United States
Environmental Protection Agency

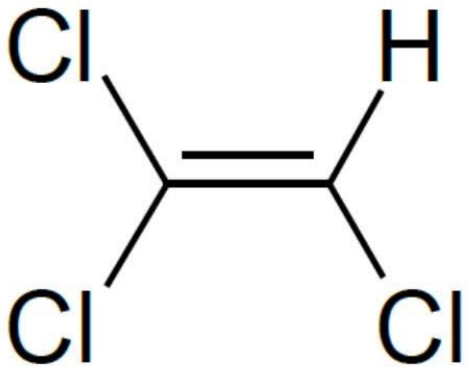
Office of Chemical Safety and
Pollution Prevention

Final Risk Evaluation for Trichloroethylene

Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Releases and Occupational Exposure Data

CASRN: 79-01-6



November 2020

This document is a compilation of tables for the data extraction and evaluation for Tricholoethylene (TCE). Each table shows the data point or set or information element that was extracted and evaluated from a data source in accordance with Appendix D of the Application of Systematic Review in TSCA Risk Evaluations. If the source contains more than one data set or information element, the review provides an overall confidence score for each data set or information element that is found in the source. Therefore, it is possible that a source may have more than one overall quality/ confidence score.

Table of Contents

Explanatory Notes

These explanatory notes provide context to understand the short comments in the data evaluation tables.

Domain	Metric	Description of Comments Field
Reliability	Methodology	Indicates the sampling/analytical methodology, estimation method, or type of publication
Representativeness	Geographic Scope	Indicates the country of the study, publication, or underlying data
	Applicability	Indicates whether the data are for a condition of use within scope of the Risk Evaluation
	Temporal Representativeness	Provides the year of study, publication, or underlying data
	Sample Size	Describes the distribution of the sample or underlying data
Accessibility / Clarity	Metadata Completeness	Describes the completeness of the metadata
Variability and Uncertainty	Metadata Completeness	Indicates if study or publication addresses variability and uncertainty of the data or information

Releases to the Environment

Source Citation:	Landrigan, P. J.,Stein, G. F.,Kominsky, J. R.,Ruhe, R. L.,Watanabe, A. S.. 1987. Common-source community and industrial exposure to trichloroethylene. Archives of Environmental Health.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	65261

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Release Source:	Spill/Leak
Disposal /Treatment Method:	None
Environmental Media:	water and land
Release Estimation Method:	Estimate
Daily Release Quantity (kg/day):	105007
Annual Release Quantity (kg/yr):	105007
Release Days per Year:	1
Number of Sites:	1

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	peer revied article, non-standard sources
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Accidental release, not in scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1979, 39 years old
	Metric 5:	Sample Size	High	× 1	1	Sample size is sufficently large to be representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Time period, number of samples, and mean provided.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusse potential reasons why TCE was not found in certain places.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.4.

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Source Citation:	Landrigan, P. J.,Stein, G. F.,Kominsky, J. R.,Ruhe, R. L.,Watanabe, A. S.. 1987. Common-source community and industrial exposure to trichloroethylene. Archives of Environmental Health.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	65261

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Release Source:	Fugitive releases
Disposal /Treatment Method:	fugitive air
Environmental Media:	air
Release Estimation Method:	TRI reporting
Annual Release Quantity (kg/yr):	6708081
Number of Sites:	783

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Release data from historical (pre-2000) TRI reports, EPA obtains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001, 17 years old
	Metric 5:	Sample Size	High	× 1	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only includes release media and amount released.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

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Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Disposal /Treatment Method:	Stack air
Environmental Media:	air
Release Estimation Method:	TRI reporting
Annual Release Quantity (kg/yr):	6841572
Number of Sites:	783

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Release data from historical (pre-2000) TRI reports, EPA obtains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001, 17 years old
	Metric 5:	Sample Size	High	× 1	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only includes release media and amount released.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

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Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Disposal /Treatment Method:	Surface water
Environmental Media:	water
Release Estimation Method:	TRI reporting
Annual Release Quantity (kg/yr):	758
Number of Sites:	783

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Release data from historical (pre-2000) TRI reports, EPA obtains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001, 17 years old
	Metric 5:	Sample Size	High	× 1	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only includes release media and amount released.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

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Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Disposal /Treatment Method:	Underground Injection
Environmental Media:	Underground Injection
Release Estimation Method:	TRI reporting
Annual Release Quantity (kg/yr):	131
Number of Sites:	783

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Release data from historical (pre-2000) TRI reports, EPA obtains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001, 17 years old
	Metric 5:	Sample Size	High	× 1	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only includes release media and amount released.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

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Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Disposal /Treatment Method:	Land
Environmental Media:	Land
Release Estimation Method:	TRI reporting
Annual Release Quantity (kg/yr):	2003
Number of Sites:	783

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Release data from historical (pre-2000) TRI reports, EPA obtains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001, 17 years old
	Metric 5:	Sample Size	High	× 1	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only includes release media and amount released.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

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Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	35002

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Disposal /Treatment Method:	POTW Transfer
Environmental Media:	Water
Release Estimation Method:	TRI reporting
Annual Release Quantity (kg/yr):	22,827
Number of Sites:	783

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Release data from historical (pre-2000) TRI reports, EPA obtains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001, 17 years old
	Metric 5:	Sample Size	High	× 1	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only includes release media and amount released.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

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Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Disposal /Treatment Method:	Other Transfers
Release Estimation Method:	TRI reporting
Annual Release Quantity (kg/yr):	19,157,999
Number of Sites:	783

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Release data from historical (pre-2000) TRI reports, EPA obtains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001, 17 years old
	Metric 5:	Sample Size	High	× 1	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only includes release media and amount released.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

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Source Citation:	Hellweg, S.,Demou, E.,Scheringer, M.,McKone, T. E.,Hungerbuhler, K.. 2005. Confronting workplace exposure to chemicals with LCA: examples of trichloroethylene and perchloroethylene in metal degreasing and dry cleaning. Environmental Science and Technology.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	88147

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Release Source:	Emissions during Use (open top and closed systems)
Environmental Media:	Unknown (assume air)
Release Estimation Method:	Estimated (note units are g/m2 metal surface area)
Daily Release Quantity (kg/day):	Open Top: 1.4-1.7 g/m2 (min); 22-29 g/m2 (max); 7.2-8.1 g/m2 avg;Closed systems: 0.016-0.061 g/m2 (min); 0.16-1.5 g/m2 (max); 0.031- 0.18 g/m2 avg;

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	peer revied article, assumed to use valid methods
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US source
	Metric 3:	Applicability	Unacceptable	× 2	8	Life cycle analysis is out of scope using air releases to define inhalation exposure
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2005, 13 years old but the data it relies on is older.
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	LCA modeling approach is clear and well documented.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	Variability and uncertainty addressed in great detail.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.0.

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Source Citation:	Hellweg, S.,Demou, E.,Scheringer, M.,McKone, T. E.,Hungerbuhler, K.. 2005. Confronting workplace exposure to chemicals with LCA: examples of trichloroethylene and perchloroethylene in metal degreasing and dry cleaning. Environmental Science and Technology.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	88147

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments

⋆⋆ Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	CalEpa,. 2005. Appendix D.3 Chronic RELS and toxicity summaries using the previous version of Hot Spots Risk Assessment guidelines (OEHHA 1999).
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982628

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use/Manufacture
Annual Release Quantity (kg/yr):	CA Statewide: 176,908 lbs (1999)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Cited from CARB
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Air releases out of scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2000, 18 years old, but data is much older.
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Release data does not include needed metadata.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited uncertainty discussion.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.5.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hsia,. 2013. TSCA work plan chemicals program.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982141

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Release Source:	Vapor degreasing
Environmental Media:	Air
Annual Release Quantity (kg/yr):	Chart from 1988-2011:1988: 56,000,000 lbs2011: 2,600,000 lbs
Number of Sites:	Varies

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Data source not cited
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Air releases out of scope
	Metric 4:	Temporal Representativeness	High	× 2	2	Provides data from 1998 to 2010
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of exposures across years, but no characterization within each year.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only provides release media
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Report does not address variability or uncertainty
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.4.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	D. O. W. Deutschland. 2014. Chemical safety report: Use of trichloroethylene in industrial parts cleaning by vapour degreasing in closed systems where specific requirements (system of use-parameters) exist.
Type of Data Source	Releases to the Environment; Published Models for Exposures or Releases;
Hero ID	3970823

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Release Source:	Vapor degreasing
Environmental Media:	Air, Water, Soil
Release or Emission Factor:	Air: 5.97 percent Water: 5 percent Soil: 5 percent
Release Estimation Method:	Air: based on the finding of the PhD thesis from Julia von Grote (2003).
Daily Release Quantity (kg/day):	Air: .4 kg/dWater: .335 kg/dSoil: N/A
Annual Release Quantity (kg/yr):	Air: 167 kgWater: 200 kgSoil: 168 kg
Number of Sites:	9

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Releases assessed using EU ERC model, expected to be accurate
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Germany (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	Date of model not given, but source is from 2014
	Metric 5:	Sample Size	N/A		N/A	N/A - modeled releases
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Model inputs, equations, and basis not given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. 2004. Summary risk assessment report: Trichloroethylene.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3970815

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Release Source:	Production
Environmental Media:	Air, Water
Release Estimation Method:	Estimation
Daily Release Quantity (kg/day):	214
Number of Sites:	Many

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU report
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report is from 2004, but date of data unknown
	Metric 5:	Sample Size	Low	× 1	3	Single value given for local, regional, and continental releases, no discussion of statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Report does not document methods, sources, or assumptions estimate releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. 2004. Summary risk assessment report: Trichloroethylene.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3970815

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Release Source:	Intermediate Use
Environmental Media:	Air, Water
Release Estimation Method:	Estimation
Daily Release Quantity (kg/day):	68
Number of Sites:	Many

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU report
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report is from 2004, but date of data unknown
	Metric 5:	Sample Size	Low	× 1	3	Single value given for local, regional, and continental releases, no discussion of statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Report does not document methods, sources, or assumptions estimate releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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Source Citation:	Echa,. 2004. Summary risk assessment report: Trichloroethylene.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3970815

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Release Source:	Handling
Environmental Media:	Air, Water
Release Estimation Method:	Estimation
Daily Release Quantity (kg/day):	627
Number of Sites:	Many

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU report
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report is from 2004, but date of data unknown
	Metric 5:	Sample Size	Low	× 1	3	Single value given for local, regional, and continental releases, no discussion of statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Report does not document methods, sources, or assumptions estimate releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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Source Citation:	Echa,. 2004. Summary risk assessment report: Trichloroethylene.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3970815

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Release Source:	Metal Degreasing
Environmental Media:	Air, Water
Release Estimation Method:	Estimation
Daily Release Quantity (kg/day):	98083
Number of Sites:	Many

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU report
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report is from 2004, but date of data unknown
	Metric 5:	Sample Size	Low	× 1	3	Single value given for local, regional, and continental releases, no discussion of statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Report does not document methods, sources, or assumptions estimate releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

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† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. 2004. Summary risk assessment report: Trichloroethylene.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3970815

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Release Source:	Adhesives Formulation
Environmental Media:	Air, Water
Release Estimation Method:	Estimation
Daily Release Quantity (kg/day):	406
Number of Sites:	Many

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU report
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report is from 2004, but date of data unknown
	Metric 5:	Sample Size	Low	× 1	3	Single value given for local, regional, and continental releases, no discussion of statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Report does not document methods, sources, or assumptions estimate releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

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Source Citation:	Echa,. 2004. Summary risk assessment report: Trichloroethylene.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3970815

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Release Source:	Adhesives Use
Environmental Media:	Air, Water
Release Estimation Method:	Estimation
Daily Release Quantity (kg/day):	17088
Number of Sites:	Many

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU report
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report is from 2004, but date of data unknown
	Metric 5:	Sample Size	Low	× 1	3	Single value given for local, regional, and continental releases, no discussion of statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Report does not document methods, sources, or assumptions estimate releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

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Source Citation:	Echa,. 2004. Summary risk assessment report: Trichloroethylene.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3970815

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Release Source:	Consumer Product Formulation
Environmental Media:	Air, Water
Release Estimation Method:	Estimation
Daily Release Quantity (kg/day):	285
Number of Sites:	Many

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU report
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report is from 2004, but date of data unknown
	Metric 5:	Sample Size	Low	× 1	3	Single value given for local, regional, and continental releases, no discussion of statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Report does not document methods, sources, or assumptions estimate releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

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Source Citation:	Echa,. 2004. Summary risk assessment report: Trichloroethylene.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3970815

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Release Source:	Consumer Use
Environmental Media:	Air, Water
Release Estimation Method:	Estimation
Daily Release Quantity (kg/day):	10523
Number of Sites:	Many

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU report
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report is from 2004, but date of data unknown
	Metric 5:	Sample Size	Low	× 1	3	Single value given for local, regional, and continental releases, no discussion of statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Report does not document methods, sources, or assumptions estimate releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

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* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Exposure scenario: Use: Trichloroethylene as an extraction solvent for removal of process oil and formation of the porous structure in polyethylene based separators used in lead-acid batteries.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3970806

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Release Source:	Carbon bed discharge stack, oil coalescing filter discharge stacks, dust bag houses and many potential fugitive sources.
Environmental Media:	Air, Water
Release or Emission Factor:	Air: 0.037 percent Water: 0.0000031 percent Soil: 0 percent
Release Estimation Method:	Estimation
Annual Release Quantity (kg/yr):	41,878 kg/yr with potential to be 112,725,000 kg/yr worst case scenario.
Release Days per Year:	365
Number of Sites:	1

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Releases based on mass balance, expected to be accurate and cover all releases
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old
	Metric 5:	Sample Size	Low	× 1	3	Single value, no statistics given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	All metadata given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			High		1.6	

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Source Citation:	Feistritz Microporous, gmbh. 2014. Chemical safety report: Trichloroethylene used as degreasing solvent in the manufacture of polyethylene separators for lead-acid batteries.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3970808

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Release Source:	Various
Environmental Media:	Air
Release or Emission Factor:	48.68 percent
Annual Release Quantity (kg/yr):	12170 kg/yr

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described (information redacted)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	Unacceptable	× 2	8	Air releases out of scope
	Metric 4:	Temporal Representativeness	High	× 2	2	No date listed, but monitoring data was taken from 2014
	Metric 5:	Sample Size	Medium	× 1	2	Provides one data point of an annual relase value to air for 2014.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only provides release media
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Report does not address variability or uncertainty
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.6.

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Source Citation:	Wu, C.,Schaum, J.. 2000. Exposure assessment of trichloroethylene. Environmental Health Perspectives.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	724225

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Release Source:	Various
Disposal /Treatment Method:	Fugitive, stack air releases, surface water releases, underground injection, land disposal, and POTW transfers
Environmental Media:	Air, Water, Soil
Annual Release Quantity (kg/yr):	Data from 1987-1994 broken out by year into disposal method. Ex. 1987, in lbs/yr:Fugitive: 25,978,879Stack air releases: 29,436,952Surface water releases: 30,104Underground injection: 18,720Land disposal: 56,733POTW transfers: 130,178
Number of Sites:	681-959

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Data from US EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Low	× 2	6	2000, 18 years old, but data is much older.
	Metric 5:	Sample Size	Medium	× 1	2	Moderately well characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Minimal Metadata present.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Medium		2.0	

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Source Citation:	McCulloch, A.,Midgley, P. M.. 1996. The production and global distribution of emissions of trichloroethene, tetrachloroethene and dichloromethane over the period 1988”1992. Atmospheric Environment.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3026800

EXTRACTION

Parameter	Data
Life Cycle Stage:	Global Emissions
Environmental Media:	Air
Release Estimation Method:	Discussed, but not named.
Annual Release Quantity (kg/yr):	197,000 - 260,000 metric tonsData broken out by region and year.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Process explained and cited.
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Europe
	Metric 3:	Applicability	Unacceptable	× 2	8	Air releases out of scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995, 23 years old
	Metric 5:	Sample Size	High	× 1	1	Provides global emissions broken down by region and year.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Alludes to emisssions to air, but does not specifically state.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	Discusses uncertainty and provides a potential variance percentage of +/- 5
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.7.

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Source Citation:	U.S, E. P. A.. 1980. Waste solvent reclamation.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3840001

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Waste Solvent Reclamation
Release Source:	Fugitive, process, storage
Disposal /Treatment Method:	distillation, purification
Environmental Media:	Air, water
Release or Emission Factor:	Many sources in process cited. Example:Storage tank vent: 0.01 kg/ MgFugitive Emissions: 0.46 kg/Mg
Release Days per Year:	Continuous
Waste Treatment Method:	Recycling and recovery
P2 Control & percent Efficiency:	40-99 percent recovery

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Well cited, well detailed, but looks to be extracted from a book or manual with no attributes/citation.
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	No Comment.
	Metric 3:	Applicability	High	× 2	2	Recycling process for solvents such as TCE.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Unknown
	Metric 5:	Sample Size	Low	× 1	3	N/a
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Complete metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No Comment.
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2017. Pollution prevention search results, envirofacts database.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3860453

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use/Manufacture
Release Source:	Many

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA Envirofacts
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Releases of TCE from facilities that use TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	Spans multiple years, majority coming from 2008 or more recent.
	Metric 5:	Sample Size	High	× 1	1	site-specific releases given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata given, including media of release
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 1.6.

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* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1995. Environmental research brief: Pollution prevention assessment for a manufacturer of locking devices.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3970197

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Waste solvent
Disposal /Treatment Method:	Shipped offsite for disposal
Annual Release Quantity (kg/yr):	28700 lb/yr
Release Days per Year:	1
Number of Sites:	1
Waste Treatment Method:	Offsite disposal

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Waste releases from a degreaser using TCE
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995, 23 years old
	Metric 5:	Sample Size	Low	× 1	3	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Does not include citations
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No Comment.
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Exposure assessment: Trichloroethylene.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3970837

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Release Source:	Fugitive emissions
Disposal /Treatment Method:	ambient air, water
Environmental Media:	air, water
Release or Emission Factor:	Water: 0.01 percent Air: 60 percent
Daily Release Quantity (kg/day):	Water: 0.002 kg/dayAir: 12 kg/day
Annual Release Quantity (kg/yr):	Water: 0.3 kg/yrair: 1800 kg/yr
Release Days per Year:	180
Number of Sites:	1

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Unknown author, reads as if it is written by a manufacturer about their own process.
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Facility using small amounts of TCE in pharmaceutical productions.
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old
	Metric 5:	Sample Size	Medium	× 1	2	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes most metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No Comment.
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Exposure assessment: Trichloroethylene, Part 3.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3970842

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Release Source:	Fugitive emissions
Disposal /Treatment Method:	ambient air, water
Environmental Media:	air, water
Release or Emission Factor:	Air: 4.38 percent
Daily Release Quantity (kg/day):	Air 157.7 kg/day
Annual Release Quantity (kg/yr):	Air: 1752 kg/yr
Release Days per Year:	64 days16 batches @ 4 days per batch
Number of Sites:	1

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Unknown author, reads as if it is written by a manufacturer about their own process.
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Facility using TCE in the synthesis of vulcanization accelerating agents.
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old
	Metric 5:	Sample Size	Medium	× 1	2	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes most metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No Comment.
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Japanese Ministry of, Environment. 2004. Manual for PRTR release estimation models: Part II materials.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3986511

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use/Manufacture
Release Source:	Manufacture, storage, solvent use, cleaning
Environmental Media:	Atmosphere
Release or Emission Factor:	Manufacture: 0.001 kg/tStorage: 0.23 kg/tSolvent: 979 kg/tCleaning: 838 kg/t

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan
	Metric 3:	Applicability	Unacceptable	× 2	8	Air releases out of scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1996, 22 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Unclear how the given data source is utilized or found.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Report does not address variability or uncertainty
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 3.1.

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* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Toxic release inventory: Trichloroethylene.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3860483

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use/Manufacture
Release Source:	Landfill, Fugitive and Point Source Emissions, Surface Water, and Other
Disposal /Treatment Method:	Landfill, other
Environmental Media:	Air, Water, Ground
Annual Release Quantity (kg/yr):	Landfill: 16,697 lbsFugitive Emissions: 1,202,177 lbsPoint Source Emissions: 779,765 lbs Surface Water: 14,406 lbsOther: 24,205 lbs

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Medium	× 2	4	Industry that works with TCE, but is focused on industry - wide big picture.
	Metric 4:	Temporal Representativeness	High	× 2	2	2016, 2 years old
	Metric 5:	Sample Size	Low	× 1	3	Not well characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No Comment.
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Landmeyer, J. E.,Miller, S.,Campbell, B. G.,Vroblesky, D.,Gill, A.,Clark, A. P.. 2011. Investigation of the potential source area, contamination pathway, and probable release history of chlorinated-solvent-contaminated groundwater at the Capital City Plume Site, Montgomery, Alabama, 2008-2010.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	2129107

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Study
Release Source:	Post Emission Study
Disposal /Treatment Method:	sewer
Environmental Media:	ground and groundwater

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	USGS
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Report details attempt to find the source of a contamination plume, Does not contain applicable occupational scenario.
	Metric 4:	Temporal Representativeness	High	× 2	2	2010
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Study is well documented and process is explained.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Report does not address variability or uncertainty
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.0.

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* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ballinger, M. Y.,Larson, T. V.. 2014. Source apportionment of stack emissions from research and development facilities using positive matrix factorization. Atmospheric Environment.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	2517711

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing
Release Source:	R&D Facilities
Disposal /Treatment Method:	stack air
Environmental Media:	Atmosphere

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Report details use of positive matrix factorization to identify the contributing sources to stack emissions. Air releases are out of scope.
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old
	Metric 5:	Sample Size	Low	× 1	3	Qualitative data as ratios.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Study is well documented and method is explained.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Report does not address variability or uncertainty
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Yang, J.,Wang, K.,Zhao, Q.,Huang, L.,Yuan, C. S.,Chen, W. H.,Yang, W. B.. 2014. Underestimated public health risks caused by overestimated VOC removal in wastewater treatment processes. Environmental Science: Processes & Impacts.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	2544474

EXTRACTION

Parameter	Data
Life Cycle Stage:	Release
Release Source:	Publicly owned treatment works (POTW)
Disposal /Treatment Method:	Screen, aerated grit chamber, primary clarifier, anaerobic tank, anterior oxic tank, secondary clarifier
Environmental Media:	Air, water
Release or Emission Factor:	Concentrations found during treatment:0.55 ug/m3 air1.5 mg/L water

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	China
	Metric 3:	Applicability	Low	× 2	6	Unknown occupational scenario, but potentially useful release data.
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	High	× 1	1	Samples fully characterized and taken in multiple seasons.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Samples fully characterized and taken in multiple seasons.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited variabililty discussion.
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Chang, C. C.,Lo, G. G.,Tsai, C. H.,Wang, J. L.. 2001. Concentration variability of halocarbons over an electronics industrial park and its implication in compliance with the Montreal protocol. Environmental Science and Technology.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	2773680

EXTRACTION

Parameter	Data
Life Cycle Stage:	Processing
Release Source:	Solvent use in semiconductor, circuit chip and circuit board manufacture.
Disposal /Treatment Method:	Venting
Environmental Media:	Air
Release or Emission Factor:	Median concentration:40 PPTV TCE in July 2000200 PPTV TCE in March 1997

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Taiwan
	Metric 3:	Applicability	Unacceptable	× 2	8	Air releases out of scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2001
	Metric 5:	Sample Size	Medium	× 1	2	Many samples taken from a broad cross-section of land.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Data not well characterized, provides qualitative descriptions.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Report does not address variability or uncertainty
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.6.

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* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Chen, W. H.,Yang, W. B.,Yuan, C. S.,Yang, J. C.,Zhao, Q. L.. 2014. Fates of chlorinated volatile organic compounds in aerobic biological treatment processes: the effects of aeration and sludge addition. Chemosphere.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	2799543

EXTRACTION

Parameter	Data
Life Cycle Stage:	Study
Release Source:	air from WWTP
Environmental Media:	Air

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	China
	Metric 3:	Applicability	Unacceptable	× 2	8	Studies removal of TCE from wastewater, out of scope for engineering
	Metric 4:	Temporal Representativeness	High	× 2	2	2013, 5 years old
	Metric 5:	Sample Size	Medium	× 1	2	Only one site was used for the study, data collected not fully characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Study is well documented and method is explained.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Variability and uncertainty is not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.2.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Devinny, J. S.,Webster, T. S.,Torres, E.,Basrai, S.. 1995. Biofiltration for removal of PCE and TCE vapors from contaminated air. Hazardous Waste and Hazardous Materials.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	2803108

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Study
Release Source:	air from WWTP
Environmental Media:	Air

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Studies method for removing TCE from air streams, air releases out of scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995, 23 years old
	Metric 5:	Sample Size	Medium	× 1	2	Study used bench scale biofilters to study
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Study is well documented and method is explained.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion on the variability and uncertainty in the study.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Baek, S. O.,Suvarapu, L. N.,Seo, Y. K.. 2015. Occurrence and Concentrations of Toxic VOCs in the Ambient Air of Gumi, an Electronics-Industrial City in Korea. Sensors.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3001564

EXTRACTION

Parameter	Data
Life Cycle Stage:	Processing
Release Source:	Solvent use in semiconductor, circuit chip and circuit board manufacture.
Disposal /Treatment Method:	Venting
Environmental Media:	Air
Release or Emission Factor:	53.8 tons/yr in 2009
Number of Sites:	1428

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Korea
	Metric 3:	Applicability	Unacceptable	× 2	8	Air releases out of scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2014
	Metric 5:	Sample Size	High	× 1	1	Large sample size across many sites.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Study is well documented and method is explained. Data sets are well characterized..
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Variability and uncertainty is not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Whittaker, S. G.,Taylor, J.,Van Hooser, L. M.. 2015. Characterization of "Hydrocarbon" Dry Cleaning in King County, Washington. Journal of Environmental Health.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3488855

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Release Source:	Dry Cleaning

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Covers waste designations at dry cleaners, water releases not addressed, all other releases out of scope. TCE not addressed qunatitatively.
	Metric 4:	Temporal Representativeness	High	× 2	2	2017, 1 year old
	Metric 5:	Sample Size	Medium	× 1	2	Questionaire pulled results from a representative sample size, but does not address samples in a quantitative fashion.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Study is well documented and method is explained. Data sets are well characterized..
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Variability and uncertainty is not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Den, W.,Huang, C.,Li, C. H.. 2004. Effects of cross-substrate interaction on biotrickling filtration for the control of VOC emissions. Chemosphere.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3570982

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Study
Release Source:	VOC waste air emissions in gas-phase biological processes
Environmental Media:	air

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	China
	Metric 3:	Applicability	Unacceptable	× 2	8	Studies method for controlling air emissings, air releases out of scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2004, 14 years old
	Metric 5:	Sample Size	High	× 1	1	Experimental results are well characterized and described.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Study is well documented and method is explained. Data sets are well characterized..
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Variability and uncertainty is not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Oecd,. 2009. Emission scenario document on adhesive formulation.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827299

EXTRACTION

Parameter	**Data**

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OECD document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US and others
	Metric 3:	Applicability	High	× 2	2	ESD, not specific to TCE but includes information relevant to TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	Less than 10 years old
	Metric 5:	Sample Size	N/A		N/A	N/A - ESD
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	All metadata given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Variability addressed through different application methods, uncertainty not addressed
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Oecd,. 2009. Emission scenario documents on coating industry (paints, lacquers and varnishes).
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827298

EXTRACTION

Parameter	**Data**

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OECD document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US and others
	Metric 3:	Applicability	High	× 2	2	ESD, not specific to TCE but includes information relevant to TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	Less than 10 years old
	Metric 5:	Sample Size	N/A		N/A	N/A - ESD
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	All metadata given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Variability addressed through different application methods, uncertainty not addressed
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1995. Guidance document for the halogenated solvent cleaner NESHAP.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827323

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	EPA Guidance Document
Release Source:	Halogenated Solvent Cleaner users
Disposal /Treatment Method:	For compliance with NESHAP

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	NESHAP covers air emissions, air releases out of scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995, 23 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Detailed data and includes test methods. Does not cite any sources, but type of docment is not expected to.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.4.

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* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Carex, Canada. 2008. Priority occupational carcinogens for surveillance in Canada: Preliminary Priority List.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978369

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Country-scale Releases

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Canada (OECD)
	Metric 3:	Applicability	Medium	× 2	4	country wide release
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2006, 12 years old
	Metric 5:	Sample Size	Low	× 1	3	Single value, no statistics given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	media of release not given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.6.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1977. Control of volatile organic emissions from solvent metal cleaning.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827321

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	EPA Guidance Document

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Covers control of air releases, air releases out of scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1977, 41 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Detailed data and includes test methods. Does not cite any sources, but type of docment is not expected to.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.4.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2001. Guide to industrial assessments for pollution prevention and energy efficiency.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827322

EXTRACTION

Parameter	**Data**

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Information for in scope uses
	Metric 4:	Temporal Representativeness	Medium	× 2	4	data from 2001 (less than 20 years but older than 10)
	Metric 5:	Sample Size	N/A		N/A	N/A - only qualitative information provided
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Results provided but underlying data sources not clearly described
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S. Environmental Protection Agency. 2011. The 2011 National Emissions Inventory.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	5352399

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All
Release Source:	Provides unit/process of release.
Environmental Media:	Provides media of release
Release or Emission Factor:	Provides release data
Release Days per Year:	Provides annual operating time.
P2 Control & percent Efficiency:	Provides controls information.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Submitters provide general method used to calculate emissions, but details not provided.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	NEI is U.S. based data
	Metric 3:	Applicability	High	× 2	2	NEI includes industries included in the scopes of TCE.
	Metric 4:	Temporal Representativeness	High	× 2	2	NEI data are from 2011
	Metric 5:	Sample Size	Medium	× 1	2	Universe is limited to units subject to NESHAP with threshold potential to emit, although states may have different requirements; statistical representativeness is unclear.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	NEI includes release media and generally also includes daily and annual operating time, specific unit/process that is the source of release, and presence of engineering controls.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	NEI does not address variability or uncertainty in submitter provided data.
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Occupational Exposure

Source Citation:	Kilburn, K. H.. 1999. Neurobehavioral and respiratory findings in jet engine repair workers: a comparison of exposed and unexposed volunteers. Environmental Research.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1576

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	4800 (mg/m3)
Number of Sites:	1
Type of Measurement or Method:	8-hr TWA
Number of Workers:	6
Type of Sampling:	area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US (1 site in OK)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1993), but after PEL
	Metric 5:	Sample Size	Low	× 1	3	single data point given for 6 workers, unclear what the data represents (e.g., mean, median, etc.)
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Data indicates "area" sample but no other metadata given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nakatsuka, H.,Watanabe, T.,Takeuchi, Y.,Hisanaga, N.,Shibata, E.,Suzuki, H.,Huang, M. Y.,Chen, Z.,Qu, Q. S.,Ikeda, M.. 1992. Absence of blue-yellow color vision loss among workers exposed to toluene or tetrachloroethylene, mostly at levels below occupational exposure limits. International Archives of Occupational and Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	58349

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	6.1-11.8 (ppm)
Type of Measurement or Method:	TWA
Number of Workers:	23 (14 men; 9 women)
Type of Sampling:	personal breathing zone air samples
Exposure Duration:	unknown

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Described as "diffusive sampling" but otherwise not described
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1990), but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	geometric mean and standard deviation given, but range and discrete sample values not provided
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Data indicates PBZ samples but other metadata not given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed with respect to exposure data
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nagaya, T.,Ishikawa, N.,Hata, H.. 1989. Urinary total protein and "beta"-2-microglobulin in workers exposed to trichloroethylene. Environmental Research.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	61122

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	15 (ppm)
Number of Samples:	104
Type of Sampling:	urinealysis

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Sources documented, but not from frequently used source
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Low	× 2	6	Prior to 1988
	Metric 5:	Sample Size	N/A		N/A	N/A - information about use of TCE in semiconductor manufacturing, no quantitative data
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Sources clearly documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Stewart, P. A.,Lee, J. S.,Marano, D. E.,Spirtas, R.,Forbes, C. D.,Blair, A.. 1991. Retrospective cohort mortality study of workers at an aircraft maintenance facility: II. Exposures and their assessment. British Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	65131

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Exposure Concentration (Unit):	600 ppm (1939-1954)400 ppm (1955-1967)200 ppm (1968-1978)0 ppm (1979-1983)
Number of Workers:	7282 (over 1939-1982)
Type of Sampling:	Estimation

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Peer-reviewed article, using data not from a frequently used source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Low	× 2	6	Data from 1939-1983 (older than 20 years)
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Metadata associated with exposure indices used to estimate exposure not provided
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.2.

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* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Landrigan, P. J.,Stein, G. F.,Kominsky, J. R.,Ruhe, R. L.,Watanabe, A. S.. 1987. Common-source community and industrial exposure to trichloroethylene. Archives of Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	65261

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	117-357 (mg/m3)
Number of Sites:	1
Type of Measurement or Method:	8-hr TWA
Worker Activity:	degreasing using open-top liquid-vapor degreader with refirgerated free-board chiller and at cold degreasers
Number of Workers:	at least 10
Type of Sampling:	personal breathing zone air samples

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Method described and appears to be equivalent to NIOSH methods
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1980), but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Range of results given, but discrete data and other statistics not given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Critical metadata given but missing sample durations and exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed with respect to exposure data

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Source Citation:	Landrigan, P. J.,Stein, G. F.,Kominsky, J. R.,Ruhe, R. L.,Watanabe, A. S.. 1987. Common-source community and industrial exposure to trichloroethylene. Archives of Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	65261

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Landrigan, P. J.,Stein, G. F.,Kominsky, J. R.,Ruhe, R. L.,Watanabe, A. S.. 1987. Common-source community and industrial exposure to trichloroethylene. Archives of Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	65261

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	37-144 (mg/m3)
Number of Sites:	1
Type of Measurement or Method:	8-hr TWA
Worker Activity:	degreasing using open-top liquid-vapor degreader with refirgerated free-board chiller and at cold degreasers
Number of Workers:	at least 10
Type of Sampling:	personal breathing zone air samples

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Method described and appears to be equivalent to NIOSH methods
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US data
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1980), but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Range of results given, but discrete data and other statistics not given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Critical metadata given but missing sample durations and exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed with respect to exposure data

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Source Citation:	Landrigan, P. J.,Stein, G. F.,Kominsky, J. R.,Ruhe, R. L.,Watanabe, A. S.. 1987. Common-source community and industrial exposure to trichloroethylene. Archives of Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	65261

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	1.2-5.1 (ppm)
Number of Sites:	23225
Number of Workers:	401000
Type of Sampling:	survey

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Unknown testing methods
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Only range provided
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure and sample type given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	1-100 (ppm)
Type of Sampling:	survey

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Unknown testing methods
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Only range provided
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure and sample type given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ruijten, M. W.,Verberk, M. M.,SallÃ©, H. J.. 1991. Nerve function in workers with long term exposure to trichloroethene. British Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	65298

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	80 (ppm)
Number of Samples:	100
Number of Sites:	1
Type of Sampling:	area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described other than sampling using gas detection tube
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Study from Netherlands (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Low	× 2	6	Data collected prior to PEL (1966)
	Metric 5:	Sample Size	Medium	× 1	2	Means given but no other statisics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata provided
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed with respect to exposure data
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.4.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ruijten, M. W.,Verberk, M. M.,SallÃ©, H. J.. 1991. Nerve function in workers with long term exposure to trichloroethene. British Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	65298

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	70 (ppm)
Number of Samples:	90
Number of Sites:	1
Type of Sampling:	area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described other than sampling using gas detection tube
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Study from Netherlands (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1976) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Means given but no other statisics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata provided
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed with respect to exposure data
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.2.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ruijten, M. W.,Verberk, M. M.,SallÃ©, H. J.. 1991. Nerve function in workers with long term exposure to trichloroethene. British Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	65298

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	35 (ppm)
Number of Samples:	not provided
Number of Sites:	1
Type of Sampling:	area
Engineering Control & percent Exposure Reduction:	Local exhaust installed

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described other than sampling using gas detection tube
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Study from Netherlands (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1976) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Means given but no other statisics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata provided
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed with respect to exposure data
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.2.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ulander, A.,Selden, A.,Ahlborg, G., Jr.. 1992. Assessment of intermittent trichloroethylene exposure in vapor degreasing. AIHA Journal.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	67506

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Exposure Concentration (Unit):	3-144 (mg/m3); 16 mg/m3 median
Number of Samples:	not provided
Number of Sites:	19
Number of Workers:	31
Type of Sampling:	personal breathing zone air samples

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Study from Sweden (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1988-1989) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Median, mean, and range given, but discrete data not available
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Indicates PBZ and full-shift exposure values but sample duration, exposure duration, exposure frequency not given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited characterization of uncertainty/variability.
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Skender, L. J.,Karacic, V.,Prpic-Majic, D.. 1991. A comparative study of human levels of trichloroethylene and tetrachloroethylene after occupational exposure. Archives of Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	69136

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	25-40 (mg/m3)
Number of Samples:	not provided
Number of Sites:	4
Number of Workers:	10
Type of Sampling:	personal breathing zone air samples

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Europen study (EU countries are part of OECD)
	Metric 3:	Applicability	Unacceptable	× 2	8	Data for use of TCE as a dry cleaning solvent, not a US use (spot cleaning only)
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1990) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.8.

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Source Citation:	Skender, L. J.,Karacic, V.,Prpic-Majic, D.. 1991. A comparative study of human levels of trichloroethylene and tetrachloroethylene after occupational exposure. Archives of Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	69136

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ikeda, M.. 1977. Metabolism of trichloroethylene and tetrachloroethylene in human subjects. Environmental Health Perspectives.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75160

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	10-170 (ppm)
Number of Samples:	not provided
Number of Sites:	10
Number of Workers:	12
Type of Sampling:	area
Exposure Duration:	2-4 hrs
Exposure Frequency:	1-2/month

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1977) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Only exposure type and duration given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ikeda, M.. 1977. Metabolism of trichloroethylene and tetrachloroethylene in human subjects. Environmental Health Perspectives.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75160

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	200 (ppm)
Number of Samples:	not provided
Number of Sites:	10
Number of Workers:	6
Type of Sampling:	area
Exposure Duration:	Intermittent exp over 8hr/day

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1977) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Only exposure type and duration given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ikeda, M.. 1977. Metabolism of trichloroethylene and tetrachloroethylene in human subjects. Environmental Health Perspectives.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75160

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	20-40 (ppm)
Number of Samples:	not provided
Number of Sites:	10
Number of Workers:	6
Type of Sampling:	area
Exposure Duration:	8 hr/day
Exposure Frequency:	5 days/week

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1977) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Only exposure type and duration given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ikeda, M.. 1977. Metabolism of trichloroethylene and tetrachloroethylene in human subjects. Environmental Health Perspectives.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75160

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	50 (ppm)
Number of Samples:	not provided
Number of Sites:	10
Number of Workers:	6
Type of Sampling:	area
Exposure Duration:	Intermittent exp over 8hr/day

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1977) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Only exposure type and duration given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Inoue, O.,Seiji, K.,Kawai, T.,Jin, C.,Liu, Y. T.,Chen, Z.,Cai, S. X.,Yin, S. N.,Li, G. L.,Nakasutka, H.,Watanabe, T.,Ikeda, M.. 1989. Relationship between vapor exposure and urinary metabolite excretion among workers exposed to trichloroethylene. American Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75359

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Exposure Concentration (Unit):	3-94 (ppm) men; 2-47 (ppm) women
Number of Samples:	not provided
Number of Sites:	1
Number of Workers:	61 (men); 17 women
Type of Sampling:	personal
Exposure Duration:	3 x 8 hr shifts

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	China (non-OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1989) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only sample type (PBZ) given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Inoue, O.,Seiji, K.,Kawai, T.,Jin, C.,Liu, Y. T.,Chen, Z.,Cai, S. X.,Yin, S. N.,Li, G. L.,Nakasutka, H.,Watanabe, T.,Ikeda, M.. 1989. Relationship between vapor exposure and urinary metabolite excretion among workers exposed to trichloroethylene. American Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75359

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Exposure Concentration (Unit):	1-63 (ppm) men; 2-13 (ppm) women
Number of Samples:	not provided
Number of Sites:	1
Number of Workers:	52 (men); 10 women
Type of Sampling:	personal
Exposure Duration:	3 x 8 hr shifts

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	China (non-OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1989) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only sample type (PBZ) given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ogata, M.,Kihara, T.,Kamoi, R.,Taguchi, T.,Oda, J.,Kenmotsu, K.. 1988. A report of worker suffering from pneumatosis cystoides intestinalis following trichloroethylene exposure. Industrial Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75409

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	32 ppm (geometric mean); 18-56 ppm (90 percent range)
Number of Samples:	not provided
Number of Sites:	1
Worker Activity:	soaking metal parts in TRI tank under ultrasonic waves to degrease; additional acitivty - washing process for 1 minute at least 1/day exposed to higher concentrations than general air of working environment.
Number of Workers:	1
Type of Sampling:	area
Sampling Location:	5 sampling points in unit work area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1988) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range and mean given but no discrete data
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only sample type (area) given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.0	

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Source Citation:	Ogata, M.,Kihara, T.,Kamoi, R.,Taguchi, T.,Oda, J.,Kenmotsu, K.. 1988. A report of worker suffering from pneumatosis cystoides intestinalis following trichloroethylene exposure. Industrial Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75409

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Seiji, K.,Jin, C.,Watanabe, T.,Nakatsuka, H.,Ikeda, M.. 1990. Sister chromatid exchanges in peripheral lymphocytes of workers exposed to benzene, trichloroethylene, or tetrachloroethylene, with reference to smoking habits. International Archives of Occupational and Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75419

EXTRACTION

Parameter	Data
Life Cycle Stage:	Mfg and Use
Exposure Concentration (Unit):	7 ppm (geometric mean); 13 ppm (75 percentile); 32 ppm (max)
Number of Samples:	not provided
Number of Sites:	unknown
Type of Measurement or Method:	8-hr TWA
Number of Workers:	22 (men); 16 (women)
Type of Sampling:	assumed area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Data from China (non-OECD country) and Japan (OECD country)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1987) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Geometric mean and 75 percent -tile given, no discrete data
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Sample type (PBZ) and exposure type given; missing worker activities, sample duration, and exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.0	

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Source Citation:	Seiji, K.,Jin, C.,Watanabe, T.,Nakatsuka, H.,Ikeda, M.. 1990. Sister chromatid exchanges in peripheral lymphocytes of workers exposed to benzene, trichloroethylene, or tetrachloroethylene, with reference to smoking habits. International Archives of Occupational and Environmental Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	75419

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Chia, S. E.,Goh, V. H.,Ong, C. N.. 1997. Endocrine profiles of male workers with exposure to trichloroethylene. American Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	630431

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	9 -131 ppm (29.6 ppm mean)
Number of Sites:	1
Type of Measurement or Method:	8-hr TWA
Number of Workers:	12
Type of Sampling:	personal
Sampling Location:	various locations within the facility
Exposure Duration:	8 hr shift

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Cite NIOSH method
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Singapore (non-OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1997) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Sample type (PBZ) and exposure type given; missing worker activities, sample duration, and exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Imbriani, M.,Niu, Q.,Negri, S.,Ghittori, S.. 2001. Trichloroethylene in urine as biological exposure index. Industrial Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	663955

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Exposure Concentration (Unit):	27-387 (mg/m3); mean: 83.31 (mg/m3)
Number of Samples:	assumeed 49 based on number of workers
Number of Sites:	1
Type of Measurement or Method:	8-hr TWA
Number of Workers:	8 (men); 41 (women)
Type of Sampling:	personal
Exposure Duration:	8 hr shift

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Italy (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (2000) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Range, arithmetic mean, geometric mean, ASD, GSD all given, no discrete samples
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Sample type (PBZ), exposure type given, sample duration given; missing worker activities and exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed with respect to exposure data
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Cdc,. 1978. Health hazard evaluation report no. HETA-78-38-512: Trans World Airlines Corporation.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3994172

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	Vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	1-7ppm
Number of Samples:	4
Number of Sites:	1
Type of Measurement or Method:	Short-term
Worker Activity:	Ultrasonic Parts Cleaning
Number of Workers:	1
Type of Sampling:	Personal
Exposure Frequency:	Infrequent
PPE:	Respirator

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Not described, but NIOSH HHE, assumed to use NIOSH method
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1978) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Critical metadata present
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed

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Source Citation:	Cdc,. 1978. Health hazard evaluation report no. HETA-78-38-512: Trans World Airlines Corporation.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3994172

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Osha,. 1989. 1988 OSHA Pel Project documentation: Trichloroethyle.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3986441

EXTRACTION

Parameter	**Data**

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OSHA documet
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Discussion on health effects and rule making, not workplace
	Metric 4:	Temporal Representativeness	Low	× 2	6	1988 - 30 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/a
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	CalEpa,. 2005. Appendix D.3 Chronic RELS and toxicity summaries using the previous version of Hot Spots Risk Assessment guidelines (OEHHA 1999).
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3982628

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Physical Form:	Vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	0-200 ppm
Worker Activity:	Multiple, findings from multiple occupational studies
Number of Workers:	79
Exposure Duration:	Varies
Exposure Frequency:	Varies

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2000 - 18 years old (after PEL)
	Metric 5:	Sample Size	Medium	× 1	2	Only range provideds
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only sample type given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed with respect to exposure data
Overall Quality Determination†			Medium		2.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Osha,. 2017. WTC OSHA non-asbestos sampling data for Southeast area.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3982438

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture/Use
Route of Exposure:	inhalation
Exposure Concentration (Unit):	0 ppm
Number of Samples:	37
Type of Measurement or Method:	TWA
Worker Activity:	Various
Type of Sampling:	Personal

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Not described, but OSHA, assumed to use OSHA method
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	All TCE samples are 0 and no context given to results; therefore, it is unclear if TCE is being used
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (2002) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Critical metadata present
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.2.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Doe,. 2003. A needs assessment for medical screening of construction workers at the Portsmouth and Paducah gaseous diffusion plants.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3974976

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Number of Sites:	2
Worker Activity:	Degreasing
Number of Workers:	>1000

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	University of Cincinnati, NIOSH, DOE
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Retroactive look at a workplace scenario
	Metric 4:	Temporal Representativeness	Low	× 2	6	2003, but uses older data
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Well documented, but little to no citations inline with the text
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.6.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 1982. Health hazard evaluation report no. HETA-82-136-1175, U.S. Army Research Office, Research Triangle Park, North Carolina.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3974950

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	Vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	0.75-1.34 ppm
Number of Samples:	7
Number of Sites:	1
Type of Sampling:	Area, Personal
Sampling Location:	Work Table
Bulk and Dust Particle Size Distribution:	0.35-0.56 mg/m3
Engineering Control & percent Exposure Reduction:	Exhaust Fans,

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Not described, but NIOSH HHE, assumed to use NIOSH method
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1982) but after PEL
	Metric 5:	Sample Size	Low	× 1	3	Described as up to 1.34 ppm of TCE, no other sample data given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Indicates both PBZ and area samples taken but not clear which is applicable to the TCE value given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed

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Source Citation:	Niosh,. 1982. Health hazard evaluation report no. HETA-82-136-1175, U.S. Army Research Office, Research Triangle Park, North Carolina.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3974950

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Unacceptable		4	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Seitz, T.,Driscoll, R.. 1989. Health hazard evaluation report no. HETA 88-082-1971, Jostens Incorporated, Princeton, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970562

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	Vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	14.7-33.4 ppm
Number of Samples:	15
Number of Sites:	1
Type of Measurement or Method:	TWA
Worker Activity:	Cleaning/degreasing
Number of Workers:	35
Type of Sampling:	Area, Personal
Sampling Location:	Polishing and plating departments
Engineering Control & percent Exposure Reduction:	Local exhaust ventilation
PPE:	Gloves, goggles
Analytic Method:	NIOSH Method 1022

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1022
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1989) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	All metadata present
Domain 4: Variability and Uncertainty						

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Source Citation:	Seitz, T.,Driscoll, R.. 1989. Health hazard evaluation report no. HETA 88-082-1971, Jostens Incorporated, Princeton, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970562

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†		High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Okawa, M. T.. 1973. Health hazard evaluation report no. HHE 72-74-51, Western Electric Company, Dublic, California.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970618

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	Vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	6-106 ppm
Number of Samples:	43
Number of Sites:	1
Worker Activity:	Paint spraying, cleaning, washing
Type of Sampling:	Personal
Engineering Control & percent Exposure Reduction:	Local exhaust ventilation, vent hoods
PPE:	respirators
Analytic Method:	NIOSH method

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH report
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1979) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	All metadata present
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†			High		1.3	

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Source Citation:	Okawa, M. T.. 1973. Health hazard evaluation report no. HHE 72-74-51, Western Electric Company, Dublic, California.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970618

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	R. A. G. Aktiengesellschaft. 2014. Chemical safety report: Trichloroethylene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970841

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	2.4 - 95.5 mg/m3
Number of Sites:	2
Worker Activity:	repairing belts in coal mines
Sampling Location:	coal mine belts
Exposure Duration:	<4 hours
Exposure Frequency:	varies
Engineering Control & percent Exposure Reduction:	Good mine ventilation
PPE:	Protective gloves, suits and eye protection

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Germany (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from sources from 2011 and 2005; therefore, scored based on oldest data which is older than 10 years but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Only Sample type and exposure type give
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.9	

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Source Citation:	R. A. G. Aktiengesellschaft. 2014. Chemical safety report: Trichloroethylene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970841

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Exposure assessment: Trichloroethylene, Part 2.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970840

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	<LoD (14.6ug/m3) - 11 mg/m3
Number of Samples:	29
Number of Sites:	1
Worker Activity:	loading, unloading TCE storage tanks, and sampling
Type of Sampling:	Personal, area
Sampling Location:	around site and offsite.
Exposure Duration:	15-60 min.
Exposure Frequency:	daily
PPE:	Gloves
Analytic Method:	PN-89/Z-04016/03 and IR-TL-73

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Polish method, assumed to be acceptable
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Poland (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	data from 2014
	Metric 5:	Sample Size	Medium	× 1	2	Most samples are provided as a range, no discrete data given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	sample type and exposure type given, but missing other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed

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Source Citation:	2014. Exposure assessment: Trichloroethylene, Part 2.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970840

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	D. O. W. Deutschland. 2014. Chemical safety report: Use of trichloroethylene in industrial parts cleaning by vapour degreasing in closed systems where specific requirements (system of use-parameters) exist.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970823

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	4.61 mg/m3 – 13.69 mg/m3 (90th percentile measured data)
Number of Samples:	9941 area, 58 personal
Number of Sites:	9
Type of Measurement or Method:	8 hr TWA
Worker Activity:	Vapor degreasing
Type of Sampling:	Personal, area
Analytic Method:	methodology NF X 43-267/INRS 029-01/09

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Methods provided, sampling completed by UKAS acreddited lab; therefore, assumed to be acceptable
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Data from UK and France (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	No date listed, but monitoring data was taken from 2009-2014
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

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Source Citation:	D. O. W. Deutschland. 2014. Chemical safety report: Use of trichloroethylene in industrial parts cleaning by vapour degreasing in closed systems where specific requirements (system of use-parameters) exist.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970823

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	D. O. W. Deutschland. 2014. Chemical safety report: Use of trichloroethylene in packaging.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970813

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	0.0004 - 1.5 ppm
Number of Samples:	47
Number of Sites:	1
Type of Measurement or Method:	TWA
Worker Activity:	Filling Barrels and fill tank trucks and traincars.
Number of Workers:	2
Type of Sampling:	personal
Sampling Location:	tank filling station, barrel filling station
Exposure Duration:	8
Exposure Frequency:	240 d/y
Engineering Control & percent Exposure Reduction:	Ventilation and exhause air
PPE:	TCE resistant gloves, goggles

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU data (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	All metadata present
Domain 4: Variability and Uncertainty						

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Source Citation:	D. O. W. Deutschland. 2014. Chemical safety report: Use of trichloroethylene in packaging.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970813

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Domo Caproleuna GmbH. 2015. Chemical safety report: Industrial use as an extractive solvent for the purification of caprolactam from caprolactam oil.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970812

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	0.4-38 mg/m3
Number of Sites:	1
Type of Measurement or Method:	8 hour TWA
Worker Activity:	Tank discharge, solvent extraction, and lab sample handling
Number of Workers:	15
Type of Sampling:	personal
Sampling Location:	varies
Exposure Duration:	varies
Exposure Frequency:	365
Analytic Method:	German Technical Rule TRGS 402

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	German Technical Rule TRGS 402, assumed to be acceptable
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU data (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2015, but utilizes monitoring data from 2013
	Metric 5:	Sample Size	Low	× 1	3	unclear if sample values given are discrete samples or based on a median, mean, etc.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						

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Source Citation:	Domo Caproleuna GmbH. 2015. Chemical safety report: Industrial use as an extractive solvent for the purification of caprolactam from caprolactam oil.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970812

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†		Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	D. O. W. Deutschland. 2014. Chemical safety report: Uses of trichloroethylene in formulation.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970810

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	90th percentile calculated: 0.0172 ppm. Range: ND - 1.9 ppm
Number of Samples:	49
Type of Measurement or Method:	TWA
Worker Activity:	Sampling and maintenance on tanks
Type of Sampling:	Personal, area
Exposure Duration:	<4 hours
Exposure Frequency:	6/month
PPE:	Chem. Resistant gloves, safety glasses, safety shoes, and usual protective clothing.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU data (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	No date, but samples were pulled from 2011-2014
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	All metadata present
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

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Source Citation:	D. O. W. Deutschland. 2014. Chemical safety report: Uses of trichloroethylene in formulation.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970810

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Domo Caproleuna GmbH. 2014. Chemical safety report: Industrial use as an extractive solvent for the purification of caprolactam from caprolactam oil.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970809

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Inhalation: 0.4-38 mg/m3 (some estimated).Dermal:0.34-2.7 mg/kg (estimated).
Type of Measurement or Method:	8 hour TWA
Worker Activity:	Varies
Type of Sampling:	Personal
Exposure Duration:	Varies
Exposure Frequency:	Varies
PPE:	Chem. Resistant gloves, safety glasses, safety shoes, and usual protective clothing.
Analytic Method:	German technical rule TRGS 402

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	German Technical Rule TRGS 402, assumed to be acceptable
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU data (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2015, but utilizes monitoring data from 2013
	Metric 5:	Sample Size	Low	× 1	3	unclear if sample values given are discrete samples or based on a median, mean, etc.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						

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Source Citation:	Domo Caproleuna GmbH. 2014. Chemical safety report: Industrial use as an extractive solvent for the purification of caprolactam from caprolactam oil.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970809

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†		Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Spolana, a s. 2014. Chemical safety report: Trichloroethylene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970807

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	0-13.3 (unitless) and 0.2 - 19.2 mg/m3

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Czech Republic (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	Samples from 2011-2013
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Exposure scenario: Use: Trichloroethylene as an extraction solvent for removal of process oil and formation of the porous structure in polyethylene based separators used in lead-acid batteries.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970806

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	Personal: 0.48-44.8 mg/m3Area: 26.7-1001 mg/m3
Number of Samples:	36
Number of Sites:	1
Type of Measurement or Method:	12 hour TWA
Worker Activity:	Varies
Number of Workers:	91
Type of Sampling:	Personal, area
Sampling Location:	Multiple
Exposure Duration:	10.66 hours
Exposure Frequency:	3.5 days/week
PPE:	Respirators during certain tasks.
Analytic Method:	EN 482:2012

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Badge monitoring
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU data (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old
	Metric 5:	Sample Size	Medium	× 1	2	75th percentile given, no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata

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Source Citation:	2014. Exposure scenario: Use: Trichloroethylene as an extraction solvent for removal of process oil and formation of the porous structure in polyethylene based separators used in lead-acid batteries.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970806

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†		Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Chimcomplex, S. A. Borzesti. 2014. Chemical safety report: Industrial use of trichloroethylene (TCE) as a solvent as a degreasing agent in closed systems.
Type of Data Source	Occupational Exposure; Published Models for Exposures or Releases;
Hero ID	3970803

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Estimated: 0.05-19.2 mg/m3
Number of Sites:	1
Type of Sampling:	Estimation
Analytic Method:	Estimation Method: ECETOC TRA v3

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Model details not included in the report but model is used in a chemical safety report for the EU; and, therefore, assumed to be of high quality
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	No date, but references a risk assessment from 2014
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Document does not contain necessary metadata to understand the model
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 1.8.

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Source Citation:	Chimcomplex, S. A. Borzesti. 2014. Chemical safety report: Industrial use of trichloroethylene (TCE) as a solvent as a degreasing agent in closed systems.
Type of Data Source	Occupational Exposure; Published Models for Exposures or Releases;
Hero ID	3970803

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	D. O. W. Deutschland. 2017. Chemical safety report: Use of trichloroethylene as extraction solvent for bitumen in asphalt analysis.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970802

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	2.6 - 2.737 mg/m3
Number of Samples:	65 (sets of 13, averaged into one point)
Number of Sites:	1
Type of Measurement or Method:	8 hour TWA
Worker Activity:	Cleaning, TCE recovery operations, etc.
Type of Sampling:	Area
Sampling Location:	Multiple
Exposure Duration:	<8 hours
Exposure Frequency:	Varies
Engineering Control & percent Exposure Reduction:	SAFET Tainer system
PPE:	Varies

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	German Technical Rule TRGS 402, assumed to be acceptable
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU data (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	data from 2013
	Metric 5:	Sample Size	Medium	× 1	2	All results indicated as less the the LOQ
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						

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Source Citation:	D. O. W. Deutschland. 2017. Chemical safety report: Use of trichloroethylene as extraction solvent for bitumen in asphalt analysis.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970802

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†		Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Feistritz Microporous, gmbh. 2014. Chemical safety report: Trichloroethylene used as degreasing solvent in the manufacture of polyethylene separators for lead-acid batteries.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970808

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	36.9 mg/m3
Number of Samples:	22
Number of Sites:	1
Type of Measurement or Method:	8 hour TWA
Worker Activity:	Chopping, cutting, winding and packaging the product.
Type of Sampling:	Likely area.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU data (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	Sampling from 2014
	Metric 5:	Sample Size	Medium	× 1	2	only 90th percentile given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Sample type given, but no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Vlisco Netherlands, B. V.. 2014. Chemical safety report Part A: Use of trichloroethylene as a solvent for the removal and recovery of resin from dyed cloth.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970833

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	0.7-27.4 mg/m3
Number of Samples:	37
Number of Sites:	1
Type of Measurement or Method:	Long term
Worker Activity:	Operations, Washing cloth, operating wax recovery unit, general office work.
Type of Sampling:	Personal
Sampling Location:	Multiple
Exposure Duration:	<8 hours
PPE:	Standard PPE

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Well described, but method not cited
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU data (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2016, 2 years old
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type, sample type, worker activities given, no other metadata
Domain 4: Variability and Uncertainty						

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Source Citation:	Vlisco Netherlands, B. V.. 2014. Chemical safety report Part A: Use of trichloroethylene as a solvent for the removal and recovery of resin from dyed cloth.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970833

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Lewis, F. A.. 1980. Health hazard evaluation report no. HHE 80-87-708, Harowe Servo Contorls Inc., West Chester, Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970663

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	0.32-21 ppmTWA: 10.8-12.3 ppmCeiling:10.6 - 27.3 ppm
Number of Samples:	16
Number of Sites:	1
Type of Measurement or Method:	Short-term, 8 hour TWA
Worker Activity:	Vapor degreasing
Type of Sampling:	Personal, area
Exposure Duration:	Varies
Exposure Frequency:	Varies
PPE:	Standard PPE

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No analytical method given, but completed by NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1980) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed

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Source Citation:	Lewis, F. A.. 1980. Health hazard evaluation report no. HHE 80-87-708, Harowe Servo Contorls Inc., West Chester, Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970663

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hills, B. W.,Kawamoto, M. M.. 1992. Health hazard evaluation report no. HETA 90-029-2212; United Technologies Automotive, Port Huron, Michigan.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970662

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	3.6-21.4 ppm
Number of Samples:	4
Number of Sites:	1
Type of Measurement or Method:	Long term
Worker Activity:	lamination, cutting lamination
Number of Workers:	132
Type of Sampling:	Area
Sampling Location:	Multiple
Exposure Duration:	Varies
Exposure Frequency:	Varies
Analytic Method:	NIOSH Method 1022

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1022
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1992) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						

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Source Citation:	Hills, B. W.,Kawamoto, M. M.. 1992. Health hazard evaluation report no. HETA 90-029-2212; United Technologies Automotive, Port Huron, Michigan.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970662

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Vandervort, R.,Polakoff, P. L.. 1973. Health hazard evaluation report no. HHE 72-84-31, Dunham-Bush, Incroprated, West Hartford, Connecticut, Part 2.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970657

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	170-420 mg/m3
Number of Samples:	30
Number of Sites:	1
Type of Measurement or Method:	Short-term
Worker Activity:	Degresasing and assembling air conditioners
Number of Workers:	480
Type of Sampling:	Personal, area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No analytical method given, but completed by NIOSH and includes well described process
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1973) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

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Source Citation:	Vandervort, R.,Polakoff, P. L.. 1973. Health hazard evaluation report no. HHE 72-84-31, Dunham-Bush, Incroprated, West Hartford, Connecticut, Part 2.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970657

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Straub, W. E.,Meyer, C.. 1977. Health hazard evaluation report no. HHE 77-3-420, Essex International, Kittaning, PA.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970655

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	1-15 ppm
Number of Samples:	50
Number of Sites:	1
Type of Measurement or Method:	Short-term
Worker Activity:	Soldering, assembly of electronic chip boards
Type of Sampling:	Personal, Area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No analytical method given, but completed by NIOSH and includes well described process
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1976) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Sample type given no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Kramkowski, R. S.. 1978. Health hazard evaluation report no. HHE 78-56-511, Westclox-Division of General Time Corp., Peru, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970653

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	5-61 ppm
Number of Samples:	6
Number of Sites:	1
Type of Measurement or Method:	Long term
Worker Activity:	Degreasing.
Type of Sampling:	Personal, Area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No analytical method given, but completed by NIOSH and includes well described process
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1978) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Finely, M.,Page, E.. 2005. Health hazard evaluation report no. HETA 2003-0203-2952, Wallace Computer Services, Clinton, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970650

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	ND - 25ppm
Number of Samples:	23
Number of Sites:	1
Worker Activity:	Printing Press
Number of Workers:	81
Type of Sampling:	Personal

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No analytical method given, but completed by NIOSH and includes well described process
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2005, 13 years old (after PEL)
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Gunter, B. J.. 1977. Health hazard evaluation report no. HHE 76-101-376, FMC Corporation, Broomfield, Colorado.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970648

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	2-57 mg/m3
Number of Samples:	10
Number of Sites:	1
Worker Activity:	Degreasing, Polishing, Engraving, Painting,
Type of Sampling:	Personal, area
Engineering Control & percent Exposure Reduction:	Well Ventilated Hoods
PPE:	Appropriate PPE

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No analytical method given, but completed by NIOSH and includes well described process
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1976) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Finely, M.,Tapp, L.. 2004. Health hazard evaluation report no. HETA 2003-0029-2923, Ward Brodt Music Mall, Madison, Wisconsin.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970649

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	0-.99ppm
Number of Samples:	6
Number of Sites:	1
Type of Measurement or Method:	Long term /Full Shift
Worker Activity:	Instrument Repair, various tasks
Number of Workers:	126, with 8 working with TCE
Type of Sampling:	Personal, area
Exposure Duration:	Short
Exposure Frequency:	Frequent
Engineering Control & percent Exposure Reduction:	Local Exhaust Ventilation, Vent hoods
PPE:	Gloves, eye goggles, aprons, and dustmasks.
Analytic Method:	NIOSH method 2549

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH method 2549
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2004, 14 years old (after PEL)
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency

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Source Citation:	Finely, M.,Tapp, L.. 2004. Health hazard evaluation report no. HETA 2003-0029-2923, Ward Brodt Music Mall, Madison, Wisconsin.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970649

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Burr, G.. 2003. Health hazard evaluation report no. HETA 2002-0184-2888, Aero-Classics, Ltd., Huron, Ohio.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970647

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	Vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	7.1-7.6 ppm
Number of Samples:	3
Number of Sites:	1
Type of Measurement or Method:	Long term
Worker Activity:	Welding
Number of Workers:	15
Type of Sampling:	Personal, area
Engineering Control & percent Exposure Reduction:	Local Exhaust Ventilation
PPE:	Half face respirator
Analytic Method:	NIOSH Method No. 1003

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method No 1003
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2003, 15 years old (after PEL)
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method

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Source Citation:	Burr, G.. 2003. Health hazard evaluation report no. HETA 2002-0184-2888, Aero-Classics, Ltd., Huron, Ohio.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970647

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Kinnes, G. M.. 1998. Health hazard evaluation report no. HETA 97-0214-2689, Dorma Door Controls, Inc., Reamstown Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970645

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	Vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	0.71 - 3.5 ppm
Number of Samples:	3
Number of Sites:	1
Type of Measurement or Method:	Partial Shift, TWA
Worker Activity:	Degreaser
Type of Sampling:	Area
Analytic Method:	NIOSH Method 1022

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1022
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1998) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†			High		1.4	

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Source Citation:	Kinnes, G. M.. 1998. Health hazard evaluation report no. HETA 97-0214-2689, Dorma Door Controls, Inc., Reamstown Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970645

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Gunter, B. J.,Lucas, J. B.. 1975. Health hazard evaluation report no. HHE 74-61-232, Gates Rubber Company, Denver Colorodo.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970644

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	<.05 mg/m3
Number of Samples:	4
Number of Sites:	1
Worker Activity:	Rubber hose knitting machine
Number of Workers:	6
Type of Sampling:	Personal
Sampling Location:	Knitting Station
Exposure Duration:	Full shift
Engineering Control & percent Exposure Reduction:	Not assessed.
PPE:	Cannot wear gloves.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1975) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed

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Source Citation:	Gunter, B. J.,Lucas, J. B.. 1975. Health hazard evaluation report no. HHE 74-61-232, Gates Rubber Company, Denver Colorodo.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970644

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Crandall, M. S.,Galson, S.,Hartle, R. W.. 1988. Health hazard evaluation report no. HETA 87-095-1927, G & L Recovery Systems, Incorporated, Ashtabula, Ohio.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970640

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Personal: 4.9 - 35.5 ppmArea: 0.1 - 42.3 ppm
Number of Samples:	23
Number of Sites:	1
Worker Activity:	Stripping and recycling wire.
Type of Sampling:	Personal, area
Exposure Duration:	Full shift
Exposure Frequency:	Daily
Engineering Control & percent Exposure Reduction:	Local exhaust hoods and general building exhaust fans.
PPE:	Tyvek suits, steel toed rubber boots, hard hats, splash shields, double gloves, respirator (as needed)
Analytic Method:	NIOSH Method 1501

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1501
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1988) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						

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Source Citation:	Crandall, M. S.,Galson, S.,Hartle, R. W.. 1988. Health hazard evaluation report no. HETA 87-095-1927, G & L Recovery Systems, Incorporated, Ashtabula, Ohio.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970640

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Gilles, D.,Philbin, E.. 1976. Health hazard evaluation report no. HHE 76-61-337, TRW Incorporated, Philadelphia, Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970635

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	76 - 90 ppm
Number of Samples:	3
Number of Sites:	1
Type of Measurement or Method:	Long term
Worker Activity:	Machine lubrication
Type of Sampling:	Personal
PPE:	Uniforms, gloves

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1976) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

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Source Citation:	Gilles, D.,Philbin, E.. 1976. Health hazard evaluation report no. HHE 76-61-337, TRW Incorporated, Philadelphia, Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970635

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Snyder, E. M.. 2003. Health hazard evaluation report no. HETA 2001-0150-2917, IKI Manufacturing, Edgerton, Wisconsin.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970634

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	0.045 - 1.5 ppm
Worker Activity:	De-icer can filling.
Number of Workers:	10
Type of Sampling:	Personal
Analytic Method:	NIOSH Method 1500

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1500
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (2003) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	Only given a range
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Chrostek, W. J. Levine M. S.. 1981. Health hazard evaluation report no. HHE 30-153-881, Palmer Industrial Coatings Incorp., Williamsport, Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970632

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	1.1-10.4 mg/m31-7.3 mg/m3 TWA
Number of Samples:	13
Number of Sites:	1
Type of Measurement or Method:	8 hour TWA
Type of Sampling:	Personal
Engineering Control & percent Exposure Reduction:	Minimal
PPE:	Single cartridge respirators, helmet, goggles
Analytic Method:	NIOSH Method P&CAM 127

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method P&CAM 127
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1981) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Gilles, D.,Anania, T. L.,Ilka, R.. 1977. Health hazard evaluation report no. HHE 77-12-418, Airtex Products, Fairfield, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970629

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	.44ppm
Number of Samples:	1
Number of Sites:	1
Worker Activity:	Area beside degreaser
Type of Sampling:	Area
Sampling Location:	Area beside degreaser
Exposure Duration:	Full shift
Engineering Control & percent Exposure Reduction:	Local exhaust ventilation, vent hoods

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1977) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

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Source Citation:	Gilles, D.,Anania, T. L.,Ilka, R.. 1977. Health hazard evaluation report no. HHE 77-12-418, Airtex Products, Fairfield, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970629

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Johnson, P.. 1980. Health hazard evaluation report no. HHE 80-48-689, Miami Carey Inc., Monroe, Ohio.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970628

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Exposure Concentration (Unit):	4.0-11.9 mg/m3
Worker Activity:	Hanging products to be dip painted.
Type of Sampling:	Personal, area
Exposure Duration:	2 hours
Exposure Frequency:	6-8 hours/40 hour week
Engineering Control & percent Exposure Reduction:	Slot exhaust hood

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1980) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 1.9.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Kominsky, J. R.. 1976. Health hazard evaluation report no. HHE 76-24-350, Dana Corporation, Tipon, Indiana.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970625

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	7 - 797 ppm
Number of Samples:	20
Number of Sites:	1
Worker Activity:	Degreaser Operator
Number of Workers:	157; 12 indirectly and 8 directly affected.
Type of Sampling:	Personal
Engineering Control & percent Exposure Reduction:	Local Exhaust ventilation

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1976) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Fannick, N.. 1979. Health hazard evaluation report no. HHE 79-18-627, Standard Folding Cartons, Inc., Jackson Heights, New York.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970623

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	1.0 - 1.6
Number of Samples:	4
Number of Sites:	1
Worker Activity:	Gluing cardboard boxes
Type of Sampling:	Area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1979) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Bloom, T. F.,Kramkowski, R. S.,Cromer, J. W.. 1974. Health hazard evaluation report no. HHE 73-151-141, Essex Wire Corporation, Kenton, Ohio.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970621

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	0-100 ppm
Number of Samples:	12
Number of Sites:	1
Type of Measurement or Method:	short-term
Worker Activity:	Die cleaning, degreaser
Number of Workers:	311
Type of Sampling:	Area
Engineering Control & percent Exposure Reduction:	Some Local Exhaust Ventilation

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1974) but after PEL
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only sample type given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.8	

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Source Citation:	Bloom, T. F.,Kramkowski, R. S.,Cromer, J. W.. 1974. Health hazard evaluation report no. HHE 73-151-141, Essex Wire Corporation, Kenton, Ohio.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970621

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hervin, R. L.,Reifschneider, R.. 1973. Health hazard evaluation report no. HHE 72-42-76, Steel Tool and Engineering Company, Taylor Michigan.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970620

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Em ratio given. No concentration provided.
Number of Samples:	18
Number of Sites:	1
Worker Activity:	Degreasing, Acryloid gluing
Engineering Control & percent Exposure Reduction:	Some Local Exhaust Ventilation

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1972) but after PEL
	Metric 5:	Sample Size	Low	× 1	3	All discussed with respect to equivalent exposure
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata since no sampling details were given.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.0.

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Source Citation:	Hervin, R. L.,Reifschneider, R.. 1973. Health hazard evaluation report no. HHE 72-42-76, Steel Tool and Engineering Company, Taylor Michigan.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970620

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Okawa, M. T.. 1975. Health hazard evaluation report no. HHE 74-96-173, Richdel Corporation, Carson City, Nevada.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970619

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	1.7 - 2.9 ppm
Number of Samples:	3
Number of Sites:	1
Worker Activity:	Degreasing
Type of Sampling:	Personal
Engineering Control & percent Exposure Reduction:	Some Local Exhaust Ventilation

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1975) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only sample type given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ruhe, R. L.,Watanabe, A.,Stein, G.. 1981. Health hazard evaluation report no. HHE 80-49-808, Superior Tube Company, Collegeville, Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970617

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	32-357 mg/m3
Number of Samples:	33
Number of Sites:	1
Type of Measurement or Method:	Short term, 8 hour TWA
Worker Activity:	Degreasing
Type of Sampling:	Personal, Area
Analytic Method:	NIOSH method P &CAM 127

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH method P &CAM 127
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1981) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†			High		1.4	

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Source Citation:	Ruhe, R. L.,Watanabe, A.,Stein, G.. 1981. Health hazard evaluation report no. HHE 80-49-808, Superior Tube Company, Collegeville, Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970617

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Baumann, A.,Page, E.,Mueller, C.,Burr, G.,Hitchcok, E.. 2008. Health hazard evaluation report no. HETA 2004-0372-3054, Evaluation of neurological dysfunction among workers exposed to trichloroethylene, Entek International, Lebanon, Oregon.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970616

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	2.0 - 130.0 ppm
Number of Samples:	517
Type of Measurement or Method:	Short term, 8 hour TWA
Worker Activity:	Varied
Number of Workers:	142
Type of Sampling:	Personal, Area
Sampling Location:	multiple
Exposure Duration:	12 hour work day
Exposure Frequency:	3.5 d/w
Analytic Method:	NMAM Method 1022

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NMAM Method 1022 completed by NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2004, 14 years old (after PEL)
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						

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Source Citation:	Baumann, A.,Page, E.,Mueller, C.,Burr, G.,Hitchcok, E.. 2008. Health hazard evaluation report no. HETA 2004-0372-3054, Evaluation of neurological dysfunction among workers exposed to trichloroethylene, Entek International, Lebanon, Oregon.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970616

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ruhe, R. L.. 1982. Health hazard evaluation report no. HETA 82-040-119, Synthes Ltd. (USA), Monument, Colorado.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970595

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Personal: 4-9 mg/m3Area: 1-16 mg/m3
Number of Samples:	7
Number of Sites:	1
Type of Measurement or Method:	8 hour TWA
Worker Activity:	Electropolishing and degreasing
Number of Workers:	100
Type of Sampling:	Personal, Area
Exposure Duration:	6-8 hours
Exposure Frequency:	5 days per week
Engineering Control & percent Exposure Reduction:	Ventilated open surface tanks
Analytic Method:	NIOSH Method No. P&CAM 127

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method No. P&CAM 127
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1982) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						

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Source Citation:	Ruhe, R. L.. 1982. Health hazard evaluation report no. HETA 82-040-119, Synthes Ltd. (USA), Monument, Colorado.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970595

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Burton, N. C.,Monesterskey, J.. 1996. Health hazard evaluation report no. HETA 96-0135-2612, Eagle Knitting Mills, Inc., Shawano, Wisconsin.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970594

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Personal: 0.24 - 1.68 ppmArea: ND - 7.05 ppm
Number of Samples:	6
Number of Sites:	1
Type of Measurement or Method:	8 hour TWA
Worker Activity:	Sewing, spot cleaning fabric
Number of Workers:	85
Type of Sampling:	Personal, area
Sampling Location:	multiple
Exposure Frequency:	53 hours/week
Engineering Control & percent Exposure Reduction:	Ceiling fans
PPE:	Johnson & Johnson Germ filter masks

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1996) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						

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Source Citation:	Burton, N. C.,Monesterskey, J.. 1996. Health hazard evaluation report no. HETA 96-0135-2612, Eagle Knitting Mills, Inc., Shawano, Wisconsin.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970594

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Rosensteel, R. E.,Lucas, J. B.. 1975. Health hazard evaluation report no. HHE 74-28-212, Westinghouse Air Brake Company, Wilmerding, Pennsyvlania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970582

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Personal: ND - 535 mg/m3
Number of Samples:	6
Number of Sites:	1
Type of Measurement or Method:	TWA
Worker Activity:	Painting, degreasing
Number of Workers:	400
Type of Sampling:	Personal

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1975) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.6	

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Source Citation:	Rosensteel, R. E.,Lucas, J. B.. 1975. Health hazard evaluation report no. HHE 74-28-212, Westinghouse Air Brake Company, Wilmerding, Pennsyvlania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970582

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Barsan, M. E.. 1991. Health hazard evaluation report no. HETA 90-344-2159, A.W. Cash Valve Manufacturing Corporation, Decatur, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970554

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Personal: 4.5-5.2 ppmArea: 1.1-5.3 ppm
Number of Samples:	8
Number of Sites:	1
Type of Measurement or Method:	TWA
Worker Activity:	Open top degreaser
Type of Sampling:	Personal, area
Sampling Location:	Around the degreaser

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH method 1022
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1991) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†			High		1.4	

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Source Citation:	Barsan, M. E.. 1991. Health hazard evaluation report no. HETA 90-344-2159, A.W. Cash Valve Manufacturing Corporation, Decatur, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970554

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Gorman, R.,Rinsky, R.,Stein, G.,Anderson, K.. 1984. Health hazard evaluation report no. HETA 82-075-1545, Pratt & Whitney Aircraft, West Palm Beach, Florida.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970552

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal, ingestion
Exposure Concentration (Unit):	TWA - 0.3-22.9 ppmOnly while operating degreaser: N.D. - 233 ppmArea: .4 - 22.5 ppm
Number of Samples:	62
Number of Sites:	1
Type of Measurement or Method:	8 hour TWA
Worker Activity:	Degreasing
Number of Workers:	7200 total, 29 degreaser operators
Type of Sampling:	Personal, area
Sampling Location:	Around 10 different degreasers
Exposure Duration:	Varies
Engineering Control & percent Exposure Reduction:	roll tops to degreasers, high temp safety switches
Analytic Method:	NIOSH Method No. P&CAM 127

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method No. P&CAM 127
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1982) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency

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Source Citation:	Gorman, R.,Rinsky, R.,Stein, G.,Anderson, K.. 1984. Health hazard evaluation report no. HETA 82-075-1545, Pratt & Whitney Aircraft, West Palm Beach, Florida.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970552

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 1992. Health hazard evaluation report no. HETA-90-223-2211, Thomson Consumer Electronics, Marion, Indiana.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3974943

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Personal: 0.01 - 11 ppmArea: 0.02 - 50 ppm
Number of Samples:	11
Number of Sites:	1
Worker Activity:	Degreasing
Number of Workers:	1900
Type of Sampling:	Personal, area
Sampling Location:	Degreasers 1, 2, 3, and 4

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1003
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1992) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Love, J. R.,Kern, M.. 1981. Health hazard evaluation report no. HETA-81-065-938, METRO Bus Maintenance Shop, Washington, DC.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859376

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	ND - 3.8 mg/m3
Number of Samples:	3
Number of Sites:	1
Type of Measurement or Method:	Short term
Worker Activity:	Degreasing
Number of Workers:	17 - 2 degreasing operators.
Type of Sampling:	Area
Sampling Location:	Degreaser
Analytic Method:	NIOSH Method No. P&CAM 127

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method No. P&CAM 127
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1981) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method

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Source Citation:	Love, J. R.,Kern, M.. 1981. Health hazard evaluation report no. HETA-81-065-938, METRO Bus Maintenance Shop, Washington, DC.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859376

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Baya, M. P.,Figa-Talamanca, I.,Siskos, P. A.. 1998. Determination of selected volatile organic compounds in the air of dry-cleaning shops in the Athens area: Pilot study. Indoor and Built Environment.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3545708

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	ND - 1.96 mg/m3
Number of Samples:	14
Number of Sites:	19
Type of Measurement or Method:	short term
Worker Activity:	Dry cleaning

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described, in peer review journal assumed to use acceptable methods
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Greece (OECD country)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1998) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Addressed through sampling multiple shops
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Von Grote, J.,J. C. Hurlimann,Scheringer, M.,Hungerbuhler, K.. 2003. Reduction of Occupational Exposure to Perchloroethylene and Trichloroethylene in Metal Degreasing over the Last 30 years: Influence of Technology Innovation and Legislation. Journal of Exposure Analysis and Environmental Epidemiology.
Type of Data Source	Occupational Exposure; Published Models for Exposures or Releases;
Hero ID	3045042

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation
Type of Measurement or Method:	Estimation Model
Worker Activity:	Modeling degreaser exposure

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Published Journal Article: Journal of Exposure analysis and Environmental Epidemiology
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Data based on German facilities (OECD country).
	Metric 3:	Applicability	High	× 2	2	Degreaser exposure modeling
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2003, 15 years old
	Metric 5:	Sample Size	N/A		N/A	N/A - modeled exposures
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Sources are cited, but does not provide details on how reported values were derived from cited sources.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Variability in parameter values discussed, but no discussion of uncertainties.
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 1997. Control of health and safety hazards in commercial drycleaners: chemical exposures, fire hazards, and ergonomic risk factors.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3044963

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	ND - 9.16 ppmTWA: 0.3 - 3.11 ppm
Number of Samples:	67
Type of Measurement or Method:	Long term, TWA
Worker Activity:	Spot treating garments in drycleaning.
Type of Sampling:	Personal
Sampling Location:	Spotting Station
Engineering Control & percent Exposure Reduction:	Kitchen exhaust hood, makeup air unit
PPE:	None

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1003
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1997) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method

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Source Citation:	Niosh,. 1997. Control of health and safety hazards in commercial drycleaners: chemical exposures, fire hazards, and ergonomic risk factors.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3044963

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Baumann, A.,Page, E.,Mueller, C.,Burr, G.,Hitchcock, E.. 2008. Evaluation of Neurological Dysfunction among Workers Exposed to Trichloroethylene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2947998

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Full Shift TWA: 2.0 - 130 ppmShort Term: 30 - 450 ppm
Number of Samples:	273
Number of Sites:	1
Type of Measurement or Method:	Full shift TWA, Short term
Worker Activity:	Production of Microporous polyethylene battery separators
Number of Workers:	142
Type of Sampling:	Personal, Area
Sampling Location:	Entire process
Exposure Duration:	12 hr work day
Exposure Frequency:	3.5 days a week
Analytic Method:	NIOSH NMAM Method 1022 [NIOSH 2006].

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH NMAM Method 1022 [NIOSH 2006].
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Source dataed 2008, but data from earlier; older than 10 years but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						

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Source Citation:	Baumann, A.,Page, E.,Mueller, C.,Burr, G.,Hitchcock, E.. 2008. Evaluation of Neurological Dysfunction among Workers Exposed to Trichloroethylene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2947998

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Wadden, R. A.,Hawkins, J. L.,Scheff, P. A.,Franke, J. E.. 1991. Characterization of Emission Factors Related to Source Activity for Trichloroethylene Degreasing and Chrome Plating Processes. American Industrial Hygiene Association Journal.
Type of Data Source	Occupational Exposure; Published Models for Exposures or Releases;
Hero ID	2800647

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation
Type of Measurement or Method:	Estimation Model
Worker Activity:	Modeling degreaser exposure

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal of Exposure analysis and Environmental Epidemiology
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	Location of plants not indicated, but US-based study
	Metric 3:	Applicability	High	× 2	2	Degreaser exposure modeling
	Metric 4:	Temporal Representativeness	Low	× 2	6	1991, 27 years old
	Metric 5:	Sample Size	N/A		N/A	N/A - modeled exposures
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Transparent and well presented. Well documented.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Variability in machine types, but no discussion of uncertainties.
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Kowalska, J.,SzewczyÅska, M.,PoÅniak, M.. 2014. Measurements of chlorinated volatile organic compounds emitted from office printers and photocopiers. Environmental Science and Pollution Research.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2534318

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	ND- 11 ug/m3
Number of Samples:	7
Number of Sites:	1
Type of Measurement or Method:	Short term
Worker Activity:	Testing printer VOC production
Type of Sampling:	Area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and in peer reviewed journal article, assumed to be acceptable
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU (OECD)
	Metric 3:	Applicability	Unacceptable	× 2	8	Data taken inside test chamber, not expected to be representative of occupational exposures
	Metric 4:	Temporal Representativeness	High	× 2	2	2015, 3 years old
	Metric 5:	Sample Size	Medium	× 1	2	Range, mean, and STD given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only sample type given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.4.

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Source Citation:	Kowalska, J.,SzewczyÅska, M.,PoÅniak, M.. 2014. Measurements of chlorinated volatile organic compounds emitted from office printers and photocopiers. Environmental Science and Pollution Research.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2534318

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Fleming, D. A.,Woskie, S. R.,Jones, J. H.,Silver, S. R.,Luo, L.,Bertke, S. J.. 2014. Retrospective Assessment of Exposure to Chemicals for a Microelectronics and Business Machine Manufacturing Facility. Journal of Occupational and Environmental Hygiene.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	2128566

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Number of Sites:	1
Worker Activity:	Etch and strip resist circuit board
Number of Workers:	5,028

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Peer-reviewed article, using data not from a frequently used source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Low	× 2	6	Completed in 2013, but uses data that is over 20 years old.
	Metric 5:	Sample Size	N/A		N/A	N/A - qualitative information only
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Sources clearly documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Strelec, F.. 2012. Trichloroethylene Overexposure in an Automotive Stamping Facility. Journal of Occupational and Environmental Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2128379

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	140 ppm TWA342.5 -832.5 ppm ceiling
Number of Sites:	1
Type of Measurement or Method:	TWA, short term
Worker Activity:	Degreasing
Type of Sampling:	Personal
Sampling Location:	degreaser operator
Exposure Duration:	8 hour
Analytic Method:	OSHA 1001

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OSHA 1001
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2012, 6 years old
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method

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Source Citation:	Strelec, F.. 2012. Trichloroethylene Overexposure in an Automotive Stamping Facility. Journal of Occupational and Environmental Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2128379

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Rastkari, N.,Yunesian, M.,Ahmadkhaniha, R.. 2011. Exposure Assessment to Trichloroethylene and Perchloroethylene for Workers in the Dry Cleaning Industry. Bulletin of Environmental Contamination and Toxicology.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2128295

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	0.98 - 2.40 mg/m3
Number of Samples:	40
Worker Activity:	Dry-cleaning
Type of Sampling:	Personal
Sampling Location:	operator

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and published Journal Article; therefore, method assumed to be acceptable
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Iran (non-OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2011, 7 years old
	Metric 5:	Sample Size	Medium	× 1	2	Mean and STD given but no discrete data
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Sample type given, but no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Crandall, M. S.,Albrecht, W. N.. 1989. Health Hazard Evaluation Report No. HETA-86-380-1957, York International Corporation, Madisonville, Kentucky.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2072185

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	31.1 - 38.4 ppm
Number of Samples:	33
Number of Sites:	1
Type of Measurement or Method:	Full Shift
Worker Activity:	Metal Degreasing
Number of Workers:	40
Type of Sampling:	Personal
Analytic Method:	NIOSH Method 1022

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1022
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1989) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method

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Source Citation:	Crandall, M. S.,Albrecht, W. N.. 1989. Health Hazard Evaluation Report No. HETA-86-380-1957, York International Corporation, Madisonville, Kentucky.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2072185

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Daniels, W. J.,Orris, P.,Kramkowski, R.,Almaguer, D.. 1988. Health Hazard Evaluation Report No. HETA-86-121-1923, Modern Plating Corporation, Freeport, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1877748

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	82.1 - 84.2 ppm
Number of Samples:	2
Type of Measurement or Method:	TWA
Worker Activity:	Metal Degreasing
Number of Workers:	87
Type of Sampling:	area
Analytic Method:	NIOSH Method 1003

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1003
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1988) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†			High		1.4	

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Source Citation:	Daniels, W. J.,Orris, P.,Kramkowski, R.,Almaguer, D.. 1988. Health Hazard Evaluation Report No. HETA-86-121-1923, Modern Plating Corporation, Freeport, Illinois.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1877748

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Dodson, R. E.,Houseman, E. A.,Levy, J. I.,Spengler, J. D.,Shine, J. P.,Bennett, D. H.. 2007. Measured and modeled personal exposures to and risks from volatile organic compounds. Environmental Science and Technology.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	1067092

EXTRACTION

Parameter	Data
Life Cycle Stage:	Environment
Physical Form:	gas/vapor
Route of Exposure:	inhalation
Type of Measurement or Method:	Estimation Model
Worker Activity:	Modeling ambient exposure to VOCs

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Model appears to based on sound approaches and is in peer reviewed journal, assumed to be of acceptable quality
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Relates to general ambient exposure to VOCs (not in scope)
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2007, 11 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Transparent and well presented. Well documented.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Briefly discussed variations in the data.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.1.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Teschke, K.,Ahrens, W.,Andersen, A.,Boffetta, P.,Fincham, S.,Finkelstein, M.,Henneberger, P.,Kauppinen, T.,Kogevinas, M.,Korhonen, K.,Liss, G.,Liukkonnen, T.,Osvoll, P.,Savela, A.,Szadkowska-Stanczyk, I.,Westberg, H.,Widerkiewicz, K.. 1999. Occupational exposure to chemical and biological agents in the nonproduction departments of pulp, paper, and paper product mills: an international study. American Industrial Hygiene Association Journal.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1022908

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Exposure Concentration (Unit):	0 - 1006 (no units)
Number of Samples:	10
Number of Sites:	4
Type of Measurement or Method:	Short term

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not described
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US, Canada, and EU
	Metric 3:	Applicability	Medium	× 2	4	Use of TCE in workplace not clear
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1999, 19 years old
	Metric 5:	Sample Size	Medium	× 1	2	Mean, median, and range given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Chiang, H. L.,Lin, W. H.,Lai, J. S.,Wang, W. C.. 2010. Inhalation risk assessment of exposure to the selected volatile organic compounds (VOCs) emitted from the facilities of a steel plant. Journal of Environmental Science and Health, Part A: Toxic/ Hazardous Substances and Environmental Engineering.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	832709

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Route of Exposure:	inhalation
Exposure Concentration (Unit):	0 - 246 ppb
Number of Samples:	72
Type of Measurement or Method:	Long-term
Worker Activity:	Steel Production
Type of Sampling:	Area
Sampling Location:	Various areas of the steel plant
Analytic Method:	U.S. EPA Method TO-14

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Method described and stated to be certified by EPA Method TO-14
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Taiwan (non-OECD)
	Metric 3:	Applicability	Medium	× 2	4	Use of TCE in workplace not clear
	Metric 4:	Temporal Representativeness	High	× 2	2	2010, 8 years old
	Metric 5:	Sample Size	Medium	× 1	2	mean and 10th, 50th, and 90th percentile given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		1.9	

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Source Citation:	Chiang, H. L.,Lin, W. H.,Lai, J. S.,Wang, W. C.. 2010. Inhalation risk assessment of exposure to the selected volatile organic compounds (VOCs) emitted from the facilities of a steel plant. Journal of Environmental Science and Health, Part A: Toxic/ Hazardous Substances and Environmental Engineering.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	832709

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hsieh, L. L.,Chang, C. C.,Sree, U.,Lo, J. G.. 2006. Determination of volatile organic compounds in indoor air of buildings in nuclear power plants, Taiwan. Water, Air, and Soil Pollution.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	824990

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	gas/vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	Average: 212.9 ppb
Number of Sites:	4
Type of Sampling:	Area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described but unclear if it is equivalent to NIOSH/ OSHA
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Taiwan (non-OECD)
	Metric 3:	Applicability	Medium	× 2	4	Use of TCE in workplace not clear
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2005, 13 years old (after PEL)
	Metric 5:	Sample Size	Medium	× 1	2	Average and STD given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.4.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Xu, X.,Yang, R.,Wu, N.,Zhong, P.,Ke, Y.,Zhou, L.,Yuan, J.,Li, G.,Huang, H.,Wu, B.. 2009. Severe hypersensitivity dermatitis and liver dysfunction induced by occupational exposure to trichloroethylene. Industrial Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	730058

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	18 - 683 mg/m3
Number of Samples:	60-80
Number of Sites:	21
Type of Measurement or Method:	TWA
Worker Activity:	general factory worker - not detailed activity given.
Number of Workers:	21
Type of Sampling:	Area
Exposure Duration:	5-90 days

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and peer reviewed journal, assumed to use acceptable method
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	China (non-OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2009, 9 years old
	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed

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Source Citation:	Xu, X.,Yang, R.,Wu, N.,Zhong, P.,Ke, Y.,Zhou, L.,Yuan, J.,Li, G.,Huang, H.,Wu, B.. 2009. Severe hypersensitivity dermatitis and liver dysfunction induced by occupational exposure to trichloroethylene. Industrial Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	730058

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hein, M. J.,Waters, M. A.,Ruder, A. M.,Stenzel, M. R.,Blair, A.,Stewart, P. A.. 2010. Statistical modeling of occupational chlorinated solvent exposures for case-control studies using a literature-based database. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Published Models for Exposures or Releases;
Hero ID	729521

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation
Number of Samples:	484
Type of Measurement or Method:	short term, long term
Worker Activity:	Variety of industries

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Peer reviewed article authored by employees of the CDC, National Cancer Institute, et al. Published in an Occupational Hygiene journal.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Model predicts exposures for non-specific work scenario, not applicable to any specific condition of use for TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2010, 8 years old
	Metric 5:	Sample Size	N/A		N/A	N/A - modeled exposures
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Transparent and well presented. Well documented.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.0.

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Source Citation:	Hein, M. J.,Waters, M. A.,Ruder, A. M.,Stenzel, M. R.,Blair, A.,Stewart, P. A.. 2010. Statistical modeling of occupational chlorinated solvent exposures for case-control studies using a literature-based database. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Published Models for Exposures or Releases;
Hero ID	729521

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Kamijima, M.,Wang, H.,Huang, H.,Li, L.,Shibata, E.,Lin, B.,Sakai, K.,Liu, H.,Tsuchiyama, F.,Chen, J.,Okamura, A.,Huang, X.,Hisanaga, N.,Huang, Z.,Ito, Y.,Takeuchi, Y.,Nakajima, T.. 2008. Trichloroethylene causes generalized hypersensitivity skin disorders complicated by hepatitis. Journal of Occupational Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	729431

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	2.1-2330 mg/m3
Number of Sites:	4
Type of Measurement or Method:	TWA
Type of Sampling:	Personal, area
Sampling Location:	on worker and at site where he spends the most of his time.
Exposure Duration:	8-12 h
Exposure Frequency:	6 day/week

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described and in peer reviewed journal article, assumed to be acceptable
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	China (non-OECD)
	Metric 3:	Applicability	High	× 2	2	Multiple sites that utilize TCE in the workplace.
	Metric 4:	Temporal Representativeness	Medium	× 2	4	source from 2008, but data collected in 2002-2003 (older than 10 years but after PEL)
	Metric 5:	Sample Size	Medium	× 1	2	Range, mean, and STD given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed

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Source Citation:	Kamijima, M.,Wang, H.,Huang, H.,Li, L.,Shibata, E.,Lin, B.,Sakai, K.,Liu, H.,Tsuchiyama, F.,Chen, J.,Okamura, A.,Huang, X.,Hisanaga, N.,Huang, Z.,Ito, Y.,Takeuchi, Y.,Nakajima, T.. 2008. Trichloroethylene causes generalized hypersensitivity skin disorders complicated by hepatitis. Journal of Occupational Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	729431

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		2.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Fevotte, J.,Charbotel, B.,Muller-BeautÃ©, P.,Martin, J. L.,Hours, M.,Bergeret, A.. 2006. Case-control study on renal cell cancer and occupational exposure to trichloroethylene. Part I: Exposure assessment. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	729415

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Estimated 0-100+ ppm
Number of Sites:	750
Worker Activity:	Degreasing
Number of Workers:	12000

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	UK study (OECD)
	Metric 3:	Applicability	High	× 2	2	Multiple sites that utilize TCE in the workplace.
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Report from 2005, but cites older data (all after PEL)
	Metric 5:	Sample Size	Low	× 1	3	Some ranges given, but some values with unknown statistics given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

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Source Citation:	Fevotte, J.,Charbotel, B.,Muller-BeautÃ©, P.,Martin, J. L.,Hours, M.,Bergeret, A.. 2006. Case-control study on renal cell cancer and occupational exposure to trichloroethylene. Part I: Exposure assessment. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	729415

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Iavicoli, I.,Marinaccio, A.,Carelli, G.. 2005. Effects of occupational trichloroethylene exposure on cytokine levels in workers. Journal of Occupational and Environmental Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	700401

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	Mean of 30.75 - 36.50 mg/m3
Number of Samples:	24
Number of Sites:	1
Worker Activity:	Degreasing
Number of Workers:	105
Type of Sampling:	Personal
Analytic Method:	NIOSH Method 1022

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1022
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2005, 13 years old (after PEL)
	Metric 5:	Sample Size	Medium	× 1	2	Mean and STD given but no discrete data
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality Determination†			High		1.6	

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Source Citation:	Iavicoli, I.,Marinaccio, A.,Carelli, G.. 2005. Effects of occupational trichloroethylene exposure on cytokine levels in workers. Journal of Occupational and Environmental Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	700401

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Bakke, B.,Stewart, P.,Waters, M.. 2007. Uses of and exposure to trichloroethylene in U.S. industry: A systematic literature review. Journal of Occupational and Environmental Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	699224

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Range of 0 ppm - 637 ppm
Number of Samples:	1700+
Number of Sites:	Many
Type of Measurement or Method:	short term, long term
Worker Activity:	Many
Type of Sampling:	Personal, area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Data pulled from MEDLINE, TOXLINE, NIOSHTIC, the NIOSHHealth Hazard Evaluation database and co-written by NIOSH for the Journal of Occupational and Environmental Hygiene
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2007, 11 years old (after PEL)
	Metric 5:	Sample Size	Medium	× 1	2	Range, arthimetic mean, geometric mean, and geometric STD given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	Well addressed.

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Source Citation:	Bakke, B.,Stewart, P.,Waters, M.. 2007. Uses of and exposure to trichloroethylene in U.S. industry: A systematic literature review. Journal of Occupational and Environmental Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	699224

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Jiun-Horng, T.,Kuo-Hsiung, L.,Chih-Yu, C.,Nina, L.,Sen-Yi, M.,Hung-Lung, C.. 2008. Volatile organic compound constituents from an integrated iron and steel facility. Journal of Hazardous Materials.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	609426

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	104-427 ppbv
Number of Samples:	15
Number of Sites:	1
Type of Measurement or Method:	short term
Worker Activity:	coke making, sintering, hot forming, and cold forming
Type of Sampling:	area
Analytic Method:	US EPA Method 18

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Uesed Method certified by US EPA Method TO-14
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Taiwan (non-OECD)
	Metric 3:	Applicability	Medium	× 2	4	Use of TCE in workplace not clear
	Metric 4:	Temporal Representativeness	High	× 2	2	2008, less than 10 years old
	Metric 5:	Sample Size	Medium	× 1	2	Average and STD given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Only sample type given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.0	

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Source Citation:	Jiun-Horng, T.,Kuo-Hsiung, L.,Chih-Yu, C.,Nina, L.,Sen-Yi, M.,Hung-Lung, C.. 2008. Volatile organic compound constituents from an integrated iron and steel facility. Journal of Hazardous Materials.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	609426

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Pantucharoensri, S.,Boontee, P.,Likhitsan, P.,Padungtod, C.,Prasartsansoui, S.. 2004. Generalized eruption accompanied by hepatitis in two Thai metal cleaners exposed to trichloroethylene. Industrial Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	707342

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	3.08 - 40 ppm
Number of Samples:	11
Number of Sites:	1
Type of Measurement or Method:	short term
Worker Activity:	degreasing/cleaning metal
Number of Workers:	130
Type of Sampling:	Area, Personal
PPE:	cloth gloves, cloth dust mask

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described, in peer review journal assumed to use acceptable methods
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Thailand (non-OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2004, 14 years old (after PEL)
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed

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Source Citation:	Pantucharoensri, S.,Boontee, P.,Likhitsan, P.,Padungtod, C.,Prasartsansoui, S.. 2004. Generalized eruption accompanied by hepatitis in two Thai metal cleaners exposed to trichloroethylene. Industrial Health.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	707342

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Friesen, M. C.,Locke, S. J.,Chen, Y. C.,Coble, J. B.,Stewart, P. A.,Ji, B. T.,Bassig, B.,Lu, W.,Xue, S.,Chow, W. H.,Lan, Q.,Purdue, M. P.,Rothman, N.,Vermeulen, R.. 2015. Historical occupational trichloroethylene air concentrations based on inspection measurements from shanghai, china. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2799661

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	Arithmetic mean broken out across industries:<3 - 770 mg/m3
Number of Samples:	932
Number of Sites:	70
Type of Measurement or Method:	short term
Type of Sampling:	area

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Not known (likely method described but could not be verified for all samples)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Shanghai, China (non-OECD)
	Metric 3:	Applicability	High	× 2	2	Covers multiple in scope uses
	Metric 4:	Temporal Representativeness	High	× 2	2	2015, 3 years old
	Metric 5:	Sample Size	Medium	× 1	2	Mean and STD given but no discrete data
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	Well addressed.
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Shipman, A. J.,Whim, B. P.. 1980. Occupational exposure to trichloroethylene in metal cleaning processes and to tetrachloroethylene in the drycleaning industry in the UK. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	632849

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	0-100 ppm99 percent < 100 ppm97 percent < 50 ppm91 percent < 30 ppm
Number of Samples:	212
Number of Sites:	25
Type of Measurement or Method:	time weighted average
Worker Activity:	Metal Cleaning
Type of Sampling:	personal

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described, in peer review journal assumed to use acceptable methods
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	UK (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years (1980) but after PEL
	Metric 5:	Sample Size	Low	× 1	3	Only qualitatively described
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Medium		2.0	

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Source Citation:	Shipman, A. J.,Whim, B. P.. 1980. Occupational exposure to trichloroethylene in metal cleaning processes and to tetrachloroethylene in the drycleaning industry in the UK. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	632849

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Atsdr,. 2007. Health consultation: Evaluation of indoor air migration in building on-site and adjacent to the Omega Chemical site: Whittier, Los Angeles County, California: EPA facility ID: CAD042245001.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3978063

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Physical Form:	vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	1.7 - 270 ug/m3
Number of Samples:	60
Number of Sites:	8
Exposure Frequency:	continuous
Analytic Method:	US EPA Method TO-15 SIM

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA Method TO-15 SIM
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Ambient and building measurements not related to work scenario
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2007, 11 years old
	Metric 5:	Sample Size	Medium	× 1	2	Moderately well characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Missing sampling data, type, etc.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.6.

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Source Citation:	Atsdr,. 2007. Health consultation: Evaluation of indoor air migration in building on-site and adjacent to the Omega Chemical site: Whittier, Los Angeles County, California: EPA facility ID: CAD042245001.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3978063

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Fan, A.. 1988. Trichloroethylene: Water contamination and health risk assessment. Reviews of Environmental Contamination and Toxicology.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	701917

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	200-8,000 ppm (article page 57); below 100 ppm (pages 58 and 59)
Number of Workers:	73 workers exposed to concentrations 14-85 ppm (page 63); 2646 employees who worked in a manufacturing plant that used TCE as a degreasing agent (page 70).

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Trusted author i.e., California Dept. of Health Services
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Covers exposure to contaminated groundwater
	Metric 4:	Temporal Representativeness	Low	× 2	6	Published 1988 (approx. 30 years old).
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Transparent and well presented. Well documented.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.5.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Dobaradaran, S.,Mahvi, A. H.,Nabizadeh, R.,Mesdaghinia, A.,Naddafi, K.,Yunesian, M.,Rastkari, N.,Nazmara, S.. 2010. Hazardous Organic Compounds in Groundwater Near Tehran Automobile Industry. Bulletin of Environmental Contamination and Toxicology.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2127942

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Environment
Physical Form:	liquid
Route of Exposure:	ingestion
Exposure Concentration (Unit):	97.7-1345.7 ug/L
Number of Samples:	24
Number of Sites:	6

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Method described, in peer review journal assumed to use acceptable methods
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Iran (non-OECD)
	Metric 3:	Applicability	Unacceptable	× 2	8	Data for groundwater contamination
	Metric 4:	Temporal Representativeness	High	× 2	2	2010, 8 years old
	Metric 5:	Sample Size	Low	× 1	3	Not well characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Basic metadata present
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.7.

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Source Citation:	Dobaradaran, S.,Mahvi, A. H.,Nabizadeh, R.,Mesdaghinia, A.,Naddafi, K.,Yunesian, M.,Rastkari, N.,Nazmara, S.. 2010. Hazardous Organic Compounds in Groundwater Near Tehran Automobile Industry. Bulletin of Environmental Contamination and Toxicology.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2127942

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2014. Degreasing with TCE in commercial facilities: Protecting workers.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3045553

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Engineering Control & percent Exposure Reduction:	Closed-loop vapor degreasers/up to 98 percent emission reduction
PPE:	Solvent-resistant gloves, long sleeves, coveralls, chemical splash eye protection, full-face respirators.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Cites frequently used sources
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2014 report
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Transparent and well presented. Well documented.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2016. TSCA work plan chemical risk assessment: Peer review draft 1-bromopropane: (n-Propyl bromide) spray adhesives, dry cleaning, and degreasing uses CASRN: 106-94-5.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3355305

EXTRACTION

Parameter	**Data**

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA peer reviewed draft risk evaluation, assumed to use high quality data
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Data is for 1-BP; however, has information (worker activities, process descriptions, etc.) directly applicable to TCE occupational scenarios
	Metric 4:	Temporal Representativeness	High	× 2	2	Report from 2016
	Metric 5:	Sample Size	N/A		N/A	N/A - sample data for 1-BP not TCE
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	All data sources clearly documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	Detailed uncertainty section
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ruijten, M. W.,Verberk, M. M.,SallÃ©, H. J.. 1991. Nerve function in workers with long term exposure to trichloroethene. British Journal of Industrial Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	65298

EXTRACTION

Parameter	**Data**

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Low	× 2	6	Both pre- and post-PEL data
	Metric 5:	Sample Size	Low	× 1	3	mean given, no other statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Moderately well documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion of uncertainty or variability
Overall Quality Determination†			Medium		2.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EXTRACTION

Parameter	Data
Life Cycle Stage:	MFG
Physical Form:	liquid, vapor
Route of Exposure:	inhalation, dermal
Exposure Concentration (Unit):	Geometric mean 0.6 (ppm)Max 128 (ppm)98.5 percent sample <10 ppm
Number of Samples:	837
Number of Sites:	1
Type of Measurement or Method:	8-hr TWA
Worker Activity:	Process operators, maintenance, and overall plant employees.
Number of Workers:	75 staff + up to 60 contractors
Type of Sampling:	PBZ
Sampling Location:	Everywhere
PPE:	Wear respiratory protective equipment when doing maintenance on production lines.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Specific methods not provided for exposures. Peer-reviewed by the Scientific Committee on Toxicity, Ecotoxicity, and the Environment (CSTEE)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace occupational scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Data is from 1991, 27 years old
	Metric 5:	Sample Size	Medium	× 1	2	837 data points, well characterized with statistics but no discrete data points beyond max.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Sample type, duration, time period, and other metrics provided.

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Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†		Medium		2.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EXTRACTION

Parameter	Data
Life Cycle Stage:	Recycling
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	<1 to 9ppmmean, 2.7 ppm
Number of Samples:	unknown
Number of Sites:	1
Type of Measurement or Method:	unknown
Number of Workers:	unknown
Type of Sampling:	Area
Sampling Location:	unknown
Exposure Duration:	unknown
Exposure Frequency:	unknown
Bulk and Dust Particle Size Distribution:	unknown
Engineering Control & percent Exposure Reduction:	unknown
PPE:	unknown
Analytic Method:	MDHS 72

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Specific methods not provided for exposures. Peer-reviewed by the Scientific Committee on Toxicity, Ecotoxicity, and the Environment (CSTEE)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace occupational scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Data is from unknown time period
	Metric 5:	Sample Size	Low	× 1	3	Unknown sample size.
Domain 3: Accessibility/Clarity						

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Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 6: Metadata Completeness	Unacceptable	× 1	4	Dataset provides method but does not detail the sample type
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†		Unacceptable		4	Metric Mean Score: 2.6.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EXTRACTION

Parameter	Data
Life Cycle Stage:	Metal Cleaning -HSE inspectors
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	24 samples <30 ppm.All samples < 50 ppm
Number of Samples:	25
Number of Sites:	12
Type of Measurement or Method:	8-hr TWA
Worker Activity:	degreasing operators
Number of Workers:	unknown
Type of Sampling:	PBZ
Sampling Location:	unknown
Exposure Duration:	unknown
Exposure Frequency:	unknown
Bulk and Dust Particle Size Distribution:	unknown
Engineering Control & percent Exposure Reduction:	unknown
PPE:	unknown

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Specific methods not provided for exposures. Peer-reviewed by the Scientific Committee on Toxicity, Ecotoxicity, and the Environment (CSTEE)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace occupational scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Data is from 1984s-1994
	Metric 5:	Sample Size	Medium	× 1	2	25 data points, but does not provide a true range of data-just a percenentage of data points that are under set concentration metrics.

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Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Medium	× 1	2	Sample type and exposure type provided but other key metrics are not.
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†		Medium		2.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EXTRACTION

Parameter	Data
Life Cycle Stage:	Metal Cleaning - Industry data
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	86 percent samples <30 ppm,94 percent samples <50 ppm96 percent samples <100 ppm
Number of Samples:	306
Number of Sites:	50
Type of Measurement or Method:	8-hr TWA
Worker Activity:	degreasing operators
Number of Workers:	unknown
Type of Sampling:	PBZ
Sampling Location:	unknown
Exposure Duration:	unknown
Exposure Frequency:	unknown
Bulk and Dust Particle Size Distribution:	unknown
Engineering Control & percent Exposure Reduction:	unknown
PPE:	unknown

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Specific methods not provided for exposures. Peer-reviewed by the Scientific Committee on Toxicity, Ecotoxicity, and the Environment (CSTEE)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace occupational scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Data is from 1970s-1994
	Metric 5:	Sample Size	Medium	× 1	2	306 data points, but does not provide a true range of data-just a percenentage of data points that are under set concentration metrics.

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Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Medium	× 1	2	Sample type and exposure type provided but other key metrics are not.
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Medium	× 1	2	Limited discussion about how the range of exposure can be influenced.
Overall Quality Determination†		Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use as intermediate: manufacture of HCFC 133a and HFC 134a
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	Process Operators mean (0.2 ppm) max (11.5 ppm).Maintenance mean (0.2 ppm), max (2.7 ppm)
Number of Samples:	Process Operators: 219Maintenance Operators: 41
Number of Sites:	unknown
Type of Measurement or Method:	8-hr TWA
Worker Activity:	process and maintenace operators
Number of Workers:	unknown
Type of Sampling:	PBZ
Sampling Location:	unknown
Exposure Duration:	unknown
Exposure Frequency:	unknown
Bulk and Dust Particle Size Distribution:	unknown
Engineering Control & percent Exposure Reduction:	unknown
PPE:	unknown

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Specific methods not provided for exposures. Peer-reviewed by the Scientific Committee on Toxicity, Ecotoxicity, and the Environment (CSTEE)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace occupational scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Data is from 1991-1994
	Metric 5:	Sample Size	Medium	× 1	2	280 data points, but only provides mean and max.

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Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827429

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Medium	× 1	2	Sample type and exposure type provided but other key metrics are not.
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†		Medium		2.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Halogenated Solvents Industry Alliance, Inc.. 2018. Re: Docket no. EPA-HQ-OPPT-2016-0737. EPA-HQ-OPPT-2016-0737-0103.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5176415

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	MFG
Physical Form:	liquid, vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	BDL - 6.9 ppm
Number of Samples:	57
Number of Sites:	unknown
Type of Measurement or Method:	Task, 8-hour TWA
Worker Activity:	Manufacturing
Type of Sampling:	Personal
Exposure Duration:	8 hours

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	No method provided by the HSIA Industry organization
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that MFGs TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	Data is from 2016 (<10 years)
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed.
Overall Quality Determination†			High		1.6	

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Source Citation:	Halogenated Solvents Industry Alliance, Inc.. 2018. Re: Docket no. EPA-HQ-OPPT-2016-0737. EPA-HQ-OPPT-2016-0737-0103.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5176415

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Facility

Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	145,000,000 kg/yr

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Low	× 2	6	1992
	Metric 4:	Temporal Representativeness	Low	× 2	6	Nearly 30+ yrs old
	Metric 5:	Sample Size	Low	× 1	3	single value, no statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Cites sources for all data used.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion of uncertainty or variability
Overall Quality Determination†			Low		2.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Import
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	19,800,000 kg/yr

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Low	× 2	6	1985
	Metric 4:	Temporal Representativeness	Low	× 2	6	Over 30 yrs old
	Metric 5:	Sample Size	Low	× 1	3	single value, no statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Cites sources for all data used.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion of uncertainty or variability
Overall Quality Determination†			Low		2.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	35002

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Export
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	10,600,000 kg/yr

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Low	× 2	6	1985
	Metric 4:	Temporal Representativeness	Low	× 2	6	Over 30 yrs old
	Metric 5:	Sample Size	Low	× 1	3	single value, no statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Cites sources for all data used.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion of uncertainty or variability
Overall Quality Determination†			Low		2.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hellweg, S.,Demou, E.,Scheringer, M.,McKone, T. E.,Hungerbuhler, K.. 2005. Confronting workplace exposure to chemicals with LCA: examples of trichloroethylene and perchloroethylene in metal degreasing and dry cleaning. Environmental Science and Technology.
Type of Data Source	Facility; Published Models for Exposures or Releases;
Hero ID	88147

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Process Description:	No

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Well cited.
Domain 2: Representative						
	Metric 2:	Geographic Scope	Low	× 1	3	Unknown
	Metric 3:	Applicability	Medium	× 2	4	2005
	Metric 4:	Temporal Representativeness	Low	× 2	6	< 15 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Cites sources for all data used.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion of uncertainty or variability
Overall Quality Determination†			Low		2.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nih,. 2016. Report on carcinogens: Trichloroethylene.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982332

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture of TCE
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	2002: 330,000,000 lbs
Number of Sites:	2

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ICIS sourced data
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	TCE Producers
	Metric 4:	Temporal Representativeness	High	× 2	2	First published in 2000, but updated 2014
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Cites sources for all data used.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion of uncertainty or variability
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hsia,. 2008. Chlorinated solvents - The key to surface cleaning performance.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982144

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Process Description:	Yes
Possible Physical Form:	Liquid, Vapor

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Halogenated Solvents Industry Alliance document.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Operation that uses TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2008 - 10 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Nothing cited/documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Iarc,. 1999. IARC Monographs on the evaluation of carcinogenic risks to humans: Trichloroethylene, tetrachloroethylene, and some other chlorinated agents.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970844

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	85 percent metal cleaning, 15 percent other
Process Description:	Yes
Total Annual U.S. Volume (and percent of PV):	USA produces 150,000,000 pounds annually

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	IARC/WHO document
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Data ftom World Health Organization, includes both US and non-US, OECD countries
	Metric 3:	Applicability	High	× 2	2	information covers in scope uses
	Metric 4:	Temporal Representativeness	Low	× 2	6	Report from 2014, but cites data over 20 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Sources, methods, assumptions clearly documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Exposure scenario: Use: Trichloroethylene as an extraction solvent for removal of process oil and formation of the porous structure in polyethylene based separators used in lead-acid batteries.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970806

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Manufacture of polyethylene battery separators
Process Description:	Yes
Number of Sites:	1
Operating Days per Year and Batches per Day:	365

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Clear description of operation, procedures, etc.
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old
	Metric 5:	Sample Size	High	× 1	1	Reasonably well characterized.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Basic Metadata present.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Addressed in a general sense.
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Vlisco Netherlands, B. V.. 2014. Chemical safety report Part A: Use of trichloroethylene as a solvent for the removal and recovery of resin from dyed cloth.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970833

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Resin Extraction from Fabric
Process Description:	Yes
Number of Sites:	1
Possible Physical Form:	Liquid, vapor
Chemical Concentration:	Pure

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Reliable, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Well documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Parker Hannifin, Manufacturing. 2014. Chemical safety report: Use of trichloroethylene as a process solvent for the manufacturing of hollow fibre gas separation membranes out of polyphenylene oxide (PPO).
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970838

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Use of trichloroethylene as a process solvent for manufacturing hollow fiber gas separation memebranes out of polyphenylene oxide.
Process Description:	Yes
Total Annual U.S. Volume (and percent of PV):	20.3 tonnes TCE made in EU
Number of Sites:	1
Possible Physical Form:	Liquid, vapor

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Reliable, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2013, 5 years old.
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Moderately well documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Pubchem,. 2017. PubChem: Trichloroethylene.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970252

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture
Process Description:	Yes
Total Annual U.S. Volume (and percent of PV):	1976: 610,000,000 lbs1981: 258,182 lbs1985: 170,196,866 lbs1991: 320,000,000 lbs1992: 160,000,000 lbs
Number of Sites:	All US producers
Possible Physical Form:	Liquid, Vapor

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Pubmed source that compiles data from many other reliable sources such as EPA, NIOSH, and OSHA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Industry that makes TCE
	Metric 4:	Temporal Representativeness	Low	× 2	6	Pubmed accessed in 2017, but data is from 80's and 90's: 20-30 years old.
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Well documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/a
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Atsdr,. 2014. Draft toxicological profile for trichloroethylene.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982339

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture
Process Description:	Yes
Total Annual U.S. Volume (and percent of PV):	1960: 354,000,000 lbs1970: 612,000,000 lbs1980: 267,000,000 lbs1987: 195,000,000 lbs2005: est. 320,000,000 lbs2011: est. 270,000,000 lbs
Number of Sites:	All US producers: DOW Chemical in Freeport, TX,PPG Industries, Lake Charles, LA
Possible Physical Form:	Liquid, Vapor

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US Dept. of Health and Human Services - Agency for Toxic Substances and Disease Registry
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Industry that makes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old.
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Well documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Jordan, B. ruce C.. 1994. Memorandum: Transmittal of alternative control technology documents.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860917

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	EPA
Life Cycle Description (Subcategory of Use):	Industry Guidance on VOC reduction
Process Description:	No

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Report is on control of emissions to air from industrial wastewater. Releases to air out of scope and fate of TCE after entering industrial wastewater stream outside perview of engineers
	Metric 4:	Temporal Representativeness	Low	× 2	6	1994, 24 years old
	Metric 5:	Sample Size	Low	× 1	3	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Sources cited, but not well described or attributed to data.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.8.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Chimcomplex, S. A. Borzesti. 2014. Analysis of alternatives: Industrial use of trichloroethylene (TCE) as a solvent as a degreasing agent in closed systems.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970830

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture and use of TCE
Process Description:	Yes
Total Annual U.S. Volume (and percent of PV):	Global Consumption: 429500 tonnes

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Company that produces TCE
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Industry that makes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Primary source, but no documentation provided.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Spin,. 2017. SPIN substances in preparations in nordic countries tetrachloroethylene, Part 2.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3981134

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture of TCE
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	2014 TCE in preparationsSE: 22 tonnesNO: 17.1 tonnesDK: 1.9 tonnesFI: –

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	Methods not specified
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	SE, FI, DK, NO (OECD countries)
	Metric 3:	Applicability	High	× 2	2	in scope uses
	Metric 4:	Temporal Representativeness	High	× 2	2	2014, 4 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	No metadata given
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 1.9.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Carex, Canada. 2008. Priority environmental carcinogens for surveillance in Canada: Preliminary priority list.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978370

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Variety
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	Canada: 710 tonnes
Number of Sites:	49

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	School of Environmental Health, Department of Health Care & Epidemiology, and Department of Geography, Canada
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Canada (OECD)
	Metric 3:	Applicability	High	× 2	2	in scope uses
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2008, 10 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Sources documented, but no other metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Doherty, R. E.. 2000. A history of the production and use of carbon tetrachloride, tetrachloroethylene, trichloroethylene and 1,1,1-trichloroethane in the United States: Part 1"historical background; carbon tetrachloride and tetrachloroethylene. Environmental Forensics.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	194808

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	cleaning and degreasing solvents
Process Description:	PCE was typically manufactured as a co-product with either TCE or CTC. One of the earliest manufacturing methods was a multi-step process beginning with the chlorination of acetylene, followed by lime dehydro-chlorination and chlorination steps (Seiler, 1960). This method, which yielded TCE as a co-product, gradually became obsolete in the 1970s due to the high price of acetylene. Hooker Chemical closed down the last plant to use this process in 1978 (Kroschwitz and Howe-Grant, 1991). More recent processes include (1) the high-temperature chlorination of ethylene or 1,2-dichlor-ethane (with TCE as a co-product)...
Total Annual U.S. Volume (and percent of PV):	Includes insight into the origins of US chemical manufacturing (e.g., Military) without providing actual production totals" environmental regulations increased the use of TCE and reduced demand for related dry-cleaning and degreasing solvent (e.g., CTC). TCE also was a regulated pollutant (e.g., land dispoal treatment standards, drinking water standards).
Number of Sites:	Dow constructed a new CTC, PCE and TCE facility in Plaquemine, Louisiana between 1956 and 1958 (Chem. Eng. News, 1958)" In 1963, Pittsburgh Plate Glass announced plans to build a new PCE/TCE production facility in Lake Charles, Louisiana, to supplement the 35 million pound annual PCE output of its Barberton, Ohio facility (Chem. Eng. News, 1963c).

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
	Metric 1: Methodology	Medium	× 1	2	Peer reviewed article, uses acceptable but not frequently used sources

Continued on next page

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Source Citation:	Doherty, R. E.. 2000. A history of the production and use of carbon tetrachloride, tetrachloroethylene, trichloroethylene and 1,1,1-trichloroethane in the United States: Part 1"historical background; carbon tetrachloride and tetrachloroethylene. Environmental Forensics.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	194808

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	in scope uses
	Metric 4:	Temporal Representativeness	Low	× 2	6	Report is from 2000 (less than 20 years old) but most data cited is older than 20 years
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Sources, methods, assumptions clearly documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2017. Preliminary information on manufacturing, processing, distribution, use, and disposal: Trichloroethylene.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827394

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	TCE Manufacture and Import
Total Annual U.S. Volume (and percent of PV):	2012: 220,536,812 lbs2013: 198,987,532 lbs2014: 191,996,578 lbs2015: 171,929,400 lbs
Number of Sites:	13

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Industry that makes TCE
	Metric 4:	Temporal Representativeness	High	× 2	2	2017, 1 year old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Basic Metadata present.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	1989. Alternative control technology document – Halogenated solvent cleaners.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860356

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Process Description:	Yes, description of multiple degreasing systems
Batch Size:	Varies
Operating Days per Year and Batches per Day:	Varies
Possible Physical Form:	Liquid, vapor

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Industry that uses TCE
	Metric 4:	Temporal Representativeness	Low	× 2	6	1989, 29 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Sources are well cited. Meta data complete.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1980. Waste solvent reclamation.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3840001

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Recovery
Process Description:	Yes, description of multiple recovery processes

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	information for solvent recovery
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995, 23 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Sources, methods, assumptions clearly documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Doherty, R. E.. 2000. A history of the production and use of carbon tetrachloride, tetrachloroethylene, trichloroethylene and 1,1,1-trichloroethane in the United States: Part 2 - Trichloroethylene and 1,1,1-trichloroethane. Environmental Forensics.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	2923308

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Solvents (for cleaning and degreasing)
Total Annual U.S. Volume (and percent of PV):	approximately 115 million pounds in 1996
Number of Sites:	2

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Peer reviewed article, uses acceptable but not frequently used sources
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	in scope uses
	Metric 4:	Temporal Representativeness	Low	× 2	6	Report is from 2000 (less than 20 years old) but most data cited is older than 20 years
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Sources, methods, assumptions clearly documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Newmoa,. 2001. Pollution prevention technology profile - Closed loop vapor degreasing.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3044986

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Batch Vapor degreaser

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Northeast Waste Management Officials' Association - uses high-quality non-standard sources
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data older than 10 years but less than 20 years
	Metric 5:	Sample Size	N/A		N/A	N/A - only process description information given
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	sources clearly documented
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion of uncertainty or variability
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2015. List of lists: Consolidated list of chemicals subject to the Emergency Planning and Community Right-To-Know Act (EPCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Section 112(r) of the Clean Air Act.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3378218

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	EPA
Life Cycle Description (Subcategory of Use):	EPA List of Chemicals
Process Description:	No

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	List of chemicals subject to emergency planning, no information relevant to TCE conditions of use
	Metric 4:	Temporal Representativeness	High	× 2	2	2015, 3 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Sources cited and clearly described.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 1.9.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Dyer, M.. 2003. Field investigation into the biodegradation of TCE and BTEX at a former metal plating works. Engineering Geology.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3570965

EXTRACTION

Parameter	Data
Life Cycle Stage:	Groundwater
Life Cycle Description (Subcategory of Use):	Groundwater Study
Process Description:	No
Number of Sites:	1
Possible Physical Form:	Liquid

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal article
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	UK
	Metric 3:	Applicability	Unacceptable	× 2	8	Field work looking at biodegradation of TCE in groundwater near a closed metal plating factory. Outside scope.
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2003, 15 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Sources cited and clearly described.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.3.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1977. Control of volatile organic emissions from solvent metal cleaning.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827321

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	EPA
Life Cycle Description (Subcategory of Use):	Guidance to inspectors on VOC reduction
Process Description:	No
Possible Physical Form:	Vapor

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA document
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Old 1977 guidelines on controling VOCs from metal cleaning. Outdated, no new data
	Metric 4:	Temporal Representativeness	Low	× 2	6	1977, 42 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Sources cited, but not well described or attributed to data.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4	Metric Mean Score: 2.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3827429

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	EU: 51,000,000-225,000,000 kg

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU Chemicals Bureau peer reviewed risk assessment for TCE
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Most data from <1996
	Metric 5:	Sample Size	Medium	× 1	2	Provides a large range of possible values and is uncertain.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Cleary documented sources and reasonably articulated assumptions, but not fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusses uncertainty in overall production and importation
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3827429

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Metal Degreasing
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	EU: 63,140,000kg

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU Chemicals Bureau peer reviewed risk assessment for TCE
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Most data from <1996
	Metric 5:	Sample Size	Medium	× 1	2	Provides annual use across all of the EU
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Cleary documented sources and reasonably articulated assumptions, but not fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusses uncertainty in amount used in production.
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3827429

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Adhesives
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	EU: 6,930,000kg

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU Chemicals Bureau peer reviewed risk assessment for TCE
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Most data from <1996
	Metric 5:	Sample Size	Medium	× 1	2	Provides annual use across all of the EU
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Cleary documented sources and reasonably articulated assumptions, but not fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusses uncertainty in amount used in production.
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3827429

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Intermediate
Process Description:	No
Total Annual U.S. Volume (and percent of PV):	EU: 45,000,000 kg

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EU Chemicals Bureau peer reviewed risk assessment for TCE
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	European Study (OECD)
	Metric 3:	Applicability	High	× 2	2	Workplace scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Low	× 2	6	Most data from <1996
	Metric 5:	Sample Size	Medium	× 1	2	Provides annual use across all of the EU
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Cleary documented sources and reasonably articulated assumptions, but not fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusses uncertainty in amount used in production.
Overall Quality Determination†			Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Snedecor, G.,Hickman, J. C.,Mertens, J. A.. 2004. Chloroethylenes and chloroethanes.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3859422

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Maufacture
Life Cycle Description (Subcategory of Use):	Manufacture
Process Description:	Yes
Total Annual U.S. Volume (and percent of PV):	2004:Dow: 59,000 tonsPPG: 91,000 tons
Number of Sites:	2

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Kirk-Othmer ecyclopedia of chemical technology (frequently used source)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	USA
	Metric 3:	Applicability	High	× 2	2	Workplace scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2004 data (>10 but <20 years old)
	Metric 5:	Sample Size	High	× 1	1	Discrete data for each US production facility
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	In-text citations for all sources used and fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Not discussed
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Entek International Limited. 2014. Analysis of alternatives: Use of trichloroethylene as an extraction solvent for removal of process oil and formation of the porous structure in polyethylene based separators used in lead-acid batteries.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970832

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Battery Separators
Process Description:	Yes
Total Annual U.S. Volume (and percent of PV):	10-100 metric tons
Number of Sites:	1
Possible Physical Form:	liquid, vapor

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Data from site using TCE, assumed to have reliable process description information
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	UK based company
	Metric 3:	Applicability	High	× 2	2	Workplace scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	High	× 2	2	Data from 2014 (<10 years old)
	Metric 5:	Sample Size	High	× 1	1	All data is fully characterized
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Data provided directly from manufacturer on the facility's process.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 2002. In-depth survey report: Control of perchloroethylene exposure (PCE) in vapor degreasing operations, site #3.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3974920

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Surrogate Use
Life Cycle Description (Subcategory of Use):	OTVD
Process Description:	Yes
Number of Sites:	1
Batch Size:	255 gallon capacity

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH (frequently used source)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	USA
	Metric 3:	Applicability	High	× 2	2	Process description for directy applicable workplace scenario
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from 2002 (>10 years) that is expected to be similar to current degreasing processes.
	Metric 5:	Sample Size	Low	× 1	3	single value, no statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	NIOSH assessment that clearly describes assessment methods.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.,I. C. F. Consulting. 2004. The U.S. solvent cleaning industry and the transition to non ozone depleting substances.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982140

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Solvent cleaning
Process Description:	Yes

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA (frequently used source)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	USA
	Metric 3:	Applicability	High	× 2	2	Workplace scenario within scope of risk evaluation.
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from 2004 (>10 years) that is expected to be similar to current degreasing processes.
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Assessment clearly documents where data is coming from and is fully transparent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	National Institute for Occupational Safety and Health (NIOSH). 2002. In-depth survey report: control of perchloroethylene (PCE) in vapor degreasing operations, site #4. EPHB 256-18b.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5071453

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Surrogate Use
Life Cycle Description (Subcategory of Use):	Vacuum Degreasing
Process Description:	Yes
Number of Sites:	1
Operating Days per Year and Batches per Day:	Each batch is 20-30 minuts

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH (frequently used source)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	USA
	Metric 3:	Applicability	High	× 2	2	Process description for directy applicable workplace scenario
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from 2002 (>10 years) that is expected to be similar to current degreasing processes.
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	NIOSH assessment that clearly describes assessment methods.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	National Institute for Occupational Safety and Health (NIOSH). 2002. In-depth survey report: control of perchloroethylene (PCE) in vapor degreasing operations, site #1. EPHB 256-19b.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5071461

EXTRACTION

Parameter	Data
Life Cycle Stage:	Surrogate Use
Life Cycle Description (Subcategory of Use):	Vacuum and OTV Degreasing
Process Description:	Yes
Number of Sites:	1

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH (frequently used source)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	USA
	Metric 3:	Applicability	High	× 2	2	Process description for directy applicable workplace scenario
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Data from 2002 (>10 years) that is expected to be similar to current degreasing processes.
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	NIOSH assessment that clearly describes assessment methods.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Orris, P; Daniels, W. 1981. Health Hazard Evaluation Report 80-201-816: Peterson/Puritan Company. HE 80-201-816.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5099140

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Surrogate Use
Life Cycle Description (Subcategory of Use):	Use- packaging commercial aerosols.
Process Description:	Yes
Total Annual U.S. Volume (and percent of PV):	unknown
Number of Sites:	1

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH (frequently used source)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	USA
	Metric 3:	Applicability	High	× 2	2	Process description for directy applicable workplace scenario
	Metric 4:	Temporal Representativeness	Low	× 2	6	Data from 1980 (>20 years)
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	NIOSH assessment that clearly describes assessment methods.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.