic studies in animals following 1,2-dichloropropane inhalation exposure for the intermediate and chronic inhalation exposure scenarios. Three high-quality 13-week inhalation studies were considered adequate for dose-response analysis (Matsumoto et al., 2013; Umeda et al., 2010; Dow Chemical, 1988). Dow Chemical (1988) examined effects in rats, mice, and rabbits whereas (Matsumoto et al., 2013) evaluated effects in mice

and (Umeda et al., 2010) evaluated rats. All three studies reported nasal lesions in at least one species, indicating that the upper respiratory was a sensitive target. Dow Chemical (1988) observed nasal hyperplasia and degeneration of the olfactory mucosa in both sexes of rats. Matsumoto (2013) reported nasal lesions in mice and (Umeda et al., 2010) observed nasal effects in both sexes of rats. The chronic inhalation database for 1,2-dichloropropane consisted of two studies ((Matsumoto et al., 2013) and (Umeda et al., 2010)). Similar to the intermediate studies conducted by the same authors described above, nasal lesions were reported in rats and mice after chronic inhalation exposure to 1,2-dichloropropane and considered adequate for dose-response analysis. Nasal respiratory epithelium hyperplasia in male rats from Dow Chemical (1988) was selected as the most robust endpoint to inform the POD for the inhalation intermediate and chronic exposure scenarios (HEC = 0.25 mg/m^3). Among the suite of nasal lesions observed in rodents, the chosen endpoint (nasal respiratory epithelium hyperplasia in male rats) was BMD-modeled; however, because BMDLs associated with viable models were not sufficiently close (differed by >3-fold), the model with the lowest BMDL was selected. Although this approach is health-protective, there is uncertainty due to variability across models. EPA applied the animal-to-human extrapolation factor (*i.e.,* interspecies extrapolation; UF_A) of 3 and a within human variability extrapolation factor (*i.e.,* intraspecies extrapolation; UF_H) of 10. A total UF of 30 was applied for use as the benchmark MOE for both intermediate and chronic inhalation durations.

No reasonably available human hazard data were identified for the dermal route that are suitable for deriving route-specific PODs. Therefore, the oral HED was used for route-to-route extrapolation to inform the dermal HED.

5.2.2 Cancer Human Health Hazards

As discussed in the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u), genotoxicity studies of 1,2-dichloropropane indicate that this chemical is not a potent mutagen in mice exposed by inhalation or in bacterial or mammalian cells *in vitro* but may induce DNA damage and chromosomal changes.

Two potential MOAs plausibly supporting carcinogenesis were identified from the scientific literature and existing regulatory agency evaluations on 1,2-dichloroproane (as summarized in (Kozal et al., 2023; ECHA, 2022; ATSDR, 2021; U.S. EPA, 2016b)). Both potential MOAs are described in detail in the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u). Briefly, the first MOA proposed metabolism of 1,2-dichloropropane by glutathione-S-transferase generating reactive metabolites that promote DNA damage. After these key events, DNA damage is postulated to cause tissue damage and regenerative hyperplasia, followed by precancerous lesions and initiation of human cancer. In the second MOA, exposure to 1,2-dichloropropane is proposed to saturate the CYP2E1 and glutathione-S-transferase metabolic pathways, leading to generation of reactive oxygen species causing cytotoxicity, inflammation, and tissue damage. Subsequently, chronic tissue damage is proposed to lead to regenerative hyperplasia and chronic inflammation leading to DNA damage, mutagenesis, and cancer.

Under the *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005), 1,2-dichloropropane is considered "Likely to Be Carcinogenic to Humans" based on evidence of carcinogenicity in multiple tissues in two species and both sexes of animals in high-quality cancer bioassays (Matsumoto et al., 2013; Umeda et al., 2010; NTP, 1986). EPA's review of the genotoxicity and cancer data as well as MOA analysis determined significant uncertainties exist surrounding both proposed MOAs for 1,2-dichloropropane. In this context, the Agency determined a default, linear low-dose extrapolation approach was appropriate for carcinogenic dose-response assessment. Because no MOA could be

established and the default extrapolation approach was utilized, an age-dependent adjustment factor (ADAF) was not applied (Barton et al., 2005)

There was only one 2-year assay in rats and mice (NTP, 1986) that was appropriate to serve as the basis for derivation of the oral cancer slope factor. The National Toxicology Program study reported a significant increase in mammary gland adenocarcinomas in female rats as well increased incidences of hepatic adenomas or carcinomas in both male and female mice. The female mouse arm of the study exhibited reduced survival at the highest dose, possibly due to infection (suppurative inflammation of the reproductive tract). However, the incidences of hepatic adenomas or carcinomas were statistically significantly increased at the lowest dose in female mice where no effect on survival was observed and the incidences of hepatic adenomas or carcinomas were statistically significantly increased when adjusted for intercurrent mortality. In male mice, survival at both doses was similar to controls (NTP, 1986). Mice exhibited significant dose-related trends for hepatocellular adenomas and adenomas or carcinomas (combined). The $BMDL_{10}$ of 2.52 mg/kg-day (HED) for liver tumors in male mice was chosen as the basis to derive the oral cancer slope factor of 0.04 per mg/kg. Because there were no dermal studies available, the oral slope factor was extrapolated to the dermal route to derive the corresponding dermal slope factor of 0.04 per mg/kg.

For derivation of the cancer IUR, two studies available: one in rats (Umeda et al., 2010) and one in mice (Matsumoto et al., 2013). Umeda and colleagues reported significant increases in the incidences of total nasal cavity tumors in both male and female rats. The mouse study reported a significant increase in the combined incidence of bronchiolo-alveolar adenoma or carcinoma in females and increased incidences of Harderian gland adenoma and spleen tumors in males (Matsumoto et al., 2013). Given the lack of carcinogenic evidence and relevance to humans (humans lack a functional Harderian gland), Harderian gland tumors were not further considered for dose-response analysis. Splenic tumors did not demonstrate a dose-response relationship and the incidence in 1,2-dichloropropane-exposed males was within the historical control range for the author's laboratory. The $BMCL_{10}$ (lower limit of the benchmark concentration) of 26.7 mg/m^3 (HEC) based on nasal tumors in male rats was chosen for deriving an IUR of 0.0037 per mg/m^3 (3.7×10^{-3}).

5.2.3 Weight of Scientific Evidence Conclusions and Overall Confidence in Human Health Hazards

EPA evaluated the confidence for human health hazard conclusions based on evidence integration conclusions, selection of the most critical endpoint and study, relevance to exposure scenarios, dose-response considerations, study quality and incorporation of PESS. More details on how EPA evaluated these factors are provided in the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u). The overall confidence summary for the human health hazard assessment is presented in Table 5-19 and outlines the considerations of the systematic review overall study quality determination, benchmark dose modeling model fit, route-to-route extrapolation, and application of uncertainty factors.

Non-Cancer

EPA has robust overall confidence for the evidence integration, study/endpoint selection, exposure scenario applicability, dose-response, and PESS sensitivity conclusions for the 1,2-dichloropropane acute POD based on maternal CNS depression (decreased respiration, movement, muscle tone, and extensor thrust reflex and increased salivation and lacrimation). The non-cancer acute oral POD for neurological effects utilizes a robust study and the endpoint of maternal CNS depression is supported by the weight of scientific evidence. EPA has robust overall confidence for the evidence integration, study/endpoint selection, exposure scenario applicability, dose-response, and PESS sensitivity

conclusions for the intermediate and chronic oral PODs based on hematological effects indicative of hemolytic anemia (increased reticulocytes). The non-cancer intermediate and chronic PODs for hematological toxicity utilize a robust developmental study and biologically relevant endpoint and are supported by the weight of scientific evidence.

EPA has moderate overall confidence for the evidence integration, study/endpoint selection, exposure scenario applicability, dose-response, and PESS sensitivity conclusions for 1,2-dichloropropane acute inhalation due to uncertainties associated with route-to-route extrapolation from the corresponding oral POD based on neurological effects from a high-quality oral study and biologically relevant endpoint supported by the weight of evidence. EPA has moderate overall confidence for the evidence integration, study/endpoint selection, exposure scenario applicability, dose-response, and PESS sensitivity conclusions for 1,2-dichloropropane intermediate inhalation POD and slight-to-moderate confidence in the chronic inhalation POD. The non-cancer intermediate and chronic inhalation PODs for upper respiratory effects utilize a high-quality study and biologically relevant endpoint of nasal lesions, which are supported by the weight of scientific evidence.

No studies for the dermal route of exposure were suitable for identifying route-specific PODs. Therefore, EPA used the acute, intermediate, and chronic oral PODs and benchmark MOEs to evaluate risks from dermal exposure to 1,2-dichloropropane. The Agency has moderate confidence for the evidence integration, study/endpoint selection, exposure scenario applicability, dose-response evaluation, and PESS sensitivity conclusions of the dermal acute and intermediate PODs due to uncertainties associated with route-to-route extrapolation from the corresponding oral POD. The Agency has slight-to-moderate confidence in the chronic dermal hazard value due to uncertainties associated with route-to-route extrapolation from the corresponding oral POD.

Cancer

EPA has robust overall confidence for the evidence integration, study/endpoint selection, exposure scenario applicability, dose-response, and PESS sensitivity of the conclusions for liver tumors associated with 1,2-dichloropropane oral exposure scenarios. Data from epidemiological, animal, and mechanistic studies generally provide moderate evidence of liver and bile duct cancers following 1,2-dichloropropane exposure. The 1,2-dichloropropane oral cancer slope factor was based on liver tumors in mice reported in a 2-year bioassay (NTP, 1986). Reports of bile duct tumors in a cohort of Japanese print shop workers, the chronic *in vivo* animal studies, and the amenability for dose-response analysis support robust confidence in the oral cancer hazard value. EPA has robust overall confidence for the evidence integration, study/endpoint selection, exposure scenario applicability, dose-response, and PESS sensitivity of the conclusions regarding nasal tumors associated with 1,2-dichloropropane inhalation exposures. The high-quality 1,2-dichloropropane inhalation cancer study by Umeda et al. (2010) served as the basis for the IUR based on nasal tumors in male rats. The increase of respiratory tumors in multiple studies (2 chronic, 1 subchronic) in both sexes and in two different species (rats and mice) provide robust confidence in the inhalation cancer hazard value.

No studies were identified to inform the dermal cancer risks for 1,2-dichloropropane. A dermal cancer slope factor was derived using route-to-route extrapolation from the oral cancer slope factor based on liver tumors reported in (NTP, 1986). Due to uncertainties associated with route-to-route extrapolation there is moderate confidence in this dermal cancer hazard value.

5.2.4 Human Health Hazard Values

Table 5-19 lists the non-cancer and cancer PODs and the corresponding HEDs, HECs, and uncertainty factors (UFs) that EPA utilized in the 1,2-dichloropropane draft risk evaluation for characterizing human

health hazards associated with the acute, intermediate, and chronic durations for the oral, dermal and inhalation routes of exposure.

2619 **Table 5-19. Confidence Summary for Selection of Hazard Values for 1,2-Dichloropropane Human Health Hazard Assessment**

Exposure Scenario	Acute			Intermediate			Chronic			Cancer		
	Oral	Inhalation	Dermal	Oral	Inhalation	Dermal	Oral	Inhalation	Dermal	Oral	Inhalation	Dermal
Study (OQD)	(Kirk et al., 1995) (High)	(Kirk et al., 1995) (High)	(Kirk et al., 1995) (High)	(Kirk et al., 1995) (High)	(Dow Chemical, 1988) (High)	(Kirk et al., 1995) (High)	(Kirk et al., 1995) (High)	(Dow Chemical, 1988) (High)	(Kirk et al., 1995) (High)	(NTP, 1986) (High)	(Umeda et al., 2010) (High)	(NTP, 1986) (High)
POD	CNS depression NOAEL= 30 mg/kg-d	CNS depression NOAEL= 30 mg/kg-d	CNS depression NOAEL= 30 mg/kg-d	Hematological $BMDL_{1SD}$ = 27 mg/kg-d	Nasal lesions $BMCL_{10}$ = 0.25 mg/m^3 [0.054 ppm]	Hematological $BMDL_{1SD}$ = 27 mg/kg-d	Hematological $BMDL_{1SD}$ = 27 mg/kg-d	Nasal lesions $BMCL_{10}$ = 0.25 mg/m^3 [0.054 ppm]	Hematological $BMDL_{1SD}$ = 27 mg/kg-d	Liver tumors $BMDL_{10}$ = 2.52 mg/kg-d	Nasal tumors $BMCL_{10}$ = 26.7 mg/m^3	Liver tumors $BMDL_{10}$ = 2.52 mg/kg-d
HED/HEC /CSF/IUR	HED = 7.2 mg/kg-d	HEC = 39 mg/m^3 [8.4 ppm]	HED = 7.2 mg/kg-d	HED = 11.4 mg/kg-d	HEC = 0.25 mg/m^3 [0.054 ppm]	HED = 11.4 mg/kg-d	HED = 11.4 mg/kg-d	HEC = 0.25 mg/m^3 [0.054 ppm]	HED = 11.4 mg/kg-d	CSF = 0.04 per mg/kg	IUR = 0.0037 per mg/m^3	CSF = 0.04 per mg/kg
Route-to-route extrapolation	N/A	From acute oral duration	From acute oral duration		N/A	From intermediate oral duration	From intermediate oral duration	From intermediate inhalation duration	From intermediate oral duration	N/A	N/A	From oral
Interspecies consid-eration (UF_A)	Allometric ¾ BW scaling (PK = 1×, PD = 3×)	Dosi-metrically adjusted (PK = 1×, PD = 3×)	Allometric ¾ BW scaling (PK = 1×, PD = 3×)	Allometric ¾ BW scaling (PK = 1×, PD = 3×)	Dosi-metrically adjusted (PK = 1×, PD = 3×)	Allometric ¾ BW scaling (PK = 1×, PD = 3×)	Allometric ¾ BW scaling (PK = 1×, PD = 3×)	Dosi-metrically adjusted (PK = 1×, PD = 3×)	Allometric ¾ BW scaling (PK = 1×, PD = 3×)	N/A	N/A	N/A
Intraspecies consid-eration (UF_H)	Default 10× factor	Default 10× factor	Default 10× factor	Default 10× factor	Default 10× factor	Default 10× factor	Default 10× factor	Default 10× factor	Default 10× factor	N/A	N/A	N/A
UF_s (Total UF)	1× (30)	1× (30)	1× (30)	1× (30)	1× (30)	1× (30)	1× (30)	1× (30)	1× (30)	N/A	N/A	N/A
Overall confidence	Robust confidence in the duration- and route-specific POD from a study of high OQD using a default extrap-olation approach	Moderate confidence in the POD from a study of high OQD using a default extrapolation approach and applying route-to-route extrapolation	Moderate confidence in the POD from a study of high OQD using a default extra-polation approach and applying route-to-	Robust confidence in the POD from a study of high OQD using a default extrapolation approach	Moderate confidence in the duration- and route-specific POD from a study of high OQD using a default extrapolation approach	Moderate confidence in the POD from a study of high OQD using a default extrapolation approach and applying route-to-route extrapolation from oral POD	Robust confidence in the POD from a study of high OQD using a default extrapolation approach	Moderate-slight confidence in the POD from a study of high OQD using a default extrapolation approach	Slight-to-Moderate confidence in the POD from a study of high OQD using a default extrapolation approach and applying route-to-route extrapolation	Robust confidence in the duration- and route-specific POD from a study of high OQD using a default extrapolation approach	Robust confidence in the duration- and route-specific POD from a study of high OQD using a default extrapolation approach	Moderate confidence in the POD from a study of high OQD using a default extrap-olation approach and applying route-to

Exposure Scenario	Acute			Intermediate			Chronic			Cancer		
	Oral	Inhalation	Dermal	Oral	Inhalation	Dermal	Oral	Inhalation	Dermal	Oral	Inhalation	Dermal
		from oral POD	route extrap-olation						from oral POD			route extrap-olation from oral POD

BMCL = lower limit of the benchmark concentration; BMDL = lower limit of the benchmark dose; BW = body weight; CNS = central nervous system; CSF = cancer slope factor; HEC = human equivalent concentrations; HED = human equivalent dose; IUR = inhalation unit risk; NOAEL = no-observed-adverse-effect level; OQD = overall study quality determination; POD = point of departure; UF = uncertainty factor; UFs = subchronic to chronic duration

2620

5.3 Human Health Risk Characterization

5.3.1 Risk Assessment Approach

The exposure scenarios, populations of interest, and toxicological endpoints used for evaluating risks from acute, intermediate, and chronic/lifetime exposures are summarized in Table 5-20.

Table 5-20. Use Scenarios, Populations of Interest, and Toxicological Endpoints Used for Acute and Chronic Exposures

Population of Interest and Exposure Scenario	***Workers*** [a] Male and female adolescents and adults (16+ years) directly working with 1,2-dichloropropane under light activity (breathing rate of 1.25 m^3/hour) (for further details such as the skin surface area for dermal exposure estimates, see the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)) *Exposure Durations* • Acute – 8 hours for a single workday • Intermediate – 8 hours per workday for up to 22 working days • Chronic – 8 hours per workday for up to 250 days per year for 31 or 40 working years, or utilizing industry-specific data where applicable *Exposure Routes* – Inhalation and dermal
	Occupational Non-Users Male and female adolescents and adults (16+ years) indirectly exposed to 1,2-dichloropropane within the same work area as workers (breathing rate of 1.25 m^3/hour) (for further details see the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) *Exposure Durations* • Acute, Intermediate, and Chronic – same as workers *Exposure Route* – Inhalation
	Consumers [a] Young teens (11–15 years), teenagers (16–20 years), and adults (21+ years) exposed to 1,2-dichloropropane through stone polish/cleaner product use (for further details see the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)) *Exposure Durations* • Acute – 1 product application/buffing or product cleaner use per day exposure • Chronic – 365 days per year *Exposure Routes* – Inhalation and dermal
	Consumer Bystanders Infants, children, teens or adults (21+ years) exposed to 1,2-dichloropropane by presence in same room where use of stone polish/cleaner product use (for further details see the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)) *Exposure Durations* • Acute – 1 use/day exposure

Population of Interest and Exposure Scenario *(continued)*	• Chronic – 365 days per year *Exposure Routes* – Inhalation
	General Population Male and female infants, children, youth, and adults exposed to 1,2-dichloropropane through drinking water, ambient water, ambient air, soil, and fish ingestion (for further details see the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)) *Exposure Durations* • Acute – Exposed to 1,2-dichloropropane continuously for a 24-hour period • Chronic – Exposed to 1,2-dichloropropane continuously up to 78 years *Exposure Routes* – Inhalation, dermal, and oral (depending on exposure scenario)
Health Effects, Hazard Values, and Benchmarks	***Non-Cancer PODs Based on Robust Non-Cancer Health Effects*** [a] See Section 5.2 for acute and intermediate/chronic non-cancer HECs and HEDs and UFs for each route of exposure. *Acute* Protective oral, dermal, and inhalation exposure health effect for acute scenarios: CNS depression • Acute HED = 7.2 mg/kg/day • Acute HEC = 39 mg/m^3 (8.4 ppm) • Total UF (Benchmark MOE) = 30 (UF = UF_A of 3 × UF_H of 10) *Intermediate/Chronic* Protective oral and dermal exposure health effect for intermediate and chronic scenarios: hematological effects • Intermediate/chronic HED = 11.4 mg/kg/day • Total UF (Benchmark MOE) = 30 (UF = UF_A 3 × UF_H 10) Protective inhalation exposure health effect for intermediate and chronic scenarios: nasal lesions • Intermediate/chronic HEC = 0.25 mg/m^3 (0.054 ppm) • Total UF (Benchmark MOE) = 30 (UF = UF_A 3 × UF_H 10)
	Cancer Hazard Values See Section 5.2 for a summary of the basis for cancer slope factors and inhalation unit risk. *Inhalation Exposure* Oral and Dermal • Cancer slope factor = 0.04 per mg/kg-day • Derived based on liver tumors in mice Inhalation • Inhalation unit risk = 0.0037 per mg/m^3 • Derived based on nasal tumors in rats

HEC = human equivalent concentration; HED = human equivalent dose; MOE = margin of exposure; POD = point of departure; UF = uncertainty factor; UF_A = interspecies consideration; UF_H = intraspecies consideration; UFs = subchronic-to-chronic duration

[a] All inhalation values are adjusted for continuous exposure (24 h/day for inhalation, 7 days/week for all exposure routes).

5.3.1.1 Estimation of Non-Cancer Risks

EPA used an MOE approach to identify potential non-cancer risks. The MOE is the ratio of the non-cancer hazard value (or POD) divided by a human exposure dose. The chronic MOEs for non-cancer inhalation risks were calculated using Equation 5-2.

Equation 5-2. Margin of Exposure Calculation

$$MOE = \frac{Non\text{-}Cancer\ Hazard\ Value\ (POD)}{Human\ Exposure}$$

Where:

MOE	=	Margin of exposure for acute, short-term, or chronic risk comparison (unitless)
Non-cancer Hazard Value (POD)	=	Human equivalent concentration (HEC, µg/m^3)
Human Exposure	=	Exposure estimate (µg/m^3)

MOE risk estimates are interpreted in relation to benchmark MOEs, which incorporate the total UF for each non-cancer POD. The MOE estimate is interpreted as a potential human health risk of concern if the MOE estimate is less than the benchmark MOE (*i.e.,* the total UF) for the lowest tier of analysis and can be refined following further analysis. For screening-level analyses such as the analysis conducted for general population groundwater ingestion, if the MOE estimate is equal to or exceeds the benchmark MOE, then the exposure pathway is not analyzed further. Typically, the larger the MOE, the more unlikely it is that a non-cancer adverse effect occurs relative to the benchmark. When determining whether a chemical substance presents unreasonable risk to human health or the environment, calculated risk estimates are not "bright-line" indicators of unreasonable risk, and EPA uses discretion to consider other risk-related factors in addition to risks identified in the risk characterization.

5.3.1.2 Estimation of Cancer Risks

Extra cancer risks for repeated exposures to a chemical were estimated using the following equations:

Equation 5-3.

$$Lifetime\ Cancer\ Risk = Human\ Exposure \times IUR$$

or

$$Dermal\ or\ Oral\ Cancer\ Risk = Human\ Exposure \times CSF$$

Where:

Human Exposure	=	Exposure estimate (LADC in ppm or µg/m^3; LADD in mg/kg-day)
IUR	=	Inhalation unit risk (risk per unit of exposure (ppm or µg/m^3)
CSF	=	Cancer slope factor (risk per mg/kg-day)

Estimates of extra cancer risks are interpreted as the incremental probability of an individual developing cancer over a lifetime following exposure (*i.e.,* incremental or extra individual lifetime cancer risk). EPA considers a range of extra cancer risk from 1×10^{-4} to 1×10^{-6} to be relevant benchmarks for risk assessment (U.S. EPA, 2017). Consistent with National Institute for Occupational Safety and Health (NIOSH) guidance (Whittaker et al., 2016), under TSCA, EPA typically applies a 1×10^{-4} benchmark for occupational scenarios in industrial and commercial work environments subject to Occupational Safety and Health Administration (OSHA) requirements. EPA also typically considers the general population and consumer benchmark for cancer risk to be within the range of 1×10^{-4} to 1×10^{-6}. Again, these benchmarks are not bright-lines and EPA uses discretion to find unreasonable risks based on other risk-

related considerations based on analysis. Exposure-related considerations (*e.g.,* duration, magnitude, population exposed) can affect EPA's estimates of the excess lifetime cancer risk.

5.3.2 Risk Estimates for Workers

This section presents the preliminary risk estimates associated with the levels of occupational inhalation and dermal exposure that have been estimated. EPA evaluated risk for acute, intermediate, chronic non-cancer and cancer effects and risk estimates for each are included. The *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026e) provides more detail on the estimation of the inhalation and dermal exposure metrics.

Where possible, EPA has considered reasonably available information on personal protection equipment (PPE such as respirators and gloves) in characterizing the risk estimates for workers. EPA notes that OSHA and NIOSH recommend employers utilize the hierarchy of controls to address hazardous exposures in the workplace (OSHA, 2016) (NIOSH, 2024). The hierarchy of controls strategy outlines, in descending order of priority, the use of elimination, substitution, engineering controls, administrative controls, and lastly PPE (such as respirators or gloves). The hierarchy of controls prioritizes the most effective measures first, which is to eliminate or substitute the harmful chemical (*e.g.,* use a different process, substitute with a less hazardous material), thereby preventing or reducing exposure potential. Following elimination and substitution, the hierarchy recommends engineering controls to isolate employees from the hazard (*e.g.,* source enclosure) followed by administrative controls (*e.g.,* do not open machine doors when running) or changes in work practices such as the use of a maintenance plan to check equipment to ensure no leaks to reduce exposure potential. Administrative controls are policies and procedures instituted and overseen by the employer to limit worker exposures (additional information is included in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)). In the hierarchy of controls, the use of PPE is considered to be the last means of control to reduce worker exposures.

5.3.2.1 Occupational Inhalation Exposure Risk Characterization

This section provides a summary table of preliminary inhalation risk estimates in Table 5-22, as well as a discussion of the risk characterization per OES. Table 5-22 provides occupational inhalation MOEs with and without PPE. Additionally, this table provides a potential minimum assigned protection factor (APF) required for an MOE to be above the non-cancer benchmark or below the cancer benchmark (depending on the expected workplace activity). In addition to the use of respirators that achieve a minimum APF, these benchmarks may be met by implementation of other exposure controls (*e.g.,* engineering controls) that may be equally or more effective in reducing worker exposure. Additional information on respiratory protection and APFs is provided below.

Discussion of Respirator Assigned Protection Factors (APFs)

OSHA's Respiratory Protection Standard (29 CFR 1910.134) requires employers in certain industries to address workplace hazards by implementing engineering control measures and, if these are not feasible, provide respirators that are applicable and suitable for the purpose intended. Respirator selection provisions are provided in 1910.134(d) and require that appropriate respirators are selected based on the respiratory hazard(s) to which the worker will be exposed and workplace and user factors that affect respirator performance and reliability. Assigned APFs are provided in Table 1 under 1910.134(d)(3)(i)(A) (see also Table 5-21 below) and refer to the level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program according to the requirements of OSHA's Respiratory Protection Standard.

Table 5-21. Assigned Protection Factors (APFs) for Respirators in OSHA Standard 29 CFR 1910.134

Type of Respirator	Quarter Mask	Half Mask	Full Facepiece	Helmet/ Hood	Loose-Fitting Facepiece
1. Air-Purifying Respirator	5	10	50	–	–
2. Power Air-Purifying Respirator (PAPR)	–	50	1,000	25/1,000	25
3. Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode	–	10	50	–	–
• Continuous flow mode	–	50	1,000	25/1,000	25
• Pressure-demand or other positive-pressure mode	–	50	1,000	–	–
4. Self-Contained Breathing Apparatus (SCBA)					
• Demand mode	–	10	50	50	–
• Pressure-demand or other positive-pressure mode (*e.g.*, open/closed circuit)	–	–	10,000	10,000	–
Source: 29 CFR 1910.134(d)(3)(i)(A)					

2722 **Table 5-22. Occupational Inhalation Risk Summary Table**

Condition of Use		Occupational Exposure Scenario	SEG Description	Exposure Level	Acute Non-Cancer (Benchmark MOE = 30)		Intermediate Non-Cancer (Benchmark MOE = 30)		Chronic Non-Cancer (Benchmark MOE = 30)		Cancer (Benchmark = 1E−04)	
Life Cycle Stage	Category/ Subcategory				MOE – No PPE [a]	MOE – APF [b]	MOE – No PPE [a]	MOE – APF [b]	MOE – No PPE [a]	MOE – APF [b]	MOE – No PPE [a]	MOE – APF [b]
Manufacture	Domestic Manufacture	Manufacture (OES #1)	Laboratory Technician	CT	2,487	–	**22**	218 (APF 10)	**23**	233 (APF 10)	1.6E−05	–
				HE	468	–	**4.1**	41 (APF 10)	**4.4**	44 (APF 10)	**1.1E−04**	1.1E−05 (APF 10)
			Laboratory Technician – Pooled Samples	CT	429	–	**3.8**	38 (APF 10)	**4.0**	52 (APF 50)	9.1E−05	–
				HE	120	–	**1.0**	52 (APF 50)	**1.1**	56 (APF 50)	**4.2E−04**	4.2E−05 (APF 10)
			Logistics Technician	CT	64	–	**0.95**	47 (APF 50)	**0.96**	48 (APF 50)	**3.8E−04**	3.8E−05 (APF 10)
				HE	36	–	**0.53**	527 (APF 1,000)	**0.53**	535 (APF 1,000)	**8.9E−04**	8.9E−05 (APF 10)
			Logistics Technician – Pooled Samples	CT	325	–	**4.8**	48 (APF 10)	**4.9**	49 (APF 10)	7.5E−05	–
				HE	44	–	**0.66**	33 (APF 50)	**0.67**	33 (APF 50)	**7.1E−04**	7.1E−05 (APF 10)
			Processing Operator	CT	5,101	–	45	–	48	–	7.7E−06	–
				HE	185	–	**1.6**	41 (APF 25)	**1.7**	43 (APF 25)	**2.7E−04**	2.7E−05 (APF 10)
			Maintenance Technician	CT	496	–	48	–	49	–	7.6E−06	–
				HE	430	–	41	–	42	–	1.1E−05	–
			ONU	CT	2.5E04	–	220	–	236	–	1.6E−06	–
				HE	6,911	–	61	–	65	–	7.3E−06	–
Manufacture	Import	Import/ Processing – Repackaging (OES #2)	Worker	CT	325	–	**2.9**	71 (APF 25)	**3.1**	31 (APF 10)	**1.2E−04**	1.2E−05 (APF 10)
				HE	44	–	**0.39**	388 (APF 1,000)	**0.42**	415 (APF 1,000)	**1.1E−03**	4.6E−05 (APF 25)

Condition of Use		Occupational Exposure Scenario	SEG Description	Exposure Level	Acute Non-Cancer (Benchmark MOE = 30)		Intermediate Non-Cancer (Benchmark MOE = 30)		Chronic Non-Cancer (Benchmark MOE = 30)		Cancer (Benchmark = 1E−04)	
Life Cycle Stage	**Category/ Subcategory**				**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**
Processing	Repackaging	Import/ Processing – Repackaging (OES #2)	ONU	CT	1.3E05	–	1,117	–	1,196	–	3.1E−07	–
				HE	2,283	–	**20**	200 (APF 10)	**21**	214 (APF 10)	2.2E−05	–
Processing	Processing as a Reactant/ Intermediate in All Other Basic Organic Chemical Manufacturing Incorporation into Formulation, Mixture, or Reaction Product/ Intermediate in All Other Chemical Product and Preparation Manufacturing	Processing as a Reactant (OES #3)	Laboratory Technician	CT	302	–	**2.6**	66 (APF 25)	**2.8**	71 (APF 25)	**1.3E−04**	1.3E−05 (APF 10)
				HE	115	–	**1.0**	51 (APF 50)	**1.1**	54 (APF 50)	**4.4E−04**	4.4E−05 (APF 10)
			Logistics Technician	CT	630	–	**9.3**	93 (APF 10)	**9.5**	95 (APF 10)	3.9E−05	–
				HE	121	–	**1.1**	53 (APF 50)	**1.1**	57 (APF 50)	**4.2E−04**	4.2E−05 (APF 10)
			Marine Logistics Technician	CT	1,021	–	33	–	33	–	1.1E−05	–
				HE	**3.7**	37 (APF 10)	**0.12**	120 (APF 1,000)	**0.12**	122 (APF 1,000)	**3.9E−03**	7.8E−05 (APF 50)
			Processing Operator	CT	694	–	**6.1**	61 (APF 10)	**6.5**	65 (APF 10)	5.6E−05	–
				HE	28	282 (APF 10)	**0.25**	247 (APF 1,000)	**0.26**	265 (APF 1,000)	**1.8E−03**	7.2E−05 (APF 25)
			Maintenance Technician	CT	4.1E04	–	3,948	–	4,003	–	9.2E−08	–
				HE	29	286 (APF 10)	**2.8**	69 (APF 25)	**2.8**	70 (APF 25)	**1.7E−04**	1.7E−05 (APF 10)
			ONU	CT	8,355	–	73	–	78	–	4.7E−06	–
				HE	168	–	**1.5**	37 (APF 25)	**1.6**	39 (APF 25)	**3.0E−04**	3.0E−05 (APF 10)

Condition of Use		Occupational Exposure Scenario	SEG Description	Exposure Level	Acute Non-Cancer (Benchmark MOE = 30)		Intermediate Non-Cancer (Benchmark MOE = 30)		Chronic Non-Cancer (Benchmark MOE = 30)		Cancer (Benchmark = 1E−04)	
Life Cycle Stage	**Category/ Subcategory**				**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**
Industrial Use	Non-Incorporative Activities/ Processing Aids	Processing Aid (Non-Incorporative Activities) (OES #4)	Laboratory Technician	CT	302	–	**2.6**	66 (APF 25)	**2.8**	71 (APF 25)	**1.3E−04**	1.3E−05 (APF 10)
				HE	115	–	**1.0**	51 (APF 50)	**1.1**	54 (APF 50)	**4.4E−04**	4.4E−05 (APF 10)
			Logistics Technician	CT	630	–	**5.5**	55 (APF 10)	**5.9**	59 (APF 10)	6.2E−05	–
				HE	121	–	**1.1**	53 (APF 50)	**1.1**	57 (APF 50)	**4.2E−04**	4.2E−05 (APF 10)
			Processing Operator	CT	694	–	**6.1**	61 (APF 10)	**6.5**	65 (APF 10)	5.6E−05	–
				HE	28	282 (APF 10)	**0.25**	247 (APF 1,000)	**0.26**	265 (APF 1,000)	**1.8E−03**	7.2E−05 (APF 25)
			Maintenance Technician	CT	4.1E04	–	359	–	384	–	9.5E−07	–
				HE	29	286 (APF 10)	**0.25**	251 (APF 1,000)	**0.27**	269 (APF 1,000)	**1.8E−03**	7.0E−05 (APF 25)
			ONU	CT	8,355	–	73	–	78	–	4.7E−06	–
				HE	168	–	**1.5**	37 (APF 25)	**1.6**	39 (APF 25)	**3.0E−04**	3.0E−05 (APF 10)
Commercial Use	Other Uses/Laboratory Chemical	Commercial Use as a Laboratory Chemical (OES #5)	Worker	CT	429	–	**3.8**	38 (APF 10)	**4.0**	40 (APF 10)	9.1E−05	–
				HE	120	–	**1.0**	52 (APF 50)	**1.1**	56 (APF 50)	**4.2E−04**	4.2E−05 (APF 10)
			ONU	CT	9,803	–	86	–	92	–	4.0E−06	–
				HE	8,164	–	72	–	77	–	6.2E−06	–

Condition of Use		Occupational Exposure Scenario	SEG Description	Exposure Level	Acute Non-Cancer (Benchmark MOE = 30)		Intermediate Non-Cancer (Benchmark MOE = 30)		Chronic Non-Cancer (Benchmark MOE = 30)		Cancer (Benchmark = 1E−04)	
Life Cycle Stage	**Category/ Subcategory**				**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**
Commercial Use	Cleaning and Furnishing Care Product/All-Purpose Liquid Spray Cleaner	Commercial Use of Stone Waxes, Polishes, and Cleaners (OES#6)	Worker/ ONU	See Table 5-4								
	Cleaning and Furnishing Care Product/All-Purpose Waxes and Polishes		Worker/ ONU	See Table 5-4								
	Cleaning and Furnishing Care Product/All-Purpose Liquid Cleaner and Polish		Worker/ ONU	See Table 5-4								
Disposal	Disposal	Disposal to Incineration (OES #7) [d]	Worker	CT	325	–	**2.9**	71 (APF 25)	**3.1**	31 (APF 10)	**1.2E−04**	1.2E−05 (APF 10)
				HE	44	–	**0.39**	388 (APF 1,000)	**0.42**	415 (APF 1,000)	**1.1E−03**	4.6E−05 (APF 25)
			ONU	CT	1.3E05	–	1,117	–	1,196	–	3.1E−07	–
				HE	2,283	–	**20**	200 (APF 10)	**21**	214 (APF 10)	2.2E−05	–
		Disposal to Landfill (OES #8)	Worker	CT	2.0E05	–	1,757	–	1,881	–	2.0E−07	–
				HE	9.5E04	–	834	–	893	–	5.3E−07	–
			ONU [c]	CT	2.0E05	–	1,757	–	1,881 [d]	–	2.0E−07	–
		Disposal to POTW and Non-POTW WWT (OES #9, 10) [d]	Worker	CT	325	–	**2.9**	71 (APF 25)	**3.1**	31 (APF 10)	**1.2E−04**	1.2E−05 (APF 10)
				HE	44	–	**0.39**	388 (APF 1,000)	**0.42**	415 (APF 1,000)	**1.1E−03**	4.6E−05 (APF 25)

Condition of Use		Occupational Exposure Scenario	SEG Description	Exposure Level	Acute Non-Cancer (Benchmark MOE = 30)		Intermediate Non-Cancer (Benchmark MOE = 30)		Chronic Non-Cancer (Benchmark MOE = 30)		Cancer (Benchmark = 1E−04)	
Life Cycle Stage	**Category/ Subcategory**				**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**	**MOE – No PPE [a]**	**MOE – APF [b]**
Disposal	Disposal	Disposal to POTW and Non-POTW WWT (OES #9, 10) [d]	ONU	CT	1.3E05	–	1,117	–	1,196	–	3.1E−07	–
				HE	2,283	–	**20**	200 (APF 10)	**21**	214 (APF 10)	2.2E−05	–
		Remediation (OES #11)	Worker	CT	286	–	**2.5**	63 (APF 25)	**2.7**	67 (APF 25)	**1.4E−04**	1.4E−05 (APF 10)
				HE	141	–	**1.2**	31 (APF 31)	**1.3**	33 (APF 33)	**3.6E−04**	3.6 E−05 (APF 10)
			ONU [c]	CT	286	–	**2.5**	63 (APF 25)	**2.7**	67 (APF 25)	**1.4E−04**	1.4E−05 (APF 10)

APF = assigned protection factor; CT = central tendency; HE = high-end; MOE = margin of exposure; OES = occupational non-user; ONU = occupational non-user; POTW = publicly owned treatment works; SEG = similar exposure group; WWT = wastewater treatment

[a] Risk estimates that exceed the benchmark (*i.e.,* non-cancer risks less than the risk benchmark and cancer risks greater than the cancer risk benchmark) are **bolded and shaded**.

[b] APF listed in parentheses is the level of protection needed for estimated MOEs to be above the non-cancer benchmark or below the cancer benchmark.

[c] Where EPA was not able to estimate ONU inhalation exposure from monitoring data or models, ONU inhalation exposures were assumed to be equivalent to the central tendency experienced by workers for the corresponding OES.

[d] Inhalation exposure estimates based on analogous monitoring data from manufacturers and processers, as described in Table 5-3.

2723

5.3.2.1.1 OES #1 for Manufacture of 1,2-Dichloropropane

As described in Section 5.1.1.2, EPA estimated inhalation exposure based on monitoring data from 1,2-dichloropropane manufacturing facilities submitted by the ACC PDC Consortium under a TSCA section 4 Test Order (Integral Consulting, 2026). Empirical inhalation monitoring data for 1,2-dichloropropane during its manufacture as a byproduct were collected from two manufacturing facilities according to an EPA-approved study plan. Samples were collected for the following SEGs: Process Operators, Logistics Technicians, Maintenance Technicians, Laboratory Technicians, and ONUs. EPA used the monitoring data to estimate the 50th percentile as central tendency and the 95th percentile as the high-end exposures for each exposure group, including ONUs. A summary of the full-shift occupational inhalation exposure estimates is provided in Table 5-7. EPA rated the overall weight of scientific evidence as robust for this OES as described in Table 5-11. Additional discussion of the data by SEG is provided later in this section.

Inhalation monitoring data was available for each SEG and indicate that workers in an exposure group experience a range of potential exposure concentrations and that not all high exposure tasks are performed on a daily basis during the working year. EPA utilized information on specific worker tasks, including the results of task-based monitoring data as well as information on frequency and duration of tasks and use of respiratory protection during specific tasks, to provide context to the risk estimates. These are discussed below in each SEG-specific section. Given the available information on respiratory PPE used during high exposure tasks for certain SEGs within this OES (Logistics Technicians, Process Operators), high-end estimates are likely to over-estimate risk where respiratory PPE is worn properly during high-exposure tasks performed by workers in these SEGs. For certain SEGs, EPA considered reasonably available information on PPE, which influenced EPA's reliance on high-end exposure estimates in the preliminary risk determination (see Section 6.1.3).

Estimates of occupational inhalation risks are presented in Table 5-22. For this OES, there were no acute non-cancer inhalation MOEs below the MOE benchmark of 30 at the high-end or central tendency exposure estimates. EPA has robust confidence in these estimates because they are associated with a range of potential 1,2-dichloropropane in the manufacturing process stream, including concentrations up to 100% for all SEGs. Additionally, these risk estimates do not account for potential use of respiratory protection, which is further discussed below.

The following sections include additional risk characterization for all other metrics (intermediate non-cancer, chronic non-cancer, and cancer) for each SEG that was assessed as part of the inhalation monitoring study, including available information on respiratory protection.

Information on Inhalation Monitoring Data, Including Use of Respiratory Protection, for Specific SEGs

Laboratory Technician: For the Laboratory Technician SEG, EPA estimated inhalation exposures and risks based on two datasets: (1) full-shift inhalation monitoring samples for laboratory technicians at manufacturing sites only (n = 3), and (2) full-shift inhalation monitoring samples for laboratory technicians at manufacturing and processing sites (pooled samples) combined (n = 11). Based on the available information, some laboratory technicians that were sampled during the inhalation monitoring study performed activities in a laboratory shared by production areas in the Manufacturing and Processing OES (Integral Consulting, 2026). Due to the small sample size (n = 3), EPA has lower confidence in the inhalation estimates provided by the manufacturing laboratory technician samples

alone, and greater confidence in the combined dataset that incorporates laboratory technician samples from the processing OES (n = 11).

EPA utilized estimated working days based on a standard working schedule of 8 hours per day, 5 days per week, 250 days per year, as the Agency had information from the test order that certain tasks with exposure potential could be performed daily. The actual maximum number of exposures days for an individual worker within an SEG may be less than 250 days. Full-shift inhalation monitoring samples were associated with processes that involved a range of 1,2-dichloropropane concentrations from 0 to 100% or are of unknown concentration. As such, this data captures work with a range of 1,2-dichloropropane concentrations that may occur throughout the manufacturing process.

Based on the information in the final study report, there was no documented use of respiratory protection for workers in this SEG (Integral Consulting, 2026). It was noted that laboratory workers performed most work inside fume hoods, with the exception of select analyses (Fren test, pH testing, pouring sample into a graduated cylinder and separatory funnel). Due to the lack of reported respiratory protection use, EPA has confidence that the inhalation exposure estimates is reflective of worker exposures without the consideration of potential effects of respirator usage. For this SEG, for both the manufacturing only and pooled samples (manufacturing and processing settings), the Agency found intermediate and chronic non-cancer MOEs below the benchmark MOE (30) at both central tendency and high-end exposure levels, and cancer risk estimates above the cancer benchmark (10^{-4}) at high-end exposure levels only (Table 5-22).

Logistics Technician: For the Logistics Technician SEG, EPA estimated inhalation exposures and risks based on two datasets: (1) full-shift inhalation monitoring samples for logistics technicians at manufacturing sites only (n = 3), and (2) full-shift inhalation monitoring samples for logistics technicians at manufacturing and processing sites (pooled samples) combined (n = 11). Based on the available information, activities performed by logistics technicians at manufacturing sites were similar to those performed by logistics technicians at processing sites, and the railcars associated with logistics technician work move between manufacturing and processing facilities (Integral Consulting, 2026). Due to the small sample size (n = 3), EPA has lower confidence in the inhalation estimates provided by the manufacturing logistics technician samples alone, and greater confidence in the combined dataset that incorporates logistics technician samples from the processing OES (n = 11).

EPA had information from the test order submission that workers in this SEG did not perform work associated with 1,2-dichloropropane on a daily basis, and utilized this information on maximum number of worker days for chronic (156 days/year) and intermediate (13 days/year) exposure estimates (Integral Consulting, 2026). According to the information from the test order, workers in this SEG work on tasks involving other chemicals or process stream waste when not performing work associated with 1,2-dichloropropane.

Full-shift samples inhalation monitoring samples were associated with 1,2-dichloropropane concentrations of 3.0×10^{-3} to 100% in the process streams. Information from the test order indicates that exposures were driven by the percent of 1,2-dichloropropane in the product, and that higher exposures were observed when worker activities were associated with concentrations of 1,2-dichloropropane above 90% (Integral Consulting, 2026). EPA notes that workers in this SEG were reported to work with processes associated with a range of 1,2-dichloropropane, and therefore, high-end estimates on a chronic duration (multiple years) may be overly conservative as to the range of potential exposures experienced by workers in this SEG.

Logistics technicians were reported to wear full-face air-purifying respirators with filtering facepieces (Integral Consulting, 2026). This type of respirator is associated with an APF of 50 when the employer implements a continuing, effective respiratory protection program under the OSHA Respiratory Protection Standard (20 CFR 1910.134). Task-specific or short-term respiratory protection usage was documented for 9 of 11 full-shift inhalation monitoring samples, including the 6 highest reported full-shift concentrations. Additionally, use of a full-face respirator was also documented for 10 of 11 task-based samples collected on these workers, including the four highest measured concentrations.

Respirators were documented as being worn during tasks such as purging lines and equipment
As there is evidence that operators wear respiratory protection (including during high-end exposures), EPA believes that high-end risk estimates, though they are informed by real world data and therefore reasonably expected to occur, are likely an overestimate of actual worker risk because PPE is noted as being worn during high exposure tasks. The Agency is not able to quantify the exposure reduction of the reported respirator use as it is not used during the full-shift. EPA considers evidence that respirators are worn during high-exposure, short-term tasks (as documented by both the task-length and full-shift samples) indicates that the use of respiratory protection is likely to reduce overall full-shift exposures for workers with high-end inhalation exposures in this SEG. EPA notes that respirators were also worn on workers with central tendency exposure estimates, but this practice was not consistent across all full-shift or task-based samples. As such, EPA considers that the central tendency risk estimates are representative of occupational exposures, respective to potential respiratory protection usage.

For the pooled samples, EPA identified intermediate and chronic non-cancer risk estimates below the benchmark MOE (30) at both the central tendency and high-end exposure levels, and cancer risk estimates above the cancer benchmark (10^{-4}) at the high-end exposure level, without accounting for potential PPE usage (Table 5-22). Based on the available data and the information described above, for this SEG, EPA considers that the high-end exposure estimates are likely to overestimate worker exposures. This conclusion is based on (1) evidence that workers with high-end exposure concentrations were consistently documented as wearing respiratory protection, and (2) evidence that workers in this SEG encounter the range of percent concentrations and do not exclusively work with process streams exceeding 90% 1,2-dichloropropane, which are associated with higher exposures. Additionally, EPA does not expect workers in this SEG to experience the high-end exposure concentration repeatedly across days and years and considers central tendency values more appropriate for characterization of chronic non-cancer and cancer risks.

Process Operator: Inhalation estimates for this SEG were based on 12 full-shift samples collected from process operators at two manufacturing sites; all samples were above the LOD. Full-shift samples were associated with 1,2-dichloropropane concentrations ranging from 10.4 to 100% in the process streams. EPA utilized estimated working days based on a standard working schedule of 8 hours per day, 5 days per week, 250 days per year, as EPA had information from the test order that certain tasks could be performed daily (Integral Consulting, 2026). The actual maximum number of exposure days for an individual worker within an SEG may be less than 250 days, and there is evidence from the inhalation monitoring study that not all tasks with high exposure potential are performed with a daily frequency.

According to the Final Study Report, operators in this SEG typically wear full-face respirators with organic vapor cartridges (Integral Consulting, 2026). Full-face air purifying respirators are associated with an APF of 50 when the employer implements a continuing, effective respiratory protection program under the OSHA Respiratory Protection Standard (20 CFR 1910.134). Task-specific or short-term respiratory protection usage was documented for the three highest full-shift sample concentrations; respirators were worn during tasks such as collecting samples, isolating lines, and draining lines. Use of

respiratory protection was not noted for the remaining nine full-shift samples. Additionally, use of a respirator was documented for 5 of 10 task-based samples, including the 5 highest measured concentrations.

Because there is evidence that operators wear respiratory protection during high-end exposures but not during central tendency exposures, EPA believes that central tendency risk estimates are representative of operator exposures and that high-end risk estimates—though they are informed by real world data and therefore reasonably expected to occur—are likely an overestimate of actual worker risk, as PPE is noted as being worn during high exposure tasks. EPA is not able to quantify the exposure reduction of the reported respirator use, as it is not used during the full shift. The Agency considers the evidence that respirators are worn during high-exposure, short-term tasks (as documented by both the task-length and full-shift samples) indicates that the use of respiratory protection is likely to reduce overall full-shift exposures for workers with high-end inhalation exposures in this SEG.

For this SEG, EPA identified intermediate and chronic non-cancer risk estimates below the benchmark MOE (30) at high-end exposure levels only, and cancer risk estimates above the cancer benchmark (10^{-4}) at the high-end exposure levels only, without accounting for potential PPE usage (Table 5-22). EPA considers the evidence that workers wear PPE for the highest exposure tasks indicates that the high-end exposure estimates may be an overestimation of worker exposures, including for intermediate exposures. As previously noted, the Agency does not expect workers in this SEG to experience the high-end exposure concentration repeatedly across days and years and considers central tendency values more appropriate for characterization of chronic non-cancer and cancer risks.

Maintenance Technician: Inhalation estimates for this SEG were based on a combined dataset that included two sources of data: (1) an 8-hour TWA that was estimated using a task-length PBZ sample collected as part of the ACC PDC Consortium Inhalation Monitoring Study (Integral Consulting, 2026), and 2) three historical (2014) full-shift PBZ samples (ACC, 2021). The three full-shift samples were below the limit of detecton (LOD; 2.5×10^{-2} to 2.9×10^{-2} ppm).

EPA has slight-to-moderate confidence in the exposure and risk estimates for this SEG. The confidence is lower due to the low number of total samples (n = 4), use of a task-length sample to estimate a full-shift exposure concentration, number of full-shift samples below the limit of detection (n = 3 of 3), and the LOD being high relative to other benchmarks. EPA assessed non-detect (ND) samples at the full LOD, which is the most conservative method for replacing non-detects. The Agency had information that workers in this SEG did not perform work associated with 1,2-dichloropropane on a daily basis and utilized this information on maximum number of worker days for chronic (24 days/year) and intermediate (2 days/year) exposure estimates.

For the purpose of risk characterization, EPA has moderate confidence that the resulting MOEs are representative of this SEG. All estimated non-cancer MOEs were above the benchmark of 30, and the estimated cancer risk was below the cancer benchmark at both central tendency and high-end exposures (Table 5-22). EPA notes that these risk estimates incorporate conservative assumptions, including the use of the full limit of detection to replace non-detect values and do not account for any potential use of PPE. Use of respiratory protection was not documented for the one full-shift sample collected in the inhalation monitoring study.

ONUs: Inhalation estimates for this SEG were based on 12 full-shift samples collected from ONUs at 2 manufacturing sites; all samples were above the LOD. Full-shift samples were associated with 1,2-dichloropropane concentrations ranging from 10.4 to 100% in the process streams. ONUs included in

the sampling study worked in control rooms and laboratory offices, with some workers visiting operating units to deliver samples, issue permits, and observe work. Job titles included Analytical Technologist, Process Operator, Inside Operator, and Inside Process Operator. EPA utilized estimated working days based on a standard working schedule of 8 hours per day, 5 days per week, 250 days per year. All estimated non-cancer MOEs were above the benchmark of 30 and the estimated cancer risk was below the cancer benchmark at both central tendency and high-end exposures (Table 5-22). Use of respiratory protection was not indicated for ONUs. Based on the available information, ONUs in this OES do not wear PPE.

5.3.2.1.2 OES #2 for Import/Processing – Repackaging

EPA estimated inhalation exposures for repackaging scenarios utilizing analogous monitoring data (same chemical, similar OES) from 1,2-dichloropropane manufacturing and processing facilities provided via a test order submission from the ACC PDC Consortium (Integral Consulting, 2026). EPA identified 11 full-shift samples for logistics technicians, which included 4 full-shift samples from manufacturing sites and 7 full-shift samples from processing sites. All samples were above the limit of detection. Additionally, EPA identified 11 full-shift ONU samples that were relevant to ONUs working in areas where activities relevant to repackaging (such as chemical loading and unloading) occurred. ONU samples in this dataset also included dispatchers and operators who monitored distributions or performed communications and logistics tasks from office areas or control rooms. The inhalation estimates are provided in Table 5-3. EPA rated the weight of scientific evidence as moderate (Table 5-11).

Exposure and risk estimates are based on PBZ data on 1,2-dichloropropane exposures for an analogous scenario of logistics technicians performing similar tasks (*e.g.,* repackaging activities) at 1,2-dichloropropane manufacturing and processing facilities. However, because these data are specific to manufacturing and processing settings, there is uncertainty in the representativeness of this dataset to exposures at other facilities where repackaging may be performed. For example, it is unclear whether the impact of administrative and engineering controls on these facilities would be similar. EPA considers this data to be a plausible estimate of exposures to workers and ONUs within this OES.

Acute inhalation risk estimates were above the benchmark MOE of 30 at both central tendency and high-end exposures for workers and ONUs. Inhalation risk estimates were below the benchmark MOE of 30 for intermediate and chronic non-cancer exposures for both central tendency and high-end inhalation exposures for workers as well as high-end inhalation estimates only for ONUs (Table 5-22). Inhalation cancer risk estimates were above the cancer benchmark at both the central tendency and high-end inhalation exposure levels for workers, but below the benchmark for ONUs for both central tendency and high-end exposures.

Due to the strength of having chemical-specific PBZ monitoring data for workers and ONUs for an analogous setting, both the central tendency and high-end estimates are suitable for use in risk determination. EPA considers that high-end exposure and risk estimates are most appropriate for consideration of shorter duration exposures (*e.g.,* acute). Chronic non-cancer and cancer effects involved repeated exposures over a high expose frequency and high number exposure days. Use of the high-end inhalation estimate in combination with these other conservative default values may result in an overly conservative estimate of chronic risk for this OES. For example, EPA assumed 250 days/year of exposure for workers in this OES, based on assumptions of working 50 weeks per year and 5 days per week. The actual maximum number of exposure days for workers in this OES may be less than 250.

Information on Use of Respiratory Protection

Some information on PPE was available from the Chemical Repackaging GS, indicating potential use of safety glasses, face shields, aprons, and gloves. There was no information on potential use of respiratory protection in the Chemical Repackaging GS. EPA did not identify any specific information on PPE utilized by workers in repackaging facilities. In absence of industry or facility specific information, the Agency considers the information on PPE described for the Manufacturing as a Byproduct and Processing as a Reactant OES may be relevant to the Repackaging OES, but with greater uncertainty as to how representative this might be across all facilities in this OES.

5.3.2.1.3 OES #3 for Processing as a Reactant

As described in Section 5.1.1.2, EPA estimated inhalation exposure based on monitoring data from 1,2-dichloropropane processing facilities provided via a test order submission from the ACC PDC Consortium in response to a test order issued under section 4(a) of TSCA (Integral Consulting, 2026). Empirical inhalation monitoring data for 1,2-dichloropropane during processing as a reactant were collected from three facilities according to an EPA-approved study plan. Samples were collected for the following SEGs: Process Operators, Logistics Technicians, Maintenance Technicians, Laboratory Technicians, Marine Logistics Technicians, and ONUs. EPA used the monitoring data to estimate the 50th percentile as central tendency and the 95th percentile as the high-end exposures for each exposure group, including ONUs. A summary of the full-shift occupational inhalation exposure estimates is provided in Table 5-7. EPA rated the overall weight of scientific evidence for this OES as robust (Table 5-11). Additional discussion of the data by SEG is provided later in this section.

Inhalation monitoring data was available for each SEG and indicate that workers in an exposure group experience a range of potential exposure concentrations, and that not all high exposure tasks are performed on a daily basis during the working year. Use of the high-end inhalation estimate in combination with these other conservative default values may result in an overly conservative estimate of chronic risk for this OES. Given the available information on respiratory PPE used during high exposure tasks for certain SEGs within this OES (Logistics Technicians, Marine Logistics Technicians), high-end estimates are likely to over-estimate risk where sufficient respiratory PPE is worn properly during high-exposure tasks performed by workers in these SEGs. For certain SEGs, EPA considered reasonably available information on PPE that influenced EPA's reliance on high-end exposure estimates in the risk determination (see Section 6.2.3).

The below sections include additional risk characterization for each SEG that was assessed as part of the inhalation monitoring study, including available information on respiratory protection.

Information on Inhalation Monitoring Data, including Use of Respiratory Protection, for Specific SEGs

Laboratory Technician: Inhalation estimates for this SEG were based on 8 full-shift samples collected from laboratory technicians at two processing sites; all samples were above the LOD. Full-shift samples were associated with 1,2-dichloropropane concentrations of 0 to 80%, 93.4%, or of unknown concentrations in the process streams. EPA utilized estimated working days based on a standard working schedule of 8 hours per day, 5 days per week, 250 days per year, as EPA had information from the test order that certain tasks with exposure potential could be performed daily (Integral Consulting, 2026). The actual maximum number of exposures days for an individual worker within an SEG may be less than the currently used value of 250 days. EPA has robust confidence in the inhalation exposure estimates associated with this monitoring data.

Risk estimates were below the benchmark MOE for central tendency and high-end intermediate and chronic non-cancer exposures (MOE = 30). Additionally, cancer risks were above the benchmark at both the central tendency and high-end exposure estimates (Table 5-22). Acute risk estimates were above the benchmark MOE at central tendency and high-end exposure levels. According to the information in the final study report, workers in this SEG did not utilize respiratory protection (Integral Consulting, 2026). It was noted that laboratory workers perform most work inside fume hoods.

Logistics Technician: Inhalation estimates for this SEG were based on 8 full-shift samples collected from logistics technicians at two processing sites; all samples were above the LOD. Full-shift samples were associated with 1,2-dichloropropane concentrations of 3×10^{-3} to exceeding 99% (pure 1,2-dichloropropane) in the process streams. EPA had information from the test order that workers in this SEG did not perform work associated with 1,2-dichloropropane on a daily basis and utilized this information on maximum number of worker days for chronic (156 days/year) and intermediate (13 days/year) exposure estimates (Integral Consulting, 2026). When not performing work associated with 1,2-dichloropropane, workers in this SEG were employed on tasks involving other chemicals or process stream waste. Information from the final study report indicates that exposures were driven by the percent of 1,2-dichloropropane in the product and that higher exposures were observed when worker activities were associated with concentrations of 1,2-dichloropropane exceeding 90%. EPA has robust confidence in the inhalation exposure estimates for this SEG.

Logistics technicians in the processing OES were reported to wear full-face air-purifying respirators with filtering facepieces. This type of respirator is associated with an APF of 50 when the employer implements a continuing, effective respiratory protection program under the OSHA Respiratory Protection Standard (20 CFR 1910.134). Task-specific or short-term respiratory protection usage was documented for 6 of 8 full-shift samples, including the three highest full-shift sample concentrations (4.2×10^{-2} to 0.12 ppm). Use of a full-face respirator was also documented for 10 of 14 task-based samples collected on these workers, including the 7 highest measured concentrations. Respirators were worn during tasks such as purging lines and equipment.

Because there is evidence that operators wear respiratory protection (including during high-end exposures), EPA believes that high-end risk estimates—though informed by real world data and therefore reasonably expected to occur—are likely an overestimate of actual worker risk because PPE is noted as being worn during high exposure tasks. The Agency is not able to quantify the exposure reduction of the reported respirator use because it is not used during the full shift. EPA considers that the evidence that respirators are worn during high-exposure, short-term tasks (as documented by both the task-length and full-shift samples) indicates that the use of respiratory protection is likely to reduce overall full-shift exposures for workers with high-end inhalation exposures in this SEG. EPA notes that respirators were also worn on workers with central tendency exposure estimates, but this practice was not consistent across all full-shift or task-based samples.

For this SEG, EPA identified intermediate and chronic non-cancer risk estimates below the benchmark MOE (30) at both central tendency and high-end exposure levels and cancer risk estimates above the cancer benchmark (10^{-4}) at high-end exposure level only, without accounting for potential PPE usage (Table 5-22). Acute risk estimates were above the benchmark MOE at central tendency and high-end exposure levels. Based on the available data and the information described above, for this SEG, EPA considers that the high-end exposure estimates are likely to overestimate worker exposures. This conclusion is based on (1) the evidence that workers with high-end exposure concentrations were consistently documented as wearing respiratory protection, and (2) evidence that workers in this SEG encounter the range of percent concentrations, and do not exclusively work with process streams

exceeding 90% 1,2-dichloropropane, which are associated with higher exposures. Additionally, and as previously noted, EPA does not expect workers in this SEG to experience the high-end exposure concentration repeatedly across days and years and considers central tendency values more appropriate for characterization of chronic non-cancer and cancer risks.

Marine Logistics Technician: Inhalation estimates for this SEG were based on 40 full-shift samples collected from marine logistics technicians at 1 processing site; all samples were above the LOD. Full-shift samples were associated with pure (≈99%) 1,2-dichloropropane. EPA had information that workers in this SEG did not perform work associated with 1,2-dichloropropane on a daily basis and utilized this information on maximum number of worker days for chronic (72 days/year) and intermediate (6 days/year) exposure estimates (Integral Consulting, 2026).

EPA notes that this is a large variation in exposures within the Marine Logistics Technician SEG, as indicated by the reported geometric standard deviation (GSD) of 20.4 (Integral Consulting, 2026). The dataset in this SEG is right-skewed, with the majority of values less than 0.1 ppm (25 of 40 full-shift samples) or 1 ppm (35 of 40 full-shift samples). The Final Study Report did not identify any samples in this SEG as outliers, but noted that the estimated 95th percentile concentration was driven by "the higher full-shift exposures for outside operators working on barges and ships during the unloading/loading events" (Integral Consulting, 2026). Additionally, the Final Study Report described that a unique unloading and loading event occurred during 1 sampling day (October 27), during which a multigrade ship containing six different chemicals unloaded a portion of its cargo (including PDC*; i.e.,* 1,2-dichloropropane) to a barge, and then the remaining chemical volume to the shore tanks (Integral Consulting, 2026). It was noted that this event was unusual as multigrade ships usually contain one to three chemicals, as opposed to six, and ships rarely unload onto barges. Two of the five highest full-shift sample concentrations (including the highest full-shift sample concentration) occurred during this sampling day (2.04 and 7.39 ppm). Additionally, the Final Study Report noted that variability among workers in this SEG was driven by locations, with lower concentrations further away (on the dock, in ship shacks, in the cab of cranes) and higher concentrations on ships and barges (Integral Consulting, 2026).

EPA notes that the ACC PDC Consortium initially grouped "marine terminal workers" into several preliminary SEGs, including marine terminal logistics on shore, marine rover, and marine terminal logistics on ships. It was described that the workers were grouped into one larger SEG due to site conditions, job rotations, and sampling results. Additionally, the Consortium authors described different job duties for several job titles (such as outside operators and marine rovers). It was noted that workers were cross-trained to serve multiple roles, but there was no information as to how frequently a worker may transition between different roles. A GSD greater than 3 may (but not always) indicates that an SEG may not be properly defined, and if so, should be reconsidered and regrouped into two or more SEGs (NMCPHC, 2021). EPA requests comment on information to inform or refine interpretation of this SEG, as described in the Executive Summary ("Next Steps and Public Input").

For this SEG, due to the large variation in exposure concentrations, EPA considers that both central tendency and high-end exposure and risk estimates are appropriate for use in the risk assessment. The Agency considers that central tendency exposure estimates may be more appropriate to characterize exposures for some workers in this SEG, while high-end exposure estimates may be more appropriate to characterize exposures for other workers in this SEG. Due to the large variation in inhalation exposure concentrations and large number of workers captured in this SEG, as well as the use of exposure duration information provided by the test order (*e.g.,* number of days per year), EPA has uncertainty as to (1) if the central tendency estimates may under-estimate exposures for certain workers in this SEG,

and (2) if the high-end estimates may over-estimate exposures for certain workers in this SEG. For example, as noted by the Final Study Report, higher full-shift exposures were indicated for outside operators working on barges and ships during unloading/loading events. EPA notes that if the five highest full-shift inhalation concentrations are excluded from the analysis, then the resulting central tendency exposure estimate (50th percentile) is 1.0×10^{-2} ppm. The central tendency exposure estimate for the entire dataset is 1.2×10^{-2} ppm (Table 5-7).

Task-specific or short-term respiratory protection usage was documented for the 14 of 40 full-shift sample concentrations, including the eight highest full-shift sample concentrations. The respirators utilized were full-face (APF 50) or half-face respirators (APF 10).

EPA identified acute, intermediate, and chronic non-cancer risk estimates below the benchmark MOE (30) at high-end exposure levels only, and cancer risk estimates above the cancer benchmark (10^{-4}) at high-end exposure levels only, without accounting for potential PPE usage (Table 5-22). EPA notes that per Table 5-22, a minimum APF of 10 was indicated for estimated MOEs to be above benchmark for acute high-end exposures. Thus, for acute exposures, as there is evidence that marine logistics technicians wear respiratory protection (including during high-end exposure tasks), EPA believes that high-end acute risk estimates—though they are informed by real world data and therefore reasonably expected to occur—are likely an overestimate of actual worker risk as PPE is noted as being worn during high exposure tasks. Additionally, a minimum APF of 1,000 was indicated for estimated MOEs to be above benchmarks for intermediate and chronic high-end exposures, and a minimum APF of 50 was indicated for benchmark MOEs to be below the cancer benchmark at high-end exposures (Table 5-22).

Process Operator: Inhalation estimates for this SEG were based on 31 full-shift samples collected from process operators at 2 manufacturing sites; all samples were above the LOD. Full-shift samples were associated with 1,2-dichloropropane concentrations ranging from 0 to 100% in the process streams. EPA utilized estimated working days based on a standard working schedule of 8 hours per day, 5 days per week, as the Agency had information from the test order that certain tasks could be performed daily (Integral Consulting, 2026). The actual maximum number of exposures days for an individual worker within an SEG may be less than 250 days, and there is evidence from the inhalation monitoring study that not all tasks with high exposure potential are performed with a daily frequency. EPA has robust confidence in the inhalation exposure estimates for this SEG.

Task-specific or short-term respiratory protection usage was documented for the 3 of 31 full-shift sample concentrations, including 2 of the 9 full-shift sample concentrations that were above the central tendency exposure estimate (1.8×10^{-2} ppm; see Table 5-7). Respirator use was noted for 3 of 17 task-length samples, including 2 of the 3 highest recorded inhalation concentrations. The respirators utilized were full-face respirators. There is limited evidence that workers in this SEG wore respirators during the inhalation monitoring that was performed at central tendency or high-end exposure estimates.

For the process operator SEG, EPA identified (1) acute risk estimates below the benchmark MOE (30) at high-end exposure levels only; (2) intermediate and chronic non-cancer risk estimates below the benchmark MOE (30) at both central tendency and high-end exposure levels; and (3) cancer risk estimates above the cancer benchmark (10^{-4}) at high-end exposure levels only, without accounting for potential PPE usage (Table 5-22). As previously noted, EPA does not expect workers in this SEG to experience the high-end exposure concentration repeatedly across days and years and considers central tendency values more appropriate for characterization of chronic non-cancer and cancer risks. EPA

notes that the Final Study Report indicated that variability in this SEG is likely due to infrequent tasks such as collecting quality assurance samples and performing filter changes.

Maintenance Technician: Inhalation estimates for this SEG were based the results of 12 short-term PBZ, which were used to estimate 8-hour TWAs. Short-term samples were collected as part of the ACC PDC Consortium inhalation monitoring study (Integral Consulting, 2026).

EPA has slight-to-moderate confidence in the inhalation exposure estimates based on this data. The confidence is reduced due to the use of short-term samples to estimate full-shift exposures, which introduces uncertainty, as short-term inhalation measurements are meant to capture peak exposures. Additionally, the Agency assumed an exposure of zero for the remaining duration of the shift, which may not capture potential background exposures for workers. EPA had information that workers in this SEG did not perform work associated with 1,2-dichloropropane on a daily basis. The Agency utilized this information on maximum number of worker days for chronic (24 days/year) and intermediate (2 days/year) exposure estimates (Integral Consulting, 2026).

EPA notes that there was a large distribution in the reported short-term sample concentrations as well as the resulting estimated 8-hour TWAs. As such, the central tendency and high-end exposure estimates vary by several orders of magnitude (Table 5-8). The three highest short-term sample concentrations (2–5.6 ppm; sample duration range: 38–41 minutes) were collected during a pump disassembly, clean, and repair task that occurred in an indoor shop area. The Final Study Report described that these samples were associated with a "non-routine" event in which 1,2-dichloropropane was trapped in the pump head and spilled out of the pump during maintenance (Integral Consulting, 2026).

EPA identified acute, intermediate, and chronic non-cancer risk estimates below the benchmark MOE (30) at high-end exposure levels only, and cancer risk estimates above the cancer benchmark (10^{-4}) at high-end exposure levels only, without accounting for potential PPE usage (Table 5-22). Respirator use was noted for 5 of 12 task-length samples; however, this was not documented for the 4 highest sample concentrations. EPA notes that while respirator use was inconsistent, it was reported, and these risk estimates do not account for potential use of respiratory PPE, which will further reduce exposures.

ONUs: Inhalation estimates for this SEG were based on 32 full-shift samples collected from ONUs at 2 manufacturing sites; 2 samples were below the LOD ($<1.3\times10^{-3}$ ppm). Full-shift samples were associated with 1,2-dichloropropane concentrations ranging from 0 to 100%. ONUs included in the sampling study worked in control rooms and laboratory offices, and some workers visited operating units to deliver samples, issue permits, and observe work. Job titles included Analytical Technologist, Process Operator, Inside Operator, and Inside Process Operator. EPA utilized estimated working days based on a standard working schedule of 8 hours per day, 5 days per week. Use of respiratory protection was not indicated for ONUs.

For ONUs, EPA identified intermediate and chronic non-cancer risk estimates below the benchmark MOE (30) at high-end exposure levels only, and cancer risk estimates above the cancer benchmark (10^{-4}) at high-end exposure levels only, without accounting for potential PPE usage (Table 5-22). Acute risk estimates were above the benchmark MOE at central tendency and high-end exposure levels.

EPA considers that high-end exposure and risk estimates are most appropriate for consideration of shorter duration exposures (acute, intermediate). Chronic non-cancer and cancer effects involved repeated exposures over a high exposure frequency and high number exposure days. Use of the high-end

inhalation estimate in combination with other conservative default values may result in an overly conservative estimate of chronic risk for this OES.

5.3.2.1.4 OES #4 for Processing Aid – Non-Incorporative Activities

Because EPA did not identify any 1,2-dichloropropane-specific inhalation monitoring data for this OES, analogous data from the Processing as a Reactant OES were utilized. Specifically, to estimate worker inhalation exposures, the Agency utilized data from the following SEGs from the Processing as a Reactant OES: Laboratory Technician, Logistics Technicians, Processing Operator, Maintenance Technician, and ONUs. Additional information on these samples is described in the preceding section. EPA selected samples from these worker SEGs because the job activities and work processes are similar to tasks performed by workers in the Processing Aid OES. Additionally, EPA expects that this OES will utilize 1,2-dichloropropane in concentrations similar to those reported being used in the Processing as a Reactant OES (concentrations up to 100%).

From these monitoring data, EPA calculated the 50th and 95th percentile 8-hour TWA concentrations to estimate a central tendency and high-end estimate of potential occupational inhalation exposures, respectively. Inhalation exposure concentrations utilized in the assessment are presented in Table 5-7. The weight of scientific evidence is discussed in Table 5-22. As described in this table, EPA has moderate confidence in the assessment of inhalation exposure for this OES.

The available data and confidence support the use of the central tendency and high-end exposures for assessment of non-cancer acute and intermediate risk and the central tendency for the assessment of chronic and cancer risks. EPA considers high-end exposure and risk estimates to be the most appropriate for consideration of shorter duration exposures (acute, intermediate). Chronic non-cancer and cancer effects involved repeated exposures over a high exposure frequency and high number exposure days. Use of the high-end inhalation estimate in combination with other conservative default values may result in an overly conservative estimate of chronic risk for this OES.

Information on Use of Respiratory Protection

Estimates of occupational inhalation risks are presented in Table 5-22. Where the estimated MOE is below the benchmark value, an indication of the respirator APF needed to reduce exposures relative to applicable benchmarks is also provided. Because EPA did not identify reasonably available information on PPE usage for this OES, there is uncertainty related to whether the information on PPE provided by the test order, which was specific to manufacturing and processing, is relevant for this OES.

5.3.2.1.5 OES #5 for Commercial Use as a Laboratory Chemical

EPA did not identify any 1,2-dichloropropane-specific inhalation monitoring data for the Commercial Use as a Laboratory Chemical OES and instead utilized analogous data from the Manufacturing as a Byproduct and Processing as a Reactant OES. Specifically, to estimate worker inhalation exposures, the Agency utilized 11 full-shift PBZ samples for laboratory technicians; all samples were above the limit of detection. For workers, EPA used monitoring data to estimate the 50th percentile as central tendency and the 95th percentile as the high-end exposures for workers. Additionally, the Agency identified two full-shift ONU samples that were relevant to laboratory settings; samples were collected from ONUs with the job title of analytical technologists. All samples were above the limit of detection. For ONUs, EPA utilized the average of the two samples as the central tendency and the highest concentration for the high-end exposure estimates. Inhalation exposure concentrations utilized in the assessment are presented in Table 5-7. The weight of scientific evidence is discussed in Table 5-11. As described in this table, the Agency has moderate confidence in the assessment of inhalation exposure for this OES.

EPA considers these to be plausible estimates of worker exposure but notes several areas of uncertainty. Specifically, there is uncertainty in the representativeness of this dataset to exposures at laboratory settings that are not associated with manufacturing and processing settings, and whether the impact of administrative and engineering controls on exposure levels at these facilities would be similar. Additionally, workers in manufacturing and processing settings collect samples in process areas in production units and do not work exclusively in a laboratory settings. For the reason, worker inhalation monitoring concentrations may overestimate worker exposures in other laboratory settings that are not associated with manufacturing or processing operations. Nonetheless, EPA considers this data to be a plausible estimate of exposures to workers and ONUs within this OES. The Agency is seeking additional information on the amounts of 1,2-dichloropropane used by commercial laboratories on a daily (kg/site-day) and yearly (kg/site-yr) basis. The Agency is also seeking additional information on the amounts of 1,2-dichloropropane used by commercial laboratories on a daily (kg/site-day) and yearly (kg/site-yr) basis and corresponding PPE and engineering controls to reduce exposures.

Estimates of occupational inhalation risks are presented in Table 5-22. For workers, inhalation risks were below the benchmark MOE of 30 for intermediate and chronic non-cancer exposures at both central tendency and high-end exposures and above the cancer benchmark at high-end exposures only. Acute risk estimates were above the benchmark MOE at central tendency and high-end exposure levels. For ONUs, all non-cancer risk estimates were above benchmark MOE of 30 and all cancer risk estimates were below the cancer benchmark of 10^{-4}.

Because inhalation monitoring data was collected in manufacturing and processing sites, EPA considers that high-end exposure and risk estimates are likely to overestimate exposures for workers in commercial laboratory settings. Additionally, and in particular in the case of chronic non-cancer and cancer risks, use of the high-end inhalation estimate in combination with these other conservative default values (*e.g.,* 250 days/year of exposure) may result in an overly conservative estimate of chronic risk for this OES. EPA notes that four of the five highest full-shift inhalation monitoring concentrations involved work in process area and/or tank areas and not exclusively in laboratory settings. Such exposures are not expected for laboratory workers in this OES. Overall, EPA has higher confidence in the use of central tendency exposure and risk estimates for this OES in comparison to the high-end exposure and risk estimates.

5.3.2.1.6 OES #6 for Commercial Use of Stone Waxes, Polishes, and Cleaners

As previously described in Section 4, at the time the final scope was release, several SDSs for products containing 1,2-dichloropropane used for stone waxing, polishing, and cleaning were identified (Tenax Spa, 2015a, b, c). EPA received information from the manufacturer that these products no longer contain 1,2-dichloropropane as of 2022. Based on the available information, and as described in Section 5.1.2, EPA believes use of these products to be reasonably foreseen. The Agency assumes that commercial workers will utilize stone waxes, polishes, and cleaners in the same manner as described throughout the consumer exposure assessment (Section 5.3.3). Thus, EPA has performed a qualitative assessment of occupational inhalation and dermal exposures for this OES that are based on the consumer exposure assessment. The settings would be the same as both commercial workers and consumers would apply the product containing 1,2-dichloropropane in the same household settings. The application amounts for commercial workers and consumers in a household setting based on surface area treated may be higher for the commercial worker than the consumer as the commercial applicator may treat more surfaces. Daily exposures are expected to be at least at the same level as the consumer if not higher. Use by consumers and use by commercial workers at household settings would differ in the frequency of exposure (exposure days/yr), which would be higher for commercial workers as they may apply in multiple household settings throughout the year.

Additional information on the confidence of the consumer assessment is described in Section 5.3.3.3. EPA has lower confidence in the use of this data for assessment of the occupational exposures because this assessment performed is qualitative. As noted in the Executive Summary ("Next Steps and Public Input"), EPA welcomes comment on how to refine this analysis.

5.3.2.1.7 OES #7 for Disposal to Incineration

Because EPA did not identify any 1,2-dichloropropane-specific inhalation monitoring data for the Disposal by Incineration OES, analogous data from the Manufacturing as a Byproduct and Processing as a Reactant OES were utilized. EPA selected samples from these OESs because the job activities are expected to be similar to tasks performed by workers at incineration facilities. Specifically, the unloading and loading activities conducted by logistics technicians are assumed to be similar to material handling activities performed by workers at incineration facilities. For example, one task-based sample collected on a logistics technician noted work involving moving contaminated waste into a hazardous waste bucket. EPA notes that the inhalation monitoring data are associated with 1,2-dichloropropane concentrations up to 100% in the process streams at manufacturing/processing sites and lower concentrations of 1,2-dichloropropane in disposal waste streams at incineration facilities would be expected. As noted in the Executive Summary, EPA requests additional information to inform and refine the assessment of this OES.

Specifically, to estimate worker inhalation exposures, EPA utilized 11 full-shift PBZ samples for Logistics Technicians. Additionally, EPA identified 11 full-shift samples collected on ONUs who worked in the same areas as the Logistics Technicians (Railcar Area and Marine Terminal). All worker and ONU samples were above the limit of detection. The Agency selected samples from this worker SEG because the job activities are expected to be similar to tasks performed by workers at incineration facilities, though concentrations in the waste streams at incineration facilities are expected to be lower than those observed in the process streams of manufacturing/processing facilities. Specifically, the unloading and loading activities conducted by logistics technicians are assumed to be similar to material handling activities performed by workers at incineration facilities. For example, one task-based sample collected on a logistics technician noted work involving moving contaminated waste into a hazardous waste bucket (Integral Consulting, 2026).

From these monitoring data, EPA calculated the 50th and 95th percentile 8-hour TWA concentrations to estimate a central tendency and high-end estimate of potential occupational inhalation exposures for incineration sites. Inhalation exposure concentrations utilized in the assessment are presented in Table 5-7. The weight of scientific evidence is discussed in Table 5-11. As described in the latter table, EPA has moderate confidence in the assessment of inhalation exposure for this OES. The Agency notes that the full-shift inhalation monitoring samples for workers were associated with a wide range of reported 1,2-dichloropropane concentrations in the processing streams at manufacturing/processing settings (3.0×10^{-3} to 100%) (Integral Consulting, 2026). The Agency also notes that higher inhalation concentrations were observed when worker activities were associated with concentrations of 1,2-dichloropropane greater than 90% (Integral Consulting, 2026). EPA expects that 1,2-dichloropropane concentrations in this disposal setting would be less than upper range of reported concentrations in manufacturing/processing settings (*e.g.,* 90–100%), and as such, the high-end inhalation estimates may overestimate exposures. For ONUs, inhalation monitoring samples were associated with process areas containing pure 1,2-dichloropropane (≈99%), or it was noted that the ONU worked in a process area/office where the concentration of 1,2-dichloropropane was "not applicable" (Integral Consulting, 2026). There was no trend in observed airborne 1,2-dichloropropane concentration associated with concentration of 1,2-dichloropropane in the process stream. As for workers, because EPA expects that the concentrations of 1,2-dichloropropane associated with disposal facilities would be less than those

observed in the manufacturing/processing facilities, these inhalation estimates may overestimate exposures.

Estimates of occupational inhalation risks are presented in Table 5-22. For workers, inhalation risks were below the benchmark MOE of 30 for intermediate and chronic non-cancer exposures at both central tendency and high-end exposures, as well as above the cancer benchmark at central tendency and high-end exposure levels, without consideration of PPE. Acute risk estimates were above the benchmark MOE at central tendency and high-end exposure levels. For ONUs, inhalation risk estimates were below the benchmark MOE of 30 for or intermediate and chronic non-cancer exposures at high-end exposure levels only; all other non-cancer risk estimates were above the benchmark MOE. Additionally, cancer risk estimates were below the cancer benchmark of 10^{-4}.

Information on Use of Respiratory Protection

EPA did not identify reasonably available information on PPE use for this OES. In the absence of industry or facility-specific information, the Agency considered that the PPE information described for logistics technicians in the Manufacture OES may be relevant to incineration facilities but with uncertainty as to how representative this might be across incineration facilities.

5.3.2.1.8 OES #8 for Disposal to Landfill

EPA did not identify any chemical-specific inhalation monitoring data to assess exposure for the Disposal to Landfill OES. The Agency identified a total of 115 area monitoring samples from 6 hazardous waste sites and a sanitary landfill in New Jersey. Discrete data were not provided; therefore, EPA used the central tendency and high-end geometric means to represent 50th and 95th percentile potential occupational inhalation exposures, respectively, for this scenario. The number of samples below the detection limit were not provided. In using this area monitoring data, EPA assumed that workers may be near where the area inhalation monitor is located. EPA also assumed up to 8 hours of worker exposure in estimating 8-hour TWAs from the area monitoring data. The Agency did not identify data for ONU exposures and used the central tendency from the workers inhalation exposures to represent ONU inhalation exposures.

Inhalation exposure concentrations utilized in the assessment are presented in Table 5-7. The weight of scientific evidence is discussed in Table 5-11. As described in the latter table, EPA has slight confidence in the assessment of inhalation exposure for this OES.

The available data and confidence rating support the use of both the central tendency and high-end exposure estimates for assessment of acute, intermediate, chronic non-cancer, and cancer risks. For this assessment, EPA utilized the highest geometric mean from the dataset to estimate high-end exposures, which may underestimate potential exposures if discrete data were available. Additionally, the use of area monitoring data may underestimate exposures because these data are collected at stationary locations and not in the breathing zone of workers. For these reasons, EPA considers that despite the slight confidence, high-end exposure estimates are relevant for characterizing exposure—even on a chronic duration for this OES.

Estimates of occupational inhalation risks are presented in Table 5-22. Inhalation risk estimates without the consideration of PPE were well above the benchmark MOE of 30 for acute, intermediate, and non-cancer risks, at both high-end and central tendency exposures. For example, high-end risk estimates ranged from 834 (intermediate, worker) to 200,000 (acute, ONU), approximately 27 to 66,666 times greater than the benchmark MOE of 30. Cancer risk estimates were also well below the cancer

benchmark (10^{-4}) by several orders of magnitude. EPA did not identify reasonably available information on PPE usage for this OES.

5.3.2.1.9 OESs #9 and 10 for Disposal to POTW/Non-POTW WWT

EPA did not identify any 1,2-dichloropropane-specific inhalation monitoring data for these OESs. For this reason, the Agency utilized analogous data from the Manufacturing as a Byproduct and Processing as a Reactant OESs. EPA selected this data because the job activities are expected to be similar to tasks performed by workers at POTW and non-POTW WWT facilities such as unloading/loading activities.

To estimate worker inhalation exposures, EPA utilized 11 full-shift PBZ samples for logistics technicians; all samples were above the limit of detection. Additionally, EPA identified 11 full-shift samples collected on ONUs who worked in the same areas as the Logistics Technicians (Railcar Area and Marine Terminal). The Agency selected these samples because the job activities are expected to be similar to tasks performed by workers and ONUS at POTW and non-POTW WWT facilities. EPA notes that the inhalation monitoring data are associated with 1,2-dichloropropane concentrations up to 100% in the process streams at manufacturing/processing sites, and the Agency expects lower concentrations of 1,2-dichloropropane in disposal waste streams at POTW/non-POTW WWT facilities. As noted in the Executive Summary ("Next Steps and Public Input"), EPA requests additional information to inform and refine the assessment of this OES.

From these monitoring data, EPA calculated the 50th and 95th percentile 8-hour TWA concentrations to estimate a central tendency and high-end estimate of potential occupational inhalation exposures, respectively, for workers and ONUs at WWT facilities. Inhalation exposure concentrations utilized in the assessment are presented in Table 5-7; weight of scientific evidence is discussed in Table 5-11. As described in the latter table, EPA has moderate confidence in the assessment of inhalation exposure for workers in this OES. The Agency notes that the full-shift inhalation monitoring samples for workers were associated with a wide range of reported 1,2-dichloropropane concentrations in the processing streams at manufacturing/processing settings (3.0×10^{-3} to 100%) (Integral Consulting, 2026). The Agency also notes that higher inhalation concentrations were observed when worker activities were associated with concentrations of 1,2-dichloropropane exceeding 90% (Integral Consulting, 2026). EPA expects that 1,2-dichloropropane in this disposal setting would be less than those in the upper range of reported concentrations in manufacturing/processing settings (*e.g.,* 90–100%); therefore, the high-end inhalation estimates may overestimate exposures. For ONUs, inhalation monitoring samples were associated with process areas containing pure 1,2-dichloropropane (99%), or it was noted that the ONU worked in a process area/office where the concentration of 1,2-dichloropropane was "not applicable" (Integral Consulting, 2026). There was no trend in observed airborne 1,2-dichloropropane concentration associated with concentration of 1,2-dichloropropane in the process stream. As with workers, because EPA expects that the concentrations of 1,2-dichloropropane associated with disposal facilities would be less than those observed in the manufacturing/processing facilities, these inhalation estimates for ONUs may overestimate exposures.

Estimates of occupational inhalation risks are presented in Table 5-22. For workers, inhalation risks were below the benchmark MOE of 30 for intermediate and chronic non-cancer exposures at both central tendency and high-end exposures and above the cancer benchmark at central tendency and high-end exposure levels, without consideration of PPE. Acute risk estimates were above the benchmark MOE at central tendency and high-end exposure levels. For ONUs, inhalation risk estimates were below the benchmark MOE of 30 for or intermediate and chronic non-cancer exposures at high-end exposure levels only; all other non-cancer risk estimates were above the benchmark MOE. Additionally, cancer risk estimates were below the cancer benchmark of 10^{-4}.

EPA did not identify reasonably available information on PPE usage for this OES. In absence of industry- or facility-specific information, the Agency considers the information on PPE described for Logistics Technicians in the Manufacture OES, but with greater uncertainty as to how representative this might be across POTW/non-POTW WWT facilities.

5.3.2.1.10 OES #11 for Remediation

To estimate exposures for this OES, EPA utilized 1,2-dichloropropane-specific monitoring data collected from remediation contractors at facilities that manufactured 1,2-dichloropropane as byproduct. Remediation contractors at these facilities were described as operating equipment outdoors during groundwater remediation processes. The percent concentration of 1,2-dichloropropane in the waste stream was not provided in the information provided. Specifically, to estimate worker inhalation exposures, EPA utilized four full-shift PBZ samples for remediation contractors; one sample was below the limit of detection (0.022 ppm). From these monitoring data, EPA calculated the 50th and 95th percentile 8-hour TWA concentrations to estimate central tendency and high-end estimates of potential occupational inhalation exposures, respectively, for workers. The Agency did not identify data for ONU exposures and used the central tendency from the workers inhalation exposures to represent ONU inhalation exposures. Inhalation exposure concentrations utilized in the assessment are presented in Table 5-7. The weight of scientific evidence is discussed in Table 5-11. As described in the latter table, EPA has slight-to-moderate confidence in the assessment of inhalation exposure for this OES. EPA has lower confidence in the ONU inhalation exposures due to the lack of inhalation monitoring data for ONUs and the use of the central tendency worker exposures to estimate inhalation exposures.

For workers, the available data and confidence support the use of high-end exposures for assessment of non-cancer acute and intermediate risk and the central tendency for the assessment of chronic non-cancer and cancer risks. EPA considers that high-end exposure and risk estimates are most appropriate for consideration of shorter duration exposures (acute, intermediate). Chronic non-cancer and cancer effects involved repeated exposures over a high exposure frequency and high number exposure days. Use of the high-end inhalation estimate in combination with these other conservative default values may result in an overly conservative estimate of chronic risk for this OES. For ONUs, the high-end exposure estimates are likely to overestimate exposures, and EPA considers that the available data and slight confidence support the use of the central tendency exposures for assessment of risks for all exposure endpoints (acute, intermediate, and chronic non-cancer, and cancer).

Estimates of occupational inhalation risks are presented in Table 5-22. For both workers and ONUs, inhalation risks were below the benchmark MOE of 30 for intermediate and chronic non-cancer exposures at both central tendency and high-end exposures as well as above the cancer benchmark at central tendency and high-end exposure levels, without consideration of PPE. Acute risk estimates were above the benchmark MOE at central tendency and high-end exposure levels.

5.3.2.1.11 OES #12 for Distribution in Commerce

EPA did not quantitatively assess exposures for an OES of Distribution in Commerce. Activities associated with loading and unloading chemical products were assessed as part of each COU's OES. It is possible that 1,2-dichloropropane may go through a third party for temporary storage/warehousing before distribution to users. If repackaging takes place at these facilities involving transfer from larger to smaller containers, this would be captured under the OES of Repackaging. Transport containers are not expected to be opened during transport between producing and receiving sites. The Agency expects all the 1,2-dichloropropane containing products to be transported in a closed system such that there is negligible potential for releases. Therefore, no occupational exposures are reasonably expected to occur and no separate assessment was performed for estimating releases and exposures from distribution in

commerce. Speculative exposures that may result from irregular and unpredictable accidental spills during transport are not assessed by EPA in TSCA existing chemical risk evaluations.

5.3.2.2 Occupational Dermal Exposure Risk Characterization

This section provides summary tables and dermal risks (Table 5-23) as well as a discussion of the risk characterization for dermal exposures. Table 5-23 also provides occupational dermal MOEs for the OES and worker categories assessed for 1,2-dichloropropane. Additionally, EPA incorporated reasonably available information on dermal PPE, including considerations for evaluating dermal protection, in this section.

3499 **Table 5-23. Occupational Dermal Risk Estimate Summary Table**

Condition of Use		Occupational Exposure Scenario	SEG Description	Exposure Level	Acute Non-Cancer (Benchmark MOE = 30)	Intermediate Non-Cancer (Benchmark MOE = 30)	Chronic Non-Cancer (Benchmark MOE = 30)	Cancer (Benchmark = 1E−04)
Life Cycle Stage	Category/ Subcategory				MOE – No Gloves [a]	MOE – No Gloves [a]	MOE – No Gloves [a]	MOE – No Gloves [a]
Manufacture	Domestic Manufacture	Manufacture (OES #1)	Laboratory Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Laboratory Technician – Pooled Samples	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Logistics Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Logistics Technician – Pooled Samples	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Processing Operator	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Maintenance Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
Manufacture	Import	Import/Processing – Repackaging (OES #2)	Worker	CT	51	137	147	**1.1E−03**
Processing	Repackaging			HE	**20**	52	56	**3.4E−03**
Processing	Processing as a Reactant/Intermediate in All Other Basic Organic Chemical Manufacturing Incorporation into Formulation, Mixture, or Reaction Product/Intermediate in All Other Chemical Product and Preparation	Processing as a Reactant (OES #3)	Laboratory Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Logistics Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Marine Logistics Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Processing Operator	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Maintenance Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
Industrial Use	Non-Incorporative Activities/Processing Aids	Processing Aid – Non-Incorporative Activities (OES #4)	Laboratory Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Logistics Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**

Condition of Use		Occupational Exposure Scenario	SEG Description	Exposure Level	Acute Non-Cancer (Benchmark MOE = 30)	Intermediate Non-Cancer (Benchmark MOE = 30)	Chronic Non-Cancer (Benchmark MOE = 30)	Cancer (Benchmark = 1E−04)
Life Cycle Stage	**Category/ Subcategory**				**MOE – No Gloves [a]**	**MOE – No Gloves [a]**	**MOE – No Gloves [a]**	**MOE – No Gloves [a]**
Industrial Use	Non-Incorporative Activities/Processing Aids	Processing Aid – Non-Incorporative Activities (OES #4)	Processing Operator	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
			Maintenance Technician	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	**4.0E−03**
Commercial Use	Other Uses/Laboratory Chemical	Commercial use as a Laboratory Chemical (OES #5)	Worker	CT	2.7E04	7.1E04	7.6E04	2.2E−06
				HE	33	86	92	**1.9E−03**
Disposal	Disposal	Disposal to Incineration (OES #7)	Worker	CT	144	310	332	**5.0E−04**
				HE	32	69	74	**2.5E−03**
		Disposal to Landfill (OES #8)	Worker	CT	144	310	332	**5.0E−04**
				HE	32	69	74	**2.5E−03**
		Disposal to POTW and Non-POTW WWT (OES #9, 10)	Worker	CT	144	310	332	**5.0E−04**
				HE	32	69	74	**2.5E−03**
		Remediation (OES #11)	Worker	CT	144	310	332	**5.0E−04**
				HE	32	69	74	**2.5E−03**

CT = central tendency; HE = high-end; MOE = margin of exposure; NE = not evaluated; OES = occupational exposure scenario; POTW =publicly owned treatment works; PPE = personal protective equipment; SEG = similar exposure group; WWT = wastewater treatment

[a] Risk estimates that exceed the benchmark (*i.e.,* non-cancer risks less than the risk benchmark and cancer risks greater than the cancer risk benchmark) are **bolded/shaded**.

The dermal exposure assessment used the DEVL Model to estimate dermal exposures. A key strength of the approach used was the use of data on fractional absorption that was developed from a TSCA Section 4 test order for 1,2-dichloropropane (CASRN 78-87-5) requesting the guideline OECD 428 *in vitro* dermal absorption study utilizing human skin relevant to the risk evaluation ("The *In Vitro* Percutaneous Absorption of Radiolabeled 1,2-Dichloropropane (PDC) in Thirteen Dose Scenarios Through Human Split-Thickness Skin"). Because 1,2-dichloropropane is a volatile chemical, any estimate of dermal exposure must take volatility into account that was quantified by the vapor trap in the study as well as the fraction absorbed through the skin. The tests were conducted using 100% (neat), 50%, 10%, and 1% concentrations of 1,2-dichloropropane in heavy hydro-treated naphtha (HHN) as the COU vehicle (Charles River Laboratories, 2024). Due to its volatility, the study results had high variability within individual test concentrations as well as across the test concentrations. The dermal test order for the neat chemical had a mean dermal absorption of 1.08% (95% upper confidence level on the mean of 1.59%) based on *in vitro* testing utilizing human skin. When corrected for recovery, the mean dermal absorption was 1.19% (95% upper confidence level on the mean of 1.75%) (Charles River Laboratories, 2024).

In addition to the neat chemical, the test order measured dermal absorption at varying concentrations within a test vehicle: 1, 10, and 50% with corresponding adjusted mean absorption of 1.16, 1.09, and 1.55%. Although this data had high coefficients of variation ranging from 30 to 125%, the adjustment of the mean 95% upper confidence level reduces data uncertainty. The corresponding adjustment calculations are provided in the *Draft OECD 428 Dermal Absorption Study Calculations* (U.S. EPA, 2026z). In addition, EPA has assumed that the fraction absorbed for the various test fractions of 1,2-dichloropropane absorbed through the skin from dermal exposures are equal to the systemic dose. This conclusion is based on the test order data where the amount in the receptor fluid (representing blood tissue) and the exposed skin represents the actual systemic dose. For the neat chemical (1,2-dichloropropane), the adjusted fraction absorbed is 1.8% and 1.1% absorption for 10% 1,2-dichloropropane in the HHN vehicle. The IHSkinPerm Model result for neat 1,2-dichloropropane is a similar value of 1.1% absorption, providing additional support for and confidence in the empirical data of 1.8% from the Dermal Test Order.

EPA followed OECD GD156 (OECD, 2022) dermal absorption guidance to correct 1,2-dichloropropane raw dermal test order absorption values for lost mass (Charles River Laboratories, 2024) and *Draft OECD 428 Dermal Absorption Study Calculations* (U.S. EPA, 2026z). This approach was reviewed and deemed appropriate by the Science Advisory Committee on Chemicals (SACC) for the 1,1-dichloroethane risk evaluation (September 2024). A prior *in vitro* dermal absorption study "Propylene Dichloride: *In Vitro* Dermal Absorption Rate Testing" (DuPont, 2005) was submitted under a TSCA test rule, "In Vitro Dermal Absorption Rate Testing of Certain Chemicals of Interest to the Occupational Health and Safety Administration" (69 FR 22402 [April 26, 2004]), for derivation of a permeability coefficient (Kp) and short-term absorption rates at 10 and 60 minutes. However, the values derived from this study were not applied in the DEVL Model because this 2005 study only tested the neat chemical for short durations and not the full COUs under TSCA with respect to vehicles, concentrations, and exposure durations that influence dermal flux.

The rationale for the issuance of the TSCA section 4 test order for 1,2-dichloropropane (EPA-HQ-OPPT-2018-0428-0036) was to allow for test preparations of various 1,2-dichloropropane concentrations that were more representative to COU/OES exposure scenarios for workers based on industry recommendations. Furthermore, the concentration of 1,2-dichloropropane in the test compartments was measured up to 24 hours following an 8-hour exposure period to monitor 1,2-dichloropropane absorption throughout the work shift and afterwards to monitor 1,2-dichloropropane dermal translocation, even after cessation of exposure and skin washing. Additionally, the availability of

multiple fraction absorption values for 1,2-dichloropropane based on the various concentrations (1, 10, 50%, and neat) tested in the test order allows for application and alignment of the corresponding COU/OES to the most representative absorption value to mimic occupational exposures while also considering COU vehicles. For the 1,2-dichloropropane testing, the mass balance recovery was 89% or greater than the applied dose for all testing conditions. Overall, the dermal absorption study was well conducted with a high systematic review rating and robust confidence in utilizing its data for dermal risk calculations.

The dermal loading values (mg/cm^2) used for the DEVL Model are based on experimental studies on human subjects of non-aqueous liquids to measure the quantity of liquid remaining on the skin after contact. The experimental study used oils as substances to measure the applied amount on skin as opposed to solvents that are less viscous (U.S. EPA, 1992) The liquids utilized in the study included mineral oil, cooking oil, and bath oil. The oils were selected for their suitability for human use (non-toxic) and their varying viscosities. They had better retention and thus ease of measuring chemical retention on skin after contact. In the study, an initial wipe test was performed that consisted of the subjects wiping their hands with a cloth saturated with the test oil. The amount of liquid retained on the hands was measured immediately after the application. These values may overestimate dermal loading because 1,2-dichloropropane is less viscous and more volatile than the test oils. EPA did not identify dermal loading data for 1,2-dichloropropane or other volatile chemicals. The DEVL Model accounts for volatility using a "fraction absorbed" parameter. EPA is applying these loading values for exposure scenarios that are encountered in the industrial and commercial settings for the COUs/OESs identified for 1,2-dichloropropane (U.S. EPA, 1992). The modeling approach includes a weight fraction parameter that accounts for differences in the weight fraction of 1,2-dichloropropane between OESs. However, it does not account for other differences that may exist among the OESs that impact dermal exposure such as differences in dermal loading, skin surface area exposed, and frequency of contact. The weight of scientific evidence was rated as moderate for the dermal modeling method used to assess dermal exposure for the COU/OES of 1,2-dichloropropane.

In executing the DEVL Model, EPA used a probabilistic modeling approach with Monte Carlo methods to incorporate variability in the values for model parameters. This calculation included variation in fraction absorbed for different weight percents of 1,2-dichloropropane among the various OESs. The variation in the weight fraction with corresponding variability in fraction absorbed values account for the differences in dermal exposure estimates among the OES assessed. The skin surface area of contact was also varied with a uniform distribution of values ranging from 0 to 1,070 cm^2 (values corresponding to the surface area of 2 hands) used in the Monte Carlo methodology. The dermal loading values from the experimental study ranges from 0.7 to 2.1 mg/cm^2 and EPA used a uniform distribution ranging from 0.7 to 2.1 in the Monte Carlo simulations. There is uncertainty in the model results for dermal exposure in industrial and commercial settings due to the limited amount of dermal exposure monitoring data available for comparison. There is also some uncertainty in the weight percents for the various OES. For example, for the Disposal OESs, EPA expects that the waste will most likely be received in diluted form; however, the extent of dilution is unknown. Thus, the weight of scientific evidence overall for the dermal modeling method used to assess dermal exposure for the COUs/OESs of 1,2-dichloropropane was rated as moderate.

For dermal exposures for all OESs, EPA considered that the high-end dermal exposure and risk estimates are most appropriate for consideration of shorter frequency exposures (acute), while central tendency values are appropriate for consideration for intermediate and chronic exposures for 1,2-dichloropropane. The Agency has lower-confidence that high-end dermal exposures are representative for chronic non-cancer and cancer dermal exposure estimates because it is unlikely that a worker would

experience the high-end concentration for dermal contact repeatedly across the operating days and working years.

The DEVL Model estimates the acute absorbed dose rate and does not take into account the protection provided by gloves when workers perform their tasks. Additional information on dermal PPE is provided in the sections that follow.

Consideration of Information on Dermal PPE

Although hand protection provisions are provided in CFR 1910.138, OSHA has not established quantitative protection factors for gloves. OSHA's hand protection standard (29 CFR 1910.138) requires that employers select and require employees to use appropriate hand protection when expected to be exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes. Dermal protection selection provisions are provided in CFR 1910.138(b) and require that appropriate hand protection is selected based on the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards to which employees will be exposed. OSHA provides various guidance documents on the selection of protective gloves (OSHA, 2014, 2003). These guidance documents note that glove permeability and breakthrough rates are affected by a number of factors, including temperature, glove thinning due to performance of tasks with increased pressure or friction, glove degradation, wear time, and reuse of gloves.

EPA had specific information about use of dermal PPE for two OESs, as described below:
Discussion of Available Information on Dermal PPE Usage for the Manufacture (OES #1) and Processing as a Reactant (OES #3) OESs: EPA has reviewed the information on glove use provided in the ACC PDC Consortium Test Order Final Study Report (Integral Consulting, 2026). Use of gloves was documented during the collection of the full-shift inhalation exposure samples and reported use varied by SEG and OES. For the samples collected at manufacturing facilities, use of gloves was indicated for 73% full-shift samples and 100% of the task-length samples. Glove use was indicated during 100% of full-shift samples collected on laboratory technicians and logistics technicians and 92% of samples collected on processing operators. Glove use was documented on the one task length sample collected on maintenance technicians. For processing facilities, use of gloves was indicated for 66% full-shift samples and 98% of task-length samples. Glove use was indicated during 100% of full-shift samples collected on laboratory technicians and logistics technicians and 97% of samples collected on processing operators. The types of gloves utilized varied, and included nitrile gloves, butyl gloves, leather cut-resistant gloves, cotton gloves, and chemical resistant gloves. EPA notes that other dermal PPE was also utilized by workers, including chemical resistant suits, chemical resistant aprons, and chemical resistant boots.

Based on the available information, workers in manufacturing and processing settings were documented as wearing gloves when the inhalation monitoring was performed, including during specific tasks where potential for dermal exposures were identified by the test order study report authors (*e.g.,* when connecting and disconnecting lines containing pure 1,2-dichloropropane). EPA received information on generic standard operating procedures utilized by the facilities covered in the inhalation test order monitoring study, which noted PPE requirements for specific tasks such as the use of chemical resistant gloves during line opening.

Because no dermal exposure measurements are available, EPA is unable to evaluate the reported usage of gloves in the context of specific dermal exposure measurements or concentrations. Nonetheless, the occupational dermal risk estimates, which do not include or assume the use of gloves, may be an

overestimate of dermal exposures. This is because there is evidence that workers in these facilities utilize dermal PPE. Incidental, intermittent, or splash contact may occur due to accidental spills, overspray conditions, or unexpected failure of a control device—as noted by information provided by the ACC PDC Consortium (EPA-HQ-OPPT-2018-0428-0066). This is not likely to occur on a chronic, routine basis over multiple years.

5.3.2.3 Overall Confidence in Occupational Risk Estimates

This section provides a discussion of confidence in the assessment of the occupational inhalation exposure scenarios, including remaining uncertainties across multiple OESs. Detailed discussion of the inhalation exposure estimates for each OES is provided Section 5.3.2.1. Because the same dermal modeling approach was utilized for dermal exposure assessment for all OESs, the discussion of confidence in the dermal occupational exposure risk estimates was provided above in Section 5.3.2.2.

Inhalation Exposure Risk Estimates

Overall, EPA has robust confidence in the inhalation data utilized for two OESs evaluated in this draft risk evaluation: Manufacture and Processing as a Reactant. Confidence is increased by the utilization of full-shift, PBZ monitoring data from the test order inhalation monitoring study that were specific to 1,2-dichloropropane. EPA has moderate confidence in the OESs for which analogous exposure data from the Manufacture and Processing as a reactant OESs were utilized (Import/Processing – Repackaging; Processing Aid – Non-Incorporative Activities; Commercial Use as a Laboratory Chemical; Disposal to Incineration; Disposal to POTW; and Disposal to Non-POTW WWT). The Agency has lower confidence (slight or slight-to-moderate) in OESs with limited inhalation monitoring data such as area data, small sample size, historical data, and/or use of task-length samples to estimate full-shift exposures.

Overall, for most OESs, EPA has higher confidence where high-end risk estimates did not indicate risk relative to the benchmark because many of these scenarios are likely to be overly conservative—especially for chronic non-cancer and cancer exposures. The exception is the OES where area data was utilized (Disposal to Landfill). Because area data are collected at a stationary location and not in a worker's breathing zone, they may underestimate exposures. Therefore, it is not likely that the high-end exposures estimates are overly conservative. Additionally, EPA has lower confidence in risk estimates where ONU data were not available because the Agency assumed that the central tendency exposures for workers were appropriate for characterization of ONUs.

For most OESs, EPA assumed an exposure duration of up to 250 days of exposure per year with 8-hour shifts each working day. This is consistent with the OSHA permissible exposure limits (PEL) and other occupational exposure limits (OELs), but it remains uncertain whether this captures all potential worker schedules and exposures for any given OES. For two OESs (Manufacture; Processing as a Reactant), EPA had information on maximum working days for some workers (SEGs), which were less than 250 days per year. Additionally, inhalation exposure values were based on single-day full-shift measurements and extrapolated to represent average daily concentrations over the specific duration for intermediate and chronic estimates.

For all OESs, EPA relies on estimates of working years provided by BLS, which captures the expected lifetime career exposure of a worker. The Agency utilized central tendency value of 31 years and high-end value of 40 years based on analysis of the BLS data; however, EPA did not receive industry-provided information on working years for any OES. Estimates of working years provided by BLS capture the expected lifetime career exposure of a worker but are not industry-specific.

Personal inhalation monitoring results are obtained from the use of samplers attached to the workers to measure exposure concentrations near the workers' breathing zones. Because the placement of the samplers would be outside of any respiratory protection used, the inhalation exposures do not take into account the exposure reduction from respirator use. However, the monitoring results do reflect the use of exposure controls such as administrative and engineering controls as these control measures would impact the exposure concentrations measured near the workers' breathing zones.

Uncertainties with the PPE Use and Protection Factors

Respirator APFs have technical significance but are generic values based on assumed workplace conditions and because usage of a specific respirator type does not guarantee achieving the generic APF during all use scenarios. Nevertheless, respirator APFs are based on specific conditions and approved by NIOSH in conjunction with OSHA regulations.

EPA had specific information on PPE usage, including use of respirators, for two OESs (Manufacture; Processing as a Reactant). EPA's practice is to consider whether the PPE used at the facility, as described in the test order summary report, provides protection consistent with the Agency's assessment of the PPE protection factor needed to achieve acceptable MOEs. As part of the test order submission process, the ACC PDC Consortium identified two facilities that manufacture 1,2-dichloropropane as a byproduct and three facilities that process 1,2-dichloropropane as a reactant. Information on PPE usage was submitted for workers across all these facilities. EPA did not identify other manufacturers or processors of 1,2-dichloropropane through the test order process or through other sources. Furthermore, EPA did not receive specific information on respiratory protection or other PPE usage for any other OESs. There is also uncertainty regarding the applicability of this information to other OESs, such as Import – Repackaging, because this information was collected from sites representative of Manufacture and Processing as a Reactant OESs.

Based on the available information in the test order report, workers do not wear respiratory protection as standard PPE for full- or near full-shift durations; however, respirators are used during specific tasks, including tasks with high-exposure potential. As previously described, varying levels of respirator protection are associated with tasks described in the test order and use of PPE varies across workers and OESs. Given the variation reported respirator use associated with specific worker exposure groups, it is difficult to assume a consistent level of respiratory protection across a job group. However, EPA performed a detailed review of respirator use by SEG, and identified that across several SEGs, workers typically or always wear respirators, including during high-exposure tasks. Specifically, this was noted for Logistics Technicians in manufacturing and processing settings, Process Operators in manufacturing settings, and Marine Logistics Technicians in processing settings. For other worker SEGs, the information indicated that workers do not wear respirators (*e.g.,* Laboratory Technicians and ONUs in both manufacturing and processing settings) or that there is only limited use of respirators by few workers and not always at the high-end exposure concentrations (e.*g.,* Maintenance Technicians and Process Operators in processing settings).

The proper use of respiratory protection during high-exposure tasks will reduce the overall full-shift exposure. If these high-exposure tasks contribute a large percentage of potential exposure over the full-shift, then the proper use of PPE will significantly reduce full-shift exposure. Given the detailed amount of information on respiratory protection usage provided in the Test Order Final Study Report and associated documentation, EPA has included additional discussion of respiratory PPE worn by workers for select OESs and SEGs in Section 5.3.2.1 (Occupational Inhalation Exposure Risk Characterization). Additionally, information on dermal PPE is provided in Section 5.3.2.2 (Occupational Dermal Exposure Risk Estimates).

5.3.3 Risk Estimates for Consumers

The next two subsections summarize the consumer inhalation (Section 5.3.3.1) and dermal (Section 5.3.3.2) risk estimates, including the calculation of MOEs for dermal and inhalation exposures based on reasonably foreseen use of previously formulated 1,2-dichloropropane-containing products and the corresponding use scenarios. Section 5.3.3.3 summarizes EPA's overall confidence in the consumer risk estimates.

5.3.3.1 Consumer Inhalation Risk Characterization

EPA estimated consumer exposures to products containing 1,2-dichloropropane (see detailed description in Section 5.1.2.2 and the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)) and based risk estimates on these exposures and the associated 1,2-dichlropropane hazard for corresponding exposure duration and route. For all of these stone polishing and cleaning products, acute exposures were assessed from a single use scenario. For one product that is intended as a daily spray cleaner, chronic exposures were assessed. Because for four of these products based on the technical product datasheet information, the product use frequency was once every 18 months, only the acute exposures were assessed and intermediate and chronic duration exposures and risks are not expected and not quantitatively assessed.

This assessment for consumer inhalation exposures and subsequent risk considers a range of low- to high-intensity use exposure scenario risk estimates (MOEs). It relies on realistic and representative input parameters to assess exposures that would be expected to be the lower and upper end of the expected exposure distribution. MOEs for low-, medium-, and high-intensity exposure scenarios are shown for all consumer COUs as well as bystanders which are people assumed to be in the room where the product is used (see Table 5-24).

Table 5-24. Consumer Acute and Chronic Inhalation Risk Estimates

Consumer COU and Subcategory	Product	Exposure Level	Weight Fraction[a]	Frequency (Events/day or Events/year) [b]	Adults 21+ Years or Youth Users MOE	Bystander MOE
Acute non-cancer inhalation risk estimates (benchmark = 30)						
Cleaning and Furnishing Care Product; All-Purpose Liquid Cleaner/Polish	Cera Fluida Classic Liquid Wax	Low	0.5412	1	**6.57E−02**	**4.42E−01**
		Medium	0.5412	1	**5.42E−02**	**2.81E−01**
		High	0.5412	1	**4.57E−02**	**2.01E−01**
	UniBlack2	Low	0.3	1	**0.12**	**7.96E−01**
		Medium	0.4	1	**9.35E−02**	**4.81E−01**
		High	0.5	1	**6.34E−02**	**2.79E−01**
Cleaning and Furnishing Care Product; All-Purpose Waxes and Polishes (Paste)	CeraTe Wax	Low	0.3	1	**9.24E−02**	**6.21E−01**
		Medium	0.4	1	**7.33E−02**	**3.79E−01**
		High	0.5	1	**4.94E−02**	**2.18E−01**
	Quartz Toner	Low	0.01	1	**4.02**	**27.1**
		Medium	0.0225	1	**1.88**	**9.73**
		High	0.035	1	**1.03**	**4.53**
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner	Lustro Italiano	Low	0.010	1	**25.2**	591
		Medium	0.0225	1	**10.7**	210
		High	0.035	1	**4.8**	76.8
Chronic non-cancer inhalation risk estimates (benchmark = 30)						

Consumer COU and Subcategory	Product	Exposure Level	Weight Fraction[a]	Frequency (Events/day or Events/year) [b]	Adults 21+ Years or Youth Users MOE	Bystander MOE
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner	Lustro Italiano	Low	0.010	185/year	**15.7**	134
		Medium	0.0225	300/year	**2.7**	**24.1**
		High	0.035	365/year	**0.83**	**7.62**
Lifetime cancer inhalation risk estimates (benchmark = 1.0E−04 to 1.0E−06)						
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner / Polish	Lustro Italiano	Low	0.010	185/year for 57 years	**5.29E−05**	**6.22E−06**
		Medium	0.0225	300/year for 57 years	**2.52E−04**	**2.76E−05**
		High	0.035	365/year for 57 years	**8.14E−04**	**7.40E−05**

COU = condition of use; MOE = margin of exposure
Bolded/shaded values denote risk estimate below benchmark for acute and chronic non-cancer and above benchmark for cancer risk.

5.3.3.2 Consumer Dermal Risk Characterization

The dermal risk assessment used non-cancer human hazards (Section 5.2) to characterize acute and chronic exposures to 1,2-dichloropropane from consumer products and presents these values for each COU. This assessment of consumer dermal exposures and associated risk considers a range of low- to high-intensity use exposure scenarios and their corresponding risk estimates (MOEs) using realistic and representative input parameters of reasonably foreseen, previously formulated 1,2-dichloropropane-containing products to estimate exposures expected to fall at the lower and upper end of the exposure distribution. MOEs for low-, medium-, and high-intensity exposure scenarios are shown for all consumer COUs. Table 5-25 summarizes the inputs used to obtain acute and chronic dermal exposures, and acute and chronic dermal MOE values by COU. In addition, each COU-specific section provides a sensitivity analysis matrix results that shows resolution for which combination of dermal modeling inputs is needed to obtain MOEs above or below the dermal benchmark MOE of 30. A summary of COU-specific discussion by subsections is available in Table 5-25.

EPA estimated dermal lifetime dose by adding the average chronic dose for each life stage. Specifically, for the 11 to 15 years age range, the corresponding chronic dose is multiplied by the proportion of 5 of the 78 lifetime years (5 ÷ 78). For the 16 to 20 years age range, the corresponding chronic dose is multiplied by the proportion of 5 out of 78 years (5 ÷ 78). For the adult ages (21–78 years), the chronic dose is multiplied by the proportion of 57 of 78 years (57 ÷ 78). For the lifetime dose, each of the proportional doses are summed. The cancer risks associated with the use and exposure from the daily cleaner for all scenarios, weight fractions, duration of use, and one inside hand surface area resulted in risk estimates above the 1×10^{-6} cancer risk benchmark.

Table 5-25. Consumer Dermal Risk Estimates

Consumer COU and Subcategory	Product	Exposure Level	Weight Fraction [a]	Frequency (Events/day or Events/year) [b]	Q_u (mg/cm^2-event) [c]	Fraction Absorbed [d]	Contact Area [e]	Adults ≥ 21 years MOE	Youths 16–20 Years MOE	Youths 11–15 Years MOE	Cancer Risk 67-Year Duration (11–78 years)
Acute dermal non-cancer risk estimates											
Cleaning and Furnishing Care Product; All-Purpose Liquid Cleaner/ Polish	Cera Fluida Classic Liquid Wax	Low	0.5412	1	0.7	1.55E−02	One hand	396	423	387	–
		Medium	0.5412	1	1.4	1.55E−02	One hand	198	211	193	–
		High	0.5412	1	2.1	1.55E−02	Two hands	66	70	64	–
	UniBlack2	Low	0.3	1	0.7	1.55E−02	One hand	714	763	698	–
		Medium	0.4	1	1.4	1.55E−02	One hand	268	286	262	–
		High	0.5	1	2.1	1.55E−02	Two hands	71	76	70	–
Cleaning and Furnishing Care Product; All-Purpose Waxes and Polishes (Paste)	CeraTe Wax	Low	0.3	1	0.7	1.55E−02	One hand	714	763	698	–
		Medium	0.4	1	1.4	1.55E−02	One hand	268	286	262	–
		High	0.5	1	2.1	1.55E−02	Two hands	71	76	70	–
	Quartz Toner	Low	1E−02	1	0.7	1.16E−02	One hand	28,597	30,560	27,947	–
		Medium	2.25E−02	1	1.4	1.16E−02	One hand	6,355	6,791	6,210	–
		High	3.5E−02	1	2.1	1.16E−02	Two hands	1,362	1,455	1,331	–
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner	Lustro Italiano	Low	1.0E−02	1	0.7	1.16E−02	One hand	28,597	30,560	27,947	–
		Medium	2.25E−02	1	1.4	1.16E−02	One hand	6,355	6,791	6,210	–
		High	3.5E−02	1	2.1	1.16E−02	Two hands	1,362	1,455	1,331	–
Chronic dermal non-cancer risk estimates											
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner	Lustro Italiano	Low	1.0E−02	185	0.7	1.16E−02	One hand	155	165	151	–
		Medium	2.25E−02	300	1.4	1.16E−02	One hand	**21**	**23**	**21**	–
		High	3.5E−02	365	2.1	1.16E−02	Two hands	**4**	**4**	**4**	–
Cancer risk estimates											
Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner	Lustro Italiano	Low	1.0E−02	185	0.7	1.16E−02	One hand	–	–	–	**1.60E−03**
		Medium	2.25E−02	300	1.4	1.16E−02	One hand	–	–	–	**1.16E−02**
		High	3.5E−02	365	2.1	1.16E−02	Two hands	–	–	–	**6.61E−02**

Consumer COU and Subcategory	Product	Exposure Level	Weight Fraction [a]	Frequency (Events/day or Events/year) [b]	Q_u (mg/cm^2-event) [c]	Fraction Absorbed [d]	Contact Area [e]	Adults ≥ 21 years MOE	Youths 16–20 Years MOE	Youths 11–15 Years MOE	Cancer Risk 67-Year Duration (11–78 years)
CEM = consumer exposure model; COU = condition of use; MOE = margin of exposure; SDS = safety data sheet **Bolded/shaded** values indicate MOEs below the dermal benchmark of 30. [a] Weight fraction values were obtained from product specific SDSs. [b] Frequency for acute dermal exposures is expressed in events per day and for chronic dermal exposures is expressed events per year. The chronic frequency inputs were obtained from CEM defaults used for all-purpose liquid cleaners' scenario. [c] Amount of liquid product retained on the skin, Q_u, was obtained from U.S. EPA (1992). [d] Fraction absorbed values were obtained from the 1,2-dichloropropane dermal test order (Charles River Laboratories, 2024). [e] Contact area is used for the ratio of skin surface area in contact with product to body weight by population group (adults and youth). For 1 and 2 hands, EPA used the inside of the hand(s) including palms and fingers.											

3796

5.3.3.3 Overall Confidence in Consumer Risk Estimates

EPA estimated acute risks from inhalation and dermal exposures resulting from the reasonably foreseen use of previous formulations of 1,2-dichloropropane-containing stone polishing products. For one product, a daily stone cleaner, EPA estimated both non-cancer and cancer risks from inhalation and dermal exposures. The Agency has robust confidence in these risk estimates because the consumer inhalation and dermal risk estimates are based on product-specific data and manufacturer-publicized use scenarios. Exposure estimates are based on the manufacturer's or retailer's product-specific data regarding amount (mass) of product used; the weight fraction and density of each product and duration of use are based on cited data for range of surface areas treated (*i.e.,* square footage of stone countertops.

EPA, however, is uncertain as to whether the future use of products containing 1,2-dichloropropane and associated exposure estimates are plausible or likely in the United States, which impacts the Agency's overall confidence in the consumer use scenario. Therefore, EPA welcomes comment on whether, based on these or other assumptions, it is reasonable to foresee a return to distribution in U.S. commerce of consumer products containing 1,2-dichloropropane.

The range of risk estimates captures the range of exposures based on current product advertised and marketed consumer activity and use patterns as a stone polish such as for granite kitchen countertops. These risk estimates are thus representative of this use scenario. Other consumer use scenarios such as use in bathrooms or floors would reflect greater surface area and thus, higher expected exposures and associated risks.

The range of 1,2-dichloropropane weight fractions for the various products and the duration of use provides a useful comparison to understand the inhalation risks across these products. As shown in Table 5-24, all products and use intensities result in acute and chronic inhalation risk estimates for the product users below the benchmark of 30—even at 1% weight fraction and 5 minutes of use (risk estimate = 25). In addition, the lifetime (57 year) adult use exposure also results in cancer risk estimates above the 1×10^{-6} to 1×10^{-4} benchmark for all (low-, medium- and high-) intensity scenarios. Thus, EPA is confident in the conclusion that all previous formulations of stone cleaner products would result in 1,2-dichloropropane acute and chronic inhalation risks below benchmark and cancer inhalation risks above the cancer benchmark for consumers.

For dermal risks, EPA conducted a sensitivity analysis, varying for three products, the dermal surface area of exposure, and the corresponding product weight fraction and mass of product used. Only the daily cleaner resulted in chronic dermal risks below benchmark at the higher weight fractions, though there is a significant impact of surface area—with the inside of one hand still resulting in dermal risks below benchmark for both the 3.5 and 2.25% weight fractions. It is only at the low-end of 1% weight fraction that risk estimates are above the benchmark of 30. EPA has robust confidence in the dermal risk estimates. For the four products with only acute exposures, there are no dermal risks below benchmark. However, for the one product that is a daily cleaner, chronic dermal risks only reach below benchmark at the lowest weight fraction and with limited dermal surface area in contact with the product.

Lastly, EPA estimates there are dermal cancer risks associated with the use and exposure from the daily cleaner for all scenarios, weight fractions, duration of use, and one inside hand surface area. The lowest cancer MOE was 1.6×10^{-3}, which is well above the cancer benchmark of 1.0×10^{-6}. EPA, therefore, has robust confidence that the lifetime use of the previous formulation of 1,2-dichloropropane-containing daily cleaner results in dermal cancer risks above the cancer benchmark for consumers.

5.3.4 Risk Estimates for General Population

As detailed in Section 5.1.3, EPA conducted a quantitative exposure assessment for the air, land, and water pathways to evaluate non-cancer and cancer risks for the general population based on the 1,2-dichloropropane-specific hazard values (Section 5.2). The following sections summarize the risk estimates and conclusions for inhalation, dermal, and oral exposures for all general population exposure scenarios.

5.3.4.1 General Population Inhalation Risk Estimates

EPA estimated risks of general population exposures to 1,2-dichloropropane released to air, with a focus on exposures to general populations residing near 1,2-dichloropropane emitting facilities. Risks were evaluated for air releases from industrial and commercial COUs based on exposure estimated from reported and estimated ambient air releases (Section 3.2) and human health hazard values (selected PODs) (Section 5.2) for chronic and acute inhalation exposures (Section 5.3.4). EPA estimated risks using modeling results from IIOAC and HEM.

HEM5.0 was used to estimate exposures using releases from TRI (2019–2023) and NEI (2017 and 2020) reporting facilities. IIOAC was used to estimate exposures for EPA estimated releases from generic facilities/sites (*i.e.,* Commercial Use as a Laboratory Chemical [OES #5]). HEM5.0 was used to characterize populations living near 1,2-dichloropropane-releasing facilities and estimate inhalation risk up to 50,000 m from releasing facilities at polar receptors and census block centroids. HEM5.0 combines 2010 U.S. Census data with estimated ambient air concentrations to calculate MIR and the number of people within each census block with a cancer risk estimate between 1×10^{-6} and 1×10^{-4}.

5.3.4.1.1 Estimated General Population Cancer Risks via Ambient Air Using HEM5.0

TRI Reporting Facilities

HEM5.0 modeling of TRI-reported releases did not identify any populations with an estimated inhalation cancer risk exceeding 1 in 1 million (1×10^{-6}) from 1,2-dichloropropane across all OESs and years modeled. Across all releases and years, the highest estimated inhalation cancer risk at the centroid of a populated census block was 6.38×10^{-7} and was associated with the OES of Manufacture (Table 5-26). Detailed descriptions of the HEM5.0 modeling are provided in the *Draft Chemistry, Fate, Release and Exposure Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026e).

Table 5-26. Maximum Inhalation Cancer Risk Estimates at a Populated Census Block Estimated Using HEM5.0 for TRI Reported Releases from 2019–2023[a]

Occupational Exposure Scenario[b]	Maximum Estimated Inhalation Cancer Risk	TRI Reporting Year Associated with the Maximum Inhalation Cancer Risk[c]	Distance to From Census Block Centroid to Facility Contributing Highest Risk (m) [d]
Manufacture	6.38E−07	2021	706
Processing as a Reactant	6.77E−08	2023	506
Processing Aid – Non-Incorporative Activities	4.73E−07	2019	1,000
Disposal to Incineration	2.72E−09	2023	3,113
HEM = Human Exposure Model; OES = occupational exposure scenario; TRI = Toxics Release Inventory; Cancer Risk Benchmark = 1E−04 to 1E−06			

Occupational Exposure Scenario[b]	Maximum Estimated Inhalation Cancer Risk	TRI Reporting Year Associated with the Maximum Inhalation Cancer Risk[c]	Distance to From Census Block Centroid to Facility Contributing Highest Risk (m) [d]

[a] HEM5.0 calculates a maximum individual risk, which is equivalent to the highest cancer risk for any populated receptor modeled. When calculating cancer risk, HEM assumes that an individual breathes the ambient air at a given receptor site 24 hours per day over a 70-year lifetime.
[b] The risk estimates in this table are aggregated across all modeled facilities; therefore, a census block can be impacted by multiple facilities from multiple OESs. Each census block was mapped to an OES based on the OES of the facility that contributed the most risk at that census block.
[c] All releases reported to TRI from 2019–2023 were used as inputs for HEM5.0. This year in the column is the release year associated with the maximum inhalation cancer risk estimate across all years.
[d] The distance (m) shown in this table is the distance from the census block centroid with the highest estimated cancer inhalation risk to the release location that contributes the highest risk. It is possible that there are releases closer than the reported distance.

NEI Reporting Facilities

HEM5.0 modeling of NEI-reported releases predicted that an estimated 232 people across all OESs represented in TRI would have an estimated inhalation cancer risk exceeding 1 in 1 million (10^{-6}) from 1,2-dichloropropane (Table 5-27). A single facility in the Processing as a Reactant OES was the only contributer to an estimated general population cancer risk above 1 in 1 million (10^{-6}), with an estimated an estimated risk value of 2.26×10^{-6}. This sole facility only contributed to an estimated cancer inhalation risk greater than 1 in 1 million at a single populated census (population of 232) for releases from 2017. This census block is affected by two point sources and two fugitive sources from the same facility. The maximum estimated inhalation cancer risk when considering only 2020 data across all OESs was 3.19×10^{-7}.

No populations were estimated to have an inhalation cancer risk greater than 1 in 100,000 (10^{-5}). Detailed descriptions of the HEM5.0 modeling are provided in the *Draft Chemistry, Fate, Release and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e).

Table 5-27. Maximum Inhalation Cancer Risk Estimates at a Populated Census Block Estimated Using HEM5.0 for NEI Reported Releases from 2017 and 2020[a]

Occupational Exposure Scenario or Assessment[b]	Maximum Estimated Inhalation Cancer Risk	NEI Reporting Year[c]	Distance to from Census Block Centroid to Release Point Contributing Highest Risk (m) [d]
Manufacture	6.74E−07	2017	930
Import/Processing – Repackaging	4.36E−08	2020	1,058
Processing as a Reactant	2.26E−06	2017	112
Processing Aid – Non-Incorporative Activities	5.86E−08	2017	388
Commercial Use as a Laboratory Chemical	3.49E−17	2017	2,208
Disposal to Incineration	3.79E−10	2020	2,856
Disposal to Landfill	3.71E−07	2020	13
Disposal to POTW	1.09E−07	2017	570

Occupational Exposure Scenario or Assessment[b]	Maximum Estimated Inhalation Cancer Risk	NEI Reporting Year[c]	Distance to from Census Block Centroid to Release Point Contributing Highest Risk (m) [d]
Disposal to Non-POTW WWT	1.73E−07	2017	499
Remediation	9.06E−09	2020	590
Facilities Not Mapped to an OES – Miscellaneous	4.60E−07	2020	1,473
Facilities Not Mapped to an OES – Impurity in Plastics	2.63E−10	2017	1,431
Facilities Not Mapped to an OES – Combustion Related to Non-OES	1.63E−08	2020	50

HEM5.0 = Human Exposure Model Version 5; OES = occupational exposure scenario; NEI = National Emissions Inventory; POTW = publicly owned treatment works; WWT = wastewater treatment; Cancer Risk Benchmark = 1E−04 to 1E−06

[a] HEM5.0 calculates a maximum individual risk, which is equivalent to the highest cancer risk for any populated receptor modeled. When calculating cancer risk, HEM5.0 assumes that an individual breathes the ambient air at a given receptor site 24 hours per day over a 70-year lifetime.

[b] The risks estimates in this table are aggregated across all modeled facilities; therefore, a census block can be impacted by multiple facilities from multiple OESs. Each census block was mapped to an OES based on the OES of the facility that contributed the most risk at that census block.

[c] All releases reported to NEI from 2017 and 2020 were used as inputs for HEM5.0. This year in the column is the release year associated with the maximum inhalation cancer risk across all years.

[d] Multiple release locations can contribute to risk at a census block. The distance (m) shown in this table is the distance from the census block centroid with the highest estimated cancer inhalation risk to the release location that contributes the highest risk. It is possible that there are releases closer than the reported distance.

5.3.4.1.2 Estimated General Population Acute Non-Cancer Risks via Ambient Air Using HEM5.0

For this analysis, acute concentrations were only calculated based on the 95th percentile of the daily concentrations at each receptor. Daily concentrations were calculated for each receptor, resulting in 365 daily concentrations. In this evaluation, only the 18th highest of the 365 daily concentrations was an output of HEM5.0, which equates to approximately the 95th percentile. Table 5-28 shows the acute inhalation risk estimate closest to the benchmark of 30 for each OES based on the acute concentrations at census block centroids using both TRI and NEI release data. The OES of Commercial Use as a Laboratory Chemical showed the highest estimated risk (lowest MOE) based on NEI release data, with a value of 1.55×10^4. The OES of Manufacture showed the highest estimated risk (lowest MOE) based on TRI release data, with a value of 6.76×10^4. The analysis did not identify any populated census blocks with estimated acute inhalation risk below the benchmark. Acute risks estimations at polar receptors up to 50,000 m from the release locations were also calculated and are available in *Draft Supplemental Information on HEM TRI Exposure and Risk Analysis for 1,2-Dichloropropane* (U.S. EPA, 2026ad) and *Draft Supplemental Information on HEM NEI Exposure and Risk Analysis for 1,2-Dichloropropane* (U.S. EPA, 2026ac).

Table 5-28. Estimated Acute Inhalation Risk MOEs at Census Block Showing Most Risk Based on TRI[a] and NEI[b] Releases Using HEM5.0[c]

Occupational Exposure Scenario or Assessment	Acute Non-Cancer Inhalation Risk MOE based on TRI Releases (Benchmark = 30)	Acute Non-Cancer Inhalation Risk MOE Based on NEI Releases (Benchmark = 30)
Manufacture	6.76E04	7.57E07
Import-Repackaging	N/A	5.08E04
Processing as a Reactant	1.18E05	1.39E06
Processing Aid – Non-Incorporative Activities	1.12E05	6.37E05
Commercial Use as a Laboratory Chemical	N/A	1.55E04
Disposal to Incineration	3.80E08	6.81E05
Disposal to Landfill	N/A	6.10E04
Disposal to POTW	N/A	8.35E14
Disposal to Non-POTW WWT	N/A	9.35E07
Remediation	N/A	9.50E04
Facilities Not Mapped to an OES – Miscellaneous	N/A	2.77E05
Facilities Not Mapped to an OES – Impurity in Plastics	N/A	4.47E06
Facilities Not Mapped to an OES – Combustion Related to Non-OES	N/A	2.07E05

HEM5.0 = Human Exposure Model Version 5; OES = occupational exposure scenario; NEI = National Emissions Inventory; POTW = publicly owned treatment works; WWT = wastewater treatment

[a] For each OES, EPA modeled each total (fugitive + stack) annual TRI-reported release from each facility from 2019–2023.

[b] For NEI data, EPA used all data reported in 2017 and 2020 in this analysis.

[c] Risk estimates are shown for the populated census block within each OES that had the risk estimates closest to the benchmark. The risks estimated are based on the annual average concentration at the centroid of each census block. The estimated risks in this table are aggregated across all modeled facilities; therefore, a census block can be impacted by multiple facilities from multiple OESs. Each census block was mapped to an OES based on the OES of the facility that contributed the most estimated risk at that census block.

[d] HEM5.0 calculates a maximum individual risk, which is equivalent to the highest cancer risk estimate for any populated receptor modeled. When calculating cancer risk estimates, HEM5.0 assumes that an individual breathes the ambient air at a given receptor site 24 hours per day.

5.3.4.1.3 Estimated General Population Chronic Non-Cancer Risks via Ambient Air Using HEM5.0

For this analysis, chronic non-cancer inhalation risks were calculated using annual average concentrations for each receptor. Table 5-29 shows the estimated chronic non-cancer inhalation MOEs closest to the benchmark of 30 for each OES based on annual average concentrations at census block centroids using both NEI and TRI release data. Based on NEI release data, the OES of Processing as a Reactant had the lowest estimated MOEs, with a value of 409. The OES of Manufacture had the lowest estimated MOE based on TRI releases, with a value of 1,447. The analysis did not identify any populated census blocks with chronic non-cancer risk estimated below the benchmark MOE.

Table 5-29. Estimated Chronic Non-Cancer Risk MOEs at Populated Census Block Showing Most Risk Based on TRI[a] and NEI[b] Releases Using HEM5.0[c]

Occupational Exposure Scenario or Assessment	Chronic Non-Cancer Inhalation Risk MOE Based on TRI Releases (Benchmark = 30)	Chronic Non-Cancer Inhalation Risk MOE Based on NEI Releases (Benchmark = 30)
Manufacture	1,447	1,370
Import/Processing	N/A	2.12E04
Processing as a Reactant	1.36E04	409
Processing Aid – Non-Incorporative Activities	1,952	1.58E04
Commercial Use as a Laboratory Chemical	N/A	2.64E13
Disposal to Incineration	3.39E05	2.44E06
Disposal to Landfill	N/A	2,486
Disposal to POTW	N/A	8,466
Disposal to Non-POTW WWT	N/A	5,351
Remediation	N/A	1.02E05
Facilities Not Mapped to an OES – Miscellaneous	N/A	2,007
Facilities Not Mapped to An OES – Impurity in Plastics	N/A	3.51E06
Facilities Not Mapped to an OES – Combustion Related to Non-OES	N/A	5.65E04

HEM5.0 = Human Exposure Model Version 5; OES = occupational exposure scenario; NEI = National Emissions Inventory; POTW = publicly owned treatment works; TRI = Toxics Release Inventory; WWT = wastewater treatment
[a] For each OES, EPA modeled each total (fugitive + stack) annual TRI-reported release from each facility from 2019–2023.
[b] For NEI data, EPA used all data reported in 2017 and 2020 in this analysis.
[c] Risks are shown for the populated census block within each OES that had the risk closest to the benchmark. The risks are based on the annual average concentration at the centroid of each census block. The risks in this table are aggregated across all modeled facilities; therefore, a census block can be impacted by multiple facilities from multiple OESs. Each census block was mapped to an OES based on the OES of the facility that contributed the most risk at that census block.

5.3.4.1.4 Estimated General Population Cancer and Non-Cancer Risks for Generic Facilities/Sites Using IIOAC

EPA used the IIOAC-modeled results to assess OESs that relied on estimated releases from generic facilities/sites; that is, Commercial Use as a Laboratory Chemical (OES #5). EPA used the IIOAC-modeled concentrations, as described in Section 5.1.3.1, to derive acute, chronic non-cancer, and lifetime cancer risk estimates.

Hazard values used to calculate risk estimates are described in the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u). MOEs and lifetime cancer risk estimates were calculated at each distance (100, 100–1,000, and 1,000 m) using the 50th and 95th percentile IIOAC-modeled ambient air concentrations as conservative exposure estimates for each OES that relied on EPA estimated releases from generic facilities/sites. See Appendix F for risk estimates.

All non-cancer risk estimates were above the non-cancer benchmark for both acute and chronic exposures based on stack and fugitive modeled releases. Also, no cancer risk estimates resulted in cancer risk estimates above 1×10^{-6} (1 in a million; see Appendix F for risk estimates). Exposure concentrations, acute non-cancer, chronic non-cancer, and cancer risk estimates based on IIOAC-modeled results for the OESs that relied on releases from generic facilities/sites; that is, Commercial Use as a Laboratory Chemical (OES #5) are presented in the *Draft Integrated Indoor Outdoor Air Calculator (IIOAC) Generic Releases Exposure and Risk Analysis for 1,2-Dichloropropane* (U.S. EPA, 2026v).

5.3.4.1.5 Characterization and Summary of Risk via Inhalation of Ambient Air for the General Population

This section provides an overview of the factors used to estimate the cancer and non-cancer risks to the general population, with each major factor being described in its own subsection.

Releases

For modeling of ambient air concentrations, OESs fell into one of the following categories:

- OESs for which there were only facility reported releases (Manufacture; Import/Processing – Repackaging; Processing Aid – Non-Incorporative Activities; Disposal to Incineration; Disposal to Landfill; Disposal to POTW; Disposal to Non-POTW; and Remediation); and
- OESs for which there were both modeled releases from generic facilities/sites and reported releases (Commercial Use in Laboratory Chemicals)

EPA modeled ambient air concentrations using release data from TRI and NEI for this analysis as described in the *Draft Chemistry, Fate, Release and Exposure Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026e).

EPA considered TRI release data from the years 2019 to 2023 for this analysis. For each facility, EPA used all reported releases from all years. TRI releases were categorized into four OESs. Concentrations were modeled for both fugitive and stack emissions. TRI data reported on a total facility basis. That is, each facility reports one emission rate even if there are multiple emissions locations (stack or fugitive) at the facility. For facilities reporting both stack and fugitive emissions, modeled concentrations from both types of emissions were added together to determine a total concentration of 1,2-dichloropropane in the ambient air at the distances evaluated specific to each OES. TRI reporters may report with either Form A or Form R. To use Form A, reporters must release less than 500 lb/year and facilities do need to report release quantities or uses/sub-uses on Form A. Due to uncertainties in the actual amount released by Form A reporting facilities, EPA included only TRI Form R submissions in this analysis.

For NEI data, EPA used data reported in 2017 and 2020 in this analysis. EPA modeled all reported releases across both reporting years for this analysis. Concentrations and risks reported at the census block level in this draft risk evaluation are aggregated across all release points.

For OESs where release data were not available or limited (*i.e.,* Commercial Use as a Laboratory Chemical), EPA use alternative release estimates, as described in the *Draft Chemistry, Fate, Release and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e), to estimate ambient air concentrations around a generic facility/site.

Modeling Methodologies

EPA used two modeling approaches to estimate ambient air concentrations resulting from releases of 1,2-dichloropropane: IIOAC to model concentrations at user-defined distances (discrete and area distances) and HEM5.0 to model concentrations at the centroids of census blocks and polar receptors up to 50,000 m of each release location. HEM 5.0 has two components, (1) an atmospheric dispersion model—American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD)—with included meteorological data; and (2) U.S. Census Bureau population data at the block level. The HEM5.0 version uses 2020 Census data—including all 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. AERMOD has been peer reviewed as part of the regulatory model process described in Appendix W to 40 CFR part 51. HEM5.0 was developed by EPA's Office of Air and Radiation (OAR) and runs AERMOD as a compiled executable program to model ambient air concentrations. HEM5.0 was used in a fit for purpose matter for this 1,2-dichloropropane risk evaluation. Furthermore, AERMOD has undergone testing and validation in comparing predicted and measured air concentrations and has been externally peer reviewed (Cimorelli et al., 2018).

EPA used IIOAC for one OES that had EPA estimated releases from generic facility/site (*i.e.,* Commercial Use as a Laboratory Chemical) because it has assumed release location. The IIOAC Model has limitations regarding which input can be modified and which cannot. Since it is based on pre-run scenarios within AERMOD, certain default parameters (*e.g.*, stack characteristics and 2011–2015 meteorological data) are predefined. Certain parameters like building dimensions, release elevation, and land use cannot be considered by the IIOAC Model. Overall, EPA has moderate confidence that the conservative assumptions used in the IIOAC for the ambient air exposure scenario modeled represent a high-end estimate. EPA has moderate confidence in the IIOAC modeling approach. The moderate confidence in the IIOAC Model was based on the use of conservative inputs and the reliance on assumed model input parameters.

Release Site Physical Characteristics Input Data

For 10 of the OESs evaluated in this assessment, EPA has site-specific, facility-reported releases available for use as direct inputs to HEM5.0. Availability of facility-reported data allows for the use of site-specific information—such as facility location and stack height—as model inputs. HEM5.0 uses the latitude/longitude information reported by each facility to TRI as the location for the point of release. Although this may generally be a close approximation of the release point for a small facility (*e.g.,* a single building), it may not represent the release point within a much larger facility. Therefore, there is some uncertainty associated with the modeled distances from each release point and the associated concentrations—especially for communities that may live near release sites. The TRI-reported data used for HEM5.0 do not include source-specific stack parameters that can affect plume characteristics and associated dispersion of the plume. Thus, EPA used pre-defined stack parameters within IIOAC to represent stack parameters of all facilities modeled using each of these methodologies. Those stack parameters include a stack height 10 m above ground with a 2-meter inside diameter, an exit gas temperature of 300 K, and an exit gas velocity of 5 m/s (see Table 6 of the IIOAC User Guide). These parameters were selected because they represent a slow-moving, low-to-the-ground plume with limited dispersion that results in a more conservative estimate of concentrations at the distances evaluated. As such, these parameters may result in some overestimation of emissions for certain modeled facilities. Contrary to the TRI-reported data, some of the data reported to the NEI that was used for modeling with HEM5.0 include source-specific stack parameters. Therefore, specific parameter values were used in modeling, when available.

When parameters were not available or values were reported outside of normal bounds, reported values were replaced as outlined in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-*

Dichloropropane (U.S. EPA, 2026e). Therefore, due to the uncertainty in some of the model input parameters, EPA has moderate confidence in the model input data used for HEM5.0 for OESs with facility-reported releases.

For four OESs, EPA estimated releases from generic facilities/sites to estimate exposures for ambient air. The Agency's modeling from generic facilities/sites required assumptions concerning release, location, meteorological data, land cover parameters, stack parameters, and fugitive release area. Each of these assumptions introduces uncertainties that lower the overall confidence relative to releases with site-specific data. Additional uncertainties that lower the overall confidence in ambient air exposures for these OESs are associated with the development of the generic release scenarios and are discussed in Section 3.2. The Agency has slight confidence in the input parameters used to estimate exposures to ambient air when using EPA-estimated releases from generic facilities/sites.

Exposure Scenarios and Exposure Factors

For the analysis using IIOAC, EPA assumed a 78-year lifespan and a constant exposure over an entire lifetime (U.S. EPA, 2011). An exposure duration of 78 years when calculating lifetime exposures was assumed to be protective of PESS group and communities that are located near releasing facilities. Note that the assumption of 78 years of exposure does not necessarily indicate that people are stagnant; rather, it is meant to characterize anyone that resides, works, or remains, within approximately the same distance from a facility for their entire life. It is also consistent with previous recommendations from the SACC (U.S. EPA, 2023c). The default scenario in HEM5.0 assumes an exposure duration of 70 years and a lifetime of 70 years. For both the HEM5.0 and IIOAC analyses, the averaging time and exposure time are the same, which means the risks calculated using both models can be directly compared. Overall, the assumption of a constant exposure over a lifetime of either 70 or 78 years is a conservative assumption that will result in high-end risk estimates. Additionally, for the purposes of this draft risk evaluation, EPA is assuming that indoor air concentrations are equal to the 1,2-dichloropropane ambient air concentrations from releasing facilities.

Population Characterization and Risk Estimates Using HEM5.0

HEM5.0 was used to characterize the general population living near facilities releasing 1,2-dichloropropane. For cancer and chronic non-cancer risks calculated at census block centroids, which is a single discrete location, the risks are calculated using the annual average concentrations (daily averages that are averaged across 365 days). For acute non-cancer risks, values are calculated using the 18th highest of the 365 daily averages, which equates to approximately the 95th percentile. All risk estimates account for local meteorological conditions and conditions such as the prevailing winds. The census block-level analysis using HEM5.0 provides the total population with cancer risk estimates above 1×10^{-4}, 1×10^{-5}, and 1×10^{-6} (Section 5.3.4.1.1). Table 5-26 and Table 5-27 show the distance from the releasing facility to the census block with the highest cancer risk per OES. A census block can be affected by multiple facilities or facilities from different OESs. Each census block was mapped to an OES based on the OES of the facility that contributed the most risk at that census block. Only one census block centroid had an inhalation cancer risk estimate above 1×10^{-6}. The centroid was 112 m from the nearest release point and the census block had a population of 232 people. The analysis did not identify and census block centroids with cancer risk estimates greater that 1×10^{-5}. The analysis also did not identify and census block centroids with acute or chronic non-cancer risks below the benchmarks.

The population analysis represents a highly refined approach, but EPA acknowledges that these risks are based on census block centroids and that the population distribution within each census block is not well characterized; therefore, these population estimates would be overestimations if people live farther from the release point than the centroid.

Estimated Cancer Incidence Due to Ambient Air Inhalation of 1,2-Dichlorpropane by the General Population

EPA calculated additional cancer incidence rates based on the HEM5.0 results for the population with estimated cancer risks exceeding 1×10^{-6}. When using NEI-reported releases for the year 2017, there were 232 people with an estimated cancer risk of 2.26×10^{-6}. By multiplying the risk and the population, the estimated additional lifetime cancer incidence is 5.24×10^{-4}. Assuming a 70-year lifetime, the annual estimated additional cancer incidence is 7.49×10^{-6}. The only facility contributing to an estimated cancer risk greater than 1×10^{-6} is associated with the OES of Processing as a Reactant.

Estimated Acute and Chronic Non-Cancer Ambient Air Inhalation Risks

For estimated acute and chronic non-cancer risks using HEM5.0, EPA did not identify any populated census blocks with risk estimates below the benchmark MOEs of 30.

5.3.4.1.6 Overall Confidence in the Ambient Air Risk Estimates

For the ambient air pathway, EPA provides an OES-specific risk characterization that is based on the lines of evidence available for each OES (Table 5-30). This section also provides overarching characterizations of each line of evidence that feed into the OES-specific characterization. Across all OESs, EPA relied on and has robust confidence in the non-cancer and cancer inhalation hazard values that are based on the weight of scientific evidence across a number of studies.

1,2-Dichloropropane ambient air concentrations were estimated using either facility release data reported in TRI and NEI corresponding to COUs or EPA-estimated releases for generic facilities/sites. The Agency used high-end release data based on TRI release data from 2019 to 2023 and NEI release data from 2017 and 2020 (see Section 3.2 for additional information). Additionally, EPA used HEM5.0 to characterize populations living near releasing facilities (see Sections 3.3.1 and 5.1.3.1 for additional information).

The population analysis performed using HEM5.0 is based on the centroids of census blocks. HEM5.0 does not provide population distribution within a census block and individuals within a census may live closer to or farther from the 1,2-dichloropropane-releasing facility than the centroid. Additionally, the current population analysis does not account for future residential land use changes or population shifts. Because EPA used TRI and NEI release data that cover multiple years, EPA has robust confidence that the analysis performed in this evaluation has captured high-end releases that affect populations living nearest to releasing facilities that are exposed to 1,2-dichloropropane in the ambient air.

Overall, EPA has robust confidence in risk estimates that were calculated using release data reported to both TRI and NEI release data, and that the risks are representative of actual exposures to the general population living near releasing facilities. The robust confidence is based on high levels of confidence in underlying release information used to estimate exposures, the completeness of the datasets modeled, and the modeling methods used. The use of both NEI and TRI data provides a complete and robust dataset. The use of HEM5.0 also allowed for the characterization of populations living near facilities and provided strong evidence for distances that are most relevant for general population exposure.

Additionally, overall, the Agency has moderate confidence in risk estimates that relied on EPA-estimated releases from generic facilities/sites. Although EPA has robust confidence in the methodology used to calculate ambient air concentrations, the uncertainties in release estimates and lack of site-specific data resulted in overall moderate confidence in the risk estimates. For OESs where the Agency had facility-reported releases and EPA-estimated releases for generic facilities/site, the Agency preferred risks calculated using reported releases due to the uncertainties associated with the estimated releases.

Table 5-30. Confidence in Each Line of Evidence and Overall Confidence for Each OES

OES	Data Source	Overall Confidence
Manufacture	TRI and NEI	For this OES, EPA used facility-reported releases from TRI and NEI to estimate risks using HEM5.0. The use of both NEI and TRI databases provides robust confidence that EPA captured high-end releases across the years assessed in this evaluation. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below the relevant benchmark. Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
Import – Repackaging	NEI	For this OES, EPA used facility-reported releases from NEI to estimate risks HEM5.0. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below the benchmark. Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
Processing as a Reactant	TRI and NEI	For this OES, EPA used facility-reported releases from TRI and NEI to estimated risks using HEM5.0. The use of both NEI and TRI databases provides robust confidence that EPA captured high-end releases across the years assessed in this evaluation. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below the relevant benchmark. Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
Processing Aid – Non-Incorporative Activities	TRI and NEI	For this OES, EPA used facility-reported releases from TRI and NEI to estimated risks using HEM5.0. The use of both NEI and TRI databases provides robust confidence that EPA captured high-end releases across the years assessed in this evaluation. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below the relevant benchmark. Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
Commercial Use as a Laboratory Chemical	NEI and EPA estimated releases from generic facilities/sites	For this OES, EPA used facility-reported releases from NEI to estimate risks HEM5.0. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below

OES	Data Source	Overall Confidence
		the benchmark. Additionally, due to the limited number of facility-reported releases, the Agency calculated risk estimates for EPA-estimated releases from generic sites/facilities using IIOAC. Due to the uncertainties in these releases, EPA has slight confidence in the accuracy of the risk estimates for generic facilities/sites and is relying on risks calculated using facility-reported releases; however, the estimated risks from the generic/facilities likely represent high-end estimations. Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
Disposal to Incineration	TRI and NEI	For this OES, EPA used facility-reported releases from TRI and NEI to estimated risks using HEM5.0. The use of both NEI and TRI databases provides robust confidence that EPA captured high-end releases across the years assessed in this evaluation. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below the relevant benchmark. Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
Disposal to Landfill	NEI	For this OES, EPA used facility-reported releases from NEI to estimate risks HEM5.0. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below the benchmark. Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
Disposal to POTW	NEI	For this OES, EPA used facility-reported releases from NEI to estimate risks HEM5.0. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below the benchmark. Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
Disposal to Non-POTW WWT	NEI	For this OES, EPA used facility-reported releases from NEI to estimate risks HEM5.0. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below the benchmark.

OES	Data Source	Overall Confidence
		Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
Disposal to Remediation	NEI	For this OES, EPA used facility-reported releases from NEI to estimate risks HEM5.0. A strength of NEI data are that NEI captures additional sources that are not included in TRI due to reporting thresholds. The use of HEM5.0 to model risks at census block centroids provides robust confidence that there are no populations that are exposed to ambient air concentrations that would result in inhalation cancer risk estimates >1 in a million (1E−06) or non-cancer risk estimates below the benchmark. Based on the overall weight of evidence, the Agency has robust confidence in the risk estimates and that the estimated risks are protective of actual exposures to the general population living near releasing facilities.
EPA = Environmental Protection Agency; HEM5.0 = Human Exposure Model version 5.0; IIOAC = Integrated Indoor-Outdoor Air Calculator; NEI = National Emissions Inventory; OES = occupational exposure scenario; TRI = Toxics Release Inventory		

5.3.4.2 General Population Oral Risk Estimates

Risk Estimates for Incidental Oral via Swimming

As described in Section, EPA estimated general population incidental oral exposures to 1,2-dichloropropane from swimming in streams that have received facility-specific releases of 1,2-dichloropropane. The COU/OES of Waste Handling, Treatment, and Disposal (POTW) resulted in the greatest exposure and represents a high-end exposure to 1,2-dichloroprpane. The risk estimates associated with this OES is 1.9×10^{5} for acute incidental oral exposures and is well above the benchmark of 30. EPA has robust confidence that the high-end risk estimate represents risks above the benchmark and incidental oral exposures from other OESs surface waters would represent lower risks.

Risk Estimates for Drinking Water

As described in Section 5.1.3.3.2, EPA estimated 1,2-dichloropropane concentrations in surface waters at the point of drinking water treatment system intakes within 250 km of a facility releasing 1,2-dichloropropane. Further than 250 km, the Agency considered the dilution of 1,2-dichloropropane to be sufficient to reach such low concentrations as to potentially reach the limit of detection. As screening for drinking water risks, EPA estimated risk estimates associated with potential infant drinking exposures of the 1,2-dichloropropane as infants have higher exposures given their drinking water ingestion (as assumed for formula-fed infants) relative to body weight is greater than other age groups. The acute drinking water risks of 1.8×10^{5} are estimated for bottle-fed infant exposures and the chronic infant risk estimates is 2.3×10^{6}, both of which are well above the benchmark margin of exposure of 30. The cancer risk estimate based on lifetime exposure is 8.6×10^{-8}, which is significantly lower than the cancer risk benchmark of 1×10^{-6}.

EPA has robust confidence that the risks associated with drinking water exposures to 1,2-dichloropropane from releases of 1,2-dichloropropane to surface waters are representative of risks from COUs. The location-specific release information together with intake locations provide robust estimates. In addition, EPA has confidence that the levels of 1,2-dichloropropane from surface water releases is not higher than levels provided by drinking water treatment system monitoring after treatment and before distribution.

Risk Estimates for Fish Ingestion

As a screening analysis, EPA used the highest 1,2-dichloropropane surface water concentration for the Waste Handling, Treatment, and Disposal (POTW) OESs to estimate the high-end oral risk estimates from exposures via fish ingestion for general population across several life stages as well as subsistence fishing populations. EPA also estimated tribal fish ingestion risks from exposures of facility discharges on tribal lands, specifically the Navajo Nation.

Calculations and estimates are presented in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) and in the Supplemental File (U.S. EPA, 2026r). For adult subsistence fishers the highest Waste Handling, Treatment, and Disposal (POTW) OESs acute risk was 5.4×10^{4} and chronic risk was 5.1×10^{5}. For tribal fishers and with the consideration of higher tribal fish consumption rates, the corresponding acute and chronic risks were 4.2×10^{4} and 6.7×10^{4}, resulting from releases specifically on tribal lands. EPA has robust confidence that the non-cancer risk estimates are well above the benchmark of 30 as the basis of the risk estimate is facility-specific release data and receiving water body surface water concentrations.

Risk Estimates from Groundwater Exposures

Evaluation of potential drinking water exposures from landfill-impacted groundwater followed a tiered approach where if preliminary indications of risk were identified at initial tiers of analysis, then higher tiers or refined analyses were evaluated when possible.

Table 8-1 in Section 8.3.2 of *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) shows estimated groundwater concentrations of groundwater impacted by landfill leachate. These concentrations were used to estimate drinking water doses as shown in Table 8-2, 8-3, and 8-4 in Section 8.3.3 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* TSD (U.S. EPA, 2026e).

Estimated groundwater concentrations and drinking water exposures from leachate impacted groundwater were evaluated and presented for chronic non-cancer exposure in Section 7.3.2 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e) with full results presented in the *Draft Predicted Groundwater Concentrations, Exposure and Risks from Releases to Landfills for 1,2-Dichloropropane* (U.S. EPA, 2026aa). The estimated groundwater concentrations are combined with upper percentile drinking water ingestion rates for each evaluated age group to arrive at potential doses.

Estimated average daily doses across age groups were 7.43×10^{-13} to 1.58×10^{-5} mg/kg-day while estimated lifetime average daily doses ranged from 7.43×10^{-13} to 6.18×10^{-6} mg/kg-day, based on a groundwater concentration of 5.62×10^{-4} mg/L. Associated MOEs related to the average daily doses ranged from 1.71×10^{6} to 3.63×10^{13}, which are all at least 5,700 times greater than the benchmark cancer of 300 and indicate no identified risk below the benchmark for the chronic non-cancer drinking water pathway (see Table 5-31 and Table 5-32). Associated cancer risks related to the lifetime average daily doses (LADD) ranged from 2.97×10^{-14} to 2.47×10^{-7}, which are all at least 4 times less than 1×10^{-6} and indicate no risk above the benchmark for the cancer drinking water pathway (Table 5-33). Given the uncertainties in the groundwater estimates and the conservative assumptions (loading rates and leachate concentrations far above reported values), EPA has moderate confidence in the accuracy of the risk estimates and moderate confidence that the estimates represent high-end exposure scenarios.

Table 5-31. Chronic Non-Cancer Risk Estimates for Adults Exposed to Landfill Leachate-Impacted Groundwater (Benchmark MOE = 300)

Leachate Concentration (mg/L)	Loading Rate (kg/yr)				
	0.1	1	10	100	1,000
0.1	3.63E13	3.81E12	3.98E11	4.17E10	4.37E09
1	3.63E12	3.81E11	3.98E10	4.17E09	4.37E08
10	3.63E11	3.81E10	3.98E09	4.17E08	4.37E07
100	3.63E10	3.81E09	3.98E08	4.17E07	4.37E06

Table 5-32. Chronic Non-Cancer Risk Estimates for Infants Exposed to Landfill Leachate-Impacted Groundwater (Benchmark MOE = 300)

Leachate Concentration (mg/L)	Loading Rate (kg/yr)				
	0.1	1	10	100	1,000
0.1	1.42E13	1.49E12	1.56E11	1.63E10	1.71E09
1	1.42E12	1.49E11	1.56E10	1.63E09	1.71E08
10	1.42E11	1.49E10	1.56E09	1.63E08	1.71E07
100	1.42E10	1.49E09	1.56E08	1.63E07	1.71E06

Table 5-33. Cancer Risk Estimates for Adult Exposed to Landfill Leachate-Impacted Groundwater (Benchmark Cancer Risk = 1×10^{-6})

Leachate Concentration (mg/L)	Loading Rate (kg/yr)				
	0.1	1	10	100	1,000
0.1	2.97E−14	2.84E−13	2.71E−12	2.59E−11	2.47E−10
1	2.97E−13	2.84E−12	2.71E−11	2.59E−10	2.47E−09
10	2.97E−12	2.84E−11	2.71E−10	2.59E−09	2.47E−08
100	2.97E−11	2.84E−10	2.71E−09	2.59E−08	2.47E−07

Overall confidence in risk estimates for drinking water exposure to 1,2-dichloropropane in landfill leachate impacted groundwater is moderate. This reflects moderate confidence in the exposure estimates generated using the DRAS Model. DRAS based exposure estimates were used to estimate risks because of the uncertainty associated with identifying the source of 1,2-dichloropropane in groundwater (*i.e.,* current vs. legacy uses). Remaining uncertainty in the exposure estimates arises from the underlying basis of the DRAS Model, which relies in part on an older survey of drinking water wells located down gradient from waste management units (U.S. EPA, 1988). It is unclear how well this survey reflects current conditions, the proximity of wells to waste disposal units, or whether the surveyed units are representative of current waste management practices.

5.3.4.3 General Population Dermal Risk Estimates

EPA assessed the general population risk estimates resulting from incidental dermal exposures from swimming in receiving waters from releases of 1,2-dichloropropane. Associated MOEs related to these doses ranged from 3.9×10^4 to 2.3×10^7, which are all greater than the benchmark MOE of 30 and indicate no further refinement is needed for risk estimation. EPA has robust confidence in these estimates as they are based on the high-end scenario of available facility-specific releases and the Agency's robust confidence in the surface water concentration that underlies the risk estimates.

5.3.5 Risk Characterization for Potentially Exposed or Susceptible Subpopulations

For this draft risk evaluation, EPA considered information that could support increased exposure or biological susceptibility compared to the general population (see Table 5-11 for full list of factors). EPA was able to incorporate considerations for multiple PESS factors into risk estimates, as presented in Table 5-11. PESS factors were identified as part of the evaluation of environmental hazards from the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u) (see Section 2.6). EPA may have considered these through the use of exposure factors, uncertainty factors, and PESS group-specific data. In some cases, information on PESS factors may have supported the weight of scientific evidence for a particular hazard or exposure value. For other factors, EPA was either unable to identify relevant chemical-specific data or could not adequately quantify their contribution. These are addressed in detail in the corresponding hazard and exposure assessment support documents and supplemental files.

Table 5-34. Summary of PESS Factors Incorporated into Risk Estimates

PESS Factor	Potential Increased Exposures Incorporated into Exposure Assessment	Sources of Uncertainty for Exposure Assessment	Potential Sources of Biological Susceptibility Incorporated into Hazard Assessment	Sources of Uncertainty for Hazard Assessment
Life stage	• Life stage-specific exposure scenarios included infants exposed through bottle feeding using drinking water. • Exposure factors by age group were applied to calculate exposure from drinking water, fish ingestion, incidental oral and incidental dermal. In addition, youth life stages were considered for dermal exposures from use of 1,2-dichloropropane-containing consumer stone polishing or stone cleaning products.	• EPA exposure assessment is based on facility-specific ambient air and surface water release data which provides high confidence in the and exposure estimates and the applicability to various life stages.	• EPA incorporated life stage susceptibility into hazard values for intermediate and chronic exposure scenarios with selection of a maternal endpoint measured in rabbits exposed during gestation. • EPA applied a 10× UF for human variability.	• The magnitude of toxicokinetic differences across life stages is not well characterized.
Pre-existing disease	• EPA did not identify health conditions that may influence exposure to 1,2-dichloropropane	• EPA lacks specific data regarding the location of pre-existing conditions and exposures to 1,2-dichloropropane.	• EPA did not identify evidence of pre-existing disease or disorder that may modify susceptibility to 1,2-dichloropropane. • Any pre-existing condition affecting a target organ may increase susceptibility to 1,2-dichloropropane in that organ. In the absence of quantitative information on how specific health conditions may contribute to susceptibility, a 10 × UF_H was applied for human variability.	• The effects of pre-existing diseases or toxicokinetic differences on 1,2-dichloroprone hazards is not well characterized.
Lifestyle activities	• EPA identified tribal lifestyle factors that may influence exposure to 1,2-dichloropropane	• EPA has incorporated tribal fish consumption levels in estimating exposures and risks to 1,2-dichloropropane from fish ingestion.	• EPA did not identify lifestyle activities that may modify susceptibility to 1,2-dichloropropane • Potential susceptibility due to smoking, alcohol consumption, and physical activity was addressed through a 10× UF for human variability.	• The effects of lifestyle activities on 1,2-dichloroprone hazards is not well characterized.
Occupational and consumer exposures	• EPA evaluated risks for both central tendency and high-end exposure estimates for workers and for low-, medium-, and high-intensity use scenarios for consumers	• EPA has robust confidence on the consumer use and activity patterns associated with 1,2-	• Print shop workers in a single Japanese cohort and in an occupational survey in Europe	• The effects of occupational 1,2-dichloropropane are limited by exposure

PESS Factor	Potential Increased Exposures Incorporated into Exposure Assessment	Sources of Uncertainty for Exposure Assessment	Potential Sources of Biological Susceptibility Incorporated into Hazard Assessment	Sources of Uncertainty for Hazard Assessment
		dichloropropane- containing consumer products.	reported higher incidences of cancers • Potential susceptibility due to occupational exposure was addressed through a 10× UF for human variability.	characterization and co-exposures.
Geography/ site-specific	• EPA's general population exposure assessment relied on facility site-specific data as reported to TRI, NEI and DMR databases.	• EPA has robust confidence in the site-specific 1,2-dichloropropane release data and its spatial relevance to general population inhalation, oral and dermal exposures	• EPA did not identify geographic factors that may modify susceptibility to 1,2-dichloropropane	• Not applicable
Socio-demographic status	• EPA did not identify sociodemographic factors that may influence exposure to 1,2-dichloropropane	• EPA did not utilize any relevant sociodemographic data for the 1,2-dichloropropane exposure assessment	• Sex-specific differences were observed in rodents following inhalation or oral exposure to 1,2-dichloropropane • Potential susceptibility due to sex differences were addressed by selecting the most biologically relevant endpoint from rodent assays for dose-response analysis	• The sex-specific differences in rodents are not well characterized.
Nutrition	• EPA did not identify nutritional factors that may influence exposure to 1,2-dichloropropane	• EPA lacked any nutrition data that could impact the 1,2-dichloropropane exposure assessment.	• Increased hazard ratio for breast cancer risk was reported in individuals with a higher BMI and studies indicated a preferential 1,2-dichloropropane in adipose tissue. • Potential susceptibility due to increased body burden of 1,2-dichloropropane was addressed through a 10× UF for human variability.	• The effects of 1,2-dichloroprone accumulating in adipose tissue are not well characterized.
Genetics/ epigenetics	• EPA did not identify genetic factors that may influence exposure to 1,2-dichloropropane	• Not considered	• Genetic polymorphisms impacting glutathione levels (*e.g.,* an inherited glucose-6-phosphate dehydrogenase deficiency) may increase	• The effects of genetics/epigenetics on 1,2-dichloroprone hazards is not well characterized.

PESS Factor	Potential Increased Exposures Incorporated into Exposure Assessment	Sources of Uncertainty for Exposure Assessment	Potential Sources of Biological Susceptibility Incorporated into Hazard Assessment	Sources of Uncertainty for Hazard Assessment
			susceptibility to 1,2-dichloropropane toxicity (*e.g.,* hemolytic anemia). • Potential susceptibility due to toxicodynamic or toxicokinetic differences was addressed through a 10× UF for human variability.	
Unique activities	• Not considered	• Not considered	• EPA did not identify specific activities that may modify susceptibility to 1,2-dichloropropane	• Not applicable
Aggregate exposures	• EPA aggregated acute incidental oral, incidental dermal and fish ingestion exposures associated with the highest POTW release location • EPA aggregated inhalation exposures across all modeled facilities at a populated census block	• EPA did not consider other aggregation pathways such as downstream release locations • A census block can be impacted by multiple facilities from multiple OESs	• Not applicable	• Not applicable
Other chemical and non-chemical stressors	• EPA did not consider other chemical and non-chemical stressors that may influence exposure to 1,2-dichloropropane	• Not considered	• EPA did not identify chemical and non-chemical stressors that may modify susceptibility to 1,2-dichloropropane. • Potential susceptibility due to built environments, social environments, and chemical co-exposures was addressed through a 10× UF for human variability	• The effects of chemical and non-chemical stressors on 1,2-dichloroprone hazards is not well characterized.

BMI = body mass index; DMR = Discharge Monitoring Report; NEI = National Emissions Inventory; PESS = potentially exposed or susceptible subpopulations; POTW = publicly owned treatment works; TRI = Toxics Release Inventory; UF = uncertainty factor

4237
4238

5.3.6 Risk Characterization for Aggregate and Sentinel Exposures

EPA defines aggregate exposure as "the combined exposures to an individual from a chemical substance across multiple routes and across multiple pathways (40 CFR 702.33)." EPA did not consider aggregate exposure scenarios across COUs because the Agency did not find any evidence to support such an aggregate analysis, such as statistics of populations using certain products represented across COUs or workers performing tasks across COUs. However, where biologically appropriate, EPA combined exposure across routes of exposure for general population and consumer COUs to calculate aggregate risks.

As discussed in Section 2.6.2 of the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u), EPA concluded that aggregation across routes could be biologically relevant for acute oral and dermal exposures. Therefore, the Agency considered aggregate scenarios where acute oral and dermal exposures could co-occur.

EPA conducted a screening analysis in aggregating exposures for acute oral and dermal exposure pathways. Specifically, the Agency aggregated the adult highest incidental acute oral, acute dermal and fish ingestion exposures from the Waste Handling, Treatment, and Disposal (POTW) OES. For adult the highest incidental acute oral exposure was from the Waste Handling, Treatment, and Disposal (POTW) OES at 3.7×10^{-5} mg/kg-day—the highest incidental acute dermal exposure from the same location was 8.6×10^{-6} mg/kg-day with the total aggregated adult acute exposures equal to 4.6×10^{-5} mg/kg-day. EPA further aggregated the acute oral fish ingestion at the POTW location with the total dose of 1.8×10^{-4} mg/kg-day. The associated non-cancer risk for this OES was 4.0×10^{4}, well above the benchmark of 30. EPA has robust confidence that this risk estimate represents the aggregated risk associated with high-end exposures.

Similarly, EPA aggregated the acute oral/dermal exposures from incidental oral, incidental dermal, and fish ingestion resulting from surface water releases on tribal lands. The Agency incorporated tribal-specific fish ingestion rates to characterize the traditionally higher fish consumption of fish. The aggregated adult high-end tribal exposures were 2.1×10^{-4} mg/kg-day and the associated non-cancer risk estimate is 3.5×10^{4}, well above the benchmark of 30. EPA has robust confidence that this estimate is representative of tribal risk associated with the high-end aggregated exposures from swimming and fish ingestion.

EPA defines sentinel exposure as "the exposure to a chemical substance that represents the plausible upper bound of exposure relative to all other exposures within a broad category of similar or related exposures (40 CFR 702.33)." In terms of this draft risk evaluation, EPA considered sentinel exposures by considering risks to populations who may have upper-bound exposures; for example, workers and ONUs who perform activities with higher exposure potential or consumers who have higher exposure potential or certain physical factors like body weight or skin surface area exposed. The Agency characterized high-end exposures in evaluating exposure using both monitoring data and modeling approaches. Where statistical data are available, EPA typically uses the 95th percentile value of the available dataset to characterize high-end exposure for a given COU. The 95th percentile is defined as an estimate of individual exposure or dose for those persons at the upper end of an exposure or dose distribution, conceptually above the 90th percentile, but not higher than the individual in the population who has the highest exposure or dose (*e.g.,* 99.9th percentile) (U.S. EPA, 1994). As the midpoint of that range, the 95th percentile was selected to be representative of occupational exposures in the upper tail of the distribution. For general population and consumer exposures, the Agency characterized sentinel

exposure by conducting a conservative analysis using elevated consumption rates, breathing rates, or user-specific factors that did not indicate risks.

6 UNREASONABLE RISK DETERMINATION

TSCA section 6(b)(4) requires EPA to conduct a risk evaluation to determine whether a chemical substance presents an unreasonable risk of injury to health or the environment, without consideration of costs or other non-risk factors, including an unreasonable risk to a PESS identified by the Agency as relevant to this draft risk evaluation, under the COUs.

EPA has preliminarily determined that 1,2-dichloropropane presents unreasonable risk of injury to human health. In this draft risk evaluation, 15 COUs were assessed for workers and occupational non-users (ONUs), consumers and bystanders, the general population (including PESS), and the environment. Fourteen of the 15 COUs assessed for 1,2-dichloropropane significantly contribute to unreasonable risk to human health (see Table ES-1 and Table ES-2). Of the 12 COUs assessed for workers and ONUs, 11 significantly contribute to a preliminary determination of unreasonable risk to workers due to both non-cancer and cancer effects for inhalation or dermal risks—including 4 COUs to ONUs due to both non-cancer and cancer effects for inhalation risk. Of the 15 total COUs assessed, all 3 COUs assessed for 1,2-dichloropropane significantly contribute to a preliminary determination of unreasonable risk to consumers due to acute non-cancer inhalation risks. Two COUs contribute to a preliminary determination of unreasonable risk to bystanders based on acute non-cancer inhalation risk. One COU also contributes to chronic non-cancer inhalation and dermal risk for consumers; cancer inhalation and dermal risk for consumers; and chronic non-cancer and cancer inhalation risks to bystanders.

EPA has preliminarily determined that no COU for 1,2-dichloropropane significantly contributes to unreasonable risk to the general population, including fenceline communities, or the environment.

This preliminary unreasonable risk determination is based on the information provided in previous sections of this draft risk evaluation and subsequent appendices, the draft TSDs, and supplemental files (see Appendix C)—in accordance with TSCA section 6(b). This preliminary unreasonable risk determination and the underlying evaluations are consistent with the best available science (TSCA section 26(h)) and based on the weight of scientific evidence (TSCA section 26(i)).

EPA notes that uses of 1,2-dichloropropane that are not subject to TSCA (*e.g.,* cosmetics, medical devices) and resulting in human or environmental exposure to 1,2-dichloropropane were not evaluated as COUs by the Agency because these uses are explicitly excluded from TSCA's definition of a chemical substance. Thus, it is not appropriate to extrapolate from this preliminary risk determination to form conclusions about uses of 1,2-dichloropropane that are not subject to TSCA and that EPA did not evaluate as COUs.

The full list of 15 COUs evaluated for 1,2-dichloropropane is presented in Table 1-1. EPA has preliminarily determined that the following 14 COUs (11 to workers, 4 to ONUs, and 3 to consumers/bystanders) significantly contribute to unreasonable risk to human health due to inhalation and/or dermal exposures:

- Manufacture – Domestic Manufacture [worker only – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks], see Section 6.1.3.1.1
- Manufacture – Import [worker only – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks], see Section 6.1.3.2.1

- Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing [worker only – acute, intermediate, chronic non-cancer, and cancer inhalation risks, as well as acute and cancer dermal risks], see Section 6.1.3.1.2
- Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing [worker only – acute, intermediate, chronic non-cancer and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks], see Section 6.1.3.1.2
- Processing – Repackaging [worker only – intermediate, chronic non-cancer, and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks], see Section 6.1.3.2.1
- Industrial Use – Non-Incorporative Activities – Processing Aids [worker only – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks], see Section 6.1.3.2.2
- Commercial Use – Other uses – Laboratory Chemicals [worker only – intermediate and chronic non-cancer inhalation risks], see Section 6.1.3.2.3
- Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Spray Cleaner [worker – acute non-cancer, chronic non-cancer, and cancer inhalation risks, as well as chronic non-cancer and cancer dermal risks; ONU – chronic non-cancer and cancer inhalation risks], see Section 6.1.3.3.1
- Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes [worker and ONU – acute non-cancer inhalation risk], see Section 6.1.3.3.1
- Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polish [worker and ONU – acute non-cancer inhalation risk], see Section 6.1.3.3.1
- Consumer Use – Cleaning and Furnishing Care Products – All-Purpose Liquid Spray Cleaner [consumer – acute non-cancer, chronic non-cancer, and cancer inhalation risks, as well as chronic non-cancer and cancer dermal risks; bystander – chronic non-cancer and cancer inhalation risks] see Section 6.1.4
- Consumer Use – Cleaning and Furnishing Care Products – All-Purpose Waxes and Polishes [consumer and bystander – acute non-cancer inhalation risk], see Section 6.1.4
- Consumer Use – Cleaning and Furnishing Care Products – All-Purpose Liquid Cleaner and Polish [consumer and bystander – acute non-cancer inhalation risk], see Section 6.1.4
- Disposal [worker – intermediate, chronic non-cancer, and cancer inhalation risks, as well as cancer dermal risk; ONU – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks], see Section 6.1.3.2.4.

EPA has preliminarily determined that the following COU does not significantly contribute to unreasonable risk of 1,2-dichloropropane to human health:

- Distribution in Commerce, see Section 6.1.3.4.1.

An unreasonable risk determination must be informed by best available science, and EPA considers risk-related factors beyond exceedance of benchmarks. Risk-related factors include the type and severity of health effects under consideration, the reversibility of the health effects being evaluated, exposure-related considerations (*e.g.,* duration, magnitude, frequency of exposure), or population exposed—particularly PESS—as well as the confidence in the information used to inform the hazard and exposure values. For COUs evaluated quantitatively, as described in the risk characterizations (see Sections 4 and 5), EPA based the preliminary determination of unreasonable risk of injury to human health or the environment on the risk estimate that best represents the COU. The Agency describes the strength of the scientific evidence supporting the human health and environmental assessments as robust, moderate-to-robust, moderate, slight-to-moderate, or slight.

This draft risk evaluation discusses important assumptions and key sources of uncertainty in the risk characterization; these are described in more detail in the respective weight of scientific evidence conclusions sections for fate and transport (Section 2.2), environmental release (Section 3.2), human health hazards (Section 5.2.3), human health risk characterization (Section 5.3), environmental hazards (Section 5.2.3), and environmental risk characterization (Section 4.4.2.4). Appendix E describes EPA's draft intermediate and chronic occupational exposure value (OEV) derivation; it also includes a summary of air sampling analytical methods identified for 1,2-dichloropropane.

6.1 Unreasonable Risk to Human Health

Calculated risk estimates (MOEs[3] and cancer risk estimates) can provide a risk profile of 1,2-dichloropropane by presenting a range of estimates for different health effects for different COUs. EPA conducted baseline assessments of risk and made its preliminary determination of unreasonable risk in a manner that takes into consideration reasonably available information (*e.g.,* test order information). This allows EPA to make unreasonable risk determinations based on the information regarding workers wearing PPE where the Agency has such reasonably available information. In addition, certain risk estimates are based on exposure scenarios with monitoring data that reflect existing requirements, such as those established by OSHA or industry sector best practices. EPA received some information regarding PPE use relevant to Manufacturing and for a Processing COU relevant to the test order data. EPA's consideration of the relevant dermal and inhalation PPE for both COUs is discussed in more detail in Section 6.2.3 (for a detailed review, see Section 5.1.1). EPA will consider any additional information on the consistency and effectiveness of PPE use in the development of the final risk evaluation.

To characterize risk from non-cancer endpoints, the estimated MOEs are compared to their respective benchmark MOE—a starting point for informing a determination of unreasonable risk of injury to health from non-cancer effects. Additional information regarding the non-cancer hazard identification and the benchmark MOE is provided in Section 5.2.1. A calculated cancer risk estimate that is greater than the cancer benchmark is a starting point for informing a determination of unreasonable risk of injury to health from cancer. Cancer risk estimates represent the incremental increase in probability of an individual in an exposed population developing cancer over a lifetime (excess lifetime cancer risk [ELCR]) following exposure to the chemical. Standard cancer benchmarks used by EPA and other regulatory agencies are an increased cancer risk ranging from 1 in 1,000,000 to 1 in 10,000 (*i.e.,* 1×10^{-6} to 1×10^{-4}), depending on the subpopulation(s) exposed and other considerations. In this draft risk evaluation, the Agency considers 1×10^{-4} as the appropriate benchmark for increased cancer risk for workers and ONUs.

It is important to emphasize that these calculated risk estimates alone may not reflect certain mitigation measures such as engineering controls or use of respiratory protection or other PPE for facilities that have such controls in place. In this draft risk evaluation, monitoring data submitted pursuant to a test order under TSCA allowed EPA to make its unreasonable risk determination taking into consideration specific information regarding 1,2-dichloropropane workers wearing PPE. In addition, the preliminary risk estimates are based on exposure scenarios with monitoring data that reflect existing requirements, such as those established by OSHA (*i.e.,* permissible exposure limits [PELs]) or industry or sector best practices. EPA considered risk-related factors beyond exceedance of benchmarks, including the Agency's confidence in the data as well as an evaluation of the strengths, limitations, uncertainties, and confidences associated with the information used to inform the risk estimate and risk characterization.

[3] EPA derives non-cancer MOEs by dividing the non-cancer POD (HEC [mg/m^3] or HED [mg/kg-day]) by the exposure estimate (mg/m^3 or mg/kg-day). Section 5.3.1 has additional information on the risk assessment approach for human health.

Descriptions of risk estimates that are based on highly refined hazard and exposure information would be considered differently than risk estimates based on conservative assumptions on both hazard and exposure. The process of determining unreasonable risk is made on a case-by-case basis, given the inherently unique nature of chemical-specific risk evaluations.

6.1.1 Populations and Exposures Assessed for Human Health

EPA evaluated risk to workers (aged 16+ years) and ONUs; consumers and bystanders (adults and children); as well as the general population (including PESS)—using reasonably available monitoring and modeling data for inhalation, dermal, and ingestion exposures, as applicable. More specifically, the Agency evaluated risk from exposures from surface water, drinking water, and land pathways (*i.e.,* landfills and application of biosolids) to the general population (Section 5.1). EPA's evaluation of the general population included populations living near facilities releasing 1,2-dichloropropane to the ambient air, which includes fenceline communities, as part of the ambient air exposure assessment.

In developing the exposure and hazard assessments for 1,2-dichloropropane, EPA analyzed reasonably available information to ascertain whether some human populations may have greater exposure and/or susceptibility than the general population to the hazard posed by 1,2-dichloropropane. For this draft risk evaluation, the Agency accounted for the following PESS: men and women of reproductive age; pregnant women; infants; children; people who frequently use consumer products containing high concentrations of 1,2-dichloropropane; people exposed to 1,2-dichloropropane in the workplace; people in close proximity to releasing facilities, including fenceline communities; and tribal and subsistence fishers whose diets include large amounts of fish. Section 5.3.5 summarizes the PESS which were incorporated into this draft risk evaluation through consideration of potentially increased exposures and/or potentially increased biological susceptibility and summarizes additional sources of uncertainty related to consideration of PESS.

6.1.2 Summary of Human Health Effects

EPA has preliminarily determined that the unreasonable risk to human health presented by 1,2-dichloropropane is due to both non-cancer and cancer effects in the following populations via the following listed exposures:

- workers and ONUs from acute, intermediate, and chronic non-cancer, and cancer risk from inhalation exposures;
- workers from acute, intermediate, and chronic non-cancer, and cancer risk from dermal exposures;
- consumers and bystanders from acute, chronic non-cancer, and cancer risk from inhalation exposures; and
- consumers from chronic non-cancer and cancer risk from dermal exposures.

EPA used systematic review of animal toxicology data and also considered human evidence qualitatively. High- and medium-quality studies were used for quantitative analysis. Lower-quality studies were used only for qualitative discussion.

EPA found that 1,2-dichloropropane can cause harmful health effects by breathing it in, or with limited information, through skin contact. The Agency determined the most robust short-term effect in maternal rats was central nervous system (CNS) depression within an hour of oral exposure. EPA has robust confidence in the acute effects reported in this oral animal study. These acute effects were the basis for route-to-route extrapolation for dermal and inhalation routes. The Agency has moderate confidence in the acute inhalation conclusion because that estimate was derived from oral data using default route-to-route extrapolation. EPA has moderate confidence in the acute and intermediate dermal estimates for the

same reason. For the non-cancer acute oral and inhalation PODs, EPA used an uncertainty factor (UF) of 30, derived from an uncertainty factor of 3 for animal-to-human differences and 10 for differences within human populations.

For intermediate and chronic oral exposures, EPA identified hematological effects as a sensitive and robust endpoint. The Agency has robust confidence in the oral POD based on increased reticulocytes suggestive of hemolytic anemia. For intermediate and chronic inhalation exposures, EPA identified nasal lesions in animals as an appropriate basis for POD derivation. The Agency has moderate confidence in the intermediate inhalation POD. However, there is slight-to-moderate confidence in the chronic inhalation POD. For these non-cancer oral and inhalation chronic PODs, EPA used an uncertainty factor of 30 based on a UF_A of 3 for animal-to-human differences and a UF_H of 10 for differences within human populations. For chronic dermal POD, EPA used route-to-route extrapolation because no dermal toxicokinetic or hazard studies were available. The Agency has moderate confidence in the dermal acute and intermediate estimates and slight-to-moderate confidence in the chronic dermal estimate.

EPA also concluded that 1,2-dichloropropane is likely to cause cancer in humans. This conclusion was based on tumor evidence in animals. The Agency has robust confidence in the oral and inhalation cancer conclusions. The oral cancer risk was based on liver tumors in mice. The inhalation cancer risk was based on nasal tumors in rats. EPA used a linear low-dose approach for cancer risk but did not apply an age-dependent adjustment factor (ADAF) because the evidence did not show a definitive mutagenic mode of action (MOA). The dermal cancer estimate was derived from oral data. EPA has moderate confidence in the dermal cancer estimate because it may overestimate risk.

6.1.3 Basis for the Unreasonable Risk to Workers

Based on the occupational risk estimates and related risk factors, EPA has preliminarily determined that 11 out of 12 occupational COUs significantly contribute to unreasonable risk to workers from 1,2-dichloropropane due to a combination of acute (8-hour) non-cancer, intermediate non-cancer, chronic non-cancer, and/or cancer inhalation exposures as well as acute non-cancer and cancer dermal exposures. Four of these COUs contribute to unreasonable risk to ONUs due to intermediate non-cancer, chronic non-cancer, and cancer inhalation risk. Risk estimates are numerical expressions of many assumptions, modeling choices, exposure data, and toxicity values derived by EPA specifically for the purposes of the COUs included in the TSCA risk evaluation. For these reasons, the Agency uses benchmarks not as "bright-lines" for unreasonable risk determinations but rather part of the larger picture that considers other risk-based factors, including uncertainty.

EPA analyzed dermal and inhalation exposure in the occupational scenarios using a time-weighted average (TWA) for a typical 8-hour shift (see Section 5.1.1) for male and female workers. These estimates are then extrapolated to longer durations. Non-cancer risk estimates were calculated from acute, intermediate, and chronic exposures. Cancer risk estimates were calculated only from chronic exposures over the total number of working years. For most OESs, acute refers to an exposure timeframe of one 8-hour workday, intermediate refers to an exposure timeframe of 22 workdays (8 hours per day), and chronic refers to an exposure timeframe of 250 days per year for 31 to 40 years (8 hours per day). Cancer refers to an exposure timeframe of 250 days per year for 31 to 40 years (8 hours per day) based on lifetime risk for cancer. Estimates of central tendency and high-end inhalation and dermal exposures were made for workers directly working with 1,2-dichloropropane as well as estimates for inhalation exposures for ONUs not directly handling 1,2-dichloropropane in the workplace.

The Agency has incorporated the final study report published by the ACC PDC Consortium (Integral Consulting, 2026), which details worker activities per SEG that occurred at 1,2-dichloropropane manufacturing and processing sites. For manufacturing and processing facilities, the SEGs of Laboratory Technician, Logistics Technician, Processing Operator, Maintenance Technician, and ONUs were identified and monitored for inhalation exposure. One additional SEG (Marine Logistics Technician) was also identified at processing facilities and other monitored for inhalation exposures. These data were also used as analogous exposures for several other COUs as the Agency believes workers to be exposed at similar air concentrations, but use of analogous exposures across COUs does have higher uncertainty for these scenarios (see Section 6.1.3.2).

For dermal exposures, EPA did not identify any dermal exposure monitoring data for any OES and used the EPA Dermal Exposure to Volatile Liquids Model (DEVL Model) to calculate the acute absorbed dose rate (AADR) for each OES. EPA also utilized test order data to evaluate 1,2-dichloroproapne toxicokinetics for the dermal route (Charles River Laboratories, 2024) where various fractional absorption and flux-based dosing conditions were conducted and considered in assessing the 1,2-dichloropropane dermal absorption profile. The Agency did not assess dermal exposures to ONUs because EPA does not expect ONUs to directly handle 1,2-dichloropropane as part of their duties. Therefore, ONUs are not expected to have dermal exposures during the course of their work.

EPA calculated inhalation risk estimates for both central tendency and high-end exposure levels for workers and ONUs. Risk estimates based on high-end exposure levels are generally intended to cover exposure levels representative of 95th percentile values, whereas risk estimates at the central tendency exposure are intended to cover average or typical worker exposure.

EPA based its preliminary unreasonable risk determination on the risk estimates that best represent the COU. For COUs where the Agency was unable to estimate ONU inhalation exposure from monitoring data or models, ONU exposure was assumed to be equivalent to the central tendency exposure for workers for the corresponding COU.

6.1.3.1 COUs Covered by 1,2-Dichloropropane Test Order Data

EPA has determined that the following three COUs associated with 1,2-dichloropropane test order monitoring data significantly contribute to unreasonable risk to workers from acute non-cancer, intermediate non-cancer, chronic non-cancer, and cancer inhalation exposures as well as acute non-cancer and cancer dermal exposures:

- Manufacture – Domestic Manufacture [worker only – acute, intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as cancer dermal risk], see Section 6.1.3.1.1;
- Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing [worker only – acute, intermediate, chronic non-cancer, and cancer inhalation risks, as well as cancer dermal risk], see Section 6.1.3.1.2;
- Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing [worker only – acute, intermediate, chronic non-cancer, and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks], see Section 6.1.3.1.2.

For inhalation exposures, EPA based its preliminary unreasonable risk determination on the risk estimates that best represent the COU, recognizing there is less certainty on consistent high-end exposures for longer durations (*e.g.,* chronic, cancer). Because the Agency was able to include the number of working days associated with each SEG into the risk estimates for these COUs, including

scenarios where there is evidence of intermittent or not daily exposure for certain SEGs, high-end risk estimates are considered appropriate for intermediate exposures for all SEGs.

For dermal exposures, EPA identified acute non-cancer and cancer dermal risks for workers. No intermediate or chronic non-cancer dermal risks were below the benchmark. The dermal assessment is based on DEVL modeling supported by robust TSCA section 4 test order dermal absorption data and moderate confidence in the modeling approach. Information on the effectiveness of glove types for preventing exposures from 1,2-dichloropropane in the context of tasks performed under the COUs—including how workers and their exposure may be affected when using chemically resistant gloves, measured permeation testing of certain types of gloves, and temperature considerations (as identified in the Hand Protection section of OSHA's Personal Protective Equipment Guidance and in alignment with the OSHA Hand Protection PPE Standard [29 CFR 1910.138]).

6.1.3.1.1 Manufacturing – Domestic Manufacture COU

The preliminary determination that the Manufacturing – Domestic Manufacture COU significantly contributes to the unreasonable risk to workers is driven by acute, intermediate, chronic non-cancer, and cancer inhalation exposures as well as cancer dermal risk. This COU is informed by the Manufacture OES (OES #1). As previously mentioned, EPA's assessment under this COU is informed by personal breathing zone (PBZ) data in the final study report published by the ACC PDC Consortium (Integral Consulting, 2026). This report detailed worker activities per SEG that occurred at 1,2-dichloropropane manufacturing (as a byproduct) sites. The SEGs of Process Operators, Maintenance Technicians, Logistics Technicians, Laboratory Technicians, and ONUs were identified and monitored for inhalation exposure. The test order monitoring study includes 18 full-shift PBZ worker samples across 2 manufacturing facilities where 1,2-dichloropropane was manufactured as a byproduct. All samples were above the limit of detection (LOD). For ONUs, the 1,2-dichloropropane dataset included 12 ONU full-shift PBZ samples from the same study described above; all samples were above the LOD.

EPA used the 50th percentile as the central tendency estimate and the 95th percentile as the high-end inhalation estimates for each SEG. Inhalation exposures, without applying PPE, resulted in non-cancer risk estimates below the benchmark MOE of 30 for both central tendency and high-end intermediate and chronic exposures for four SEGs: Laboratory Technician (MOEs 4.1–23); Laboratory Technician – Pooled Samples (MOEs 1.0–4.0); Logistics Technician (MOEs 0.53–0.96); and Logistics Technician – Pooled Samples (MOEs 0.66–4.9). Cancer risk was identified for all SEGs but ONUs, including two that did not indicate non-cancer risk (*i.e.,* Processing Operator; Maintenance Technician) (central tendency risk estimates 3.8×10^{-4} to 1.4×10^{-3}). Because the data are based on PBZ monitoring, EPA has high confidence that both the central tendency and high-end risk estimates represent real world scenarios when not accounting for PPE, including the use of engineering controls at the facilities. The Agency therefore has higher confidence in these risk estimates but also requests comment on the engineering controls and personal protective equipment that is used by these workers.

As noted in Sections 5.3.2.1.1 and 5.3.2.1.3, the small sample size (n = 3) for Laboratory Technician and Logistics Technician under this OES lowered overall confidence in the inhalation estimates provided. Thus, EPA pooled data for these SEG from both the Manufacture OES and the Processing as a Reactant OES to have a larger sample size (n = 11). With this assumption, inhalation exposures resulted in lower high-end acute (MOE = 1.0), central tendency intermediate (MOE = 3.8), high-end intermediate (MOE = 1.0), and central tendency chronic (MOE = 4.0) inhalation risk estimates for the Laboratory Technician. For the Logistics Technician, this pooling increased risk estimates for central tendency intermediate (MOE = 4.8), high-end intermediate (MOE = 0.66), and central tendency chronic (MOE =

4.9) inhalation exposures. EPA has greater confidence in the combined dataset that incorporates Laboratory Technician samples from both OESs.

The Agency considered the inhalation exposure database to have robust confidence, but noted that chronic estimates are better represented by central tendency because workers are unlikely to experience the highest concentrations repeatedly across days and years. EPA also noted that respiratory protection (full-face respirators) was documented for logistics technicians and process operators during high-exposure tasks, which are likely to reduce actual exposures and means the unadjusted high-end estimates may overestimate worker risk. Therefore, EPA is accounting for the reasonably available information in its risk determination for these SEGs and is using central tendency estimates to inform the risk determination. The Agency did not preliminarily identify unreasonable risk for any duration of inhalation exposures for ONUs.

EPA's preliminary determination of dermal unreasonable risk is driven by the cancer dermal risks (*i.e.,* central tendency risk estimate = 1.4×10^{-3}). Although acute dermal risk estimates (MOE = 20) were below the benchmark MOE of 30 for this COU, the Agency has slight-to-moderate confidence in the high-end acute risk estimates. Additionally, though the test order report provides multiple examples of spill and splashes supporting the potentially plausible scenario that workers may come into contact with 1,2-dichloropropane incidentally, the high-end dermal exposure estimate percentile is based on an upper-bound contact area equivalent to the surface area of two hands, and assumes no PPE is used. Because EPA has PPE information for activities from the test order specifically associated with the SEGs under this COU (*i.e.,* Laboratory Technicians, Logistics Technicians, Processing Operators, and Maintenance Technicians), and as discussed in more detail in Section 5.3.2.2, EPA's preliminary determination for these SEGs in based on central tendency dermal cancer risk.

Use of gloves was documented during the collection of the full-shift inhalation exposure samples. Reported use varied by SEG and OES. For samples collected at manufacturing facilities, use of gloves was indicated for 73% of full-shift samples and 100% of the task-length samples. Glove use was indicated during 100% of full-shift samples collected on laboratory technicians and logistics technicians, and 92% of samples collected on processing operators. The types of gloves utilized varied for both facility types and included nitrile gloves, butyl gloves, leather cut-resistant gloves, cotton gloves, and chemical resistant gloves. EPA notes that other dermal PPE was also utilized by workers, including chemical resistant suits, chemical resistant aprons, and chemical resistant boots. Thus, the Agency has determined that the acute high-end risk estimates may be an overestimate of risk due to observed PPE usage and uncertainty in the exposure scenario.

The central tendency cancer dermal risk was estimated at 1.4×10^{-3} for this COU. The Agency has moderate confidence in this risk estimate but recognizes that there are uncertainties in any long-term exposure. Importantly, these estimates are based on the 50th percentile from probabilistic modeling using test order data on dermal absorption for 1,2-dichloropropane. The exposure estimates also consider the distribution of surface area of skin exposed and lastly, a range of empirically-derived loading doses and the fraction absorbed were utilized to develop exposure estimates. As noted above, PPE usage is common for these COUs but the Agency did not have sufficient information to assume the use of 1,2-dichloropropane chemically resistant gloves is sufficient to mitigate risk for chronic exposures in the risk determination for any COU. For these reasons and because the risk estimate exceeds the benchmark by an order of magnitude, EPA has preliminarily determined that these COUs contribute to the unreasonable risk due to cancer dermal risks.

Table 6-1. Supporting Basis for the Manufacture – Domestic Manufacture COU

Condition of Use (COU)	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exp. Route	Exp. Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Exposure (MOE = 30)	Intermediate Non-Cancer (MOE=30)	Chronic Non-Cancer (MOE=30)	Cancer (Benchmark= 1E−04)
Manufacture – Domestic Manufacture	Manufacture (OES #1)	Laboratory Technician	I	CT	2,487	**22 (APF 10)**	**23 (APF 10)**	1.6E−05
				HE	468	**4.1 (APF 10)**	4.4	1.1E−04
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Laboratory Technician – Pooled Samples	I	CT	3.8	**3.8 (APF 10)**	**4.0 (APF 50)**	9.1E−05
				HE	**1.0 (APF 10)**	**1.0 (APF 50)**	1.1	4.2E−04
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Logistics Technician	I	CT	64	**0.95 (APF 50)**	**0.96 (APF 50)**	**3.8E−04**
				HE	36	0.53	0.53	8.9E−04
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Logistics Technician – Pooled Samples	I	CT	325	**4.8 (APF 10)**	**4.9 (APF 10)**	7.5E−05
				HE	44	**0.66 (APF 50)**	0.67	7.1E−04
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Processing Operator	I	CT	5,101	45	48	7.7E−06
				HE	185	1.6	1.7	2.7E−04
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Maintenance Technician	I	CT	496	48	49	7.6E−06
				HE	430	41	42	1.1E−05
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		ONU	I	CT	2.5E04	220	236	1.6E−06
				HE	6,911	61	65	7.3E−06

APF = assigned protection factor; CT = central tendency; D = dermal; Exp. = exposure; HE = high-end; I = inhalation; MOE = margin of exposure; ONU = occupational non-user
Bolded/shaded values indicate MOEs exceeding the benchmark (*i.e.,* non-cancer risks < risk benchmark and cancer risks > cancer risk benchmark) contributing to unreasonable risk.
Note: No protection factors are provided for dermal risk.

6.1.3.1.2 Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing; and Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing COUs

The preliminary determination that Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing; and Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing COUs significantly contributes to the unreasonable risk to workers is driven by acute, intermediate, and chronic non-cancer and chronic cancer inhalation exposures as well as acute and/or cancer dermal exposures. This COU is associated with the Processing as a Reactant OES (OES #3). EPA's inhalation assessment under this COU is informed by PBZ data in the final study report published by the ACC PDC Consortium (Integral Consulting, 2026). That report detailed worker activities per SEG that occurred at 1,2-dichloropropane manufacturing (as a byproduct) sites. The SEGs of Laboratory Technician, Logistics Technician, Marine Logistics Technician, Processing Operator, Maintenance Technician, and ONUs were identified and monitored for inhalation exposure at three manufacturing facilities.

The test order monitoring study includes 87 full-shift PBZ worker samples across the facilities where 1,2-dichloropropane is processed as a reactant. All full-shift worker samples were above the LOD. Twelve task-length samples (15–68 minutes in duration) were provided for maintenance technicians; EPA utilized these samples to estimate 8-hour TWAs for this SEG. Two task-length samples were below the LOD range (5.9×10^{-4} to 6.1×10^{-5} ppm). The 1,2-dichloropropane dataset also included 32 ONU full-shift PBZ samples from the same study described above. Two samples were below the LOD (4.4×10^{-5} to 1.3×10^{-5} ppm).

EPA used the 50th and 95th percentile values to represent the central tendency and high-end exposures for each SEG, respectively. Inhalation exposures resulted in risk estimates below the benchmark for central tendency intermediate (MOE = 2.6), chronic non-cancer (MOE = 2.83), and cancer (1.30×10^{-4}) durations for the Laboratory Technician SEG; for central tendency intermediate (MOE = 9.3) and chronic non-cancer (MOE = 9.5) durations for the Logistics Technician SEG; for the high-end acute (MOE = 3.7) duration for the Marine Logistics Technician SEG; and for central tendency intermediate (MOE = 6.1) and chronic non-cancer (MOE = 6.5) durations for the Processing Operator SEG.

EPA notes that there is large variation in exposures and risk estimates within the Marine Logistics Technician SEG indicated by the reported GSD of 20.4 (Integral Consulting, 2026). The dataset for this SEG is right-skewed with most air concentration measurements occuring at less than 0.1 ppm (25 of 40 full-shift samples) or 1 ppm (35 of 40 full-shift samples). Additionally, the final study report noted that variability among workers in this SEG was driven by locations, with lower concentrations further away (on the dock, in ship shacks, in the cab of cranes) and higher concentrations on ships and barges. As a result, EPA considers that central tendency exposure estimates may be more appropriate to characterize intermediate exposures for some workers in this SEG, but high-end intermediate exposure estimates may be more appropriate to characterize others; therefore, the Agency based the preliminary risk determination for intermediate durations on these high-end risk estimates. EPA believes that high-end risk estimates are informed by real world data and therefore reasonably expected to occur for some workers. PPE (*i.e.,* an APF 10 or APF 50 respirator) as reported in the PDC Consortium Report (Integral Consulting, 2026) may not be sufficient if worn during high exposure tasks for this SEG.

With the previously mentioned exception (Marine Logistics Technician SEG), EPA considered the inhalation exposure database to have robust confidence but noted that high-end estimates are most appropriate for shorter-duration exposures and that chronic estimates are better represented by central

tendency because workers are unlikely to experience the highest concentrations repeatedly across days and years. The Agency also noted that respiratory protection was documented for Logistics Technicians for the Processing as a Reactant COU during high-exposure tasks, which likely reduces actual high-end exposures and means the unadjusted high-end estimates may overestimate chronic worker risk. For the Marine Logistics Technician SEG, EPA accounted for the information provided through the test order and used high-end risk estimates for the acute and intermediate durations. For the Logistics Technician, the Agency accounted for the reasonably available information on PPE use in its risk determination for these SEGs and used central tendency to inform the risk determination. No risk was identified for ONUs.

Regarding EPA's preliminary determination of unreasonable risk based on dermal exposures, similar to the Manufacturing COU, EPA was able to consider reasonably available dermal PPE information for one of the two COUs: Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing. As discussed in Section 3.1.1, there is one other COU associated with Processing as a Reactant OES based on activities occurring at the facilities in the test order submission. However, though EPA has confidence in its use of that data for that other COU due to similarities in release and exposure sources, worker activities, and use patterns, there is less certainty that the PPE used at facilities associated with the Processing as a Reactant COU are applicable to facilities for other COUs not directly related to the test order. Additionally, the test order report does not suggest the PPE info is representative of the Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing COU. Use of gloves was documented during the collection of the full-shift inhalation exposure samples. Reported use varied by SEG and OES. For samples collected at processing facilities, use of gloves was indicated for 66% of full-shift samples and 98% of the task-length samples. Glove use was indicated during 100% of full-shift samples collected on Laboratory Technicians and Logistics Technicians, and 97% of samples collected on processing operators. The types of gloves utilized varied for both facility types and included nitrile gloves, butyl gloves, leather cut-resistant gloves, cotton gloves, and chemical resistant gloves. EPA notes that other dermal PPE was also utilized by workers, including chemical resistant suits, chemical resistant aprons, and chemical resistant boots. Thus, the Agency has determined that the acute high-end risk estimates may be an overestimate of risk due to observed PPE usage and uncertainty in the exposure scenario; therefore, EPA has preliminarily determined that it does not drive the unreasonable risk.

The central tendency cancer dermal risk was estimated at 1.4×10^{-3} for these COUs. Similar to the Manufacturing COU, the Agency has moderate confidence in this risk estimate but recognizes that there are uncertainties in any long-term exposure. However, given the more realistic scenario of central tendency exposures over longer durations and the risk estimate exceeds the benchmark by an order of magnitude, EPA has preliminarily determined these COUs significantly contribute to the unreasonable risk due to cancer dermal risks.

Table 6-2. Supporting Basis for Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing; and Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing COUs

Condition of Use (COU)	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exp. Route	Exp. Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Non-Cancer (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing	Processing as Reactant (OES #3)	Laboratory Technician	I	CT	302	**2.6 (APF 25)**	**2.83 (APF 25)**	**1.3E−04 (APF 10)**
				HE	115	**1.0 (APF 50)**	1.08	4.37E−04
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Logistics Technician	I	CT	630	**9.3 (APF 10)**	**9.5 (APF 10)**	3.9E−05
				HE	121	1.1	1.1	4.2E−04
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Marine Logistics Technician	I	CT	1,021	33	33	1.1E−05
				HE	**3.7 (APF 10)**	**0.12 (APF 1,000)**	0.12	3.9E−03
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Processing Operator	I	CT	694	**6.1 (APF 10)**	**6.5 (APF 10)**	5.6E−05
				HE	28	**0.25 (APF 1,000)**	0.26	1.8E−03
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Maintenance Technician	I	CT	4.1E04	3,948	4,003	9.2E−08
				HE	29	2.8	2.8	1.7E−04
			D	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		ONU	I	CT	8,355	73	78	4.7E−06
				HE	168	1.5	1.6	3.0E−04
Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing	Processing as Reactant (OES #3)	Laboratory Technician	I	CT	302	**2.6 (APF 25)**	**2.8 (APF 25)**	**1.3E−04 (APF 10)**
				HE	115	**1.0 (APF 50)**	1.1	4.37E−04
			D	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Logistics Technician	I	CT	630	**9.3 (APF 10)**	**9.5 (APF 10)**	3.9E−05
				HE	121	1.1	1.1	4.2E−04
			D	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03

Condition of Use (COU)	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exp. Route	Exp. Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Non-Cancer (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing	Processing as Reactant (OES #3)	Marine Logistics Technician	I	CT	1,021	33	33	1.1E−05
				HE	**3.7 (APF 10)**	**0.12 (APF 1,000)**	0.12	3.9E−03
			D	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Processing Operator	I	CT	694	**6.1 (APF 10)**	**6.5 (APF 10)**	5.6E−05
				HE	28	**0.25 (APF 1,000)**	0.26	1.8E−03
			D	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Maintenance Technician	I	CT	4.1E04	3,948	4,003	9.2E−08
				HE	29	2.8	2.8	1.7E−04
			D	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		ONU	I	CT	8,355	73	78	4.7E−06
				HE	168	1.5	1.6	3.0E−04

APF = assigned protection factor; CT = central tendency; D = dermal; Exp. = exposure; HE = high-end; I = inhalation; MOE = margin of exposure; ONU = occupational non-user
Bolded/shaded values indicate MOEs exceeding the benchmark (*i.e.,* non-cancer risks < risk benchmark and cancer risks > cancer risk benchmark) contributing to unreasonable risk.
Note: No protection factors are provided for dermal risk estimates below the benchmark.

6.1.3.2 COUs Covered by Analogous 1,2-Dichloropropane Test Order Data

EPA has preliminarily determined that five COUs evaluated with analogous 1,2-dichloropropane test order monitoring data significantly contribute to unreasonable risk to workers driven by acute non-cancer, intermediate non-cancer, chronic non-cancer, and cancer inhalation risks as well as acute non-cancer and cancer dermal risks:

- Manufacture – Import [worker only – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks, as well as acute non-cancer and cancer dermal risks], see Section 6.1.3.2.1;
- Processing – Repackaging [worker only – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks; and acute non-cancer and cancer dermal risks], see Section 6.1.3.2.1;
- Industrial Use – Non-Incorporative Activities – Processing Aids [worker only – intermediate, chronic non-cancer, and cancer inhalation risks; and acute non-cancer and cancer dermal risks], see Section 6.1.3.2.2;
- Commercial Use – Other Uses – Laboratory Chemicals [worker only – intermediate and chronic inhalation non-cancer risks], see Section 6.1.3.2.3; and
- Disposal [worker – intermediate, chronic non-cancer, and cancer inhalation risks as well as cancer dermal risk; ONU – intermediate non-cancer, chronic non-cancer, and cancer inhalation risks], see Section 6.1.3.2.4.

EPA is requesting comments on worker protections and information related to existing use of dermal and respiratory PPE in facilities associated with these COUs for which the Agency's analysis utilizes test order data. Although EPA has PPE information for activities from the test order specifically

associated with two COUs discussed in Section 6.1.3.1 (*i.e.,* Domestic Manufacturing and Processing as a Reactant), EPA does not have sufficient worker protection information representative of the facilities under these five COUs that demonstrate reduced exposures or that unreasonable risk is managed. Additionally, though use of the test order inhalation data for these COUs were due to similarities in release and exposure sources, worker activities, and use patterns, there is less certainty that the PPE at facilities associated with the test order COUs are applicable to facilities for other COUs not directly related to the test order. Also, the test order report does not imply that the worker protections documented are applicable to facilities outside of the scope of the test order. More specifics on the information on worker protections that are reasonably available and considered for these COUs is discussed throughout this section.

6.1.3.2.1 Manufacturing – Import and Processing – Repackaging COUs

The preliminary determination that the Manufacturing – Import and Processing – Repackaging COUs significantly contributes to unreasonable risk to workers is driven by intermediate non-cancer, chronic non-cancer, and cancer inhalation exposures as well as acute non-cancer dermal and cancer dermal exposures. These COUs are informed by the Import/Processing – Repackaging OES (OES #2). For both COUs, EPA assessed the general SEG categories of workers and ONUs. Workers are potentially exposed to 1,2-dichloropropane when transferring 1,2-dichloropropane from bulk containers into smaller containers or connecting/disconnecting hoses. Workers may also be exposed via inhalation of vapor or dermal contact with liquids when cleaning transport containers following emptying. For workers, EPA used the Logistics Technicians (Pooled) exposure data from manufacturing as a byproduct and processing as a reactant OES as an analogous scenario for handling 1,2-dichloropropane during import and repackaging. The test order provided 11 samples, which were all above the LOD (Integral Consulting, 2026). EPA selected this Worker SEG because their job activities are expected to be similar to tasks performed at import and repackaging facilities, such as loading/unloading tasks performed by Logistics Technicians. For ONUs, EPA used air monitoring samples collected from marine terminal and railcar areas outside facilities during 1,2-dichloropropane manufacturing and processing. This data was determined to be appropriate as EPA believes it to be representative of the Import/Processing – Repackaging OES because workers would be engaging in similar activities like unloading and loading materials. EPA identified 11 ONU samples from the test order that reflect work in these areas; 2 samples were below the LOD (4.4×10^{-5} to 4.7×10^{-5} ppm). These data were submitted to the Agency by the ACC PDC Consortium and included full-shift samples for Logistics Technicians and similarly relevant ONUs.

EPA used the 50th percentile as the central tendency estimate and the 95th percentile as the high-end estimate for workers and ONUs. No acute inhalation exposures or risks were determined to significantly contribute to the unreasonable risk determination as there was sufficient evidence to suggest risk estimates were expected to be overestimates. Worker inhalation exposures resulted in risk estimates below the benchmark for intermediate non-cancer (MOE = 2.9), chronic non-cancer (MOE = 3.0), and cancer (1.2×10^{-4}) durations. No inhalation exposure resulted in risk estimates below the benchmark for ONUs. EPA considered the weight of scientific evidence to be moderate. Because the data came from manufacturing and processing settings, there is some uncertainty about how well it represents exposure at other repackaging facilities—especially where engineering controls, administrative controls, and work practices may differ. Nevertheless. EPA considered it a plausible estimate for workers and ONUs in this exposure scenario. The Agency therefore relied on high-end inhalation estimates for acute risk characterization but gave greater weight to central tendency estimates for intermediate, chronic non-cancer and cancer risk because use of high-end values with other conservative defaults may overestimate long-term risk. EPA has some uncertainty in the use of PPE for these estimates. Analogous test order for Logistics Technicians indicates PPE usage during high-exposure tasks, which are likely to reduce actual exposures and means the unadjusted high-end estimates may overestimate worker risk. However, the

Agency does not have specific PPE information or usage for the Import/Processing – Repackaging OES, and it is unclear whether this task is completed daily or intermittently throughout the work week. Due to the strength of having chemical-specific PBZ monitoring data for workers and ONUs for an analogous setting, both the central tendency and high-end estimates are suitable for use in preliminary risk determination. For intermediate durations. In contrast, chronic non-cancer and cancer effects involved repeated exposures over longer periods of time. Therefore, EPA used central tendency estimates in its risk determination for chronic non-cancer and cancer inhalation. Lastly, the Agency did not preliminarily identify significant contributions to unreasonable risk for ONUs.

Regarding the preliminary determination of significant contributions to unreasonable risk from dermal exposures, EPA was not able to consider reasonably available dermal PPE information for these COUs. However, the Agency relied on dermal data from the test order to estimate fraction absorbed, exposures, and corresponding risk. As such, EPA has made the preliminary determination of significant contributions to unreasonable risk to human health due to high-end acute non-cancer risk and central tendency cancer dermal risks.

Table 6-3. Supporting Basis for the Manufacturing – Import and Processing – Repacking COUs

Condition of Use (COU)	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exp. Route	Exp. Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Non-Cancer (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04
Manufacture – Import Processing – Repackaging	Import/ Processing – Repackaging (OES #2)	Worker	I	CT	325	**2.9 (APF 25)**	**3.0 (APF 10)**	**1.2E−04 (APF 10)**
				HE	44	**0.39 (APF 1,000)**	0.42	1.1E−03
			D	CT	51	137	147	**1.1E−03**
				HE	**20**	44	47	3.4E−03
		ONU	I	CT	1.3E05	1,117	1,196	3.1E−07
				HE	121	1.1	1.1	4.2E−04

APF = assigned protection factor; CT = central tendency; D = dermal; Exp. = exposure; HE = high-end; I = inhalation; MOE = margin of exposure; ONU = occupational non-user
Bolded/shaded values indicate MOEs exceeding the benchmark (*i.e.,* non-cancer risks < risk benchmark and cancer risks > cancer risk benchmark) contributing to unreasonable risk.
Note: No protection factors are provided for dermal risk estimates below the benchmark.

6.1.3.2.2 Industrial Use – Non-Incorporative Activities – Processing Aids COU

The preliminary determination that the Industrial Use – Non-Incorporative Activities – Processing Aids COU significantly contributes to unreasonable risk to workers is driven by intermediate non-cancer, chronic non-cancer, and cancer inhalation exposures as well as acute dermal exposures. This COUs are informed by the Processing Aid – Non-incorporative Activities OES (OES #4). For these COUs, EPA used analogous PBZ test order data from the ACC PDC Consortium Test Order submission at sites that process 1,2-dichloropropane as a reactant. Monitoring data from five SEGs (Laboratory Technicians [Pooled], Logistics Technicians [Pooled], Processing Operators, Maintenance Technicians, and ONUs) were used to estimate exposure and corresponding risk for this COU. Workers are potentially exposed to 1,2-dichloropropane via inhalation vapors when transferring the chemical from transport containers into storage tanks. ONUs include supervisors, managers, and other employees who work at the site but do not directly handle 1,2-dichloropropane. For workers, inhalation monitoring data from the Processing as a Reactant OES provided 59 full-shift PBZ samples across worker SEGs; all worker samples were above the limit of detection (Integral Consulting, 2026). EPA selected samples from these worker SEGs

because the job activities and work processes are similar to tasks performed by workers in the Processing Aid OES. Additionally, the Agency expects that this OES will utilize 1,2-dichloropropane in concentrations similar to those reported in the Processing as a Reactant OES (concentrations up to 100%). For ONUs, the dataset included 32 ONU full-shift PBZ samples from the same study described above. Two samples were below the LOD (4.4×10^{-5} to 4.7×10^{-5} ppm).

EPA used the 50th percentile as the central tendency estimate and the 95th percentile as the high-end estimate for each SEG. No acute inhalation exposures or risks were determined to significantly contribute to the unreasonable risk determination because there was sufficient evidence to suggest risk estimates were expected to be overestimates. Inhalation exposures resulted in risk estimates below the benchmark for central tendency intermediate non-cancer (MOE = 2.6), high-end intermediate (MOE =1.0), chronic non-cancer (MOE = 1.6), and cancer inhalation (1.3×10^{-4}) durations for the Laboratory Technician; for central tendency intermediate (MOE = 5.5), high-end intermediate (MOE = 1.1), chronic non-cancer (MOE = 5.9) durations for the Logistics Technician; for central tendency intermediate (MOE = 6.1), high-end intermediate (MOE = 0.25), and chronic (MOE = 6.5) for the Processing Operator. No risk estimates were below the benchmark for ONUs. EPA considered the weight of scientific evidence to be moderate.

Because the data came from processing settings, there is some uncertainty about how well it represents exposure at other repackaging facilities—especially where engineering controls, administrative controls, and work practices may differ. Nevertheless, EPA considered it a plausible estimate for workers and ONUs in this exposure scenario. The Agency therefore relied on high-end inhalation estimates for acute risk characterization but gave greater weight to central tendency estimates for intermediate non-cancer, chronic non-cancer, and cancer risk because use of high-end values with other conservative defaults may overestimate long-term risk. EPA has some uncertainty in the use of PPE for these estimates. Analogous test order for logistics technicians indicates PPE usage during high-exposure tasks, which are likely to reduce actual exposures and means the unadjusted high-end estimates may overestimate worker risk. As such, the Agency has concluded that this COU does not contribute to the preliminary unreasonable risk determination based on acute inhalation exposures. However, the Agency does not have specific PPE information or usage for the Processing Aid – Non-incorporative Activities OES, and it is unclear whether this task is completed daily or intermittently throughout the work week. EPA has requested additional information on the use of PPE and exposure controls for this OES. Due to the strength of having chemical-specific PBZ monitoring data for workers and ONUs for an analogous setting, both the central tendency and high-end estimates are suitable for use in risk determination for the intermediate duration. Because chronic and non-cancer estimates involve repeated exposures over longer periods of time, EPA used central tendency estimates in its risk determination for chronic non-cancer and cancer inhalation.

Regarding EPA's preliminary determination of unreasonable risk based on dermal exposures, the Agency was not able to consider reasonably available dermal PPE information for these COUs but relied on dermal data from the test order to estimate fraction absorbed, exposures, and corresponding risk. As such, EPA has preliminarily determined that high-end acute non-cancer risks and central tendency cancer dermal risks significantly contribute to unreasonable risk for workers. EPA is requesting public comment on information on the effectiveness of glove types for preventing exposures from 1,2-dichloropropane in the context of tasks performed under the COUs—including how workers and their exposure may be affected when using chemically resistant gloves, measured permeation testing of certain types of gloves, and temperature considerations (as identified in the Hand Protection section of OSHA's Personal Protective Equipment Guidance and in alignment with the OSHA Hand Protection PPE Standard [29 CFR 1910.138]).

Table 6-4. Supporting Basis for Industrial Use/Non-Incorporative Activities – Processing Aids COU

Condition of Use (COU)	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exp. Route	Exp. Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Non-Cancer (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Industrial Use – Non-Incorporative Activities – Processing Aids	Processing Aid – Non-Incorporative Activities (OES #4)	Laboratory Technician	I	CT	302	**2.6 (APF 25)**	**1.6 (APF 25)**	**1.3E−04 (APF 10)**
				HE	115	**1.0 (APF 50)**	2.8	4.4E−04
			D	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Logistics Technician	I	CT	630	**5.5 (APF 10)**	**5.9 (APF 10)**	6.2E−05
				HE	121	**1.1 (APF 50)**	1.1	4.2E−04
			D	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Processing Operator	I	CT	694	**6.1 (APF 10)**	**6.5 (APF 10)**	5.6E−05
				HE	28	**0.25 (APF 1,000)**	0.26	1.8E−03
			D	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Maintenance Technician	I	CT	4.1E04	359	384	9.5E−07
				HE	29	0.25	0.26	1.8E−03
			D	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		ONU	I	CT	8,355	73	78	4.7E−06
				HE	168	1.5	1.6	3.0E−04

APF = assigned protection factor; CT = central tendency; D = dermal; Exp. = Exposure; HE = high-end; I = inhalation; MOE = margin of exposure; ONU = occupational non-user
Bolded/shaded values indicate MOEs exceeding the benchmark (*i.e.,* non-cancer risks < risk benchmark and cancer risks > cancer risk benchmark) contributing to unreasonable risk.
Note: No protection factors are provided for dermal risk.

6.1.3.2.3 Commercial Use – Other Uses – Laboratory Chemicals COU

The preliminary determination that the Commercial Use – Other Uses – Laboratory COU significantly contributes to unreasonable risk to workers is driven by intermediate and chronic non-cancer inhalation exposures. This COU is informed by the Laboratory Use OES (OES #5). For this COU, EPA assessed the general SEG categories of workers and ONUs. Workers are potentially exposed to the chemical while transferring 1,2-dichloropropane from transport containers to labware, while conducting sampling and analyses, and during container and equipment cleaning. ONUs are expected to have lower inhalation exposures and no dermal exposure. To assess inhalation exposure, EPA used worker exposure data for 1,2-dichloropropane at on-site QA/QC laboratories at sites that manufacture and process 1,2-dichloropropane (Integral Consulting, 2026). For workers, data for Laboratory Technicians (Pooled) was

used as an analogous scenario for the commercial use of 1,2-dichloropropane. The Agency assumes the tasks described for laboratory technicians in manufacturing and processing settings would be similar to tasks performed by laboratory technicians in a commercial laboratory setting. The test order inhalation monitoring study provided 11 full-shift PBZ samples for laboratory technician workers; all samples were above the LOD (Integral Consulting, 2026). For ONUs, EPA used analytical technologist ONU samples collected during manufacturing where 1,2-dichloropropane is produced as a byproduct of the reaction as an analogous scenario for commercial laboratory ONUs. EPA identified two relevant samples from the test order data and all were above the LOD.

The Agency estimated the 50th and 95th percentile values to represent the central tendency and high-end exposures. No acute inhalation exposures or risks were determined to significantly contribute to the unreasonable risk determination. Inhalation exposures resulted in risk estimates below the benchmark for central tendency intermediate (MOE = 3.8) and central tendency chronic non-cancer (MOE = 4.0) risk estimates. EPA notes that four of the five highest full-shift inhalation monitoring concentrations involved work in process area and/or tank areas and not exclusively in laboratory settings. Such exposures are not expected for laboratory workers in this OES. Overall, EPA has higher confidence in the use of central tendency exposure and risk estimates for this OES in comparison to the high-end exposure and risk estimates. The Agency has moderate confidence in the assessment of inhalation exposure for this OES. EPA considers these to be plausible estimates of worker exposures but notes several areas of uncertainty. Specifically, there is uncertainty in the representativeness of this dataset to exposures at laboratory settings that are not associated with manufacturing and processing settings and whether the impact of administrative and engineering controls on exposure levels at these facilities would be similar. Additionally, workers in manufacturing and processing settings collect samples in process areas in production units, and do not work exclusively in a laboratory settings. For these reasons, worker inhalation monitoring concentrations may overestimate worker exposures in other laboratory settings that are not associated with manufacturing or processing operations. Therefore, EPA considered this uncertainty in determining unreasonable risk and based its determination on central tendency intermediate duration. The Agency is requesting information on the amounts of 1,2-dichloropropane used by Commercial Laboratories (OES #5) on a daily (kg/site-day) and yearly (kg/site-yr) basis and corresponding PPE and engineering controls to reduce exposures.

No dermal risk estimates were below the benchmark for the Commercial Use as a Laboratory Chemical OES. The dermal assessment is supported by use of the DEVL Model and test order data from a TSCA section 4 *in vitro* dermal absorption study. EPA reported that the study used human split-thickness skin, corrected for volatile mass loss, and yielded adjusted fraction absorption values of 1.8% for neat 1,2-dichloropropane and 1.1% for 10% 1,2-dichloropropane in heavy hydrotreated naphtha, with similar results from IHSkin Perm for neat 1,2-dichloropropane. EPA characterized the dermal modeling approach as moderate overall confidence and the dermal absorption study itself as robust confidence for dermal risk calculations. Overall, EPA's dermal assessment for this COU is based on moderate confidence in the dermal modeling method and robust confidence in the underlying absorption data, but the Agency also notes that the model does not fully capture all differences within the COU that may affect dermal exposure, such as skin surface area, contact frequency, and glove use.

Table 6-5. Supporting Basis for the Commercial Use – Other Uses – Laboratory Chemical COU

Condition of Use (COU)	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exp. Route	Exp. Level	Human Health Effects (with APF to Address Risk)		
					Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Commercial Use/Other Use – Laboratory Chemical	Commercial Use as a Laboratory Chemical (OES #5)	Worker	I	CT	**3.8 (APF 10)**	**4.0 (APF 10)**	9.1E−05
				HE	1.0	1.1	4.2E−04
			D	CT	7.1E04	7.6E04	2.2E−06
				HE	86	92	1.9E−03
		ONU	I	CT	86	92	4.0E−06
				HE	72	77	6.2E−06

APF = assigned protection factor; CT = central tendency; D = dermal; Exp. = Exposure; HE = high-end; I = inhalation; MOE = margin of exposure; ONU = occupational non-user
Bolded/shaded values indicate MOEs exceeding the benchmark (*i.e.,* non-cancer risks < risk benchmark and cancer risks > cancer risk benchmark) contributing to unreasonable risk.
Note: No protection factors are provided for dermal risk estimates below the benchmark.

6.1.3.2.4 Disposal COU

For the Disposal COU, EPA preliminarily determined that it significantly contributes to unreasonable risk to workers due to inhalation and dermal exposures. This determination is driven by intermediate non-cancer, chronic non-cancer, cancer inhalation risks, and dermal cancer risks. This COU is informed by five OESs: Disposal to Incineration (OES #7), Disposal to Landfill (OES #8), Disposal to Publicly Owned Treatment Works (OES #9), Disposal to Non-POTW Wastewater Treatment (WWT) (OES #10), and Remediation (OES #11). For ONUs, the preliminary determination is driven by intermediate non-cancer, chronic non-cancer, and cancer inhalation risks. No acute inhalation exposures or risks were determined to significantly contribute to the preliminary unreasonable risk determination.

All of the risk being preliminarily identified is associated with Disposal to Incineration, Disposal to Publicly Owned Treatment Works, Disposal to Non-POTW Wastewater Treatment, and Remediation OESs. Risk is not driven by Disposal to a Landfill OES.

For the Disposal to Incineration and Disposal to POTW or non-POTW WWT OESs, the significant contribution to unreasonable risk to workers was determined by the use of analogous 1,2-dichloropropane test order data for the Logistic Technician SEGs (pooled – 11 samples). These data were used based on similar expected tasks performed such as loading/unloading; however, EPA notes that there is greater uncertainty in exposures as the Agency does not have monitoring data specific to worker activities at these facilities. For ONUs, the unreasonable risk was determined via the use of analogous 1,2-dichloropropane test order data for the ONU samples collected from the marine terminal and railcar areas (11 samples). As noted in Section 5.3.2.1.3, these data are right-skewed, with the majority of values less than 0.1 ppm (25 of 40 full-shift samples) or 1 ppm (35 of 40 full-shift samples).

For the disposal to landfills worker assessment, EPA did not identify PBZ monitoring data but did identify analogous 1,2-dichloropropane area monitoring data from one study in Italy (Ravina et al., 2020). For ONUs, EPA did not identify applicable data and therefore used the central tendency from the worker assessment. As previously mentioned, this scenario does not significantly contribute to the

preliminary unreasonable risk determination. EPA has concluded that the weight of scientific evidence for this assessment is slight for workers and ONUs.

For disposal to remediation assessment, the significant contribution to unreasonable risk to workers was based on use of analogous 1,2-dichloropropane test order data for the remediation contractors SEG (4 samples), as similar tasks are expected to be completed at other remediation facilities. For ONUs, because EPA did not identify applicable data, the Agency used the central tendency from the worker assessment.

The overall confidence in the occupational inhalation exposure estimates for workers for the Disposal to Incineration, Disposal to a POTW, and Disposal to a Non-POTW WWT OESs was determined to be moderate. The primary strength of these data are the high-quality monitoring data from the test order process. The primary limitation is that it is from facilities in a manufacturing setting, rather than specific incineration or POTW/non-POTW settings. EPA notes that air concentrations at these sites would likely be lower than at a manufacturing facility and made a preliminary risk determination using the central tendency estimates for intermediate, chronic non-cancer, and cancer inhalation. The overall confidence in the occupational exposure estimates for workers for the disposal to landfills was determined to be slight.

The primary strength of these data are the directly applicable concentration data for 1,2-dichloropropane at landfills were used. The primary limitations were that only area samples (as opposed to PBZ samples) were available, only summary statistics were available (as opposed to discrete measurements), and the data were from only one international site. EPA has preliminarily determined that the exposures from disposal to landfill does not contribute to the unreasonable risk from 1,2-dichloropropane. The overall confidence in the occupational exposure estimates to workers for the disposal to remediation was determined to be slight-to-moderate. The primary strength of these data are that high-quality monitoring data from the test order process were used; the primary limitations of the data are that it was from facilities in a manufacturing setting with a limited number of samples, including one sample below the limit of detection. Therefore, EPA used central tendency risk estimates for intermediate, chronic non-cancer, and cancer inhalation exposures.

As mentioned previously, EPA has also preliminarily determined that cancer dermal exposures and risk significantly contribute to unreasonable risk. The Agency does not currently have information regarding the use of PPE and no dermal exposure measurements are available. As such, EPA is unable to evaluate the reported usage of gloves in the context of specific dermal exposure measurements or concentrations. Additionally, as previously noted, there are no established quantitative protection factors for gloves and this assessment did not quantify if the use of gloves would mitigate exposures relative to benchmarks. Nonetheless, the occupational dermal risk estimates may be an overestimate of dermal exposures for chronic cancer exposures. Because workers are not required to wear gloves for a full-shift basis, EPA has more certainty that dermal exposure estimates on a short duration basis (acute/intermediate) are not likely to overestimate exposure respective to potential use of dermal PPE. Incidental, intermittent, or splash contact may occur due to accidental spills, overspray conditions, or unexpected failure of a control device, as noted by the PPE standard operating procedures (SOPs) for manufacturing/processing facilities. This is not likely to occur on a chronic, routine basis over multiple years.

Table 6-6. Supporting Basis for the Disposal COU

Condition of Use (COU)	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exp. Route	Exp. Level	Human Health Effects (with APF to Address Risk)		
					Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Disposal	Disposal (Incineration) (OES #7)	Worker	I	CT	**2.9 (APF 25)**	**3.1 (APF 10)**	**1.2E−04 (APF 10)**
				HE	0.39	0.42	1.1E−03
			D	CT	310	332	**5.0E−04**
				HE	69	74	2.5E−03
		ONU	I	CT	1,117	1,196	3.1E−07
				HE	20	21	2.2E−05
	Disposal (Landfill) (OES #8)	Worker	I	CT	1,757	1,881	2.0E−07
				HE	834	893	5.3E−07
			D	CT	310	332	**5.0E−04**
				HE	69	74	2.5E−03
		ONU	I	CT	1,757	1,881	2.0E−07
				HE	1,757	1,881	2.5E−07
	Disposal (POTW and Non-POTW WWT) (OES #9 and #10)	Worker	I	CT	**2.9 (APF 25)**	**3.1 (APF 10)**	**1.2E−04 (APF 10)**
				HE	0.39	0.42	1.1E−03
			D	CT	310	332	**5.0E−04**
				HE	69	74	2.5E−03
		ONU	I	CT	1,117	1,196	3.1E−07
				HE	20	21	2.2E−05
	Remediation (OES #11)	Worker	I	CT	**2.5 (APF 25)**	**2.7 (APF 25)**	**1.4E−04 (APF 10)**
				HE	1.2	1.3	3.6E−04
			D	CT	310	332	**5.0E−04**
				HE	69	74	2.5E−03
		ONU	I	CT	**2.5 (APF 25)**	**2.7 (APF 25)**	**1.4E−04 (APF 10)**
				HE	2.5	2.7	1.8E−04

APF = assigned protection factor; CT = central tendency; D = dermal; Exp. = Exposure; HE = high-end; I = inhalation; MOE = margin of exposure; ONU = occupational non-user
Bolded/shaded values indicate MOEs exceeding the benchmark (*i.e.,* non-cancer risks < risk benchmark and cancer risks > cancer risk benchmark) contributing to unreasonable risk.
Note: No protection factors are provided for dermal risk.

6.1.3.3 COUs Covered by Modeling

Three COUs were evaluated using exposure modeling—Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes; – All-Purpose Waxes and Polishes; and – All-Purpose

Liquid Spray Cleaner COUs—were all assessed under a single OES: Commercial Use of Stone Waxes, Polishes, and Cleaners (OES #6). As noted in Section 5.3.2.1.6, EPA is relying on the consumer assessment for these COUs as it believes that commercial workers using the products under these COUs would have higher exposures for performing similar tasks more frequently. As discussed below, there are some uncertainties in these estimates and further information is presented in the Basis for the Unreasonable Risk to Consumers Section (6.1.4) below.

6.1.3.3.1 Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes; – All-Purpose Liquid Cleaner and Polish; and – All-Purpose Liquid Spray Cleaner COUs

Based on the consumer risk estimates and related risk factors outlined in Section 6.1.4, EPA preliminarily determined that the Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes, Commercial Use – All-purpose Liquid Cleaner and Polish, and Commercial Use – All-Purpose Liquid Spray Cleaner significantly contributes to unreasonable risk to workers. EPA notes that commercial workers that apply products covered by these COUs are likely to have higher exposures than consumers and thus believes the consumer assessment is likely to underestimate risk to these commercial workers. As noted in Section 6.1.4 however, EPA has determined that these COUs significantly contribute to unreasonable risk for consumers as well.

EPA used a variety of data sources to inform the exposures estimates that could result from the intended consumer/commercial uses of stone cleaning products that contain 1,2-dichloropropane. Although the Agency has consumer test order submission data that indicate current cleaning and furnishing care products do not contain 1,2-dichloropropane, EPA believes that the consumer (and thus commercial) use of these products containing 1,2-dichloropropane is reasonably foreseen for three reasons: (1) the products were reformulated to remove 1,2-dichloropropane only a few years ago; (2) products containing 1,2-dichloropropane are available outside of the United States; and (3) it is reasonable to assume there may be continued use of products that were purchased prior to reformulation. However, EPA is uncertain as to whether the future use of products containing 1,2-dichloropropane and associated exposure estimates are plausible or likely in the United States, which impacts EPA's overall confidence in the commercial use scenario. Furthermore, EPA does not currently have any information on the use of PPE for commercial workers while using these products and is thus assumed no PPE is utilized.

Inhalation Exposure

EPA has robust confidence in the inputs used to define the reasonably foreseen scenarios, including the selection of kitchen countertop surface areas, the duration and amount of product used, and the corresponding 1,2-dichloropropane weight fractions for the assumed use of products that contain 1,2-dichlorpropane or future reformulation of products to contain 1,2-dichloropropane. EPA also has robust confidence in the resultant inhalation exposure estimates as representative of the reasonably foreseen scenarios. The peak air concentration represents the instant high concentration that occurs as the product is applied. Because the product is applied multiple times across the surface, the peak concentration also represents peak exposures, which are further used in determining consumer risk. Although use on kitchen countertops is advertised in product information and is considered the most common use, other scenarios such as use on stone flooring or bathrooms were not quantified and may represent higher exposures. Thus, the use patterns like exposure duration, frequency of use, and amount of product used were based on product-specific use information from manufacturer TDS, online retailer product use instructions, and do it yourself (DIY) online websites are not overly conservative scenarios. Weight fractions and densities were obtained from publicly available, product-specific SDSs and as such, EPA considers the use of these inputs in the calculation of inhalation exposures to be representative of product use.

Dermal Exposure

EPA has considered the scientific evidence and uncertainties for the assumed use of products that contain 1,2-dichloropropane or future reformulation of products to contain 1,2-dichloropropane. The fractional absorption approach was determined to be appropriate for dermal assessment of 1,2-dichloropropane because the approach reflects the limited absorption due to its physical properties such as volatility. EPA has robust confidence in modeling used to estimate the dermal exposure to liquid materials.

The Agency used a combination of chemical-specific experimental data (fraction absorbed), and product-specific information (density and frequency of use) to model dermal exposures. Fractional absorptive dermal data was obtained via a test order (Charles River Laboratories, 2024) to model consumer dermal exposures to liquid products containing 1,2-dichloropropane (see Section 5.3.3Risk Estimates for Consumers). The experimental fraction absorbed values from test orders are considered representative for the high-intensity use exposure scenarios because these experiments were inclusive of the weight fractions considered in these scenarios (>30% w/w). For exposure scenarios with weight fractions less than 10% w/w, EPA used the experimental fraction absorbed values test order data for 1% w/w, which is representative of the low intensity exposure scenario (weight fraction of 1%).

EPA has robust confidence in the inputs used in this fractional absorption dermal exposure method. The use patterns like exposure duration, frequencies, and amount of product used are based on product-specific use information from manufacturer technical data sheets (TDSs), online retailer product use instructions, and DIY online websites. Weight fractions and densities were obtained from publicly available product specific SDSs for products previously available in the United States, and as such, EPA considers the use of these inputs in the calculation of dermal exposures to be representative of product uses.

6.1.3.4 COUs Not Contributing to the Preliminary Unreasonable Risk

Based on the risk estimates and related risk factors, EPA has preliminarily determined that one COU does not contribute to the unreasonable risk determination: Distribution in Commerce. The rationale for this preliminary risk determination is outlined below.

6.1.3.4.1 Distribution in Commerce

For Distribution in Commerce, EPA defined this COU as the transportation of 1,2-dichloropropane-containing products between sites at which 1,2-dichloropropane manufacturing, processing, and use occurs or the transportation of 1,2-dichloropropane-containing wastes for recycling or disposal. This COU was informed by the Distribution in Commerce OES (OES #12). The Agency expects all of the aforementioned materials to be transported in a form (*e.g.,* articles containing 1,2-dichloropropane) such that there is negligible potential for occupational exposure except during an incident. Other exposure opportunities during this life cycle are captured under other relevant COUs (*e.g.,* once distributed in commerce, 1,2-dichloropropane in a truck or container may be transferred and repackaged, so this exposure point in the life cycle would fall under Repackaging). Therefore, EPA has preliminarily determined that the Distribution in Commerce COU does not significantly contribute to unreasonable risk to human health.

6.1.4 Basis for the Unreasonable Risk to Consumers

EPA identified cleaning and furnishing care products—specifically pastes, liquid waxes, or liquid spray stone polishers—imported into the United States by one company, Tenax USA (U.S. EPA, 2025a). As discussed in Section 5.1.2, since the publication of the final scope document in August 2020 (U.S. EPA, 2020c), these products imported into the United States have been reformulated without 1,2-

dichloropropane (U.S. EPA, 2025a). However, the products are still formulated with 1,2-dichloropropane and available internationally (Tenax Spa, 2019, 2015a, b, c, 2013a, b). Likewise, the Agency believes it is possible that consumers have retained some unknown number of these products in their homes without knowledge of the reformulation. Because the reformulation of products is a recent change and given the availability of these products containing 1,2-dichloropropane outside of the United States, EPA believes that the use of the all-purpose waxes and polishes products, the use of all-purpose liquid cleaner and polish products, and the use of the all-purpose liquid spray cleaner products formulated with 1,2-dichloropropane are reasonably foreseen (see COUs in Table 1-1). Thus, the Agency assessed these products.

Given the identified products and the use-patterns of those products, EPA assessed consumer and bystander risk from inhalation and dermal exposures. Ingestion is not anticipated based on the identified uses of these products and the Agency does not reasonably expect exposures via ingestion. EPA assessed product user and bystander risk from inhalation exposures, but only product user for dermal exposures. This assessment was conducted via a sensitivity analysis that varied exposure durations and product concentrations. Additional consideration was given to dermal exposure based on skin surface area exposure, associated dermal dose, and life stage. The assessment for consumers was conducted for a single use as well as for multiple uses where applicable, considering low-, medium-, and high-intensity exposure scenarios, which rely on identified product specifications (*i.e.,* weight fraction, use duration, and amount of product used). The manufacturer notes that the all-purpose liquid cleaner and polish as well as the all-purpose wax and polish will only need to be repeated every year to 18 months (depending on the product); thus, for these products only acute exposures associated with a single use were assessed. Only one product, a daily spray cleaner, was identified and evaluated for chronic non-cancer and cancer risk based on potential daily use.

For acute inhalation exposure and associated hazards, the following three consumer COUs preliminarily contributed to unreasonable risk due to acute inhalation exposures: the Consumer Use – Cleaning and Furnishing Care Product – (1) All-Purpose Liquid Spray Cleaner; (2) All-Purpose Waxes and Polishes; and (3) All-Purpose Liquid Cleaner and Polish. For all three consumer COUs, the acute inhalation exposure risk estimates are below the non-cancer benchmark at the low, medium and high intensity for the user (see Table 6-7). Bystander risk estimates were below the benchmark for both the all-purpose wax and polishes and the all-purpose liquid cleaner and polish. No acute dermal risk was associated with any of these products or uses. As discussed in Section 5.3.3.3, EPA has robust confidence in these risk estimates because the consumer inhalation and dermal risk estimates are based on product-specific data and manufacturer-advertised use scenarios. Exposure estimates are based on the manufacturer or retailer's product-specific data regarding amount (mass) or product used, the weight fraction and density of each product, and duration of use are based on cited data for range of surface areas treated (*i.e.,* the square footage of stone countertops). EPA also has robust confidence in the associated hazard value (CNS depression).

For chronic non-cancer inhalation exposures, cancer inhalation exposures, and chronic dermal exposures and associated hazards, only the daily spray cleaner COU was evaluated. Users of this product have estimated risk below the inhalation chronic non-cancer benchmark at the low- (MOE = 15.7), medium- (MOE = 2.7), and high- intensity (MOE = 0.83) applications whereas bystanders have risk estimates below the benchmark at only the medium- (MOE = 24.1) and high-intensity (MOE = 7.62) applications. Users and bystanders may also have chronic cancer inhalation risk ranging from 6.22×10^{-6} to 8.14×10^{-4}. For chronic dermal non-cancer, risk estimates are below the benchmark for adult (21+ years) and youth (ages 11–15 years) users at the medium- (MOE = 21) and high-intensity (MOE = 4) application as are the risk estimates for young users (16–20 years) at the medium- (MOE = 23) and high-intensity (MOE =

4) applications. All cancer dermal risk estimates for the low-, medium-, and high-intensity application rates are 1.6×10^{-3}. The Agency may use a range of cancer risk estimates to determine risk for consumers. It is also worth noting that the Agency does not have information on how common these chronic uses are, but that they are based on the assumption that the product would be used daily for cleaning stone kitchen countertops.

Overall, EPA believes these to be reasonable estimates of risk for consumers using these spray cleaners, polishes, and waxes and thus concludes that all three COUs of Cleaning and Furnishing Care Products significantly contribute to unreasonable risk to consumers.

5182 **Table 6-7. Supporting Basis for Consumer and Commercial Worker Conditions of Use (COUs)**

Consumer COU	Product	Population (Age Range [years])	Exp. Route	Acute Non-Cancer (Benchmark MOE = 30)			Chronic Non-Cancer (Benchmark MOE = 30)			Cancer (Benchmark = 1.0E−06)		
				Low	Medium	High	Low	Medium	High	Low	Medium	High
Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Spray Cleaner	Lustro Italiano	User	Inhalation	**25.2**	**10.7**	**4.8**	**15.7**	**2.7**	**0.83**	**5.29E−05**	**2.52E−04**	**8.14E−04**
		Bystander	Inhalation	591	210	76.8	134	**24.1**	**7.62**	**6.22E−06**	**2.76E−05**	**7.40E−05**
		User (Adult 21+)	Dermal	2.9E04	6,355	1,362	155	**21**	**4**	**1.60E−03**	**1.60E−03**	**1.60E−03**
		User (16–20)	Dermal	3.1E04	6,791	1,455	165	**23**	**4**			
		User (11–15)	Dermal	2.8E04	6,210	1,331	151	**21**	**4**			
Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polishes	Cera Fluida Classic Liquid Wax	User	Inhalation	**6.57E−02**	**5.42E−02**	**4.57E−02**	–	–	–	–	–	–
		Bystander	Inhalation	**0.442**	**0.281**	**0.201**	–	–	–	–	–	–
		User (Adult 21+)	Dermal	396	198	66	–	–	–	–	–	–
		User (16–20)	Dermal	423	211	70	–	–	–	–	–	–
		User (11–15)	Dermal	387	193	64	–	–	–	–	–	–
	UniBlack2	User	Inhalation	**0.12**	**9.35E−02**	**6.34E−02**	–	–	–	–	–	–
		Bystander	Inhalation	**0.796**	**0.481**	**0.279**	–	–	–	–	–	–
		User (Adult 21+)	Dermal	714	268	71	–	–	–	–	–	–
		User (16–20)	Dermal	763	286	76	–	–	–	–	–	–
		User (11–15)	Dermal	698	262	70	–	–	–	–	–	–
Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes	CeraTe Wax	User	Inhalation	**9.24E−02**	**7.33E−02**	**4.94E−02**	–	–	–	–	–	–
		Bystander	Inhalation	**0.621**	**0.379**	**0.218**	–	–	–	–	–	–
		User (Adult 21+)	Dermal	714	268	71	–	–	–	–	–	–
		User (16–20)	Dermal	763	286	76	–	–	–	–	–	–
		User (11–15)	Dermal	698	262	70	–	–	–	–	–	–

Consumer COU	Product	Population (Age Range [years])	Exp. Route	Acute Non-Cancer (Benchmark MOE = 30)			Chronic Non-Cancer (Benchmark MOE = 30)			Cancer (Benchmark = 1.0E−06)		
				Low	Medium	High	Low	Medium	High	Low	Medium	High
Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes	Quartz Toner	User	Inhalation	**4.02**	**1.88**	**1.03**	–	–	–	–	–	–
		Bystander	Inhalation	**27.1**	**9.73**	**4.53**	–	–	–	–	–	–
		User (Adult 21+)	Dermal	2.86E04	6,355	1,362	–	–	–	–	–	–
		User (16–20)	Dermal	3.06E04	6,791	6,210	–	–	–	–	–	–
		User (11–15)	Dermal	2.79E04	6,210	1,331	–	–	–	–	–	–

"–" = not assessed; Exp. = exposure; MOE = margin of exposure
Bolded/shaded values indicate MOEs exceeding the benchmark (*i.e.,* non-cancer risks < risk benchmark and cancer risks > cancer risk benchmark) contributing to unreasonable risk.

5183

6.1.5 Basis for No Unreasonable Risk to the General Population

Based on the draft risk evaluation for 1,2-dichloropropane—including the risk estimates, the human health effects of 1,2-dichloropropane, the exposures, physical and chemical properties of 1,2-dichloropropane, as well as the consideration of uncertainties—EPA has preliminarily determined that no COU contributes to unreasonable risk to the general population, including PESS such as fenceline communities.

EPA considered the following exposure routes and pathways in this draft risk evaluation:

- inhalation exposure to ambient air in proximity to releasing facilities, including fenceline communities;
- incidental ingestion from swimming;
- incidental dermal exposure from swimming;
- ingestion of surface water and groundwater-sourced drinking water;
- fish ingestion; and
- exposure via the land pathway (*i.e.,* landfills and biosolids).

EPA quantitatively assessed risk to the general population for inhalation exposure to ambient air in proximity to releasing facilities, including fenceline communities, oral ingestion and dermal exposure from swimming in surface water, and ingestion of drinking water. For pathways assessed quantitatively, the Agency used the highest modeled 1,2-dichloropropane concentration in the various environmental media for both facility-specific releases and generic scenario releases for screening-level purposes. EPA used an MOE approach using upper-bound exposure estimates with the human health POD to determine whether an exposure pathway had non-cancer risk estimates below the benchmark. Again, calculated risk estimates alone are not "bright-line" indicators of unreasonable risk and other risk-related factors such as the Agency's confidence in the hazard and exposure characterization are used to inform the risk estimate and risk characterization. Each pathway is discussed below.

Basis of the Preliminary Risk Determination for Ambient Air

EPA assessed acute, chronic non-cancer, and cancer risk to the general population from inhalation of 1,2-dichloropropane in ambient air in proximity to releasing facilities. These risks were evaluated using HEM modeling as discussed in Section 5.1.3.1, and further detailed in the *Draft Supplemental Information on HEM TRI Exposure and Risk Analysis for 1,2-Dichloropropane (*U.S. EPA, 2026ad*)* and *Draft Supplemental Information on HEM NEI Exposure and Risk Analysis for 1,2-Dichloropropane* (U.S. EPA, 2026ac). For TRI releases, acute and chronic non-cancer were above their corresponding benchmark for every reporting year for both stack and fugitive releases. Similarly, no cancer risk estimates exceeded 1 in 1 million (1.0×10^{-6}). For NEI releases, acute and chronic non-cancer were above their corresponding benchmark for every reporting year for both stack and fugitive releases. One COU (Processing as a Reactant) approached the 1 in 1 million (1.0×10^{-6}), but no populations were estimated to have an inhalation cancer risk greater than 1 in 100,000 (1.0×10^{-5}). Because this risk estimate was close to the benchmark and no population risk estimates exceeded the next possible benchmark, the Agency has low confidence in the risk estimates. Furthermore, EPA believes these estimates may be an overestimate of risk and are not using them as a supporting basis for a preliminary determination of unreasonable risk to human health for 1,2-dichloropropane.

For three COUs (Commercial use – Cleaning and Furnishing Care Product – All-Purpose Liquid Spray Cleaner; Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes; and Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polish),

no environmental releases were estimated. EPA believes that the general populations would not be at unreasonable risk for ambient air inhalation from these products.

Overall, EPA has preliminarily determined that there is no significant contribution to unreasonable risk from 1,2-dichloropropane to general population from inhalation of ambient air for any COU. The results of these assessments support EPA's preliminary determination that there is no significant contribution to unreasonable risk to the general population from ambient air. This is based on most OESs with facility-specific releases having no risk estimates below the benchmark, and EPA having low confidence in one scenario (Processing as a Reactant) indicating risk at the 1 in a million benchmark.

Basis of the Preliminary Risk Determination for Incidental Surface Water Ingestion

EPA assessed acute non-cancer risk to the general population from oral (Section 5.3.4.1.6) exposure to 1,2-dichloropropane while swimming in surface water using a screening-level assessment. Chronic non-cancer and cancer oral risk estimates were not assessed for this pathway. Surface water concentrations were modeled for a high-end facility-specific release. The POTW releases under the Disposal COU resulted in the greatest exposure and represents a high-end exposure to 1,2-dichloroprpane. The non-cancer risk estimate associated with this OES for acute incidental oral swimming exposures was well above the benchmark MOE of 30 (*i.e.,* 1.9×10^{5}). As discussed in Section 5.1.3.4, EPA has robust confidence that the modeled surface water concentrations presented represent higher-end estimated 1,2-dichloropropane concentrations, and that these are reasonably applied for estimation of potential oral exposure. Overall, EPA has robust confidence that there are no identified risks below the benchmark across all scenarios assessed for swimming because of the use of high-end dermal and oral exposures combined with the use of a health-protective POD and UF for an acute scenario, resulting in no risk estimates below the benchmark. Therefore, the Agency has preliminarily determined that there is no significant contribution to unreasonable risk from 1,2-dichloropropane to general population from incidental surface water ingestion.

Basis of the Risk Determination for Drinking Water Ingestion

EPA assessed acute non-cancer and chronic non-cancer risk to the general population from oral (Section 5.3.4.1.6) exposure to 1,2-dichloropropane in drinking water sourced from surface water. The POTW releases under the Disposal COU resulted in the greatest exposure and represents a high-end exposure to 1,2-dichloroprpane. EPA estimated risk estimates associated with potential infant drinking exposures of the 1,2-dichloropropane as infants have higher exposures given their drinking water ingestion (as assumed for formula-fed infants) relative to body weight is greater than other age groups. The acute drinking water risks was estimated to be 1.8×10^{5} for infant exposures and chronic infant risk estimates was 2.3×10^{6}. Both MOEs are well above the benchmark MOE of 30. The cancer risk estimates based on cancer oral exposures are 8.6×10^{-8}, which is significantly lower than the cancer risk benchmark range of 1×10^{-4} to 1×10^{-6}. As discussed in Section 3.3.2, EPA has robust confidence that the modeled surface water concentrations presented represent higher-end estimated concentrations, and that these concentrations are reasonably applied for estimation of potential oral exposure.

For drinking water sourced from groundwater, chronic and cancer oral risk were estimated. Even when based on conservative assumptions that would lead to overestimations of risk (*i.e.,* a person living near a poorly managed landfill that is leaking), no risk estimates exceeded their relevant benchmarks (*i.e.,* MOE of 1.71×10^{6} for non-cancer and 2.47×10^{-7} cancer oral risk). Therefore, has EPA has preliminarily concluded that this pathway does not contribute to the unreasonable risk from 1,2-dichloropropane. As discussed in Section 5.3.4.1.6, there is moderate confidence in these estimates.

Overall, EPA has robust confidence and that all scenarios assessed for drinking water do not contribute to unreasonable risk, because of the use of high-end oral exposures combined with the use of a health-protective POD and UF for an acute and chronic scenarios resulting in (1) no risk estimates below the benchmark for acute non-cancer risk benchmark and (2) no cancer risk estimates above the cancer risk benchmark. These findings support EPA's preliminary determination that there is no significant contribution to unreasonable risk to the general population from oral exposure from incidental acute oral ingestion of surface water while swimming; acute, chronic, and lifetime ingestion of surface water-sourced drinking water; and chronic and lifetime ingestion of groundwater-sourced drinking water near landfills.

Basis of the Risk Determination for Incidental Dermal Exposure

EPA estimated the MOEs for incidental dermal risk from swimming in waterways potentially containing 1,2-dichloropropane. These risk estimates ranged from 3.9×10^4 to 2.3×10^7 and are well above the benchmark MOE of 30. EPA has robust confidence in these estimates because they are likely to be overestimates of risk as they consider the highest potential release based on the POTW releases under the Disposal COU. EPA has preliminarily determined that there is no significant contribution to unreasonable risk from 1,2-dichloropropane to general population from incidental dermal exposure.

Basis of the Risk Determination for Fish Ingestion

EPA estimated MOE risk for acute and chronic ingestion of fish after release of 1,2-dichloropropane to waterways based on POTW releases under the Disposal COU. For the general population, the acute MOE was 5.4×10^4 and the chronic MOE was 5.4×10^5. Risk estimates were also calculated for tribal populations that are anticipated to consume fish in large amounts. The acute risk estimate for these populations was 4.2×10^4 and the chronic risk estimate was 6.7×10^4. All MOEs are above the benchmark of 30; therefore, EPA has confidence that its assessment is not underestimating risk from fish ingestion because of the reliance on highest potential release. Therefore, the Agency has preliminarily determined that there is no significant contribution to unreasonable risk from 1,2-dichloropropane to general population from fish ingestion.

6.2 Unreasonable Risk to the Environment

Based on this draft risk evaluation—including the risk estimates, the environmental effects of for 1,2-dichloropropane, the exposures, and the physical and chemical properties of 1,2-dichloropropane—EPA has preliminarily determined that no COU significantly contributes to unreasonable risk of injury to the environment. The Agency expects 1,2-dichloropropane to be released to the environment via air, surface water, and from biosolids to soils. Environmental risk of 1,2-dichloropropane to aquatic organisms was assessed by COUs for the water pathway with facility-specific release scenarios (Section 4.2.1). For terrestrial species, environmental risk of 1,2-dichloropropane in air was assessed using high-end exposure concentrations in a screening assessment from reported releases and generic scenarios (Section 4.2.3). Environmental risk of 1,2-dichloropropane to terrestrial organisms via exposures to soils via biosolids and air-to-soil deposition. Dietary exposure to 1,2-dichloropropane was assessed via bioaccumulation in fish based on weight of evidence approaches related to monitoring data, physical and chemical properties, fugacity modeling, and release information.

EPA calculated risk quotients (RQs) that can provide a risk profile by presenting a range of estimates for different environmental hazard effects for different COUs. An RQ equal to 1 indicates that the exposures are the same as the concentration that has been shown to cause effects. An RQ is less than 1 when the exposure is less than the effect concentration. This generally indicates that the COU does not contribute to a preliminary determination of significant risk to the environment. An RQ is greater than 1 when the exposure is greater than the effect concentration. In addition to RQ values, when an RQ is 1 or greater

the Agency evaluates the number of days that a concentration exceeded a hazard threshold to align the durations of 1,2-dichloropropane exposure to the acute or chronic exposure durations that lead to adverse population effects before making a preliminary determination of significant contribution to unreasonable risk. Based on EPA's screening assessments, no RQs were found to be above 1 for any pathway as discussed below

6.2.1 Populations and Exposures Assessed for the Environment

EPA estimated environmental exposures to both aquatic and terrestrial species based on releases of 1,2-dichloropropane and concentrations of 1,2-dichloropropane in the environment as part of its environmental risk assessment. For aquatic organisms, the Agency estimated exposures from surface water and sediment. The Agency also estimated exposure to algae from surface water. Exposures of 1,2-dichloropropane within soils amended with biosolids were also assessed for soil-dwelling terrestrial invertebrates and plants. Inhalation exposure of terrestrial mammals to 1,2-dichloropropane via the ambient air pathway were conducted through modeling.

6.2.2 Summary of Environmental Effects

EPA has preliminarily determined that no COUs assessed significantly contribute to unreasonable risk to the environment presented by 1,2-dichloropropane because environmental concentrations are well below identified environmental hazard thresholds. Reasonably available data for 1,2-dichloropropane has allowed for the identification of hazard thresholds for a variety of receptor groups (aquatic and terrestrial) and exposure durations (acute and chronic) that increase confidence in the preliminary risk determination for this chemical (Table 4-3). Thus, EPA made the preliminarily determination of no contribution to unreasonable risk for aquatic organisms, including fish, benthic invertebrates, and algae.

EPA has preliminarily determined that no COU assessed significantly contributes to unreasonable risk for terrestrial organisms, including soil-dwelling invertebrates, via 1,2-dichloropropane in biosolid-amended soil. EPA has also preliminarily determined that no COU assessed significantly contribute to unreasonable risk for terrestrial organisms, including terrestrial mammals, due to inhalation or tropic transfer from fish ingestion. Additional information about EPA's confidence in the aquatic, terrestrial, and trophic transfer hazard assessments are provided in Section 4.4.2.4 of this draft risk evaluation.

6.2.3 Basis for No Unreasonable Risk to the Environment

Based on this draft risk evaluation for 1,2-dichloropropane, including the risk estimates, the environmental effects of 1,2-dichloropropane, exposures, physical and chemical properties of 1,2-dichloropropane, as well as the consideration of uncertainties, EPA has preliminarily determined that no COU significantly contributes to unreasonable risk to the environment.

6.2.3.1 Aquatic Species

For aquatic organisms, surface water and sediment (including pore water) were characterized by comparing hazard thresholds from exposures due to industrial releases. Each surface water releasing COU with facility-specific TRI or DMR data was used to produce modeled concentrations of 1,2-dichloropropane in surface water (Section 4.4.1). Similarly, a screening-level assessment was conducted with facility-specific TRI or DMR data to represent the highest modeled concentrations of 1,2-dichloropropane in sediment (Sections 4.2.2 and 4.4.1). EPA's confidence in the aquatic exposure assessment for the surface water and sediment pathways are robust because they represent conservative modeling and monitoring information to inform the assessment. Modeled 1,2-dichloropropane concentrations resulting from facility-specific, reported data are represented within Table 4-4 for surface water and Table 4-5 for sediment. There were no modeled concentrations resulting in RQs greater than 1

for acute or chronic exposures for surface water and chronic exposures to sediment and porewater, respectively.

Exposure pathways to surface water and sediment for the Disposal COU were considered for 5 different scenarios (OESs #9 to #13; see Table 3-1) and considered using DMR-reported data (Table 4-4 and Table 4-5). Based on this assessment for risk to aquatic species, EPA has preliminarily determined that this pathway does not significantly contribute to the unreasonable risk of 1,2-dichloropropane.

6.2.3.2 Terrestrial Species

For terrestrial organisms, IIOAC modeling was used to assess inhalation exposures to terrestrial mammals via the ambient air pathway using COUs with fugitive and stack emissions 30 and 100 m from the release source (Section 3.1.5) and represented for COUs with TRI data in Table 5-2, NEI data in Table 5-3, fugitive releases for generic scenario OESs in Table 5-4, and stack releases for generic scenarios in Table 5-5 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e). EPA's confidence in the exposure assessment for the air pathway is robust with modeling and monitoring data informing the exposure characterization. The assessment of risk to terrestrial invertebrates via biosolid-amended soil exposure is based on robust confidence that 1,2-dichloropropane will be present at concentrations in soils based well below hazard thresholds identified for soil invertebrates on the monitoring data, physical and chemical properties, fugacity modeling, and release data (Section 4.4.2).

No reasonably available studies report evidence of 1,2-dichloropropane in tissues of wild-caught fish or other organisms and no modeled bioaccumulation estimates indicate a low BAF factor (see Section 3.5.4 in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)). EPA has robust confidence that low bioaccumulation potential (Section 2.2) and demonstration of empirical and modeled bioaccumulation metrics (Table 2-2) indicate that risk from exposure via fish ingestion are not anticipated. Based on this assessment for risk to terrestrial species, EPA has preliminarily determined that this pathway does not significantly contribute to the unreasonable risk of 1,2-dichloropropane.

COUs with exposure pathways with media of release leading to air deposition to soil and trophic transfer do not preliminarily significantly contribute to unreasonable risk to the environment. This is based on multiple lines of evidence, including physical and chemical properties, fugacity modeling, reasonably available environmental monitoring, and release data. Furthermore, air deposition to soil and water is not expected to be significant and was not assessed in this draft risk evaluation (see Section 8.1 of the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)). Both modeled and empirical studies on 1,2-dichloropropane bioaccumulation indicate a limited ability for this compound to accumulate in fish (see Section 3.5.4 in the *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)).

6.3 Additional Information Regarding the Basis for the Preliminary Risk Determination

Table 6-8 (workers/ONUs) and Table 6-9 (consumer/bystanders) summarize the basis for EPA's preliminary unreasonable risk determination of injury to human health. Bolded and shaded numbers indicate estimates that were used to inform the significant contributions to unreasonable risk. Both tables identify the duration of exposure (*e.g.,* acute, intermediate, or chronic duration) and the exposure route to the population. The APFs of the PPE in parentheses for workers represent the minimum necessary measures required, when other exposure controls (*e.g.,* engineering controls) are not in place, so that the

risk is no longer unreasonable. However, PPE is not included where the exposed population would not be expected to wear PPE (*e.g.,* ONUs and the general population).

5416 **Table 6-8. Supporting Basis for the Preliminary Unreasonable Risk Determination for Human Health (Workers and ONUs)**

Condition of Use	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exposure Route	Exposure Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Exposure (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Manufacture – Domestic Manufacture	Manufacture (OES #1)	Laboratory Technician	Inhalation	CT	2,487	**22 (APF 10)**	**23 (APF 10)**	1.6E−05
				HE	468	4.1	4.4	1.1E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Laboratory Technician – Pooled Samples	Inhalation	CT	3.8	**3.8 (APF 10)**	**4.0 (APF 50)**	9.1E−05
				HE	**1.0 (APF 10)**	**1.0 (APF 50)**	1.1	4.2E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Logistics Technician	Inhalation	CT	64	**0.95 (APF 50)**	**0.96 (APF 50)**	**3.8E−04**
				HE	36	0.53	0.53	8.9E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Logistics Technician – Pooled Samples	Inhalation	CT	325	**4.8 (APF 10)**	**4.9 (APF 10)**	7.5E−05
				HE	44	**0.66 (APF 50)**	0.67	7.1E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Processing Operator	Inhalation	CT	5,101	45	48	7.7E−06
				HE	185	1.6	1.7	2.7E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Maintenance Technician	Inhalation	CT	496	48	49	7.6E−06
				HE	430	41	42	1.1E−05

Condition of Use	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exposure Route	Exposure Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Exposure (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Manufacture – Domestic Manufacture	Manufacture (OES #1)	Maintenance Technician	Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		ONU	Inhalation	CT	2.5E04	220	236	1.6E−06
				HE	6,911	61	65	7.3E−06
Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing	Processing as a Reactant (OES #3)	Laboratory Technician	Inhalation	CT	302	**2.6 (APF 25)**	**2.8 (APF 25)**	**1.3E−04 (APF 10)**
				HE	115	**1.0 (APF 50)**	1.1	4.4E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Logistics Technician	Inhalation	CT	630	**9.3 (APF 10)**	**9.5 (APF 10)**	3.9E−05
				HE	121	1.1	1.1	4.2E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Marine Logistics Technician	Inhalation	CT	1,021	33	33	1.1E−05
				HE	**3.7 (APF 10)**	**0.12 (APF 1,000)**	0.12	3.9E−03
			Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Processing Operator	Inhalation	CT	694	**6.1 (APF 10)**	**6.5 (APF 10)**	5.6E−05
				HE	28	**0.25 (APF 1,000)**	0.26	1.8E−03
			Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		Maintenance Technician	Inhalation	CT	4.1E04	3,948	4,003	9.2E−08
				HE	29	2.8	2.8	1.7E−04

Condition of Use	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exposure Route	Exposure Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Exposure (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Processing – Processing as a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing	Processing as a Reactant (OES #3)	Maintenance Technician	Dermal	CT	51	110	118	**1.4E−03**
				HE	20	44	47	4.0E−03
		ONU	Inhalation	CT	8,355	73	78	4.7E−06
				HE	168	1.5	1.6	3.0E−04
Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing	Processing as a Reactant (OES #3)	Laboratory Technician	Inhalation	CT	302	**2.6 (APF 25)**	**2.8 (APF 25)**	**1.3E−04 (APF 10)**
				HE	115	**1.0 (APF 50)**	1.1	4.37E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Logistics Technician	Inhalation	CT	630	**9.3 (APF 10)**	**9.5 (APF 10)**	3.9E−05
				HE	121	1.1	1.1	4.2E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Marine Logistics Technician	Inhalation	CT	1,021	33	33	1.1E−05
				HE	**3.7 (APF 10)**	**0.12 (APF 1,000)**	0.12	3.9E−03
			Dermal	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Processing Operator	Inhalation	CT	694	**6.1 (APF 10)**	**6.5 (APF 10)**	5.6E−05
				HE	28	**0.25 (APF 1,000)**	0.26	1.8E−03
			Dermal	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03

Condition of Use	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exposure Route	Exposure Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Exposure (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Processing – Incorporation into Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing	Processing as a Reactant (OES #3)	Maintenance Technician)	Inhalation	CT	4.1E04	3,948	4,003	9.2E−08
				HE	29	2.8	2.8	1.7E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		ONU	Inhalation	CT	8,355	73	78	4.7E−06
				HE	168	1.5	1.6	3.0E−04
Manufacture – Import	Import/Processing – Repackaging (OES #2)	Worker	Inhalation	CT	325	**2.9 (APF 25)**	**3.0 (APF 10)**	**1.2E−04 (APF 10)**
				HE	44	**0.39 (APF 1,000)**	0.42	1.1E−03
			Dermal	CT	51	137	147	**1.1E−03**
				HE	**20**	44	47	3.4E−03
		ONU	Inhalation	CT	1.3E05	1,117	1,196	3.1E−07
				HE	121	1.1	1.1	4.2E−04
Processing – Repackaging	Import/Processing – Repackaging (OES #2)	Worker	Inhalation	CT	325	**2.9 (APF 25)**	**3.0 (APF 10)**	**1.2E−04 (APF 10)**
				HE	44	**0.39 (APF 1,000)**	0.42	1.1E−03
			Dermal	CT	51	137	147	**1.1E−03**
				HE	**20**	44	47	3.4E−03
		ONU	Inhalation	CT	1.3E05	1,117	1,196	3.1E−07
				HE	121	1.1	1.1	4.2E−04
Industrial Use – Non-Incorporative Activities – Processing Aids	Processing Aid – Non-Incorporative Activities (OES #4)	Laboratory Technician	Inhalation	CT	302	**2.6 (APF 25)**	**1.6 (APF 25)**	**1.3E−04 (APF 10)**
				HE	115	**1.0 (APF 50)**	2.8	4.4E−04

Condition of Use	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exposure Route	Exposure Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Exposure (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Industrial Use – Non-Incorporative Activities – Processing Aids	Processing Aid – Non-Incorporative Activities (OES #4)	Laboratory Technician	Dermal	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Logistics Technician	Inhalation	CT	630	**5.5 (APF 10)**	**5.9 (APF 10)**	6.2E−05
				HE	121	**1.1 (APF 50)**	1.1	4.2E−04
			Dermal	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Processing Operator	Inhalation	CT	694	**6.1 (APF 10)**	**6.5 (APF 10)**	5.6E−05
				HE	28	**0.25 (APF 1,000)**	0.26	1.8E−03
			Dermal	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		Maintenance Technician	Inhalation	CT	4.1E04	359	384	9.5E−07
				HE	29	0.25	0.26	1.8E−03
			Dermal	CT	51	110	118	**1.4E−03**
				HE	**20**	44	47	4.0E−03
		ONU	Inhalation	CT	8,355	73	78	4.7E−06
				HE	168	1.5	1.6	3.0E−04
Commercial Use – Other uses – Laboratory Chemical	Laboratory Use (OES #5)	Worker	Inhalation	CT	429	**3.8 (APF 10)**	**4.0 (APF 10)**	9.1E−05
				HE	120	1.0	1.1	4.2E−04
			Dermal	CT	2.7E04	7.1E04	7.6E04	2.2E−06
				HE	33	86	92	1.9E−03
		ONU	Inhalation	CT	9,803	86	92	4.0E−06
				HE	8,164	72	77	6.2E−06

Condition of Use	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exposure Route	Exposure Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Exposure (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)
Disposal	Disposal (Incineration) (OES #7)	Worker	Inhalation	CT	325	**2.9 (APF 25)**	**3.1 (APF 10)**	**1.2E−04 (APF 10)**
				HE	44	0.39	0.42	1.1E−03
			Dermal	CT	144	310	332	**5.0E−04**
				HE	32	69	74	2.5E−03
		ONU	Inhalation	CT	1.3E05	1,117	1,196	3.1E−07
				HE	2,283	20	21	2.2E−05
	Disposal (Landfill) (OES #8)	Worker	Inhalation	CT	2.0E05	1,757	1,881	2.0E−07
				HE	9.5E04	834	893	5.3E−07
			Dermal	CT	144	310	332	**5.0E−04**
				HE	32	69	74	2.5E−03
		ONU	Inhalation	CT	2.0E05	1,757	1,881	2.0E−07
				HE	2.0E05	1,757	1,881	2.5E−07
Disposal	Disposal (POTW and Non-POTW WWT) (OES #9 and #10)	Worker	Inhalation	CT	325	**2.9 (APF 25)**	**3.1 (APF 10)**	**1.2E−04 (APF 10)**
				HE	44	0.39	0.42	1.1E−03
			Dermal	CT	144	310	332	**5.0E−04**
				HE	32	69	74	2.5E−03
		ONU	Inhalation	CT	1.3E05	1,117	1,196	3.1E−07
				HE	2,283	20	21	2.2E−05
	Remediation (OES #11)	Worker	Inhalation	CT	286	**2.5 (APF 25)**	**2.7 (APF 25)**	**1.4E−04 (APF 10)**
				HE	141	1.2	1.3	3.6E−04
			Dermal	CT	144	310	332	**5.0E−04**
				HE	32	69	74	2.5E−03
		ONU	Inhalation	CT	286	**2.5 (APF 25)**	**2.7 (APF 25)**	**1.4E−04 (APF 10)**
				HE	286	2.5	2.7	1.8E−04

Condition of Use	Occupational Exposure Scenario (OES)	Similar Exposure Group (SEG)	Exposure Route	Exposure Level	Human Health Effects (with APF to Address Risk)			
					Acute, 8-hour Exposure (MOE = 30)	Intermediate Non-Cancer (MOE = 30)	Chronic Non-Cancer (MOE = 30)	Cancer (Benchmark = 1E−04)

APF = assigned protection factor; CT = central tendency; HE = high-end; MOE = margin of exposure; ONU = occupational non-user; POTW = publicly owned treatment works; WWT = wastewater treatment
Bolded/shaded values indicate MOEs exceeding the benchmark (*i.e.,* non-cancer risks < risk benchmark and cancer risks > cancer risk benchmark) contributing to unreasonable risk.
Note: No protection factors are provided for dermal risk.

Table 6-9. Supporting Basis for the Preliminary Unreasonable Risk Determination for Human Health (Consumers and Commercial Workers)

Consumer Condition of Use	Product	Population (Age Range [years])	Exp. Route	Acute Non-Cancer (Benchmark MOE = 30)			Chronic Non-Cancer (Benchmark MOE = 30)			Cancer (Benchmark = 1.0E−06)		
				Low	Medium	High	Low	Medium	High	Low	Medium	High
Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Spray Cleaner	Lustro Italiano	User	Inhalation	**25**	**11**	**4.8**	**16**	**2.7**	**0.83**	**5.3E−05**	**2.5E−04**	**8.1E−04**
		Bystander	Inhalation	591	210	77	134	**24**	**7.6**	**6.2E−06**	**2.8E−05**	**7.4E−05**
		User (Adult 21+)	Dermal	28,597	6,355	1,362	155	**21**	**4**	**1.6E−03**	**1.6E−03**	**1.6E−03**
		User (16–20)	Dermal	30,560	6,791	1,455	165	**23**	**4**			
		User (11–15)	Dermal	27,947	6,210	1,331	151	**21**	**4**			
Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polishes	Cera Fluida Classic Liquid Wax	User	Inhalation	**6.6E−02**	**5.4E−02**	**4.6E−02**	–	–	–	–	–	–
		Bystander	Inhalation	**0.44**	**0.28**	**0.201**	–	–	–	–	–	–
		User (Adult 21+)	Dermal	396	198	66	–	–	–	–	–	–
		User (16–20)	Dermal	423	211	70	–	–	–	–	–	–
		User (11–15)	Dermal	387	193	64	–	–	–	–	–	–
	UniBlack2	User	Inhalation	**0.12**	**9.4E−02**	**6.3E−02**	–	–	–	–	–	–
		Bystander	Inhalation	**0.80**	**0.48**	**0.28**	–	–	–	–	–	–
		User (Adult 21+)	Dermal	714	268	71	–	–	–	–	–	–

Consumer Condition of Use	Product	Population (Age Range [years])	Exp. Route	Acute Non-Cancer (Benchmark MOE = 30)			Chronic Non-Cancer (Benchmark MOE = 30)			Cancer (Benchmark = 1.0E−06)		
				Low	Medium	High	Low	Medium	High	Low	Medium	High
Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polishes	UniBlack2	User (16–20)	Dermal	763	286	76	–	–	–	–	–	–
		User (11–15)	Dermal	698	262	70	–	–	–	–	–	–
Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes	CeraTe Wax	User	Inhalation	**9.2E−02**	**7.3E−02**	**4.9E−02**	–	–	–	–	–	–
		Bystander	Inhalation	**0.62**	**0.38**	**0.22**	–	–	–	–	–	–
		User (Adult 21+)	Dermal	714	268	71	–	–	–	–	–	–
		User (16–20)	Dermal	763	286	76	–	–	–	–	–	–
		User (11–15)	Dermal	698	262	70	–	–	–	–	–	–
	Quartz Toner	User	Inhalation	**4.02**	**1.9**	**1.03**	–	–	–	–	–	–
		Bystander	Inhalation	**27**	**9.7**	**4.5**	–	–	–	–	–	–
		User (Adult 21+)	Dermal	2.9E04	6,355	1,362	–	–	–	–	–	–
		User (16–20)	Dermal	3.1E04	6,791	6,210	–	–	–	–	–	–
		User (11–15)	Dermal	2.8E04	6,210	1,331	–	–	–	–	–	–

"–" = not assessed; Exp. = exposure; MOE = margin of exposure
Bolded/shaded values indicate MOEs exceeding the benchmark (*i.e.,* non-cancer risks < risk benchmark and cancer risks > cancer risk benchmark) contributing to unreasonable risk.

5421

REFERENCES

ACC. (2021). ACC PDC TSCA Consortium Monitoring Data - Letters and data files. Washington, DC: ACC PDC TSCA Consortium.

ACC. (2023). TSCA Section 4 (a) Test Order for 1,2-dichloropropane: Consumer exposure testing update on source characterization for consumer product emissions. Washington, DC: American Chemistry Council (ACC) 1,2-Dichloropropane (PDC) Consortium. https://www.regulations.gov/document/EPA-HQ-OPPT-2018-0428-0060.

ATSDR. (1989). Toxicological profile for 1,2-dichloropropane [ATSDR Tox Profile]. (RISKLINE/1991090047). Atlanta, GA: U.S. Department of Health and Human Services, U.S. Public Health Service. https://www.atsdr.cdc.gov/ToxProfiles/tp134.pdf.

ATSDR. (2021). Toxicological profile for 1,2-dichloropropane [ATSDR Tox Profile]. Atlanta, GA. https://www.atsdr.cdc.gov/ToxProfiles/tp134.pdf.

Barnthouse, LW; DeAngelis, DL; Gardner, RH; O'Neill, RV; Suter, GW; Vaughan, DS. (1982). Methodology for environmental risk analysis. (ORNL/TM-8167). Oak Ridge, TN: Oak Ridge National Laboratory.

Bartels, MJ; Timchalk, C. (1990). 1,2-Dichloropropane: Investigation of the mechanism of mercapturic acid formation in the rat. Xenobiotica 20: 1035-1042. https://dx.doi.org/10.3109/00498259009046824.

Barton, H; Cogliano, J; Firestone, MP; Flowers, L; Setzer, RW; Valcovic, L; Woodruff, T. (2005). Supplemental guidance for assessing susceptibility from early-life exposure to carcinogens. Washington, DC: US Environmental Protection Agency.

Boesten, J; Vanderpas, LJT; Leistra, M; Smelt, JH; Houx, NWH. (1992). Transformation of 14C-labelled 1,2-dichloropropane in water-saturated subsoil materials. Chemosphere 24: 993-1011.

Bruckner, JV; MacKenzie, WF; Ramanathan, R; Muralidhara, S; Kim, HJ; Dallas, CE. (1989). Oral toxicity of 1,2-dichloropropane: Acute, short-term, and long-term studies in rats. Fundam Appl Toxicol 12: 713-730. https://dx.doi.org/10.1016/0272-0590(89)90003-1.

CEB. (1991). Chemical Engineering Branch manual for the preparation of engineering assessments: Volume I. CEB engineering manual. Washington, DC: Office of Pollution Prevention and Toxics, US Environmental Protection Agency.

Charles River Laboratories. (2024). The in vitro percutaneous absorption of radiolabelled 1,2-dichloropropane (PDC) in thirteen dose scenarios through human split-thickness skin. (20469996). Washington, DC: American Chemistry Council.

Cimorelli, AJ; Perry, SG; Venkatram, A; Weil, JC; Paine, RJ; Wilson, RB; Lee, RF; Peters, WD; Brode, RW; Paumier, JO; Thurman, J. (2018). AERMOD Model Formulation and Evaluation, April 2018 (EPA-454/R-18-003). Cimorelli, AJ; Perry, SG; Venkatram, A; Weil, JC; Paine, RJ; Wilson, RB; Lee, RF; Peters, WD; Brode, RW; Paumier, JO; Thurman, J.

Cohen, SZ; Creeger, SM; Carsel, RF; Enfield, CG. (1984). Potential for pesticide contamination of groundwater resulting from agricultural uses. In SJN Krueger Rf (Ed.), Treatment and disposal of pesticide wastes (pp. 297-325). Washington D.C.: American Chemical Society.

DOE. (2016). Table 1: Chemicals of concern and associated chemical information. PACs. Washington, D.C.

Dow Chemical. (1983). [Redacted] Propylene dichloride: One day and two week inhalation toxicity study in rats, mice and rabbits. (HET K-002127-005). Midland, MI.

Dow Chemical. (1988). Final report on propylene dichloride 13-week inhalation toxicity study with rats, mice and rabbits with cover letter dated 032888 [TSCA Submission]. (Study ID: K-002127-006. OTS0000399-1. FYI-OTS-0488-0399. TSCATS/303604).

DuPont. (2005). Propylene dichloride: In vitro dermal absorption rate testing [TSCA Submission]. Midland, MI: Dow Chemical Company. https://www.regulations.gov/document/EPA-HQ-OPPT-2003-0006-0319.

ECB. (2003). Technical guidance document on risk assessment: Part II. (EUR 20418 EN/2). Luxembourg: Office for Official Publications of the European Communities. http://ihcp.jrc.ec.europa.eu/our_activities/public-health/risk_assessment_of_Biocides/doc/tgd/tgdpart2_2ed.pdf.

ECHA. (2016). Guidance on information requirements and chemical safety assessment. Chapter R.16: Environmental exposure assessment. (ECHA-16-G-03-EN). Helsinki, Finland. https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf/b9f0f406-ff5f-4315-908e-e5f83115d6af.

ECHA. (2022). ECHA scientific report for evaluation of limit values for 1,2-dichloropropane at the workplace. Helsinki, Finland. https://www.flashpointsrl.com/app/uploads/2022/10/oel_rep_1-2-dcp_en.pdf.

Elsevier. (2019). Reaxys: Physical-chemical property data for 1,2-dichloropropane. CAS Registry Number: 78-87-5.

ERG. (2016). Peer review of EPA's Consumer Exposure Model and draft user guide (final peer-review report). Washington, DC: U.S. Environmental Protection Agency.

ESIG. (2012). SPERC fact sheet: Formulation & (re)packing of substances and mixtures – Industrial (solvent-borne). Brussels, Belgium.

Fisher Scientific. (2026). EPA Method 524.2 Volatile Calibration Standard (No Gasses), SPEX CertiPrep.

Fuchsman, PC. (2003). Modification of the equilibrium partitioning approach for volatile organic compounds in sediment. Environ Toxicol Chem 22: 1532-1534.

Gi, M; Fujioka, M; Yamano, S; Shimomura, E; Ishii, N; Kakehashi, A; Takeshita, M; Wanibuchi, H. (2015). Determination of hepatotoxicity and its underlying metabolic basis of 1,2-dichloropropane in male Syrian hamsters and B6C3F1 mice. Toxicol Sci 145: 196-208. https://dx.doi.org/10.1093/toxsci/kfv045.

Gonzalez, FJ; Gelboin, HV. (1994). Role of human cytochromes P450 in the metabolic activation of chemical carcinogens and toxins. Drug Metab Rev 26: 165-183. https://dx.doi.org/10.3109/03602539409029789.

Government of Canada. (2022). Fact sheet: 1,2-Dichloropropane.

Guengerich, FP; Kim, DH; Iwasaki, M. (1991). Role of human cytochrome P-450 IIE1 in the oxidation of many low molecular weight cancer suspects. Chem Res Toxicol 4: 168-179. https://dx.doi.org/10.1021/tx00020a008.

Hauck, R; Hegemann, W. (2000). Anaerobic degradation of 1,2-dichloropropane in batch and continuous culture. Water Sci Technol 41: 7-13.

Integral Consulting. (2026). Final study report for inhalation monitoring of 1,2-dichloropropane [Redacted]. (SEC4-CON-21-08281). Washington, DC: ACC PDC TSCA Consortium.

Jin, M; Hong, Y; Lee, H; Tran, Q; Cho, H; Kim, M; Kwon, SH; Kang, NH; Park, J; Park, J. (2019). 1,2-Dichloropropane (1,2-DCP)-Induced angiogenesis in dermatitis. Toxicological Research 35: 361-369. https://dx.doi.org/10.5487/TR.2019.35.4.361.

Jones, AR; Gibson, J. (1980). 1,2-dichloropropane: metabolism and fate in the rat. Xenobiotica 10: 835-846. https://dx.doi.org/10.3109/00498258009033814.

Kincannon, DF; Stover, EL; Nichols, V; Medley, D. (1983). Removal mechanisms for toxic priority pollutants. J Water Pollut Control Fed 55: 157-163.

Kirk, HD; Berdasco, NM; Breslin, WJ; Hanley, TRJ. (1995). Developmental toxicity of 1,2-dichloropropane (PDC) in rats and rabbits following oral gavage. Fundam Appl Toxicol 28: 18-26. https://dx.doi.org/10.1006/faat.1995.1141.

Kozal, JS; Lynch, HN; Klapacz, J; Schoeny, RS; Jean, PA; Maier, A. (2023). Mode of action assessment for propylene dichloride as a human carcinogen [Review]. Chem Biol Interact 382: 110382. https://dx.doi.org/10.1016/j.cbi.2023.110382.

Langer, E; Rassaerts, H; Kleinschmidt, P; Torkelson, TR; Beutel, KK. (2011). Chloropropanes, chlorobutanes, and chlorobutenes. In F Ullman; M Bohnet (Eds.), Ullman's Encyclopedia of Industrial Chemistry (pp. 61-79). Online: John Wiley & Sons.

Li, R; Xu, A; Zhao, Y; Chang, H; Li, X; Lin, G. (2022). Genetic algorithm (GA) - Artificial neural network (ANN) modeling for the emission rates of toxic volatile organic compounds (VOCs) emitted from landfill working surface. J Environ Manage 305: 114433. https://dx.doi.org/10.1016/j.jenvman.2022.114433.

Mackay, D; Shiu, WY; Ma, KC. (1993). Illustrated handbook of physical-chemical properties and environmental fate for organic chemicals. Volume III: Volatile organic chemicals. Boca Raton, FL: Lewis Publishers.

Matsumoto, M; Umeda, Y; Take, M; Nishizawa, T; Fukushima, S. (2013). Subchronic toxicity and carcinogenicity studies of 1,2-dichloropropane inhalation to mice. Inhal Toxicol 25: 435-443. https://dx.doi.org/10.3109/08958378.2013.800618.

Meylan, WM; Howard, PH. (1993). Computer estimation of the atmospheric gas-phase reaction-rate of organic-compounds with hydroxyl radicals and ozone. Chemosphere 26: 2293-2299.

Mo, H; Lu, S; Shao, M. (2021). Volatile organic compound (VOC) emissions and health risk assessment in paint and coatings industry in the Yangtze River Delta, China. Environ Pollut 269: 115740. https://dx.doi.org/10.1016/j.envpol.2020.115740.

NCBI. (2020a). PubChem compound summary for CID 6564, 1,2-dichloropropane.

NCBI. (2020b). PubChem database: compound summary: 1,2-dichloropropane.

NIOSH. (1978). Occupational health guideline for propylene dichloride.

NIOSH. (2024). Hierarchy of controls. Available online at https://www.cdc.gov/niosh/hierarchy-of-controls/about/index.html (accessed August 18, 2026).

NLM. (2019). PubChem: Hazardous Substance Data Bank: 1,2-Dichloropropane, 78-87-5.

NMCPHC. (2021). Chapter 4 – Exposure assessment strategies. In Industrial Hygiene Field Operations Manual, Technical Manual NMCPHC-TM629091-2. Falls Church, VA. https://www.med.navy.mil/Portals/62/Documents/NMFA/NMCPHC/root/Industrial%20Hygiene/6IHFOM_CH4.pdf?ver=fPnIOniJTLfZCy9P6YsIRQ%3D%3D.

NTP. (1986). Toxicology and carcinogenesis studies of 1,2-dichloropropane (propylene dichloride) (CAS no. 78-87-5) in F344/N rats and B6C3F1 mice (gavage studies). (NTP-TR 263). Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/PB87114443.xhtml.

NWQMC. (2022). Water Quality Portal: 1,4-Dioxane [Database]. Washington, DC.

O'Neil, MJ. (2013). Propylene dichloride. 78-87-5. [1,2-Dichloroethane]. In MJ O'Neil; PE Heckelman; PH Dobbelaar; KJ Roman; CM Kenney; LS Karaffa (Eds.), The Merck Index (15th ed., pp. 1454-1455). Cambridge, UK: The Royal Society of Chemistry.

OECD. (2006). SIDS Initial Assessment Report: 1,2-Dichloropropane (pp. 219). Paris, France: Organisation for Economic Co-operation and Development.

OECD. (2022). No. 156: Guidance notes on dermal absorption studies (Second edition). (ENV/JM/MONO(2011)36/REV1). Paris, France: Organisation for Economic Co-operation and Development (OECD).

OSHA. (2003). Personal protective equipment: OSHA 3151-12R 2003. (OSHA 3151-12R). Washington, DC: U.S. Department of Labor. https://safety.army.mil/Portals/0/Documents/ON-DUTY/WORKPLACE/PERSONALPROTECTIVEEQUIPMENT/Standard/Personal_Protective_Equipment_OSHA_Publication_3151.pdf.

OSHA. (2014). OSHA Technical Manual (OTM) section II: Chapter 2: Appendix A: Chemicals noted for skin absorption: Table A-1. OSHA PELS and ACGIH TLVS with skin designations/notations. United States Department of Labor. https://www.osha.gov/otm/section-2-health-hazards/chapter-2.

OSHA. (2016). Recommended practices for safety and health programs. (OSHA 3885). Washington, DC: U.S. Department of Labor. https://www.osha.gov/safety-management/hazard-prevention.
Park, CS; Kim, HS; Ahn, YS; Ahn, JH; Jeong, KS. (2020). Validation of urinary 1,2-dichloropropane concentration as a biological exposure index for workers exposed to 1,2-dichloropropane. Ann Occup Environ Med 32: e24. https://dx.doi.org/10.35371/aoem.2020.32.e24.
Rathbun, RE. (1998). Transport, behavior, and fate of volatile organic compounds in streams. Rathbun, RE.
Ravina, M; Facelli, A; Zanetti, M. (2020). Halocarbon emissions from hazardous waste landfills: Analysis of sources and risks. Atmosphere (Basel) 11: 375.
Restek Corp. (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane standard. Bellefonte, PA: Restek.
RIVM. (2015). SimpleTreat [Computer Program]. Bilthoven, The Netherlands: National Institute for Public Health and the Environment.
Roff. (2026). Roff: Tenax Cera Fluida.
Rumble, JR. (2018a). Aqueous solubility and Henry's law constants of organic compounds. In CRC Handbook of Chemistry and Physics (99 ed.). Boca Raton, FL: CRC Press. Taylor & Francis Group.
Rumble, JR. (2018b). Flammability of chemical substances. In CRC Handbook of Chemistry and Physics (99 ed.). Boca Raton, FL: CRC Press. Taylor & Francis Group.
Rumble, JR. (2018c). Permittivity (dielectric constant) of liquids. In CRC Handbook of Chemistry and Physics (99 ed.). Boca Raton, FL: CRC Press. Taylor & Francis Group.
Rumble, JR, (Ed.). (2018d). 1,2-Dichloropropane. In CRC handbook of chemistry and physics. Boca Raton, FL: CRC Press. Taylor & Francis Group.
Sato, Y; Kubo, S; Takemura, S; Sugawara, Y; Tanaka, S; Fujikawa, M; Arimoto, A; Harada, K; Sasaki, M; Nakanuma, Y. (2014). Different carcinogenic process in cholangiocarcinoma cases epidemically developing among workers of a printing company in Japan. Int J Clin Exp Pathol 7: 4745-4754.
SC&A. (2023). The HEM4 User's Guide: Instructions for using the Human Exposure Model for Single and Multiple Facility Exposure and Risk Modeling, Open-Source Version 4.2 with Demographic Assessment Module and 2020 Census. Research Triangle Park, NC: Air Toxics Assessment Group, U.S. Environmental Protection Agency. https://www.epa.gov/system/files/documents/2023-03/HEM4_2_Users_Guide_1-2-23.pdf.
Service, C. (2018). Safety data sheet for 1,2-dichloropropane. Chem Service.
Shell Oil. (1986). Fate of some specific compounds in the Norco chemical biotreater and their effect on the outcome of effluent bioassays [TSCA Submission] (pp. #86-890000217). (86-890000217).
Sigma-Aldrich. (2026). Safety Data Sheet (SDS): 1,2-Dichloropropane. St. Louis, MO: Sigma-Aldrich Inc.
Supelco. (2026). Safety Data Sheet (SDS): EPA 8260 volatiles calibration mix. Millipore Sigma.
Tabak, HH; Quave, SA; Mashni, CI; Barth, EF. (1981). Biodegradability studies with organic priority pollutant compounds. J Water Pollut Control Fed 53: 1503-1518.
Tenax Spa. (2013a). Safety Data Sheet (SDS): Quartz Toner. Volargne, Italy.
Tenax Spa. (2013b). Safety Data Sheet (SDS): Uniblack 2. Volargne, Italy.
Tenax Spa. (2015a). Safety Data Sheet (SDS): Cera Distaccante, Revision no. 1. Volargne, Italy.
Tenax Spa. (2015b). Safety Data Sheet (SDS): Cera Tewax, Revision no. 4. Volargne, Italy.
Tenax Spa. (2015c). Safety Data Sheet (SDS): Lustro Italiano Stone Polish, Revision no. 1. Volargne, Italy.
Tenax Spa. (2017). Safety Data Sheet (SDS): Quartz Toner. Volargne, Italy.
Tenax Spa. (2019). Safety Data Sheet (SDS): Cera Fluida, Revision number 1. Volargne, Italy.
Tenax Spa. (2020). Safety Data Sheet (SDS): Lustro Italiano Stone Polish, Revision no. 4. Volargne, Italy.

Tenax Spa. (2023a). Safety Data Sheet (SDS): Cera Fluida, Revision Nr. 4. Volargne, Italy.
Tenax Spa. (2023b). Safety Data Sheet (SDS): Cera Tewax, Revision no. 9. Volargne, Italy.
Tenax Spa. (2023c). Safety Data Sheet (SDS): Uniblack 2. Volargne, Italy.
Timchalk, C; Dryzga, MD; Smith, FA; Bartels, MJ. (1991). Disposition and metabolism of [14C]1,2-dichloropropane following oral and inhalation exposure in Fischer 344 rats. Toxicology 68: 291-306. https://dx.doi.org/10.1016/0300-483X(91)90076-D.
Toyoda, Y; Takada, T; Suzuki, H. (2016). Halogenated hydrocarbon solvent-related cholangiocarcinoma risk: biliary excretion of glutathione conjugates of 1,2-dichloropropane evidenced by untargeted metabolomics analysis. Sci Rep 6: 24586. https://dx.doi.org/10.1038/srep24586.
U.S. BLS. (2023). May 2023 occupational employment and wage estimates: National industry-specific estimates. Washington, DC.
U.S. Census Bureau. (2017). 2017 SUSB annual data tables by establishment industry: U.S. & states, 6-digit NAICS. Suitland-Silver Hill, MD.
U.S. Census Bureau. (2022). County business patterns: 2020. Suitland, MD. Retrieved from https://www.census.gov/data/datasets/2020/econ/cbp/2020-cbp.html
U.S. EPA. (1982). Fate of priority pollutants in publicly owned treatment works, Volume i. (EPA 440/1-82/303). Washington, DC: Effluent Guidelines Division.
U.S. EPA. (1988). National survey of solid waste (municipal) landfill facilities [EPA Report]. (EPA/530-SW88-034). Washington, DC: Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency.
U.S. EPA. (1991a). Integrated Risk Information System (IRIS), chemical assessment summary, 1,2-dichloropropane; CASRN 78-87-5.
U.S. EPA. (1991b). IRIS Assessment of: 1,2-Dichloropropane (CASRN 78-87-5). Washington, DC: U.S. Environmental Protection Agency, Intergrated Risk Information System. https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=601.
U.S. EPA. (1991c). Technical support document for water quality-based toxics control. (EPA/505/2-90-001). Washington, DC: Office of Water. http://water.epa.gov/scitech/datait/models/upload/2002_10_25_npdes_pubs_owm0264.pdf.
U.S. EPA. (1992). A laboratory method to determine the retention of liquids on the surface of hands [EPA Report]. (EPA/747/R-92/003). Washington, DC.
U.S. EPA. (1993). Environmental fate constants for organic chemicals under consideration for EPA's hazardous waste identification projects. (EPA/600/R-93/132). Athens, GA: Environmental Research Laboratory.
U.S. EPA. (1994). Guidelines for statistical analysis of occupational exposure data: Final.
U.S. EPA. (1996). Technical support document for the Round Two Sewage Sludge Pollutants. (EPA-822-R-96-003). Washington, DC: Office of Water.
U.S. EPA. (1998). Guidelines for ecological risk assessment [EPA Report]. (EPA/630/R-95/002F). Washington, DC: U.S. Environmental Protection Agency, Risk Assessment Forum. https://www.epa.gov/risk/guidelines-ecological-risk-assessment.
U.S. EPA. (2002). IRIS summary for 1,2-dichloropropane; CASRN 78-87-5. Washington, DC: U.S. Environmental Protection Agency, Integrated Risk Information System. http://www.epa.gov/iris/subst/0601.htm.
U.S. EPA. (2003). Provisional peer-reviewed toxicity values for 1,2-Dichloropropane (CASRN 78-87-5): Derivation of a Carcinogenicity Assessment [EPA Report]. Cincinnati, OH. http://hhpprtv.ornl.gov/issue_papers/Dichloropropane12.pdf.
U.S. EPA. (2005). Guidelines for carcinogen risk assessment [EPA Report]. (EPA630P03001F). Washington, DC. https://www.epa.gov/sites/production/files/2013-09/documents/cancer_guidelines_final_3-25-05.pdf.

U.S. EPA. (2007). Dermal exposure assessment: A summary of EPA approaches [EPA Report]. (EPA/600/R-07/040F). Washington, DC.
U.S. EPA. (2011). Exposure factors handbook: 2011 edition [EPA Report]. (EPA/600/R-090/052F). Washington, DC: U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100F2OS.txt.
U.S. EPA. (2012a). Benchmark dose technical guidance [EPA Report]. (EPA100R12001). Washington, DC: U.S. Environmental Protection Agency, Risk Assessment Forum. https://www.epa.gov/risk/benchmark-dose-technical-guidance.
U.S. EPA. (2012b). Estimation Programs Interface Suite™ for Microsoft® Windows, v 4.11 [Computer Program]. Washington, DC.
U.S. EPA. (2014). Exposure and Fate Assessment Screening Tool Version 2014 (E-FAST 2014). Washington, DC: Office of Pollution Prevention and Toxics. Retrieved from https://www.epa.gov/tsca-screening-tools/e-fast-exposure-and-fate-assessment-screening-tool-version-2014
U.S. EPA. (2016a). Non-confidential 2016 chemical data reporting (CDR) [Database]. Washington, DC.
U.S. EPA. (2016b). Provisional peer-reviewed toxicity values for 1,2-dichloropropane. (EPA/690/R-16/002F). Washington, DC. https://cfpub.epa.gov/ncea/pprtv/documents/Dichloropropane12.pdf.
U.S. EPA. (2017). Human health benchmarks for pesticides: Updated 2017 technical document (pp. 5). (EPA 822-R -17 -001). Washington, DC: U.S. Environmental Protection Agency, Office of Water. https://www.epa.gov/sites/production/files/2015-10/documents/hh-benchmarks-techdoc.pdf.
U.S. EPA. (2019a). Chemical data reporting (2012 and 2016 public CDR database). Washington, DC: U.S. Environmental Protection Agency, Office of Pollution Prevention and Toxics.
U.S. EPA. (2019b). Chemistry Dashboard information for 1,2-dichloropropane. 78-87-5.
U.S. EPA. (2019c). User's Guide: Integrated Indoor-Outdoor Air Calculator (IIOAC). Washington, DC: U.S. EPA.
U.S. EPA. (2020a). 2017 National Emissions Inventory (NEI) data (April 2020 version) (Version April 2020). Washington, DC: US Environmental Protection Agency.
U.S. EPA. (2020b). Chemical Data Reporting (CDR): Reporting year 2020 [Database]. Washington, DC: U.S. Environmental Protection Agency, Office of Pollution Prevention and Toxics. Retrieved from https://www.epa.gov/chemical-data-reporting/access-cdr-data
U.S. EPA. (2020c). Final scope of the risk evaluation for 1,2-dichloropropane; CASRN 78-87-5. (EPA 740-R-20-006). Washington, DC: Office of Chemical Safety and Pollution Prevention. https://www.epa.gov/sites/default/files/2020-09/documents/casrn_78-87-5_12-dichloropropane_finalscope.pdf.
U.S. EPA. (2020d). Use report for 1,2-dichloropropane (CASRN 78-87-5). Washington, DC: Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2021). Draft systematic review protocol supporting TSCA risk evaluations for chemical substances, Version 1.0: A generic TSCA systematic review protocol with chemical-specific methodologies. (EPA Document #EPA-D-20-031). Washington, DC: Office of Chemical Safety and Pollution Prevention. https://www.regulations.gov/document/EPA-HQ-OPPT-2021-0414-0005.
U.S. EPA. (2022a). Access chemical data reporting data: 2020 CDR data (up-to-date as of April 2022) [Database]. Washington, DC: U.S. Environmental Protection Agency, Office of Pollution Prevention and Toxics.
U.S. EPA. (2023a). 2020 National Emissions Inventory (NEI) Data (August 2023 version) (Version August 2023). Washington, DC: US Environmental Protection Agency.
U.S. EPA. (2023b). Consumer Exposure Model (CEM) Version 3.2 User's Guide. Washington, DC.

U.S. EPA. (2023c). Meeting minutes and final report for the Science Advisory Committee on Chemicals public virtual meeting "2023 Draft Supplement to the 1,4-Dioxane Risk Evaluation" held on September 12-14, 2023. Washington, DC.

U.S. EPA. (2023d). [REFER TO CORRECTED COPY] Use of laboratory chemicals - Generic scenario for estimating occupational exposures and environmental releases (Revised draft generic scenario) [EPA Report]. Washington, DC: U.S. Environmental Protection Agency, Office of Pollution Prevention and Toxics, Existing Chemicals Risk Assessment Division.

U.S. EPA. (2024a). Chemical contaminant summaries for the fourth Six-Year Review of existing National Primary Drinking Water Regulations. (EPA-815-S-24-002). Washington, DC.

U.S. EPA. (2024b). Toxics Release Inventory (TRI): 1,2-Dichloropropane, reporting years 2019-2023. Washington, DC.

U.S. EPA. (2024c). Discharge Monitoring Report (DMR): 1,2-Dichloropropane, reporting years 2019-2023. Washington, DC.

U.S. EPA. (2025a). Memorandum: Call with the Tenax Corporation on risk evaluation and management for 1,2-dichloropropane (August 14, 2025). Washington, DC: Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2025b). Risk evaluation for 1,1-dichloroethane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention. https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-evaluation-11-dichloroethane.

U.S. EPA. (2025c). TSCA section 4(a)(2) order for 1,2-dichloropropane (DCP) on environmental hazard and consumer exposure. Washington, DC: Office of Chemical Safety and Pollution Prevention. https://www.regulations.gov/document/EPA-HQ-OPPT-2018-0428-0056.

U.S. EPA. (2026a). Chemical Data Reporting (CDR): Reporting year 2024. Washington, DC.

U.S. EPA. (2026b). Draft air releases for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026c). Draft AMTIC monitoring data for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026d). Draft benchmark dose modeling for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026e). Draft chemistry, fate, release, and exposure assessment for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026f). Draft consumer exposure analysis and risk calculator. Washington, DC.

U.S. EPA. (2026g). Draft data extraction information for general population, consumer, and environmental exposure for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026h). Draft data quality evaluation and data extraction information for environmental fate and transport for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026i). Draft data quality evaluation and data extraction information for environmental release and occupational exposure for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026j). Draft data quality evaluation and data extraction information for physical and chemical properties for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026k). Draft data quality evaluation information for dermal absorption for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026l). Draft data quality evaluation information for environmental hazard for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026m). Draft data quality evaluation information for general population, consumer, and environmental exposure for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026n). Draft data quality evaluation information for human health hazard animal toxicology for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026o). Draft data quality evaluation information for human health hazard epidemiology for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026p). Draft dermal Monte Carlo exposure model for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026q). Draft estimates of number of workers and ONUs for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026r). Draft general population fish ingestion estimates for 1,2-dichloropropane. Washington, DC.
U.S. EPA. (2026s). Draft general population surface water pathway exposure estimates for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026t). Draft human health and environmental hazard assessment for 1,1,2-trichloroethane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026u). Draft human health and environmental hazard assessment for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026v). Draft Integrated Indoor Outdoor Air Calculator (IIOAC) Generic releases exposure and risk analysis for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026w). Draft land releases for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026x). Draft number of sites for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026y). Draft occupational risk calculator for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026z). Draft OECD 428 dermal absorption study calculations. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026aa). Draft predicted groundwater concentrations, Exposure and risks from releases to landfills for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026ab). Draft risk evaluation for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026ac). Draft supplemental information on HEM NEI exposure and risk analysis for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.

U.S. EPA. (2026ad). Draft supplemental information on HEM TRI exposure and risk analysis for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026ae). Draft surface water and sediment monitoring data for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026af). Draft surface water concentration modeling and environmental exposure for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026ag). Draft systematic review protocol for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026ah). Draft use of Laboratory chemicals environmental release model for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026ai). Draft water releases for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026aj). ICIS-NPDES permit limit and Discharge Monitoring Report (DMR) datasets.
U.S. EPA. (2026ak). Risk evaluation for 1,2-dichloroethane. (EPA-740-R-26-017). Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026al). Draft HEM input and output files for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026am). Draft NEI HEM input files for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026an). Draft tool settings and analog list for environmental hazard assessment for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026ap). Draft TRI HEM input files for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
U.S. EPA. (2026aq). Draft data extraction information for environmental hazard and human health hazard animal toxicology and epidemiology for 1,2-dichloropropane. Washington, DC: Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention.
Umeda, Y; Matsumoto, M; Aiso, S; Nishizawa, T; Nagano, K; Arito, H; Fukushima, S. (2010). Inhalation carcinogenicity and toxicity of 1,2-dichloropropane in rats. Inhal Toxicol 22: 1116-1126. https://dx.doi.org/10.3109/08958378.2010.526973.
Van Dijk, H. (1980). Dissipation rates in soil of 1,2-dichloropropane and 1,3- and 2,3-dichloropropenes. Pestic Sci 11: 625-632.
Washington, JW. (1995). Hydrolysis rates of dissolved volatile organic compounds principles temperature effects and literature review. Groundwater 33: 415-424.
Westat Inc., (1987). National usage survey of household cleaning products. Westat Inc.
Whittaker, C; Rice, F; Mckernan, L; Dankovic, D; Lentz, T; Macmahon, K; Kuempel, E; Zumwalde, R; Schulte, P. (2016). Current Intelligence Bulletin 68: NIOSH Chemical Carcinogen Policy. US Department of Health and Human Services. https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/PB2017101413.xhtml.
Yanagiba, Y; Suzuki, T; Suda, M; Hojo, R; Gonzalez, FJ; Nakajima, T; Wang, RS. (2016). Cytochrome P450 2E1 is responsible for the initiation of 1,2-dichloropropane-induced liver damage. Toxicol Ind Health 32: 1589-1597. https://dx.doi.org/10.1177/0748233714568801.

APPENDICES

Appendix A KEY ABBREVIATIONS AND ACRONYMS

7Q10	Lowest 7-day flow (on average) in a 10-year period
30Q5	Lowest 30 consecutive days of flow over a 5-year period
AAD	Acute absorbed dose
AADR	Acute absorbed dose rate
ADC	Average daily concentration
AERMOD	American Meteorological Society (AMS)/EPA Regulatory Model
AMTIC	Ambient Monitoring Technology Information Center
APF	Assigned protection factor
BAF	Bioaccumulation factor
BCF	Bioconcentration factor
BLS	Bureau of Labor Service (U.S.)
BMC	Benchmark concentration
BMCL	Lower confidence limit of the BMC
BMD	Benchmark dose
BMDL	Lower confidence limit of the BMD
CAD	Chronic absorbed dose
CASRN	Chemical Abstracts Service Registry Number
CBI	Confidential business information
CDR	Chemical Data Reporting
CFR	Code of Federal Regulations
COC	Concentration of concern
COU	Condition of use
CSF	Cancer slope factor
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency (U.S.)
ESD	Emission scenario document
GS	Generic scenario
HEC	Human equivalent concentration
HED	Human equivalent dose
HEM	Human Exposure Model
HERO	Health and Environmental Research Online (Database)
IIOAC	Integrated Indoor-Outdoor Air Calculator (Model)
IRIS	Integrated Risk Information System (EPA)
IUR	Inhalation unit risk
K_{OC}	Organic carbon:water partition coefficient
K_{OW}	Octanol: water partition coefficient
LADC	Lifetime average daily concentration
LADD	Lifetime average daily dose
LCD	Life cycle diagram
LCx	Lethal concentration at which x% of test organisms die
LOD	Limit of detection
LOQ	Limit of quantification
MOE	Margin of exposure
NAICS	North American Industry Classification System
ND	Non-detect

NEI	National Emissions Inventory
NESHAP	National Emission Standards for Hazardous Air Pollutants
NIOSH	National Institute for Occupational Safety and Health
NOAEL	No-observed-adverse-effect level
NOAEC	No-observed-adverse-effect concentration
NPDES	National Pollutant Discharge Elimination System
NTP	National Toxicology Program
OCSPP	Office of Chemical Safety and Pollution Prevention (EPA)
OECD	Organisation for Economic Co-operation and Development
OEHHA	Office of Environmental Health Hazard Assessment (California)
OES	Occupational exposure scenario
OEV	Occupational exposure value
ONU	Occupational non-user
OPPT	Office of Pollution Prevention and Toxics (EPA)
OSHA	Occupational Safety and Health Administration (U.S.)
PBZ	Personal breathing zone
PEL	Permissible exposure limit
PESS	Potentially exposed or susceptible subpopulations
POD	Point of departure
POTW	Publicly owned treatment works
PPE	Personal protective equipment
PSC	Point Source Calculator
RCRA	Resource Conservation and Recovery Act
RQ	Risk quotient
SACC	Science Advisory Committee on Chemicals
SDS	Safety data sheet
SEG	Similar exposure group
SIC	Standard Industrial Classification
SSD	Species sensitivity distribution
STEL	Short-term exposure limit
TDS	Technical data sheet
TRI	Toxics Release Inventory
TRV	Toxicity reference value
TSCA	Toxic Substances Control Act
TSD	Technical support document
TWA	Time-weighted average
UF	Uncertainty factor
U.S.	United States
WQP	Water Quality Portal
WWT	Wastewater treatment

Appendix B REGULATORY AND ASSESSMENT HISTORY

B.1 Federal Laws and Regulations

Table_Apx B-1. Federal Laws and Regulations for 1,2-Dichloropropane

Statutes/Regulations	Description of Regulation	Description of Authority/Regulation
Toxic Substances Control Act (TSCA) – section 6(b)	EPA is directed to identify high-priority chemical substances for risk evaluation; and conduct risk evaluations on at least 20 high-priority substances no later than three and one-half years after the date of enactment of the Frank R. Lautenberg Chemical Safety for the 21st Century Act.	1,2-Dichloropropane is one of the 20 chemicals EPA designated as a High-Priority Substance for risk evaluation under TSCA (84 FR 71924, December 30, 2019). Designation of 1,2-dichloropropane as high-priority substance constitutes the initiation of the risk evaluation on the chemical.
TSCA – section 8(a)	The TSCA section 8(a) CDR Rule requires manufacturers (including importers) to give EPA basic exposure-related information on the types, quantities and uses of chemical substances produced domestically and imported into the United States.	1,2-Dichloropropane manufacturing (including importing), processing and use information is reported under the CDR rule (85 FR 20122, April 2, 2020).
TSCA – section 8(b)	EPA must compile, keep current and publish a list (the TSCA Inventory) of each chemical substance manufactured (including imported) or processed for commercial purposes in the United States.	1,2-Dichloropropane was on the initial TSCA Inventory and therefore was not subject to EPA's new chemicals review process under TSCA section 5 (60 FR 16309, March 29, 1995).
TSCA – section 8(d)	Provides EPA with authority to issue rules requiring manufacturers (including importers), processors, and distributors of a chemical substance or mixture to submit lists and/or copies of ongoing and completed, unpublished health and safety studies. EPA's Health and Safety Data Reporting Rule at 40 CFR part 716 generally requires such submissions for manufacturers (including importers) and (if specified) processors of substances covered by part 716.	Five health and safety studies received for [1,2-dichloropropane] (2021) (U.S. EPA, ChemView; accessed March 3, 2026.)
TSCA – section 8(e)	Manufacturers (including importers), processors, and	One risk report received for 1, 2-dichloropropane received: 1993

Statutes/Regulations	Description of Regulation	Description of Authority/Regulation
	distributors must immediately notify EPA if they obtain information that supports the conclusion that a chemical substance or mixture presents a substantial risk of injury to health or the environment.	(U.S. EPA, ChemView; accessed April 12, 2026).
TSCA – section 4	Provides EPA with authority to issue rules, enforceable consent agreements and orders requiring manufacturers (including importers) and processors to test chemical substances and mixtures.	Twelve chemical data submissions from test rules were received for 1,2-dichloropropane: • Acute aquatic plant toxicity (2) • Acute aquatic toxicity (1) • Chronic aquatic toxicity (2) • Developmental toxicity (2) • Metabolism and Pharmacokinetics (3) • Mutagenicity/genetic toxicity (1) • Neurological toxicity (2) • Reproductive toxicity (1) • Environmental monitoring (1) (Submissions received between 1988–2005) (U.S. EPA, ChemView; accessed March 18, 2026). Also, 1 chemical data submission from prior test rules and enforceable consent agreements was received for 1,2-dichloropropane (1 dermal absorption study [2005]). The Frank R. Lautenberg Chemical Safety for the 21st Century Act revised TSCA section 4 to add authority to issue test orders. Under this authority, EPA issued test orders for information on inhalation monitoring and occupational exposure for 1,2-dichloropropane on January 19, 2021. Additionally, EPA issued final test requirements; Final test standards and reporting requirements for 1,2-dichloropropane (1987).

Statutes/Regulations	Description of Regulation	Description of Authority/Regulation
Emergency Planning and Community Right-To-Know Act (EPCRA) – section 313	EPCRA section 313 – also known as the Toxic Release Inventory (TRI) – requires annual reporting from facilities in specific industry sectors that employ 10 or more full-time equivalent employees and that manufacture, process or otherwise use a TRI-listed chemical in quantities above threshold levels. A facility that meets reporting requirements must submit a reporting form for each chemical for which it triggered reporting, providing data across a variety of categories, including activities and uses of the chemical, releases and other waste management (*e.g.,* quantities recycled, treated, combusted) and pollution prevention activities (under section 6607 of the Pollution Prevention Act). These data include on- and off-site data as well as multimedia data (*i.e.,* air, land, and water).	1,2-Dichloropropane is a listed substance (or part of a listed chemical category) subject to reporting requirements under 40 CFR 372.65 effective as of [January 01, 1987].
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) – sections 3 and 6	FIFRA governs the sale, distribution and use of pesticides. Section 3 of FIFRA generally requires that pesticide products be registered by EPA prior to distribution or sale. EPA assesses the whole formulation of pesticide products including active ingredients which have pesticidal effects and inert ingredients that do not. EPA keeps lists of inert ingredients that have been approved for use in pesticide products distinguishing between those that have been approved for use on food and those that have not. Pesticide products may only be registered if, among other things, they do not cause "unreasonable adverse effects on the environment." Section 6 of FIFRA provides EPA with the authority to cancel pesticide registrations if either (1)	1,2-Dichloropropane was registered as a conventional active ingredient in1967. The last product containing 1,2-dichloropropane as an active ingredient was cancelled October 10, 1989.

Statutes/Regulations	Description of Regulation	Description of Authority/Regulation
	the pesticide, labeling, or other material does not comply with FIFRA; or (2) when used in accordance with widespread and commonly recognized practice, the pesticide generally causes unreasonable adverse effects on the environment.	
Clean Air Act (CAA) – section 111(b)	Requires EPA to establish new source performance standards (NSPS) for any category of new or modified stationary sources that EPA determines causes, or contributes significantly to, air pollution, which may reasonably be anticipated to endanger public health or welfare. The standards are based on the degree of emission limitation achievable through the application of the best system of emission reduction (BSER) which (taking into account the cost of achieving reductions and environmental impacts and energy requirements) EPA determines has been adequately demonstrated.	1,2-Dichloropropane is subject to the NSPS for equipment leaks of volatile organic compounds (VOCs) in the synthetic organic chemicals manufacturing industry for which construction, reconstruction or modification began after January 5, 1981 (40 CFR Part 60, Subpart VV).
CAA – section 112(b)	Contains the original list of 189 hazardous air pollutants (HAPs) that Congress added in 1990. Under 112(c) of the CAA, EPA must identify and list source categories that emit listed HAPs and then set emission standards for those listed source categories under CAA section 112(d). CAA section 112(b)(3)(A) specifies that any person may petition the Administrator to modify the list of HAP by adding or deleting a substance. Since 1990, EPA has both removed HAPs from and added HAPs to the original list.	1,2-Dichloropropane is listed as a HAP (42 U.S. Code section 7412).

Statutes/Regulations	Description of Regulation	Description of Authority/Regulation
CAA – sections 112(d)	Directs EPA to establish, by rule, National Emission Standards for Hazardous Air Pollutants (NESHAPs) for each category or subcategory of listed major sources and area sources of HAPs (listed pursuant to Section 112(c)). For major sources, the standards must require the maximum degree of emission reduction that EPA determines is achievable by each particular source category. This is generally referred to as maximum achievable control technology (MACT). For areas sources, the standards must require generally achievable control technology (GACT) though may require MACT. Section 112(d)(6) requires EPA to review, and revise, as necessary, (taking into account developments in practices, processes, and control technologies) the emission standards every 8 years.	EPA has established NESHAP for a number of source categories that emit 1,2-dichloropropane to air.
CAA – section 112(f)	Section 112(f)(2) requires EPA to conduct risk assessments for each source category subject to section 112(d) NESHAP that require maximum achievable control technology (MACT) and to determine if additional standards are needed to reduce remaining risks; this is required within 8 years of promulgating the NESHAP.	EPA has promulgated a number of RTR NESHAP and will do so, as required, for the remaining source categories with NESHAP.
Clean Water Act (CWA) – section 304(a)(1)	Requires EPA to develop and publish ambient water quality criteria (AWQC) reflecting the latest scientific knowledge on the effects on human health that may be expected from the presence of pollutants in any body of water.	In 2015, EPA issued updated AWQC for 1,2-dichloropropane, including a recommendation of 0.90 (µg/L) for "Human Health for the consumption of Water + Organism" and 31 (µg/L) for "Human Health for the consumption of Organism Only" that states and authorized tribes may consider when adopting criteria into their water quality standards.

Statutes/Regulations	Description of Regulation	Description of Authority/Regulation
CWA – sections 301, 304, 306, 307, and 402	CWA section 307(a) establishes a list of toxic pollutants or combination of pollutants under the CWA. The statute specifies a list of families of toxic pollutants also listed at 40 CFR 401.15. The list of "priority pollutants" lists the individual chemical names within the toxic pollutants and is found in 40 CFR Part 423 Appendix A. These are pollutants (along with non-conventional pollutants) for which best available technology effluent limitations must be established on either a national basis through rules (CWA sections 301(b), 304(b), 307(b), 306) or on a case-by-case best professional judgement basis in National Pollutant Discharge Elimination System (NPDES) permits, see CWA section 402(a)(1)(B). EPA identifies the best available technology that is economically achievable (BAT) for that industry after considering statutorily prescribed factors and sets regulatory requirements based on the performance of that technology.	1,2-Dichloropropane is designated as a priority pollutant under Section 307(a)(1) of the CWA and as such is subject to effluent limitations. Under CWA section 304, 1,2-dichloropropane is included in the list of total toxic organics (TTO) (40 CFR 413.02(i)).
CWA – sections 311(b)(2)(A) and 501(a) of the Federal Water Pollution Control Act.	Requires EPA to develop, promulgate, and revise as may be appropriate, regulations designating as hazardous substances, other than oil, which, when discharged present an imminent and substantial danger to the public health or welfare, including, but not limited to, fish, shellfish, wildlife, shorelines, and beaches.	1,2-Dichloropropane is a designated hazardous substance in accordance with Section 311(b)(2)(A) of the Federal Water Pollution Control Act (40 CFR Section 116.4, see 43 FR 10474 [March 13, 1978]).
Safe Drinking Water Act (SDWA) – section 1412	Requires EPA to publish non-enforceable maximum contaminant level goals (MCLG) and a National Primary Drinking Water Regulation (NPDWR) for a contaminant for which EPA makes the determination that the contaminant: 1. may have an	1,2-Dichloropropane is subject to NPDWR under the SDWA with a MCLG of zero mg/L and an enforceable MCL of 0.005 mg/L (section 1412) (52 FR 25690, January 30, 1991).

Statutes/Regulations	Description of Regulation	Description of Authority/Regulation
	adverse effect on the health of persons; 2. is known to occur or there is a substantial likelihood that the contaminant will occur in public water systems with a frequency and at levels of public health concern; and 3. in the sole judgement of the Administrator, regulation of the contaminant presents a meaningful opportunity for health risk reductions for persons served by public water systems. The NPDWR includes either an enforceable maximum contaminant level (MCL), or a required treatment technique. Public water systems are required to comply with NPDWRs.	
Resource Conservation and Recovery Act (RCRA) – section 3001	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.	1,2-Dichloropropane] is included on the list of hazardous wastes pursuant to RCRA 3001. RCRA Hazardous Waste Code: U083 (40 CFR 261.33).
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – sections 102(a) and 103	Authorizes EPA to promulgate regulations designating as hazardous substances, in addition to those referred to in section 101(14) of CERCLA, those elements, compounds, mixtures, solutions, and substances which, when released into the environment, may present substantial danger to the public health or welfare or the environment. EPA must also promulgate regulations establishing the quantity of any hazardous substance the release of which must be reported under section 103. Section 103 requires persons	1,2-Dichloropropane is a hazardous substance under CERCLA. Releases of 1,2-dichloropropane in excess of 1,000 lb must be reported (40 CFR 302.4).

Statutes/Regulations	Description of Regulation	Description of Authority/Regulation
	in charge of vessels or facilities to report to the National Response Center if they have knowledge of a release of a hazardous substance above the reportable quantity threshold. CERCLA Hazardous substances listed under 40 CFR Table 302.4 are subject to EPCRA section 304 notification requirements.	
Occupational Safety and Health Act (OSH Act)	Requires employers to provide their workers with a place of employment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress or unsanitary conditions (29 U.S.C section 651 et seq.). Under the Act, OSHA can issue occupational safety and health standards including such provisions as Permissible Exposure Limits (PELs), exposure monitoring, engineering and administrative control measures, and respiratory protection.	In 1993, OSHA established a PEL for 1,2-dichloropropane of 75 ppm TWA (29 CFR 1910.1000) OSHA permissible exposure limits – Annotated Tables website accessed March 18, 2026.
Federal Hazardous Materials Transportation Act (HMTA)	Section 5103 of the Act directs the Secretary of Transportation to: Designate material (including an explosive, radioactive material, infectious substance, flammable or combustible liquid, solid or gas, toxic, oxidizing or corrosive material, and compressed gas) as hazardous when the Secretary determines that transporting the material in commerce may pose an unreasonable risk to health and safety or property. Issue regulations for the safe transportation, including security, of hazardous material in intrastate, interstate and foreign commerce.	1,2-Dichloropropane is listed as a hazardous material with regard to transportation and is subject to regulations prescribing requirements applicable to the shipment and transportation of listed hazardous materials (70 FR 34381, June 14, 2005).

5952

B.2 State Laws and Regulations

Table_Apx B-2. State Laws and Regulations

State Actions	Description of Action
State Air Regulations	Allowable Ambient Levels Maryland 0.1 (µg/m^3) (MassDEP Allowable Ambient Levels), New Hampshire 232 24-Hr AAL (µg/m^3) 4.0 Annual AALB (µg/m^3) (Env-A 1400: Regulated Toxic Air Pollutants). Rhode Island 0.1 Annual (µg/m^3) (Air Pollution Regulation No. 22).
California	1,2-Dichloropropane has been identified as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the federal Clean Air Act (42 U.S.C. Section 7412(b)) and has been designated by the State Board to be a toxic air contaminant pursuant to Health and Safety Code Section 39657.
Illinois	1,2-Dichloropropane is identified as a Hazardous Air Pollutant (accessed May 20, 2026).
Maryland	1,2-Dichloropropane was identified as a Class II Toxic Air Pollutants Requiring Emission Estimates or Ambient Impact Analysis by Existing Sources (accessed May 20, 2026).
Massachusetts	MassDEP Allowable Ambient Levels established a TLV of 0.8 (µg/m^3) (accessed May 20, 2026).
State Drinking Water Standards and Guidelines	Arizona (14 Ariz. Admin. Register 2978, August 1, 2008), California (Cal Code Regs. Title 26, § 22-64444), Delaware (Del. Admin. Code Title 16, § 4462), Connecticut (Conn. Agencies Regs. § 19-13-B102), Florida (Admin. Code R. Chap. 62-550), Maine (10 144 Me. Code R. Chap. 231), Massachusetts (310 Code Mass. Regs. § 22.00), Michigan (Mich. Admin. Code r.299.44 and r.299.49,, 2017), Minnesota (Minn R. Chap. 4720) (MN specifies VOCs, but does not go beyond that), New Jersey (7:10 N.J Admin. Code § 5.2), Pennsylvania (25 Pa. Code § 109.202), Rhode Island (Rules and Regulations Pertaining to Public Drinking Water R46-13-DWQ), Texas (30 Tex. Admin. Code § 290.104).
State Permissible Exposure Limits (PELs)	California (PEL of 75 ppm and a STEL of 110) (Cal Code Regs. Title 8, § 5155). Hawaii PEL: 75 ppm (Hawaii Administrative Rules Section 12-60-50). Section 296-841-20025. Hawaii Administrative Rules Section 12-60-50. Washington PEL: 75 ppm (Washington Title 296 Chapter 296-841).
State Right-to-Know Acts	Massachusetts (105 Code Mass. Regs. § 670.000 Appendix A), New Jersey (8:59 N.J. Admin. Code § 9.1), and Pennsylvania (Chapter 232 Appendix A-Hazardous Substance List).
Chemicals of High Concern to Children	Several states have adopted reporting laws for chemicals in children's products containing 1,2-dichloropropane, including Maine's list of Chemical of Concern (38 MRSA Chapter 16-D) and Minnesota's List of Chemicals of High Concern (Toxic Free Kids Act Minn. Stat. 116.9401 to 116.9407).
Volatile Organic Compound (VOC) Regulations for Consumer Products [Only check if the chemical is a VOC and it is used in consumer products]	Many states regulate 1,2-dichloropropane as a VOC. These regulations may set VOC limits for consumer products and/or ban the sale of certain consumer products as an ingredient and/or impurity. Regulated products vary from state to state, and could include California (Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 8.5, Articles 1, 2, 3 and 4), Connecticut (R.C.S.A Sections 22a-174-40, 22a-174-41, and 22a-174-44), Delaware (Adm. Code Title 7, 1141), Rhode Island (Air Pollution Control Regulation No. 31), among other products.
Other	California listed 1,2-dichloropropane on Proposition 65 in January 1, 1990 due to cancer (Cal Code Regs. Title 27, § 27001).

State Actions	Description of Action
	1,2-Dichloropropane is listed as a Candidate Chemical under California's Safer Consumer Products Program established under Health and Safety Code § 25252 and 25253. (California, Candidate Chemicals List; accessed March 20, 2026 (CDTSC, 2017). California issued a Health Hazard Alert for 1,2-dichloropropane (Hazard Evaluation System and Information Service, 2016). California lists 1,2-dichloropropane as a designated priority chemical for biomonitoring under criteria established by California SB 1379 (CDPH, 2015) (Accessed March 20, 2026). 1,2-Dichloropropane is on the MA Toxic Use Reduction Act (TURA) list of 1989 (301 Code Mass. Regs. § 41.03) 1,2-Dichloropropane is on the Minnesota List of Chemicals of High Concern (Toxic Free Kids Act Minn. Stat. 116.9401 to 116.9407).

B.3 International Laws and Regulations

Table_Apx B-3. International Laws and Regulations

Country/Organizations	Requirements and Restrictions
Canada	Canada requires Reportable to National Pollutant Release Inventory for 1,2-dichloropropane if manufactured, processed, or otherwise used at quantities greater than: 10 tonnes. NPRI Part (Threshold Category): 1A, 2018-01-20. Canada added 1,2-dichloropropane to the Domestic Substances List as an "Existing Substance"; that is, already in commerce in Canada in 1984–1986 and not subject to the New Substance Notification Regulations. Canada Gazette Part II, Vol. 128, No. 9, May 04 1994, SOR/94-311. 1,2-Dichloropropane did not meet Canada's criteria under Subsection 73(1) of the Canadian Environmental Protection Act, 1999 (CEPA). Canadian Environmental Protection Act: categorization of existing substances. 2006-09-14.
European Union	1,2-Dichloropropane is registered for use in the EU. (European Chemicals Agency (ECHA) database; accessed May 19, 2026.)
Australia	1,2-Dichloropropane can be manufactured or imported into Australia for commercial purposes without notifying us, provided that the Australian importer/manufacturer is currently registered with us. This chemical may be subject to other Australian Government and State or Territory Government regulations. 1,2-Dichloropropane was assessed under Human Health Tier II of the Inventory Multi-Tiered Assessment and Prioritization (IMAP). No specific Australian use, import, or manufacturing information has been identified. The following international uses have been identified through Galleria Chemica, European Union Registration, Evaluation, Authorization and Restriction of Chemicals dossier (REACH), Substances and Preparations in the Nordic countries (SPIN) database, United States (US) Department of Health National Toxicology Program (NTP), US Environmental Protection Agency Chemical and Product Categories (CPCat), Hazardous Substances Data Bank (HSDB), Organisation for Economic Co-operation and Development (OECD, 2003), International Agency for Research on Cancer (IARC) Agency for Toxic

<table>
<tr><th>Country/Organizations</th><th>Requirements and Restrictions</th></tr>
<tr><td></td><td>Substances and Disease Registry ATSDR (1989) and the National Institute of standards and Technology (NIST).

The chemical may have domestic uses including: as a solvent for glues, adhesives, degreasers, cleaning and painting products; as a stain remover for fabrics; in car care products; and as a paint remover.

(NICNAS, 2017, Propane, 1,2-dichloro-: Human health tier II assessment; accessed May 20, 2026.)</td></tr>
<tr><td>Japan</td><td>1,2-Dichloropropane is regulated in Japan under the following legislation:
• Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. (Chemical Substances Control Law; CSCL)
• Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof
• Industrial Safety and Health Act (ISHA)
• Air Pollution Control Law
• Water Pollution Control Law
• Fire Service Act
(National Institute of Technology and Evaluation [NITE] Chemical Risk Information Platform [CHRIP]; accessed May 5, 2026).</td></tr>
<tr><td>World Health Organization (WHO)</td><td>EHC on 1,2-dichloropropane found that for the general population there is low or non-existent exposure to 1,2-dichloropropane from air and food. However, in certain areas, exposure may occur when groundwater is contaminated. Occupational exposure: With good work practices, hygienic measures, and safety precautions, the use of 1,2-dichloropropane is unlikely to present a risk for those occupationally exposed to it (EHC 146, 1993).</td></tr>
<tr><td>Australia, Austria, Belgium, Canada, Denmark, Finland, France, Hungary, Ireland, Japan, New Zealand, Norway, People’s Republic of China, Poland, Romania, Singapore, South Korea, Spain</td><td>Occupational exposure limits for 1,2-dichloropropane (GESTIS International limit values for chemical agents (Occupational exposure limits, OELs) database (accessed May 5, 2026).
<table>
<tr><td>Australia, Singapore, South Korea</td><td>TWA: 75 ppm
STEL: 375 ppm</td></tr>
<tr><td>Austria</td><td>TWA: 10 ppm</td></tr>
<tr><td>Belgium, Canada, Ireland, Spain</td><td>TWA: 75 ppm
STEL: 150 ppm</td></tr>
<tr><td>Denmark</td><td>TWA: 10 ppm
STEL: 20 ppm</td></tr>
<tr><td>Finland, Hungary</td><td>TWA: 75 ppm</td></tr>
<tr><td>France</td><td>TWA: 1 ppm</td></tr>
<tr><td>Japan</td><td>TWA: 5 ppm</td></tr>
<tr><td>New Zealand</td><td>TWA: 40 ppm</td></tr>
<tr><td>Norway</td><td>TWA: 350 mg/m^3
STEL: 500 mg/m^3</td></tr>
<tr><td>People’s Republic of China</td><td>TWA: 50 mg/m^3</td></tr>
<tr><td>Poland</td><td>TWA: 22 ppm
STEL: 44 ppm</td></tr>
</table></td></tr>
</table>

Country/Organizations	Requirements and Restrictions	
	Romania	TWA: 22 ppm STEL: 44 ppm

B.4 Assessment History

Table_Apx B-4. Assessment History of 1,2-Dichloropropane

Authoring Organization	Publication
EPA publications	
U.S. Environmental Protection Agency (EPA), Integrated Risk Information System (IRIS)	*IRIS summary for 1,2-dichloropropane; CASRN 78-87-5* (2002) (U.S. EPA, 2002)
	IRIS summary for 1,2-dichloropropane; CASRN 78-87-5 (U.S. EPA, 1991a)
EPA, Office of Chemical Safety and Pollution Prevention (OCSPP)	*Final Scope of the Risk Evaluation for 1,2-Dichloropropane; CASRN 78-87-5* (U.S. EPA, 2020c)
EPA, Office of Pollution Prevention and Toxics (OPPT)	ChemView (TSCA submissions – chemical test rule data and substantial risk reports)
EPA, Superfund Health Risk Technical Support Center, National Center for Environmental Assessment, Office of Research and Development	*Provisional Peer Reviewed Toxicity Values for 1,2-Dichloropropane (CASRN 78-87-5)* (U.S. EPA, 2016b)
	Provisional peer-reviewed toxicity values for 1,2-Dichloropropane (CASRN 78-87-5): Derivation of a Carcinogenicity Assessment (U.S. EPA, 2003)
Other U.S.-based organizations	
Agency for Toxic Substances and Disease Registry (ATSDR)	*Toxicological Profile for 1,2-Dichloropropane CAS#: 78-87-5*, 2021. (ATSDR, 2021)
	Toxicological Profile for 1,2-Dichloropropane CAS#: 78-87-5, 1989. (ATSDR, 1989)

Appendix C LIST OF TECHNICAL SUPPORT DOCUMENTS AND SUPPLEMENTAL FILES

This appendix includes a list of citations for all technical support documents and supplemental files associated with this *Draft Risk Evaluation for 1,2-Dichloropropane* (document "01"). These include discipline-specific assessments, systematic review results, risk calculations, and modeling outputs. Files are numbered to correspond with the filenames uploaded to the docket: EPA-HQ-OPPT-2018-0428.

Associated **Technical Support Documents (TSDs)** – Provide additional details and information on physical chemistry, fate, exposure, releases, and hazard assessments.

02. *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u)
03. *Draft Chemistry, Fate, Release, and Exposure Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026e)

Associated *Systematic Review Protocol and Data Quality Evaluation and Data Extraction Documents* – Provide additional detail and information on systematic review methodologies used as well as the data quality evaluations and extraction criteria and results.

04. *Draft Systematic Review Protocol for 1,2-Dichloropropane* (U.S. EPA, 2026ag)
06. *Draft Data Quality Evaluation and Data Extraction Information for Physical and Chemical Properties for 1,2-Dichloropropane* (U.S. EPA, 2026j)
07. *Draft Data Quality Evaluation and Data Extraction Information for Environmental Fate and Transport for 1,2-Dichloropropane* (U.S. EPA, 2026h)
08. *Draft Data Quality Evaluation and Data Extraction Information for Environmental Release and Occupational Exposure for 1,2-Dichloropropane* (U.S. EPA, 2026i)
09. *Draft Data Quality Evaluation Information for Dermal Absorption for 1,2-Dichloropropane* (U.S. EPA, 2026k)
10. *Draft Data Quality Evaluation Information for General Population, Consumer, and Environmental Exposure for 1,2-Dichloropropane* (U.S. EPA, 2026m)
11. *Draft Data Extraction Information for General Population, Consumer, and Environmental Exposure for 1,2-Dichloropropane* (U.S. EPA, 2026g)
12. *Draft Data Quality Evaluation Information for Human Health Hazard Epidemiology for 1,2-Dichloropropane* (U.S. EPA, 2026o)
13. *Draft Data Quality Evaluation Information for Human Health Hazard Animal Toxicology for 1,2-Dichloropropane* (U.S. EPA, 2026n)
14. *Draft Data Quality Evaluation Information for Environmental Hazard for 1,2-Dichloropropane* (U.S. EPA, 2026l)
15. *Draft Data Extraction Information for Environmental Hazard and Human Health Hazard Animal Toxicology and Epidemiology for 1,2-Dichloropropane* (U.S. EPA, 2026aq)

Associated Supplemental Files – Provide additional details and information on fate, release, exposure, hazard, and risk assessments.

05. *Draft Benchmark Dose Modeling for 1,2-Dichloropropane* (U.S. EPA, 2026d)
16. *Draft Integrated Indoor Outdoor Air Calculator (IIOAC) Generic Releases Exposure and Risk Analysis for 1,2-Dichloropropane* (U.S. EPA, 2026v)
17. *Draft AMTIC Monitoring Data for 1,2-Dichloropropane* (U.S. EPA, 2026c)

18. *Draft Supplemental Information on HEM TRI Exposure and Risk Analysis for 1,2-Dichloropropane* (U.S. EPA, 2026ad)
19. *Draft Supplemental Information on HEM NEI Exposure and Risk Analysis for 1,2-Dichloropropane* (U.S. EPA, 2026ac)
20. *Draft Surface Water Concentration Modeling and Environmental Exposure for 1,2-Dichloropropane* (U.S. EPA, 2026af)
21. *Draft General Population Surface Water Pathway Exposure Estimates for 1,2-Dichloropropane* (U.S. EPA, 2026s)
22. *Draft Surface Water and Sediment Monitoring Data for 1,2-Dichloropropane* (U.S. EPA, 2026ae)
23. *Draft OECD 428 Dermal Absorption Study Calculations* (U.S. EPA, 2026z)
24. *Draft Air Releases for 1,2-Dichloropropane* (U.S. EPA, 2026b)
25. *Draft Land Releases for 1,2-Dichloropropane* (U.S. EPA, 2026w)
26. *Draft Water Releases for 1,2-Dichloropropane* (U.S. EPA, 2026ai)
27. *Draft Number of Sites for 1,2-Dichloropropane* (U.S. EPA, 2026x)
28. *Draft Use of Laboratory Chemicals Environmental Release Model for 1,2-Dichloropropane* (U.S. EPA, 2026ah)
29. *Draft Occupational Risk Calculator for 1,2-Dichloropropane* (U.S. EPA, 2026y)
30. *Draft Estimates of Number of Workers and ONUs for 1,2-Dichloropropane* (U.S. EPA, 2026q)
31. *Draft Dermal Monte Carlo Exposure Model for 1,2-Dichloropropane* (U.S. EPA, 2026p)
32. *Draft Consumer Exposure Analysis and Risk Calculator* (U.S. EPA, 2026f)
33. *Draft General Population Fish Ingestion Estimates for 1,2-Dichloropropane* (U.S. EPA, 2026r)
34. *Draft Tool Settings and Analog List for Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026an)
35. *Draft HEM Input and Output Files for 1,2-Dichloropropane* (U.S. EPA, 2026al)
36. *Draft TRI HEM Input Files for 1,2-Dichloropropane* (U.S. EPA, 2026ap)
37. *Draft NEI HEM Input Files for 1,2-Dichloropropane* (U.S. EPA, 2026am)

Appendix D CONDITIONS OF USE DESCRIPTIONS

D.1 Updates to the 1,2-Dichloropropane Conditions of Use Table

After release of the *Final Scope of the Risk Evaluation for 1,2-Dichloropropane; CASRN 78-87-5* (U.S. EPA, 2020c) (EPA-HQ-OPPT-2018-0428-0033) EPA received updated submissions under the 2020 CDR reported data. In addition to new submissions received under the 2020 CDR, some industry code names were updated for the 2020 CDR reporting cycle. Therefore, EPA amended the 1,2-dichloropropane conditions of use (COUs). Table_Apx D-1 summarizes the changes to the COUs based on the new reporting codes in the 2020 CDR and any other new information since the release of the final scope document.

These COUs incorporate CDR submissions from the 2016 and 2020 CDR cycles. The 2024 CDR cycle submissions are being reviewed and EPA considered whether they would further inform these COUs. If EPA receives new information on the 1,2-dichloropropane COUs during the comment period for the draft risk evaluation, then that information will be considered and if appropriate, incorporated into the final COU descriptions.

Table_Apx D-1. Additions and Name Changes to Categories and Subcategories of Conditions of Use Based on CDR Reporting and Stakeholder Engagement

Life Cycle Stage and Category	Original Subcategory in the Final Scope Document	Occurred Change	Revised Subcategory in the 2026 Draft Risk Evaluation
Manufacturing	Domestic manufacturing	Changed "Manufacturing" in the Life Cycle Stage to "Manufacture". Changed the Subcategory from "Domestic manufacture" and "Import" to "N/A" for consistency with other chemicals.	Manufacture – Domestic Manufacture – N/A
	Import		Manufacture – Import – N/A
Processing	Not included	Added "Processing – Repackaging – N/A" condition of use, to account for 2020 CDR cycle reporting of this COU	Processing – Repackaging – N/A
Distribute in Commerce	Distribute in Commerce	Changed Life Cycle Stage from "Distribute" to "Distribution" and changed Category and Subcategory to "N/A" for consistency with other chemicals.	Distribution in Commerce – N/A – N/A
Disposal – Disposal	Disposal	Change category and subcategory to "N/A" for consistency with other chemicals.	Disposal – N/A – N/A

D.2 Descriptions of Conditions of Use

The following COU descriptions are based on CDR use codes and reflect the reasonably available information that the Agency has identified during the risk evaluation. These descriptions are intended to include examples of uses so as not to exclude other activities that may also be included in the COUs of the chemical substance. To better describe the COU, EPA considered CDR submissions from previous CDR cycles for 1,2-dichloropropane (CASRN 78-87-5) and other reasonably available information—including stakeholder engagements, published literature, company websites, as well as government and commercial trade databases and publications. The descriptions below reflect submissions and information that EPA identified as the best fit for each COU.

Examples of articles, products, or activities are included in the following descriptions to help describe the COU but are not exhaustive. EPA uses the terms "articles" and "products" or "product mixtures" in the following descriptions, which generally refer to articles and products as defined by 40 CFR 751. There may be instances where the terms are used interchangeably by a company or commenters, or by EPA in reference to a code from the CDR reports that are referenced (*e.g.,* "plastic products manufacturing" or "fabric, textile, and leather products.") The Agency will clarify as needed when these references are included throughout the following COU descriptions.

D.2.1 Manufacture – Domestic Manufacture

Domestic manufacture means to manufacture or produce 1,2-dichloropropane within the United States, including to manufacture 1,2-dichloropropane as a byproduct (including those containing 1,2-dichloropropane as a trace amount or as an impurity). For purposes of this draft risk evaluation, this includes the production of 1,2-dichloropropane and loading—but not transport—associated with the manufacture and/or production of 1,2-dichloropropane. 1,2-Dichloropropane can be manufactured by a chemical reaction of propylene chloride and antimony pentachloride, and as a byproduct of the reaction of propene and chlorine in epichlorohydrin manufacturing. 1,2-Dichloropropane can also be manufactured as a byproduct in production processes used to make propylene oxide and allyl chloride via the chlorohydrin route to form propylene chlorohydrin.

Examples of CDR Submissions

In the 2016 CDR cycle, two CDR companies reported domestic manufacturing of 1,2-dichloropropane (U.S. EPA, 2016a). In the 2020 CDR cycle, one CDR company reported domestic manufacturing of 1,2-dichloropropane (U.S. EPA, 2020b).

D.2.2 Manufacture – Import

Import refers to the import of 1,2-dichloropropane, including 1,2-dichloropropane-containing products and articles (such as products containing1,2-dichloropropane as a trace amount or as an impurity) into the customs territory of the United States. This COU includes loading/unloading and repackaging associated with the import of 1,2-dichloropropane. In general, chemicals may be imported into the United States in bulk via water, air, land, and intermodal shipments. 1,2-Dichloropropane may be imported neat or as a component in a formulation.

Examples of CDR Submissions

In the 2016 and 2020 CDR cycles, one company reported importing of 1,2-dichloropropane into the United States (U.S. EPA, 2020b, 2016a).

D.2.3 Processing – As a Reactant – Intermediate in All Other Basic Organic Chemical Manufacturing

This COU refers to the processing as a reactant or intermediate of 1,2-dichloropropane in the production of another chemical via a chemical reaction in which 1,2-dichloropropane is consumed to form the product. Processing in all other basic organic chemical manufacture includes the use of 1,2-dichloropropane as an intermediate for the manufacture of other chlorinated solvents, including those used to manufacture plastics and resins.

Examples of CDR Submissions

In the 2016 CDR cycle, two CDR companies reported use of 1,2-dichloropropane as an intermediate in the manufacture of other basic organic chemicals (U.S. EPA, 2016a). In the 2020 CDR cycle, one CDR company reported use of 1,2-dichloropropane as an intermediate in the manufacture of other basic organic chemicals (U.S. EPA, 2020b).

D.2.4 Processing – Incorporation into a Formulation, Mixture, or Reaction Product – Intermediate in All Other Chemical Product and Preparation Manufacturing

This COU refers to the preparation of a product; that is, the incorporation of 1,2-dichloropropane into a formulation, mixture, or a reaction product that occurs when a chemical substance is added to a product (or product mixture) after its manufacture, for distribution in commerce—in this case as an intermediate in all other chemical product and preparation manufacturing.

Examples of CDR Submissions

In the 2016 CDR cycle, one CDR company reported use of 1,2-dichloropropane as an intermediate in all other chemical product and preparation manufacturing (U.S. EPA, 2016a).

D.2.5 Processing – Repackaging

This COU refers to preparation of 1,2-dichloropropane for distribution in commerce in a different form, state, or quantity than originally received or stored by various industrial sectors—including chemical product and preparation manufacturing, wholesale and retail trade, and laboratory chemicals manufacturing. This COU includes the transfer of 1,2-dichloropropane from a bulk container into smaller containers, the type and size of which will vary depending on customer requirements. This COU does not apply to the relabeling or redistribution of a chemical substance without removing the chemical substance from the original container in which it was supplied.

Examples of CDR Submissions

In the 2020 CDR cycle, one CDR company reported repackaging 1,2-dichloropropane for all other basic organic chemical manufacturing (U.S. EPA, 2020b).

D.2.6 Distribution in Commerce

Under TSCA section 3(5), "The terms 'distribute in commerce' and 'distribution in commerce' when used to describe an action taken with respect to a chemical substance or mixture or article containing a substance or mixture mean to sell, or the sale of, the substance, mixture, or article in commerce; to introduce or deliver for introduction into commerce, or the introduction or delivery for introduction into commerce of, the substance, mixture, or article; or to hold, or the holding of, the substance, mixture, or article after its introduction into commerce." 1,2-Dichloropropane may be transported in pure liquid form and in various liquid formulations with a range of potential 1,2-dichloropropane concentrations. In this draft risk evaluation, distribution in commerce includes the (1) transportation associated with the moving of 1,2-dichloropropane or 1,2-dichloropropane-containing products and/or articles between sites manufacturing, (2) processing or recycling 1,2-dichloropropane or 1,2-dichloropropane-containing

products and/or articles to final use sites, or (3) for final disposal of 1,2-dichloropropane or 1,2-dichloropropane-containing products and/or articles.

D.2.7 Industrial Use – Non-Incorporative Activities – Processing Aids

This COU refers to the use of 1,2-dichloropropane in non-incorporative activities as a processing aid, including in the production of alkaline paper surface sizing agents. As a processing aid, 1,2-dichloroproprane does not become a part of the reaction product nor has function in the reaction product. At the end of this batch process, 1,2-dichloropropane is evaporated under vacuum and recovered (EPA-HQ-OPPT-2018-0428-0015). This is a use of 1,2-dichloropropane after it has already been incorporated into the processing aid, as opposed to when it is used upstream (*e.g.*, when 1,2-dichloropropane is processed into the processing aid).

Examples of CDR Submissions

This COU was not reported in the 2016 or 2020 CDR cycles.

D.2.8 Commercial Use – Other Uses – Laboratory Chemical

This COU refers to the commercial use of 1,2-dichloropropane as a laboratory chemical such as for chemical standards, research, equipment calibration and sample preparation, including as a reference material for analysis of terrestrial and extraterrestrial material samples. A federal agency indicated this was a critical use (EPA-HQ-OPPT-2018-0428-0031). This COU does not refer to when it is processed upstream (*e.g.,* when 1,2-dichloropropane is repackaged for laboratory use). For the purposes of this draft risk evaluation, EPA emphasizes that industrial and commercial use of 1,2-dichloropropane as a laboratory chemical applies to research, government, and academic institutions, as well as to industrial and commercial laboratories.

This COU was not reported in the 2016 or 2020 CDR cycles.

D.2.9 Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Spray Cleaner

This COU refers to the commercial use of 1,2-dichloropropane in spray applied liquid cleaning and furnishing care products, which may include liquid wax and resin components in spray solutions. This includes liquids that are spray applied to surfaces, such as countertops, tables, windows, and surfaces of appliances, and (1) are used to remove dirt, grease, stains, and foreign matter from furniture and furnishings; or (2) to cleanse, sanitize, bleach, scour, polish, protect, or improve the appearance of surfaces, including natural stones. According to the *Use Report for 1,2-Dichloropropane (CASRN 78-87-5)* (also called the "Use Report"), the concentration of 1,2-dichloropropane in cleaning products varies from 1 to 54.12% concentration (EPA-HQ-OPPT-2018-0428-0021). The Agency notes that the same applications and methods used for quality control can be applied in industrial and commercial settings, and both are included in this COU.

This COU was not reported in the 2016 or 2020 CDR cycles.

D.2.10 Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes

This COU refers to the commercial use of 1,2-dichloropropane in some solid cleaning and furnishing care product waxes and polishes. This includes waxes and polishes that are applied as a solid to surfaces, such as countertops, tables, windows, and surfaces of appliances, and are then wiped or buffed off. These include solid products used to remove dirt, grease, stains, and foreign matter from furniture and furnishings, or to cleanse, sanitize, bleach, scour, polish, protect, seal or impart stain resistance, or

improve the appearance of surfaces, including natural stones. According to the Use Report, the concentration of 1,2-dichloropropane in cleaning products varies from 1 to 54.12% concentration (EPA-HQ-OPPT-2018-0428-0021). The Agency notes that the same applications and methods used for quality control can be applied in industrial and commercial settings, and both are included in this COU.

This COU was not reported in the 2016 or 2020 CDR cycles.

D.2.11 Commercial Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polish

This COU refers to the commercial use of 1,2-dichloropropane in some liquid cleaning and furnishing care product waxes, polishes, and liquid cleaners. This includes waxes and polishes that are applied as a liquid to surfaces such as countertops, tables, windows, and surfaces of appliances, and are then wiped or buffed off. It does not include solid wax products. These include liquid products used to remove dirt, grease, stains, and foreign matter from furniture and furnishings, or to cleanse, sanitize, bleach, scour, polish, protect, seal or impart stain resistance, or improve the appearance of surfaces, including natural stones. According to the Use Report, the concentration of 1,2-dichloropropane in cleaning products varies from 1 to 54.12% concentration (EPA-HQ-OPPT-2018-0428-0021). The Agency notes that the same applications and methods used for quality control can be applied in industrial and commercial settings, and both are included in this COU.

This COU was not reported in the 2016 or 2020 CDR cycles.

D.2.12 Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Spray Cleaner

This COU refers to the consumer use of 1,2-dichloropropane in spray applied liquid cleaning and furnishing care products, which may include liquid wax and resin components in spray solution. This includes liquids that are spray applied to surfaces such as countertops, tables, windows, and surfaces of appliances, and are used to remove dirt, grease, stains, and foreign matter from furniture and furnishings, or to cleanse, sanitize, bleach, scour, polish, protect, or improve the appearance of surfaces, including natural stones. According to the Use Report, the concentration of 1,2-dichloropropane in cleaning products varies from 1 to 54.12% concentration (EPA-HQ-OPPT-2018-0428-0021).

This COU was not reported in the 2016 or 2020 CDR cycles.

D.2.13 Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Waxes and Polishes

This COU refers to the consumer use of 1,2-dichloropropane in some solid cleaning and furnishing care product waxes and polishes available to consumers. This includes waxes and polishes that are applied as a solid to surfaces, such as countertops, tables, windows, and surfaces of appliances, and are then wiped or buffed off. These include solid products used to remove dirt, grease, stains, and foreign matter from furniture and furnishings, or to cleanse, sanitize, bleach, scour, polish, protect, seal or impart stain resistance, or improve the appearance of surfaces, including natural stones. According to the Use Report, the concentration of 1,2-dichloropropane in cleaning products varies from 1 to 54.12% concentration (EPA-HQ-OPPT-2018-0428-0021).

This COU was not reported in the 2016 or 2020 CDR cycles.

D.2.14 Consumer Use – Cleaning and Furnishing Care Product – All-Purpose Liquid Cleaner and Polish

This COU refers to the consumer use of 1,2-dichloropropane in some liquid cleaning and furnishing care product waxes, polishes, and liquid cleaners available to consumers. This includes waxes and polishes that are applied as a liquid to surfaces such as countertops, tables, windows, and surfaces of appliances, and are then wiped or buffed off. It does not include solid wax products. These include liquid products used to remove dirt, grease, stains, and foreign matter from furniture and furnishings, or to cleanse, sanitize, bleach, scour, polish, protect, seal or impart stain resistance, or improve the appearance of surfaces, including natural stones. According to the Use Report, the concentration of 1,2-dichloropropane in cleaning products varies from 1 to 54.12% concentration (EPA-HQ-OPPT-2018-0428-0021).

This COU was not reported in the 2016 or 2020 CDR cycles.

D.2.15 Disposal

Each of the conditions of use of 1,2-dichloropropane may generate waste streams of the chemical that are collected and transported to third-party sites for disposal, treatment, or recycling. For purposes of this draft 1,2-dichloropropane risk evaluation, this COU generally refers to the 1,2-dichloropropane in a waste stream that is collected from facilities and commercial sites and is unloaded at and treated or disposed at third-party sites. This COU also includes 1,2-dichloropropane contained in wastewater released from a manufacturing, processing, industrial or commercial COU and discharged to a POTW or other, non-POTW for treatment. Releases of 1,2-dichloropropane are expected to occur to other environmental media such as migration to water sources through disposal (*e.g.,* disposal of formulations containing 1,2-dichloropropane or transport containers). Disposal may also include destruction and removal by incineration. Environmental releases from manufacturing and processing sites that treat or dispose of waste on-site are assessed in each COU.

Appendix E DRAFT OCCUPATIONAL EXPOSURE VALUE DERIVATION AND ANALYTICAL METHODS USED TO DETECT 1,2-DICHLOROPROPANE

Based on the available hazard and exposure profile for 1,2-dichloropropane, EPA has calculated a draft 8-hour time-weighted average (TWA) occupational exposure value (OEV). When final, this calculated value may be used to support risk management efforts for 1,2-dichloropropane under TSCA section 6(a), 15 U.S.C. 2605. EPA calculated the value rounded to 0.025 (2.5×10^{-2}) ppm (0.11 mg/m^3) for inhalation exposures to 1,2-dichloropropane as an 8-hour TWA and for consideration in workplace settings (see Appendix E.1 below) based on the chronic lifetime cancer inhalation unit risk (IUR) for respiratory tumors. The OSHA permissible exposure limit (PEL) for 1,2-dichloropropane is an 8-hour TWA of 75 ppm (350 mg/m^3).

TSCA requires risk evaluations to be conducted without consideration of cost and other non-risk factors, and thus this draft occupational exposure value represents a risk-only number. EPA may consider cost and other non-risk factors, such as analytical and technological feasibility, the availability of alternatives, and the potential for critical or essential uses during risk management. Any existing chemical exposure limit (ECEL) used for occupational safety risk management purposes may differ from the draft OEV presented in this appendix based on consideration of unreasonable risk identified and non-risk factors consistent with TSCA section 6(c).

This draft calculated value for 1,2-dichloropropane represents the exposure concentration below which exposed workers and occupational non-users (ONUs) are not expected to exhibit any appreciable risk of adverse toxicological outcomes based on this preliminary risk assessment. This value also accounts for PESS and is derived based on the most sensitive human health effect (*i.e.,* cancer) supported by the weight of scientific evidence. This draft value is expressed relative to benchmarks and standard occupational scenario assumptions of 8 hours per day, 5 days per week exposures for a total of 250 days exposure per year across a 40-year working life.

All hazard values used in the OEV calculations presented below are based on non-cancer human equivalent concentration (HECs) and associated uncertainty factor derivations and the IUR from the draft *Human Health Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u).

EPA expects that at the draft OEV of 2.5×10^{-2} ppm (0.11 mg/m^3) for lifetime exposure, workers and ONUs also would be protective of non-cancer health effects for acute, intermediate, and chronic inhalation durations. EPA has not separately calculated a short-term (15-minute) occupational exposure value (STEV) for 1,2-dichloropropane (see Section E.1 for details). The acute (8-hour) exposure value is applied for all durations of a single exposure and also serves as the short-term exposure value (STEV) to protect against 15-minute exposures.

A summary table of available monitoring methods from the Occupational Safety and Health Administration (OSHA), National Institute for Occupational Safety and Health (NIOSH), and EPA is included in Appendix E.2 (see Table_Apx E-1). Additionally, this table includes the monitoring method utilized in the inhalation test order (Integral Consulting, 2026). Table_Apx E-1 is not intended to be a comprehensive list of available air monitoring methods for 1,2-dichloropropane. The calculated exposure value is above the limit of detection (LOD) and limit of quantification (LOQ) for one method described in Table_Apx E-1.

E.1 Occupational Exposure Value Calculations

This section presents the calculations used to estimate the occupational exposure values using inputs derived in this draft risk evaluation. Multiple values are presented below for acute, intermediate, and chronic non-cancer and cancer hazard endpoints. For 1,2-dichloropropane, EPA selected the occupational exposure value based on respiratory cancer following chronic lifetime exposure. The resulting 8-hour TWA is rounded to 2.5×10^{-2} ppm. The human health hazard values (HECs, IUR) used in the equations represent the best available science and are derived in the draft risk evaluation and draft *Human Health Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u).

Draft Occupational Exposure Value (Lifetime Cancer)

The EV_{cancer} is the concentration at which the extra cancer risk is equivalent to the benchmark cancer risk of 1×10^{-4}:

$$EV_{cancer} = \frac{Benchmark_{Cancer}}{IUR} \times \frac{AT_{IUR}}{ED*EF*WY} \times \frac{\text{IR}_{\text{resting}}}{\text{IR}_{\text{workers}}} = \frac{1\times10^{-4}}{3.7\times10^{-3}\ per\ \frac{\text{mg}}{\text{m}^3}} \times \frac{24\frac{h}{d}\times\frac{365d}{y}\times78y}{8\frac{h}{d}\times\frac{250d}{y}\times40y} \times \frac{0.6125\frac{\text{m}^3}{hr}}{1.25\frac{\text{m}^3}{hr}} = 0.113\ \frac{\text{mg}}{\text{m}^3}$$

$$EV_{cancer}\ (ppm) = \frac{EV\ \frac{\text{mg}}{\text{m}^3} \times Molar\ Volume}{MW} = \frac{0.113\frac{\text{mg}}{\text{m}^3}\times 24.45\frac{L}{mol}}{112.99\ \frac{g}{mol}} = 0.0245\ \text{ppm}$$

Draft Acute (8-Hour) Non-Cancer Occupational Exposure Value

The acute occupational exposure value (EV_{acute}) was calculated as the concentration at which the acute margin of exposure (MOE) would equal the benchmark MOE for acute (8-hour) occupational exposures using the following equation:

$$\text{EV}_{\text{acute}} = \frac{\text{HEC}_{\text{acute}}}{Benchmark\ MOE_{acute}} \times \frac{\text{AT}_{\text{HEC acute}}}{ED} \times \frac{\text{IR}_{\text{resting}}}{\text{IR}_{\text{workers}}} = \frac{39\ \frac{\text{mg}}{\text{m}^3}}{30} \times \frac{24h}{\frac{8h}{d}} \times \frac{0.6125\ \frac{\text{m}^3}{hr}}{1.25\ \frac{\text{m}^3}{hr}} = 1.9\ \frac{\text{mg}}{\text{m}^3} = 0.41\ ppm$$

Draft Intermediate (1-Month) and Chronic (≥1 Year) Non-Cancer Occupational Exposure Value

The intermediate occupational exposure value ($EV_{intermediate}$) was calculated as the concentration at which the intermediate MOE would equal the benchmark MOE for intermediate occupational exposure using the following equation:

$$\text{EV}_{\text{intermediate}} = \frac{\text{HEC}_{\text{intermediate}}}{Benchmark\ MOE_{intermediate}} \times \frac{\text{AT}_{\text{HEC intermediate}}}{ED\times EF} \times \frac{\text{IR}_{\text{resting}}}{\text{IR}_{\text{workers}}}$$

$$= \frac{0.25\ \frac{\text{mg}}{\text{m}^3}}{30} \times \frac{24h}{\frac{8h}{d}\times 22d} \times \frac{0.6125\frac{\text{m}^3}{hr}}{1.25\frac{\text{m}^3}{hr}} = 0.0167\ \frac{\text{mg}}{\text{m}^3} = 0.00361\ ppm$$

The hazard value (an HEC of 0.25 mg/m^3 or 5.4×10^{-2} ppm) is the same for the intermediate (1-month) and chronic (≥1 year) occupational exposure scenarios. EPA has preliminarily determined that because the same critical health effect applies to both intermediate and chronic exposure contexts, the relevant averaging time should be considered equivalent across both exposure scenarios. Therefore, the resulting $EV_{chronic}$ would be the same as the $EV_{intermediate}$ based on intermediate exposures and EPA is presenting calculations for the $EV_{intermediate}$ to represent both exposure durations.

The parameters used in the above equations are described below. Numerical values chosen for the parameters are described in relevant sections of this draft risk evaluation and draft *Human Health Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u).

Where:

- $AT_{HECchronic}$ = Averaging time for the POD/HEC used for evaluating non-cancer, chronic occupational risk, based on study conditions and/or HEC adjustments (24 hour/day for 365 days/year) and assuming the number of years matches the high-end working years (WY, 40 years) for a worker
- $AT_{HECintermediate}$ = Averaging time for the POD/HEC used for evaluating non-cancer, intermediate occupational risk, based on study conditions and/or any HEC adjustments (24 hours/day for 30 days)
- $AT_{HECacute}$ = Averaging time for the POD/HEC used for evaluating non-cancer, acute occupational risk, based on study conditions and/or any HEC adjustments (24 hours/day)
- AT_{IUR} = Averaging time for the cancer IUR, based on study conditions and any adjustments (24 hour/day for 365 days/year) and averaged over a lifetime (78 years)
- Benchmark $MOE_{chronic}$ = Chronic non-cancer benchmark margin of exposure, based on the total uncertainty factor of 30
- Benchmark $MOE_{intermediate}$ = Intermediate non-cancer benchmark margin of exposure, based on the total uncertainty factor of 30
- Benchmark MOE_{acute} = Acute non-cancer benchmark margin of exposure, based on the total uncertainty factor of 30
- $Benchmark_{cancer}$ = Benchmark for excess lifetime cancer risk
- EV_{acute} = Draft occupational exposure value based on central nervous system (CNS) depression
- $EV_{intermediate}$ = Draft occupational exposure value based on nasal lesions
- $EV_{chronic}$ = Draft occupational exposure value based on nasal lesions
- EV_{cancer} = Draft occupational exposure value based on excess cancer risk
- ED = Exposure duration (8 hours/day)
- EF = Exposure frequency (1 day/year for acute; 22 days/year for intermediate; 250 days/year for chronic and lifetime)
- $HEC_{acute,\ intermediate,\ or\ chronic}$ = Human equivalent concentration for acute, intermediate, or chronic occupational exposure scenarios
- IUR = Inhalation unit risk (per mg/m^3 and per ppm)
- IR = Inhalation rate (default is 1.25 m^3/h for workers and 0.6125 m^3/h for the general population at rest; 0.6125 m^3/h is also assumed for animals in toxicity studies if they are "at rest" vs. exercising)
- WY = Working years per lifetime at the 95th percentile (40 years)
- Molar Volume = 24.45 L/mol, the volume of a mole of gas at 1 atm and 25 °C
- MW = Molecular weight of 1,2-dichloropropane (112.99 g/mole)

Unit conversion:

1 ppm = 4.62 mg/m^3 (based on the molecular weight of 112.99 g/mol for 1,2-dichloropropane)

E.2 Summary of Air Sampling Analytical Methods Identified

EPA conducted a search to identify relevant NIOSH, OSHA, and EPA analytical methods used to monitor for the presence of 1,2-dichloropropane in air (see Table_Apx E-1). This table presents validated methods from governmental agencies as well as those utilized in the TSCA Section 4 Test Order Monitoring Study (Integral Consulting, 2026) and is not intended to be a comprehensive list of available air monitoring methods for 1,2-dichloropropane. The sources used for the search included the following:

1. NIOSH Manual of Analytical Methods (NMAM); 5th Edition; accessed August 20, 2026)
2. NIOSH NMAM 4th Edition (accessed August 20, 2026)
3. OSHA Index of Sampling and Analytical Methods (accessed August 20, 2026)
4. EPA Environmental Test Method and Monitoring Information (accessed August 20, 2026)
5. Test Order Inhalation Monitoring Study (Integral Consulting, 2026).

As described in Table_Apx E-1, the approved Final Study Plan for 1,2-dichloropropane utilized a modified NIOSH 1013 capable of detecting below the standard NIOSH 1013 method. This method utilized Assay Technology 525 TraceAir II activated charcoal passive badges and gas chromatography with mass spectrometry (GC/MS), which is a more sensitive analytical technique. The laboratory method validation report is included in Appendix A of the Final Study Report (Integral Consulting, 2026). The modified method is capable of achieving an LOD below the draft occupational exposure value of 2.5×10^{-2} ppm.

Table_Apx E-1. Limit of Detection (LOD) and Limit of Quantification (LOQ) Summary for Air Sampling Analytical Methods Identified

Air Sampling Analytical Methods	Year Published	LOD[a]	LOQ	Notes	Source
NIOSH Method 1013 Modified	2026	3.0E−05 ppm	4.5E−05 ppm	Method reports the LOD as 4 ng/sample and the LOQ as 6 ng/sample; equivalent airborne concentrations (ppm) based on an 8-hour sampling duration.	(Integral Consulting, 2026)
NIOSH Method 1013[b]	1994 (Issue 2)	2.9E−02 to 1.0 mg/m^3 (6.2E−03 to 0.22 ppm)	0.14–5.0 mg/m^3 (3.1E−02 to 1.1 ppm)	Method reports the LOD as 0.1 µg per sample and provides procedures for collecting air samples between 0.1 and 3.5 L with a flow rate of 0.01–0.2 L/min. Method reports the LOQ as 0.5 µg per sample.	NIOSH NMAM 4th Edition
OSHA Method 7 (Withdrawn)	1979 (Updated 2000)	N/A	N/A	As of September 2017, OSHA no longer uses or supports this method.	OSHA Index of Sampling and Analytical Methods

NIOSH = National Institute for Occupational Safety and Health; OSHA = Occupational Safety and Health Administration; ppb = parts per billion; ppm = parts per million; ppt = parts per trillion
[a] These sources cover a range of LODs and LOQs both below and above the most sensitive occupational exposure value.
[b] This method provides the LOD based on sample size. For a sample size range of 0.1–3.5 L, the LOD would be 2.9E−02 to 1.0 mg/m^3.

Summary of Existing Occupational Exposure Limits

OSHA set a permissible exposure limit (PEL) as an 8-hour TWA for 1,2-dichloropropane of 350 mg/m^3 (75 ppm) in 1971 (https://www.osha.gov/chemicaldata/677; accessed July 28, 2026). Other governmental agencies and independent groups have also set recommended exposure limits for 1,2-dichloropropane (Table_Apx E-2). The American Conference of Governmental Industrial Hygienists (ACGIH) sets the Threshold Limit Value (TLV) at 10 ppm TWA (https://www.acgih.org/propylene-dichloride-2/; accessed May 20, 2026). NIOSH notes this chemical as "Carcinogen (CA): reduce exposure to lowest feasible concentration (LOQ 0.03 ppm)" and does not provide a TWA exposure limit. There are no short-term exposure or ceiling limits provided by OSHA, NIOSH, or ACGIH. Other available occupational limit values (TWA) vary, with the lowest value being 4.6 mg/m^3 (Japan; JSOH) and the highest value being 350 mg/m^3 (Austria, Denmark, France, People's Republic of China) (Table_Apx E-2 and Appendix B.3).

Table_Apx E-2. Summary of Occupational Exposure Limits for 1,2-Dichloropropane

Country	Limit Value (8-hour TWA)		STEL (15-minute)		Notes/Reference[a] (Year)
	ppm	mg/m^3	ppm	mg/m^3	
Australia	75	347	110	508	GESTIS – International Limit Values
Austria	75	350	375	1,750	GESTIS – International Limit Values
Belgium	10	47	–	–	GESTIS – International Limit Values
Canada – Ontario	10	–	–	–	GESTIS – International Limit Values
Canada – Québec	10	46	–	–	GESTIS – International Limit Values
Denmark	75	350	150	700	GESTIS – International Limit Values
Finland	10	46	20	92	GESTIS – International Limit Values
France	75	350	–	–	GESTIS – International Limit Values
Hungary	10	50	20	100	GESTIS – International Limit Values
Ireland	10	46	–	–	GESTIS – International Limit Values
Japan (JSOH)	1	4.6	–	–	GESTIS – International Limit Values
Japan (MHLW)	1	–	–	–	GESTIS – International Limit Values
New Zealand	5	23	–	–	GESTIS – International Limit Values
Norway	40	185	–	–	GESTIS – International Limit Values
People's Republic of China	–	350	–	500	GESTIS – International Limit Values
Poland	–	50	–	–	GESTIS – International Limit Values
Romania	22	100	44	200	GESTIS – International Limit Values
Singapore	75	347	110	508	GESTIS – International Limit Values
South Korea	75	–	110	–	GESTIS – International Limit Values
Spain	10	47	–	–	GESTIS – International Limit Values
USA – OSHA	75	350	–	–	OSHA (1971)
USA – ACGIH	10	46	–	–	ACGIH (2005)
USA – CAL/OSHA	75	350	110	510	CAL/OSHA (1983)

[a] All websites/hyperlinks provided in this table were accessed on July 28, 2026.

Appendix F IIOAC AMBIENT AIR RISK ESTIMATES FOR GENERIC SCENARIOS

F.1 Inhalation Margin of Exposure

EPA used a margin of exposure (MOE) approach using the 50th and 95th percentile modeled daily and annual concentrations. The MOE is the ratio of the non-cancer hazard value (or point of departure [POD]) divided by a human exposure concentration (HEC). The MOEs for non-cancer inhalation risks were calculated using Equation_Apx F-1 below; modeled daily and annual concentrations are used to calculate acute and chronic MOEs, respectively.

Equation_Apx F-1. Margin of Exposure Calculation

$$MOE = \frac{Non\text{-}Cancer\ Hazard\ Value\ (POD)}{Human\ Exposure}$$

Where:

MOE	=	Margin of exposure for acute, short-term, or chronic risk comparison (unitless)
Non-cancer Hazard Value (POD)	=	Human equivalent concentration (HEC, µg/m^3)
Human Exposure	=	Exposure estimate (µg/m^3)

MOE risk estimates may be interpreted in relation to benchmark MOEs, which are typically the total uncertainty factor for each non-cancer POD. The MOE estimate is interpreted as a human health risk of concern if the MOE estimate is less than the benchmark MOE (*i.e.,* the total uncertainty factor [UF]). On the other hand, for this screening-level analysis, if the MOE estimate is equal to or exceeds the benchmark MOE, the exposure pathway is not analyzed further. Typically, the larger the MOE, the more unlikely it is that a non-cancer adverse effect occurs relative to the benchmark.

EPA chose a non-cancer endpoint for general population acute exposure with an HEC value of 8.4 ppm (39,000 µg/m^3) and a chronic exposure HEC value of 0.054 ppm (250 µg/m^3). A benchmark of 30 was used for both acute and chronic screening-level risk estimates. All calculated acute and chronic MOEs were above the benchmark at the 100, 100 to 1,000, and 1,000 m distances.

For more details on the non-cancer hazard values, see the *Draft Human Health and Environmental Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u).

F.2 Inhalation Cancer Risk Estimate

Inhalation cancer risk lifetime cancer risk is calculated with Equation_Apx F-2 using the lifetime average daily concentration (LADC) based on the 50th and 95th percentile-modeled annual air concentration and the general population IUR of 3.7×10^{-6} per µg/m^3; see the *Draft Human Health Hazard Assessment for 1,2-Dichloropropane* (U.S. EPA, 2026u) for more details:

Equation_Apx F-2. Lifetime Cancer Risk Calculation

$$Lifetime\ Cancer\ Risk\ =\ LADC\ \times\ IUR$$

$$Lifetime\ Cancer\ Risk = LADC\ \left(\frac{\mu g}{m^3}\right) \times \frac{3.7E^{-6}}{\mu g/m^3}$$

Where:

LADC = Lifetime average daily concentration

IUR = Inhalation unit risk (risk per unit of exposure ($\mu g/m^3$)

If the calculated lifetime cancer risk is above the cancer risk benchmark of 1 in a million (or 1×10^{-6}), then further evaluation is warranted.

Table_Apx F-1. Acute Margin of Exposure (MOE) Estimates – Generic Scenarios Stack Releases

Condition of Use			Occupational Exposure Scenario (OES)	50th Percentile Modeled Concentration Acute MOE (Benchmark = 30)			95th Percentile Modeled Concentration Acute MOE (Benchmark = 30)		
				Distance			Distance		
Life Cycle Stage	Category	Subcategory		100 m	100–1,000 m	1,000 m	100 m	100–1,000 m	1,000 m
Commercial Use	Other Uses	Laboratory Chemicals	Commercial Use as a Laboratory Chemical (OES #5) – High-End Release	8.67E06	2.67E07	4.95E07	5.54E06	2.19E07	4.32E07

Table_Apx F-2. Acute Margin of Exposure (MOE) Estimates – Generic Scenarios Fugitive Releases

Condition of Use			Occupational Exposure Scenario (OES)	50th Percentile Modeled Concentration Acute MOE (Benchmark = 30)			95th Percentile Modeled Concentration Acute MOE (Benchmark = 30)		
				Distance			Distance		
Life Cycle Stage	Category	Subcategory		100 m	100–1,000 m	1,000 m	100 m	100–1,000 m	1,000 m
Commercial Use	Other Uses	Laboratory Chemicals	Commercial Use as a Laboratory Chemical (OES #5) – High-End Release	3.18E05	2.81E06	7.38E06	2.78E05	2.42E06	6.06E06

Table_Apx F-3. Chronic Margin of Exposure (MOE) Estimates – Generic Scenarios Stack Releases

Condition of Use			Occupational Exposure Scenario (OES)	50th Percentile Modeled Concentration Chronic MOE (Benchmark = 30)			95th Percentile Modeled Concentration Chronic MOE (Benchmark = 30)		
				Distance			Distance		
Life Cycle Stage	Category	Subcategory		100 m	100–1,000 m	1,000 m	100 m	100–1,000 m	1,000 m
Commercial Use	Other Uses	Laboratory Chemicals	Commercial Use as a Laboratory Chemical (OES #5) – High-End Release	1.98E05	4.49E05	7.86E04	5.03E04	3.92E05	5.03E04

6463 **Table_Apx F-4. Chronic Margin of Exposure (MOE) Estimates – Generic Scenarios Fugitive Releases**

Condition of Use			Occupational Exposure Scenario (OES)	50th Percentile Modeled Concentration Chronic MOE (Benchmark = 30)			95th Percentile Modeled Concentration Chronic MOE (Benchmark = 30)		
				Distance			Distance		
Life Cycle Stage	Category	Subcategory		100 m	100–1,000 m	1,000 m	100 m	100–1,000 m	1,000 m
Commercial Use	Other Uses	Laboratory Chemicals	Commercial Use as a Laboratory Chemical (OES #5) – High-End Release	2.88E03	2.54E04	6.70E04	2.52E03	2.20E04	5.50E04

6464
6465
6466 **Table_Apx F-5. Lifetime Cancer Risk Estimates – Generic Scenarios Stack Releases**

Condition of Use			Occupational Exposure Scenario (OES)	50th Percentile Modeled Concentration Cancer Risk (Benchmark = 1E−06)			95th Percentile Modeled Concentration Cancer Risk (Benchmark = 1E−04 to 1E−06)		
				Distance			Distance		
Life Cycle Stage	Category	Subcategory		100 m	100–1,000 m	1,000 m	100 m	100–1,000 m	1,000 m
Commercial Use	Other Uses	Laboratory Chemicals	Commercial Use as a Laboratory Chemical (OES #5) – High-End Release	4.66E−09	2.06E−09	1.18E−08	1.84E−08	2.36E−09	1.84E−08

6467
6468
6469 **Table_Apx F-6. Lifetime Cancer Risk Estimates – Generic Scenarios Fugitive Releases**

Condition of Use			Occupational Exposure Scenario (OES)	50th Percentile Modeled Concentration Cancer Risk (Benchmark = 1E−6)			95th Percentile Modeled Concentration Cancer Risk (Benchmark = 1E−04 to 1E−6)		
				Distance			Distance		
Life Cycle Stage	Category	Subcategory		100 m	100–1,000 m	1,000 m	100 m	100–1,000 m	1,000 m
Commercial Use	Other Uses	Laboratory Chemicals	Commercial Use as a Laboratory Chemical (OES #5) – High-End Release	3.21E−07	3.64E−08	1.38E−08	3.67E−07	4.21E−08	1.68E−08

6470

Appendix G CONSUMER DERMAL SENSITIVITY ANALYSIS

EPA conducted a dermal sensitivity analysis for each of three product types within the Cleaning and Furnishing Care Product COUs: All-Purpose Liquid Cleaner/Polish, All-Purpose Waxes and Polishes, and All-Purpose Liquid Spray Cleaners. This appendix provides an explanation of each product, the dermal assessment inputs, and assumptions. In addition, the sensitivity analysis varied product weight fraction, the dermal loading, and skin surface area to inform the parameters affecting dermal risk estimates.

G.1 All-Purpose Liquid Cleaner/Polish

This section summarizes the risk estimates, MOEs, for the Cleaning and Furnishing Care Product; All-Purpose Liquid Cleaner/Polish COU. Two consumer products were identified under this COU dermal exposure assessment. EPA modeled dermal exposures for each product because the reported weight fractions were different. By evaluating each product, EPA obtained realistic and representative exposure and risk estimates.

The first product, Cera Fluida, is a liquid wax used for the treatment of natural stones like onyxes, marbles, agglomerates, and terrazzo material. On marbles it increases the polish and eliminates the superficial defects and accents the color. On granites it increases the polish and enhances the color. The 1,2-dichloropropane content was reported in the SDS as 54.12% w/w (Tenax Spa, 2019). For the dermal exposure assessment of Cera Fluida product, EPA used 54.12% weight fraction value for the low-, medium-, and high-intensity use exposure scenarios. The second product, UniBlack2, is a black liquid wax used to increase the black effect on polished, brushed, and smooth surfaces. The 1,2-dichloropropane content was reported in the SDS as a range, 30 to 50% w/w (Tenax Spa, 2013b). For the dermal exposure assessment of UniBlack2, EPA used 30 and 50% for the low- and high-intensity use exposure scenario, respectively. For the medium-intensity use exposure scenario, EPA used the average of the minimum and maximum weight fraction values reported, 40% w/w.

The application of both products is the same general process: The liquid product is poured directly from the container onto the surface spreading the liquid product with a rag, then buffing, and finally using a rag to remove excess product still on the surface. EPA assumes no gloves are used during product application. For skin surface in contact with the product, the Agency used “inside one hand” and “inside two hands” surface area to body weight ratios. The “inside of two hands” was selected for the high-intensity use exposure scenarios based on product use patterns described above. During the application process the user is expected to have direct dermal contact with the product and the rags soaked with the product as well as during buffing. The consideration of one hand vs. two hands is based on two realistic, but different application approaches. In one, the user holds the rag used to spread the product onto the surface with one hand and only uses that hand to contact the product and rag while keeping the other hand clean to either perform other tasks or hold the product container. In the other scenario, the user switches the hand in contact with the product and rag used to spread the product onto the surface and does not clean their hands during application, thus having two hands in contact with the product.

The amount of liquid product retained on the skin, Q_u, is a conservative estimate as it assumes that the consumer does not wipe or remove any of the product when it comes in contact with the skin during the application event. The Agency used data from U.S. EPA (1992) to estimate dermal exposures to consumer products for activities associated with handling liquids and pastes containing 1,2-dichloropropane. U.S. EPA (1992) investigated amount of liquid retained from common scenarios including rag handling and direct dermal contact with liquids. The Agency utilized the minimum, 50th, and 95th percentile amount of liquid product retained values from rag handling scenarios of 0.7, 1.4, and

2.1 mg/cm^2, respectively for the low-, medium-, and high-intensity use dermal exposure estimates. For a sensitivity analysis, the Agency calculated the amount of liquid product retained on the skin using CEM Version 3.2 User Manual Equation 94 (U.S. EPA, 2023b). Briefly, the calculated amount of product that is retained on the skin, Q_u, is obtained using the liquid product film thickness on the skin's surface and the density of the formulation. Density values used in this assessment were obtained from the product SDSs. The film thickness refers to the thickness of the layer of product remaining on the skin after use. Table B-3 of the *CEM User Guide Appendices* (U.S. EPA, 2023b) provides film thickness for various products. EPA selected the value of 0.0021 cm as the film thickness from the all-purpose waxes and polishes (furniture, floor, etc.) scenario. The resulting calculated Q_u values were 1.9 and 2.3 mg/cm^2-event for UniBlack2 and Cera Fluida, respectively. Because the calculated Q_u values are product-specific and only one value was available per product, the Agency used the U.S. EPA (1992) values to provide a range of possible dermal exposures and used the calculated values in the sensitivity analysis, see Figure_Apx G-1.

The fraction absorbed value was empirically obtained from a test order (Charles River Laboratories, 2024). The fraction absorbed value used in this COU dermal exposure assessment is specific to a liquid formulation that contained 50% w/w 1,2-dichloropropane. This value is most appropriate and realistic for the high-intensity use exposure scenario and might slightly overestimate dermal exposures for both the low- and medium-intensity use scenarios.

Table 5-25 shows the acute dermal MOE values for low-, medium-, and high-intensity use exposure scenarios are all above the dermal benchmark of 30. In the sensitivity analysis, EPA explored which inputs has the highest impact on MOE values. Because youth aged 11 to 15 years are the most sensitive user population age group and the product exposure was an acute single use, the sensitivity analysis was performed on this population understanding that the other two age groups are slightly higher MOEs. In addition, the sensitivity analysis specifically focused on the 11 to 15 years age group as the most sensitive group to demonstrate the relative impact of surface area and loading on risk estimates. The fraction absorbed input used in this COU dermal exposure assessment for low- to high-intensity use exposure scenarios was already the highest value obtained via the test order experiments; thus, lower fraction absorbed values are expected to yield MOE values higher than those reported in Table 5-25 and further from the potential risk benchmark. Acute exposure frequency was set as one event per day and based on the product use description this selection is unlikely to increase to more events in a day for consumers. Once the product application event is done after product spreading, buffing, and excess removal, the application event is completed, and no further exposure is expected from application activities. The highest calculated *Qu* input value of 2.3 mg/cm^2-event combined with the highest weight fraction, surface area to body weight ratio, fraction absorbed, and acute frequency, yielded an MOE for youth aged 11 to 15 years of 59 compared to (exceeding) the dermal benchmark of 30. This sensitivity analysis confirms that no combination of reasonable and realistic inputs would yield MOEs below the dermal benchmark of 30 for the products identified under this COU.

Youth 11 to 15 Years of Age Inside of Two Hands Sensitivity Analysis Matrix							
Acute freq = 1 event per day; fraction absorbed = 1.09%; WF outside reported range							
Acute freq = 1 event per day; fraction absorbed = 1.55%							
Youth 11 to 15 years skin surface area to body weight ratio = 6.34							
Matrix content = MOEs Dermal Benchmark < 30		Weight Fraction (%)					
		Outside Range		Uniblack2			Cera Fluida
		10	**20**	**30**	**40**	**50**	**54**
Q_u (mg/cm^2-event)	**0.7**	1,482	741	349	262	209	193
	1.4	741	371	174	131	105	97
	2.1	494	247	116	87	70	64
	2.3	451	226	106	80	64	59
Qu from U.S. EPA, 1992							
Qu calculated based on 1.1 g/cm^3 product density and film thickness was a default used in CEM, Table B-3 for All-purpose waxes and polishes (furniture, floor, etc.)							

Figure_Apx G-1. Sensitivity Analysis Matrix for Liquid Cleaner/Polish: Youth Aged 11–15 Years – Inside of Two Hands

G.2 All-Purpose Waxes and Polishes (Paste)

This section summarizes the risk estimates, MOEs, for the Cleaning and Furnishing Care Product; All-Purpose Waxes and Polishes (paste) COU. Two consumer products were identified under this COU dermal exposure assessment. EPA modeled dermal exposures for each product because the reported weight fractions were different. By evaluating each product, EPA obtained realistic and representative exposure and risk estimates. The first product, Cera TeWax, is a paste wax used to increase the polishing effect on onyxes, marble, natural stones, granite, agglomerates, and terrazzo. The 1,2-dichloropropane content was reported in the SDS as a range, 30 to 50% w/w (Tenax Spa, 2019, 2015b). For the dermal exposure assessment of Cera TeWax, EPA used 30 and 50% for the low- and high-intensity use exposure scenario, respectively. For the medium-intensity use exposure scenario, EPA used the average of the minimum and maximum weight fraction values reported, 40% w/w. The second product, Quartz Toner, is a surface treatment that can be used to enhance quartz, engineered, and agglomerate stones. The 1,2-dichloropropane content was reported in the SDS as a range, 1 to 3.5% w/w (Tenax Spa, 2017). For the dermal exposure assessment of Quartz Toner, EPA used 1 and 3.5% for the low- and high-intensity use exposure scenario. For the medium-intensity use exposure scenario, EPA used the average of the minimum and maximum weight fraction values reported (2.25% w/w).

The application of both products is the same as described for the previous COU products. In general, the products are applied by pouring the paste product directly from the container onto the surface spreading the paste product with a rag, then buffing, and finally using a rag to remove excess product still on the surface. EPA assumes no gloves are used during product application. It is noteworthy that the products identified as pastes by the manufacturer have densities that are similar to products that were classified as liquids by the same manufacturer. Also noteworthy is that videos of product application for products identified as liquids and pastes for the same manufacturer showed the same approach for liquids and pastes. See the *Draft Consumer Exposure Analysis and Risk Calculator* spreadsheet (U.S. EPA, 2026f) COU Crosswalk Tab for a hyperlink to application videos.

For skin surface in contact with the product, EPA used "inside one hand" and "inside two hands" surface area to body weight ratios. The "inside of two hands" was selected for the high-intensity use exposure scenarios based on product use patterns described above. During the application process the user is expected to have direct dermal contact with the product and the rags soaked with the product, and during buffing. The consideration of one hand vs. two hands is based on two realistic, but different application approaches. In one, the user holds the rag used to spread the product onto the surface with one hand and only uses that hand to contact the product and rag while keeping the other hand clean to either perform other tasks or hold the product container. In the other scenario, the user switches the hand in contact with the product and rag used to spread the product onto the surface and does not clean their hands during application, thus having two hands in contact with the product.

The amount of liquid product retained on the skin, Q_u, is a conservative estimate because it assumes the consumer does not wipe or remove any of the product when it comes in contact with the skin during the application event. The Agency used data from U.S. EPA (1992) to estimate dermal exposures to consumer products for activities associated with handling liquids and pastes containing 1,2-dichloropropane. U.S. EPA (1992) investigated amount of liquid retained from common scenarios including rag handling and direct dermal contact with liquids. The Agency utilized the minimum, 50th, and 95th percentile amount of liquid product retained values from rag handling scenarios of 0.7, 1.4, and 2.1 mg/cm^2 for the low-, medium-, and high-intensity use exposure scenarios dermal exposure estimates. For a sensitivity analysis, EPA calculated the amount of liquid product retained on the skin using CEM Version 3.2 User Manual Equation 94 (U.S. EPA, 2023b). Briefly, the calculated amount of product that is retained on the skin, Q_u, is obtained using the liquid product film thickness on the skin's surface and the density of the formulation. Density values used in this assessment were obtained from the product SDSs. The film thickness refers to the thickness of the layer of product remaining on the skin after use. Table B-3 of the *CEM User Guide Appendices* (U.S. EPA, 2023b) gives film thickness for various products. EPA selected the value of 2.1×10^{-3} cm as the film thickness from the all-purpose waxes and polishes (furniture, floor, etc.) scenario. The resulting calculated *Qu* values were 1.8 and 2.3 mg/cm^2-event for Quartz Tone and Cera TeWax, respectively. Because the calculated *Qu* values are product specific and only one value was available per product, EPA used the U.S. EPA 1992 study (U.S. EPA, 1992) values to provide a range of possible dermal exposures and used the calculated values in the sensitivity analysis, see Figure_Apx G-2.

The fraction absorbed values were empirically obtained from a test order (Charles River Laboratories, 2024). The fraction absorbed value used for Cera TeWax dermal exposure assessment was empirically obtained from a liquid formulation that contained 50% w/w 1,2-dichloropropane. This fraction absorbed value, 1.55%, is most appropriate and realistic for the high-intensity use exposure scenario and might slightly overestimate dermal exposures for the low- and medium-intensity use scenarios for Cera TeWax. The fraction absorbed used for Quartz Toner dermal exposure assessment was empirically obtained from a liquid formulation containing 1% w/w 1,2-dichloropropane. This fraction absorbed value, 1.16%, is most appropriate and realistic for the low-intensity use exposure scenario and might slightly underestimate dermal exposures for the medium- and high-intensity use scenarios for Quartz Toner. See sensitivity analysis below for a combination of fraction absorbed input values with changing weight fractions.

Table 5-25 shows the acute dermal MOE values for low-, medium-, and high-intensity use exposure scenarios are all above the dermal benchmark of 30. In the sensitivity analysis EPA explored which inputs impacted MOE values the most. Because youth 11 to 15 years of age are the most sensitive user population age group and the product exposure was an acute single use, the sensitivity analysis was performed on this population understanding that the other two age groups are slightly higher MOEs. In

addition, the sensitivity analysis specifically focused on the 11 to 15 age group as the most sensitive group to demonstrate the relative impact of surface area and loading on risk estimates. Because the fraction absorbed input used in the Cera TeWax dermal exposure assessment for low- to high-intensity use exposure scenarios was already the highest value obtained via the test order experiments, lower fraction absorbed values are expected to yield higher MOE values than those reported in Table 5-25 and further from the potential risk benchmark (see brown cells in Figure_Apx G-2). For the sensitivity analysis dermal assessment of Quartz Toner, EPA used the higher fraction absorbed input value of 1.55% instead of the 1.16% value to observe changes to the MOE values (light yellow cells in Figure_Apx G-2 – 1, 2.25, and 3.5% w/w) for MOE results.

Acute exposure frequency was set as one event per day and based on the product use description this selection is unlikely to increase to more events in a day for consumers. Once the product application event is done after product spreading, buffing, and excess removal, the application event is completed, and no further exposure is expected from application activities. The highest calculated Q_u input value of 2.3 mg/cm^2-event, combined with the highest weight fraction, surface area to body weight ratio, fraction absorbed, and acute frequency, yielded an MOE for youth 11 to 15 years of age equal to 64 compared to the dermal benchmark of 30. This sensitivity analysis confirms that no combination of reasonable and realistic inputs would yield MOEs below the dermal benchmark of 30 for the products identified under this COU.

Youth 11 to 15 Years of Age Inside of Two Hands Sensitivity Analysis Matrix										
Acute freq = 1 event per day, fraction absorbed = 1.55%; weight fraction outside reported range										
Acute freq = 1 event per day, fraction absorbed = 1.55%										
Acute freq = 1 event per day; Chronic freq = 1 event per year; fraction absorbed = 1.55%; weight fraction outside reported range										
Acute freq = 1 event per day; Chronic freq = 1 event per year; fraction absorbed = 1.55%										
Youth 11 to 15 years skin surface area to body weight ratio = 6.34										
Matrix content = MOEs Dermal Benchmark < 30		Weight Fraction (%)								
		Outside Range		Quartz Toner			Outside Range		Cera TeWax	
		0.1	0.5	1	2.25	3.5	10	20	30	40	50
Q_u (mg/cm^2-event)	0.7	104,646	20,929	10,465	4,661	2,990	1,046	523	349	262	209
	1.4	52,323	10,465	5,232	2,325	1,495	523	262	174	131	105
	2.1	34,882	6,976	3,488	1,550	997	349	174	116	87	70
	2.3	31,849	6,370	3,185	1,416	910	318	159	106	80	64
Qu from U.S. EPA, 1992										
Qu calculated based on 1.1 g/cm^3 product density and film thickness was a default used in CEM, Table B-3 for All-purpose waxes and polishes (furniture, floor, etc.)										

Figure_Apx G-2. Sensitivity Analysis Matrix for Waxes and Polishes (Paste): Youth Aged 11–15 Years – Inside of Two Hands

G.3 All-Purpose Liquid Spray Cleaner/Polish

This section summarizes the risk estimates, MOEs, for the Cleaning and Furnishing Care Product; All-Purpose Liquid Spray Cleaner/Polish COU. One consumer product was identified under this COU dermal exposure assessment. EPA modeled dermal exposures for this product for acute and chronic exposures because the reported application approach indicates daily use is possible. The product identified, Lustro Italiano, is a liquid spray cleaner and polish. The 1,2-dichloropropane content was reported in the SDS as a range, 1 to 3.5% w/w (Tenax Spa, 2020, 2015c). For the dermal exposure assessment of Lustro Italiano, EPA used 1 and 3.5% for the low- and high-intensity use exposure scenarios, respectively. For the medium-intensity use exposure scenario, EPA used the average of the minimum and maximum weight fraction values reported, 2.25% w/w.

The application of the spray product was provided by online retailers; see the *Draft Consumer Exposure Analysis and Risk Calculator* spreadsheet (U.S. EPA, 2026f) COU Crosswalk Tab for link to application instructions from retailers. In general, the product is sprayed on the surface and allowed to sit for approximately 30 seconds before wiping with a sponge or rag, the user should then wipe dry with a paper towel, changing towels frequently when saturated with liquid. For this assessment, EPA assumed that most of the dermal exposures occur from contact with the rag(s) and paper towels, and direct contact during product spreading on the surface than from suspended spray droplets depositing on the skin. The Agency assumes no gloves are used during product application.

For skin surface in contact with the product, EPA used "inside one hand" and "inside two hands" surface area to body weight ratios. The "inside of two hands" was selected for the high-intensity use exposure scenarios based on product use patterns described above. During the application process the user is expected to have direct dermal contact with the product and the rags soaked with the product. Again, the consideration of one hand vs. two hands is based on two realistic, but different application approaches. In one, the user holds the rag used to spread the product onto the surface with one hand and only uses that hand to contact the product and rag while keeping the other hand clean to either perform other tasks or hold the product spray container. In the other scenario, the user switches the hand in contact with the product and rag used to clean the product on the surface and does not clean their hands during application, thus having two hands in contact with the product.

Because Table 5-25 shows the chronic dermal medium- and high-intensity use exposure scenarios with MOEs below the benchmark of 30, EPA performed a sensitivity analysis to observe the effect of lowering the surface area to body weight ratio input to the inside of one hand with a combination of various amount of liquid product retained on the skin, Q_u, values, weight fractions, and chronic frequencies (see end of this section for a discussion of sensitivity analysis results).

The amount of liquid product retained on the skin, Q_u, is a conservative estimate as it assumes that the consumer does not wipe or remove any of the product when it comes in contact with the skin during the application event. The Agency used data from U.S. EPA (1992) to estimate dermal exposures to consumer products for activities associated with handling liquids containing 1,2-dichloropropane. U.S. EPA (1992) investigated amount of liquid retained from common scenarios including rag handling and direct dermal contact with liquids. EPA utilized the minimum, 50th, and 95th percentile amount of liquid product retained values from rag handling scenarios of 0.7, 1.4, and 2.1 mg/cm^2 for the low-, medium-, and high-intensity use exposure scenarios dermal exposure estimates, respectively. For a sensitivity analysis, the Agency calculated the amount of liquid product retained on the skin using CEM Version 3.2 User Manual Equation 94 (U.S. EPA, 2023b). Briefly, the calculated amount of product that is retained on the skin, Q_u, is obtained using the liquid product film thickness on the skin's surface and the density of the formulation. Density values used in this assessment were obtained from the product SDSs. The film thickness refers to the thickness of the layer of product remaining on the skin after use. Table B-3 of the *CEM User Guide Appendices* (U.S. EPA, 2023b) provides film thickness for various products. EPA selected the value of 0.0021 cm as the film thickness from the all-purpose waxes and polishes (furniture, floor, etc.) scenario. The resulting calculated Q_u value was 1.7 mg/cm^2-event for Lustro Italiano. Because the calculated Q_u value is product-specific and only one value was available, EPA used the U.S. EPA 1992 study values to provide a range of possible dermal exposures. A sensitivity analysis using the calculated value was not performed because the calculated value falls within the range from the EPA 1992 study and very similar to the medium-intensity use exposure scenario Q_u value.

The fraction absorbed values were empirically obtained from a test order (Charles River Laboratories, 2024). The fraction absorbed used for Lustro Italiano dermal exposure assessment was empirically obtained from a liquid formulation containing 1% w/w 1,2-dichloropropane. This fraction absorbed value, 1.16%, is most appropriate and realistic for the low-intensity use exposure scenario (weight fraction of 1% w/w) and might slightly underestimate dermal exposures for the medium- and high-intensity use scenarios for this spray product. Because the resulting acute dermal exposures have the same patterns as the MOEs calculated for the Quartz Toner in Section G.2, and because it is expected that no combination of higher absorption fraction and other inputs will yield an MOE below the benchmark of 30 for Lustro Italiano acute dermal exposure, EPA concentrated the sensitivity analysis of this COU for the chronic dermal exposures.

Table 5-25 shows the acute dermal MOE values for low-, medium-, and high-intensity use exposure scenarios are all above the dermal benchmark of 30 and for the chronic dermal MOEs for medium- and high-intensity use exposure scenarios are below the benchmark of 30 and above for the low-intensity use exposure scenario. In the sensitivity analysis EPA explored which inputs impacted MOE values the most. Because youth 11 to 15 years of age are the most sensitive user population age group and the product exposure was an acute single use, the sensitivity analysis was performed on this population understanding that the other two age groups are slightly higher MOEs. In addition, the sensitivity analysis specifically focused on the 11 to 15 age group as the most sensitive group to demonstrate the relative impact of surface area and loading on risk estimates. The fraction absorbed input used in the Lustro Italiano dermal exposure assessment for low- to high-intensity use exposure scenarios is so close to the lowest value obtained via the test order experiments that it would not yield significantly different MOEs to those reported in Table 5-25. For the chronic sensitivity analysis dermal assessment of Lustro Italiano, EPA used the fraction absorbed input value of 1.16% in combination with changing weight fractions and chronic frequency of use to observe changes to the MOE values (see Figure_Apx G-3 light yellow cells [1, 2.25, and 3.5% w/w] for MOE results.

Chronic exposure frequency was set as 185, 300, and 365 events per year. These inputs are the CEM values for spray cleaners based on the *Westat Survey* (Westat Inc., 1987). Given these inputs are subject to great variability based on consumer unique use practices, EPA conducted a sensitivity analysis to provide a measure of the impact of changing (increasing and decreasing) inputs on MOEs within realistic scenarios. For example, when only changing the skin surface area to body weight ratio input from the inside of two hands to the inside of one hand the resulting MOEs are half. Because the skin surface to body weight ratio input has a significant impact on MOEs, EPA is confident that one hand and two hands exposures are representative of consumer application practices and therefore expected exposures. Figure_Apx G-3 panels a and b show MOEs for the described one hand vs. two hands scenario while maintaining chronic frequency at 365 events per year and 1.16% fraction absorbed and changing weight fraction and Q_u input value. The MOEs for the sensitivity analysis matrix exploring all combinations of the low intensity use inputs are shown in Figure_Apx G-3 panel c; note that some MOEs are below the dermal benchmark of 30. When the chronic frequency is decreased by approximately half of the high-intensity use value (from 365 to 185 events per year) and the skin surface area to body weight ratio is also decreased by a half to the lower intensity use input (from 2 hands to 1 hand, 6.34–3.17), the resulting MOEs decrease 4 times—approximately to that of the scenario using all high-intensity use inputs (see Figure_Apx G-3, panel a). These sensitivity analyses show that some combinations of realistic inputs yield MOEs below the benchmark of 30 for this COU for repetitive uses. The sensitivity analysis specifically focused on the 11 to 15 years age group as the most sensitive group to demonstrate the relative impact of surface area and loading on risk estimates.

Panel A. Youth 11 to 15 Years of Age Inside of Two Hands Sensitivity Analysis Matrix						
Chronic freq = 365 events/yr; fraction absorbed = 1.16%; WF outside reported range						
Chronic freq = 365 events/yr; fraction absorbed = 1.16%						
Youth 11 to 15 years skin surface area to body weight ratio = 6.34						
Matrix content = MOEs Dermal Benchmark < 30		Weight Fraction (%)				
		0.1	0.5	1	2.25	3.5
Q_u (mg/cm^2-event)	0.7	383	77	38	17	11
	1.4	191	38	19	9	5
	2.1	128	26	13	6	4
	2.3	117	23	12	5	3
Q_u from US EPA 1992						

Panel B. Youth 11 to 15 Years of Age Inside of One Hand Sensitivity Analysis Matrix						
Chronic freq = 365 events/yr; fraction absorbed = 1.16%; WF outside reported range						
Chronic freq = 365 events/yr; fraction absorbed = 1.16%						
Youth 11 to 15 years skin surface area to body weight ratio = 3.17						
Matrix content = MOEs Dermal Benchmark < 30		Weight Fraction (%)				
		0.1	0.5	1	2.25	3.5
Q_u (mg/cm^2-event)	0.7	766	153	77	34	22
	1.4	383	77	38	17	11
	2.1	255	51	26	11	7
	2.3	233	47	23	10	6.7
Q_u from US EPA 1992						

Panel C. Youth 11 to 15 Years of Age Inside of One Hand Sensitivity Analysis Matrix						
Chronic freq = 185 events/yr; fraction absorbed = 1.16%; WF outside reported range						
Chronic freq = 185 events/yr; fraction absorbed = 1.16%						
Youth 11 to 15 years skin surface area to body weight ratio = 3.17						
Matrix content = MOEs Dermal Benchmark < 30		Weight Fraction (%)				
		0.1	0.5	1	2.25	3.5
Q_u (mg/cm^2-event)	0.7	1,511	302	151	67	43
	1.4	755	151	76	34	22
	2.1	504	101	50	22	14
	2.3					
Q_u from US EPA 1992						

Figure_Apx G-3. Sensitivity Analysis Matrix for Liquid Spray Cleaner/Polish: Youth Aged 11–15 Years