



**Draft Data Extraction Information for
General Population, Consumer, and Environmental Exposure for
Ethylene Dibromide**

Systematic Review Support Document for the Draft Risk Evaluation

CASRN: 106-93-4



June 2026

This supplemental file contains information regarding the data extraction results for data sources that met the PECO (Population, Exposure, Comparator or Scenario, and Outcomes) screening criteria for the *Draft Chemistry, Fate, Release, and Exposure Assessment for Ethylene Dibromide*. EPA performs data extraction as part of the TSCA systematic review process described in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances*, (referred to hereafter as the “2021 Draft Systematic Review Protocol”). The systematic review steps are further described in *Draft Systematic Review Protocol for Ethylene Dibromide*.

EPA conducted data quality evaluation and extraction based on author-reported descriptions and results; additional analyses (e.g., statistical analyses) potentially conducted by EPA are not contained in this supplemental file. The data extraction results herein are organized by evidence streams and media types. A reference may contain data for multiple evidence streams and/or media types and will be cited in different tables if appropriate. The media type “All Applicable Media” refers to modeled doses or intakes calculated from human biomonitoring data (e.g., urine, blood, etc.) or when the media specific to the modeled route (e.g., inhalation, oral, etc.) are not clearly defined. In the data extraction results, “POINT VALUE(S)” denotes when the author(s) did not report a minimum, maximum, mean, or any other summary statistics, but rather single reported level(s) (e.g., chemical concentration). Summary statistic values that were less than the analytical limit were substituted with “0,” “ND,” “<LOD,” and “<LOQ,” as reported by the study. For further details about extraction criteria, review the *Draft Systematic Review Protocol for Ethylene Dibromide*.

Acronyms and abbreviations used within this supplemental file are defined in the table at the end of this file. The two letter country codes defined herein are consistent with those used in the searchable International Standardization Organization (ISO) 3166 standard for country codes. Finally, “NR” preceding a country code indicates that the author(s) did not report the city, state and region. This supplemental file may also be referred to as *Draft Data Extraction Information for General Population, Consumer, and Environmental Exposure for Ethylene Dibromide*.

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Table 1: Data Extraction Tables of Exposure Monitoring Studies for Ambient Air

Citation Information	Site and Data Description	Limit (LOD/LOQ)	Min	Max	Mean	Percentile	Variance
Cohen et al. 1989 HERO ID: 27314 <i>OQD:</i> Medium	Kanawha Valley region, US Scenario: Outdoor residential air in a chemical manufacturing industrialized area (n = 35; DF = 0; Sampling Period: Aug., 1987)	LOD: 8.5 $\mu\text{g}/\text{m}^3$ LOQ: Not Reported	NR	NR	<LOD	NR	NR
Midwest Research Institute et al. 1975 HERO ID: 5695461 <i>OQD:</i> Uninformative	Sugar Creek, Missouri, US Scenario: Oil refinery ambient air sample - bulk loading (n = 2; DF = 1; Sampling Period: Jul., 1975 - Aug., 1975)	LOD: Not Reported LOQ: Not Reported	POINT VALUE(S): [1.42 $\mu\text{g}/\text{m}^3$; 0.23 $\mu\text{g}/\text{m}^3$]				
Midwest Research Institute et al. 1975 HERO ID: 5695461 <i>OQD:</i> Uninformative	Sugar Creek, Missouri, US Scenario: Oil refinery ambient air sample - Process lab (n = 1; DF = 1; Sampling Period: Jul., 1975 - Aug., 1975)	LOD: Not Reported LOQ: Not Reported	POINT VALUE(S): [1.65 $\mu\text{g}/\text{m}^3$]				
Midwest Research Institute et al. 1975 HERO ID: 5695461 <i>OQD:</i> Uninformative	Phoenix, Arizona, US Scenario: Phoenix ambient air sample (n = 1; DF = 1; Sampling Period: Aug., 1975)	LOD: Not Reported LOQ: Not Reported	POINT VALUE(S): [0.069 $\mu\text{g}/\text{m}^3$]				
Midwest Research Institute et al. 1975 HERO ID: 5695461 <i>OQD:</i> Uninformative	Los Angeles, California, US Scenario: Los Angeles ambient air sample (n = 1; DF = 1; Sampling Period: Aug., 1975)	LOD: Not Reported LOQ: Not Reported	POINT VALUE(S): [0.11 $\mu\text{g}/\text{m}^3$]				
Midwest Research Institute et al. 1975 HERO ID: 5695461 <i>OQD:</i> Uninformative	Seattle, Washington, US Scenario: Seattle ambient air sample (n = 2; DF = 1; Sampling Period: Aug., 1975)	LOD: Not Reported LOQ: Not Reported	POINT VALUE(S): [0.082 $\mu\text{g}/\text{m}^3$; 0.083 $\mu\text{g}/\text{m}^3$]				
Midwest Research Institute et al. 1975 HERO ID: 5695461 <i>OQD:</i> Uninformative	Magnolia, Arkansas, US Scenario: Dow facility ambient air sample (n = 2; DF = 1; Sampling Period: Aug., 1975)	LOD: Not Reported LOQ: Not Reported	POINT VALUE(S): [105.0 $\mu\text{g}/\text{m}^3$; 115.0 $\mu\text{g}/\text{m}^3$]				
Midwest Research Institute et al. 1975 HERO ID: 5695461 <i>OQD:</i> Uninformative	Magnolia, Arkansas, US Scenario: Ethyl Corporation facility ambient air sample (n = 6; DF = 1; Sampling Period: Aug., 1975)	LOD: Not Reported LOQ: Not Reported	POINT VALUE(S): [90.2 $\mu\text{g}/\text{m}^3$; 4.2 $\mu\text{g}/\text{m}^3$; 9.1 $\mu\text{g}/\text{m}^3$; 10.5 $\mu\text{g}/\text{m}^3$; 15.3 $\mu\text{g}/\text{m}^3$]				

Ethylene dibromide

Monitoring

Dietary

Table 2: Data Extraction Tables of Exposure Monitoring Studies for Dietary

Citation Information	Site and Data Description	Limit (LOD/LOQ)	Min	Max	Mean	Percentile	Variance
Heikes et al. 1985 HERO ID: 5493125 <i>OQD:</i> Medium	Not reported, US Scenario: Sparging method (n = 1; DF = 0; Sampling Period: 1985)	LOD: Not Reported LOQ: Not Reported	NR	NR	36.0 ppb (AM)	NR	NR
Heikes et al. 1985 HERO ID: 5493125 <i>OQD:</i> Medium	Not reported, US Scenario: Modified codistillation method (n = 1; DF = 1; Sampling Period: 1985)	LOD: Not Reported LOQ: Not Reported	POINT VALUE(S): [0.42 ppb; 0.55 ppb; 0.56 ppb; 0.68 ppb; 0.8 ppb; 0.86 ppb; 0.93 ppb; 2.0 ppb; 2.8 ppb; 7.3 ppb; 8.4 ppb; 12.0 ppb]				

Table 3: Data Extraction Tables of Exposure Monitoring Studies for Drinking Water

Citation Information	Site and Data Description	Limit (LOD/LOQ)	Min	Max	Mean	Percentile	Variance
Kingsbury et al. 2008 HERO ID: 3364193 <i>OQD:</i> High	Clackamas River, OR; Truckee River, CA; Cache la Poudre River, CO; Elm Fork Trinity River, TX; Chattahoochee River, GA; White River, IN; Potomac River, VA; Running Gutter Brook, MA; Neuse River, NC, US Scenario: Source drinking water (plant intake) samples at United States CWS - Oct 2002-March 2004 (n = 147; DF = 0; Sampling Period: Oct., 2002 - Mar., 2004)	LOD: 0.036 $\mu\text{g/L}$ LOQ: Not Reported	NR	NR	ND	NR	NR
Bugher et al. 2024 HERO ID: 12795200 <i>OQD:</i> High	Ritchie, Doddridge, Tyler, Marshall and Wetzel counties, West Virginia, US Scenario: Groundwater from domestic drinking water wells in Appalachian WV hydraulic fracturing activity area (n = 56; DF = 0.02; Sampling Period: Oct., 2020)	LOD: 0.05 $\mu\text{g/mL}$ LOQ: Not Reported	<LOD	0.356 $\mu\text{g/L}$	0.006 $\mu\text{g/L}$ (AM)	50th: <LOD;	0.048 $\mu\text{g/L}$ (ASD)
Bugher et al. 2024 HERO ID: 12795200 <i>OQD:</i> High	Belmont and Monroe counties, OH, US Scenario: Groundwater from domestic drinking water wells in Appalachian OH hydraulic fracturing activity area (n = 162; DF = 0.01; Sampling Period: Jun., 2019 - Aug., 2019)	LOD: 0.05 $\mu\text{g/mL}$ LOQ: Not Reported	<LOD	0.144 $\mu\text{g/L}$	0.001 $\mu\text{g/L}$ (AM)	50th: <LOD;	0.012 $\mu\text{g/L}$ (ASD)
Bugher et al. 2024 HERO ID: 12795200 <i>OQD:</i> High	Bradford, PA, US Scenario: Groundwater from domestic drinking water wells in Appalachian PA hydraulic fracturing activity area (n = 89; DF = 0; Sampling Period: Aug., 2018 - Sept., 2018)	LOD: 0.05 $\mu\text{g/mL}$ LOQ: Not Reported	NR	NR	<LOD	NR	NR
Landmeyer et al. 2014 HERO ID: 5639273 <i>OQD:</i> High	McBee, SC, US Scenario: Drinking water from public-supply wells - 2011 (n = 9; DF = 0.111; Sampling Period: Aug., 2011)	LOD: Not Reported LOQ: 0.018 $\mu\text{g/L}$	POINT VALUE(S): [<LOD; <LOD; <LOD; <LOD; <LOD; <LOD; <LOD; <LOD; 0.0608 $\mu\text{g/L}$]				
Landmeyer et al. 2014 HERO ID: 5639273 <i>OQD:</i> High	McBee, SC, US Scenario: Drinking water from public-supply wells - 2012 (n = 3; DF = 0.33; Sampling Period: Feb., 2012 - Aug., 2012)	LOD: Not Reported LOQ: 0.018 $\mu\text{g/L}$	POINT VALUE(S): [<LOD; <LOD; 0.502 $\mu\text{g/L}$]				
Landmeyer et al. 2014 HERO ID: 5639273 <i>OQD:</i> High	McBee, SC, US Scenario: Drinking water from public-supply wells - 2010 (n = 9; DF = 0.11; Sampling Period: Aug., 2010)	LOD: Not Reported LOQ: 0.018 $\mu\text{g/L}$	NR	0.0608 $\mu\text{g/L}$	NR	NR	NR

Table 4: Data Extraction Tables of Exposure Monitoring Studies for Groundwater

Citation Information	Site and Data Description	Limit (LOD/LOQ)	Min	Max	Mean	Percentile	Variance
Westinghouse Savannah River Company et al. 1997 HERO ID: 1740826 <i>OQD:</i> Medium	South Carolina, US Scenario: Groundwater monitoring wells in a landfill (n = 308; DF = 0; Sampling Period: 1995 - 1996)	LOD: 0.05-2 $\mu\text{g/L}$ LOQ: Not Reported	NR	NR	<LOD	NR	NR
Heck et al. 1992 HERO ID: 5438509 <i>OQD:</i> Medium	Reno County, Kansas, US Scenario: Groundwater from private wells near Reno County Landfill (n = 5; DF = 0; Sampling Period: Aug., 1990)	LOD: Not Reported LOQ: 0.2 $\mu\text{g/L}$	NR	NR	<LOQ	NR	NR
Heck et al. 1992 HERO ID: 5438509 <i>OQD:</i> Medium	Reno County, Kansas, US Scenario: Groundwater from monitoring wells near Reno County Landfill (n = 8; DF = 0; Sampling Period: Aug., 1990)	LOD: Not Reported LOQ: 0.2 $\mu\text{g/L}$	NR	NR	<LOQ	NR	NR
Rowe et al. 2007 HERO ID: 5553456 <i>OQD:</i> Medium	All, 2401 sties, US Scenario: groundwater wells in USA (n = 3; DF = NR; Sampling Period: 1985 - 2002)	LOD: Not Reported LOQ: Not Reported	NR	0.05 mg/L	NR	NR	NR
Kolhatkar et al. 2021 HERO ID: 7697510 <i>OQD:</i> Medium	CA; NC; AK; SC; MI; PA; Washington DC, US Scenario: Groundwater from 6 petroleum UST sites (8 monitoring wells) with dissolved-phase vapor sources and EDB concentrations >0.18 ug/L (n = 31; DF = 1; Sampling Period: 2017 - 2019)	LOD: Not Reported LOQ: Not Reported	0.2 $\mu\text{g/L}$	13 $\mu\text{g/L}$	NR	50th: 4.3 $\mu\text{g/L}$;	NR
Kolhatkar et al. 2021 HERO ID: 7697510 <i>OQD:</i> Medium	CA; NC; AK; SC; MI; PA; Washington DC, US Scenario: Groundwater from 6 petroleum UST sites (7 monitoring wells) with LNAPL vapor sources and EDB concentrations >0.18 ug/L (n = 26; DF = 1; Sampling Period: 2017 - 2019)	LOD: Not Reported LOQ: Not Reported	13 $\mu\text{g/L}$	30 $\mu\text{g/L}$	NR	50th: 15 $\mu\text{g/L}$;	NR
Kolhatkar et al. 2021 HERO ID: 7697510 <i>OQD:</i> Medium	CA; NC; AK; SC; MI; PA; Washington DC, US Scenario: Groundwater from 8 petroleum UST sites (12 monitoring wells) with dissolved-phase vapor sources and EDB concentrations <0.18 ug/L (n = 41; DF = 1; Sampling Period: 2017 - 2019)	LOD: Not Reported LOQ: Not Reported	0.03 $\mu\text{g/L}$	0.16 $\mu\text{g/L}$	NR	NR	NR
Kolhatkar et al. 2021 HERO ID: 7697510 <i>OQD:</i> Medium	CA; NC; AK; SC; MI; PA; Washington DC, US Scenario: Groundwater from 2 petroleum UST sites (2 monitoring wells) with LNAPL vapor sources and EDB concentrations <0.18 ug/L (n = 5; DF = 0; Sampling Period: 2017 - 2019)	LOD: 0.01-0.03 $\mu\text{g/L}$ LOQ: Not Reported	<LOD	<LOD	NR	NR	NR
Hers et al. 2021 HERO ID: 10065927 <i>OQD:</i> Medium	Sobieski, MN, US Scenario: Groundwater from former service station with leaded gasoline UST spill (n = 12; DF = 1; Sampling Period: Jul., 2017 - Mar., 2018)	LOD: Not Reported LOQ: 0.5-1 $\mu\text{g/L}$	NR	175 $\mu\text{g/L}$	NR	NR	NR

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Monitoring

Groundwater

Table 4 – continued from previous page

Citation Information	Site and Data Description	Limit (LOD/LOQ)	Min	Max	Mean	Percentile	Variance
Landmeyer et al. 2014 HERO ID: 5639273 <i>OQD:</i> High	McBee, SC, US Scenario: Groundwater from Sand Hills State Forest wells - 2011 (n = 3; DF = 1.0; Sampling Period: Jun., 2011)	LOD: Not Reported LOQ: 0.018 µg/L	POINT VALUE(S): [0.06 mg/L; 0.048 mg/L; 0.029 mg/L]				
Landmeyer et al. 2014 HERO ID: 5639273 <i>OQD:</i> High	McBee, SC, US Scenario: Ground water from agricultural-supply wells - 2011 (n = 4; DF = 0.5; Sampling Period: Aug., 2011)	LOD: Not Reported LOQ: 0.018 µg/L	POINT VALUE(S): [<LOD; 1.07 mg/L; 0.108 mg/L; <LOD]				

Ethylene dibromide

Monitoring

Human Biomonitoring

Table 5: Data Extraction Tables of Exposure Monitoring Studies for Human Biomonitoring

Citation Information	Site and Data Description	Limit (LOD/LOQ)	Min	Max	Mean	Percentile	Variance
Blount et al. 2010 HERO ID: 737432 <i>OQD:</i> Medium	Baltimore, MD, US Scenario: Single human milk convenience samples from 12 women, analyzed via SPME with GC/MS. (n = 12; DF = NR; Sampling Period: 2009)	LOD: Not Reported LOQ: Not Reported	NR	NR	NR	50th: Below LRL ng/mL;	NR

Ethylene dibromide

Monitoring

Indoor Air

Table 6: Data Extraction Tables of Exposure Monitoring Studies for Indoor Air

Citation Information	Site and Data Description	Limit (LOD/LOQ)	Min	Max	Mean	Percentile	Variance
Cohen et al. 1989 HERO ID: 27314 <i>OQD:</i> Medium	Kanawha Valley region, US Scenario: Indoor residential air in a chemical manufacturing industrialized area (n = 35; DF = 0.29; Sampling Period: Aug., 1987)	LOD: 8.5 $\mu\text{g}/\text{m}^3$ LOQ: Not Reported	NR	23.53 $\mu\text{g}/\text{m}^3$	6.06 $\mu\text{g}/\text{m}^3$ (AM)	50th: <LOD;	5.94 $\mu\text{g}/\text{m}^3$ (ASD)

Monitoring

Table 7: Data Extraction Tables of Exposure Monitoring Studies for Soil

Citation Information	Site and Data Description	Limit (LOD/LOQ)	Min	Max	Mean	Percentile	Variance
Kolhatkar et al. 2021 HERO ID: 7697510 <i>OQD:</i> Medium	CA; NC; AK; SC; MI; PA; Washington DC, US Scenario: Soil Gas from 6 petroleum UST sites with LNAPL vapor sources and groundwater EDB concentrations >0.18 ug/L (n = 26; DF = 0.23; Sampling Period: 2017 - 2019)	LOD: 0.16 $\mu\text{g}/\text{m}^3$ LOQ: Not Reported	NR	NR	NR	NR	NR
Kolhatkar et al. 2021 HERO ID: 7697510 <i>OQD:</i> Medium	CA; NC; AK; SC; MI; PA; Washington DC, US Scenario: Soil gas from 6 petroleum UST sites with dissolved-phase vapor sources and groundwater EDB concentrations >0.18 ug/L (n = 31; DF = 0; Sampling Period: 2017 - 2019)	LOD: 0.16 $\mu\text{g}/\text{m}^3$ LOQ: Not Reported	NR	NR	<LOD	NR	NR
Hers et al. 2021 HERO ID: 10065927 <i>OQD:</i> Medium	Sobieski, MN, US Scenario: Soil gas from former service station with leaded gasoline UST spill (n = 23; DF = 0.3; Sampling Period: Jul., 2017 - Mar., 2018)	LOD: 0.078 $\mu\text{g}/\text{m}^3$ LOQ: 0.16 $\mu\text{g}/\text{m}^3$	<LOQ	960 $\mu\text{g}/\text{m}^3$	NR	NR	NR

Ethylene dibromide

Monitoring

Surface Water

Table 8: Data Extraction Tables of Exposure Monitoring Studies for Surface Water

Citation Information	Site and Data Description	Limit (LOD/LOQ)	Min	Max	Mean	Percentile	Variance
Midwest Research Institute et al. 1975 HERO ID: 5695461 <i>OQD:</i> Uninformative	Magnolia, Arkansas, US Scenario: Dow facility stream sample (n = 2; DF = 0.5; Sampling Period: Aug., 1975)	LOD: Not Reported LOQ: Not Reported	NR	NR	NR	NR	NR
Midwest Research Institute et al. 1975 HERO ID: 5695461 <i>OQD:</i> Uninformative	Sugar Creek, Missouri, US Scenario: Oil refinery stream sample (n = 1; DF = 1.0; Sampling Period: Jul., 1975)	LOD: Not Reported LOQ: Not Reported	POINT VALUE(S): [1.13 µg/L; 1.05 µg/L; 0.0 µg/L]				

Glossary of Select Terms for Data Extraction Tables

Table 9: Glossary of Select Terms for Data Extraction

Term	Definition
AK	Alaska
ATSDR	Agency for Toxic Substances and Disease Registry
CA, USA	California
DF	Detection Frequency
ECD	Electron Capture Detector
EDB	Ethylene Dibromide
EPA	Environmental Protection Agency
FAQ	Frequently Asked Question
FDA	Food and Drug Administration
GC	Gas Chromatography
GSD	Geometric Standard Deviation
HPLC	High Performance Liquid Chromatography
ISCST	Industrial Source COMplex Short Term
KY	Kentucky
LA	Louisiana
LLE	Liquid LIquid Extraction
LOD	Limit of Detection
LOQ	Limit of Quantification
LRL	Lowest Reportable Level
MDL	Method Detection Limit
MI	Michigan
MS	Mass Spectrometry
n	Sample Size
N/A	Not Applicable
NC	North Carolina
NJ	New Jersey
NR	Not Reported
OQD	Overall Quality Determination
P & T	Purge and Trap
PA	Pennsylvania
PM	Particulate Matter
PPB	Parts Per Billion
QA/QC	Quality Assurance/Quality Control
SC	South Carolina
SD	Standard Deviation
SPME	Solid-Phase Microextraction
TSCA	Toxic Substance Control Act
US or USA	United States of America
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant