

# 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.

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#### **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

	gan, P. J., Stein, G. F., Kominsky, J. re to trichloroethylene. Archives of	, , , ,		e, A. S.	. 1987. Common-source community and industrial
Type of Data SourceReleasHero ID65261	es to the Environment; Reports for	Data or Informa	tion Oth	er than	Exposure or Release Data;
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Use			
Release Source:		Spill/Leak			
Disposal /Treatment Met	hod:	None			
Environmental Media:		water and land	l		
Release Estimation Meth	od:	Estimate			
Daily Release Quantity (1		105007			
Annual Release Quantity	(kg/yr):	105007			
Release Days per Year:		1			
Number of Sites:		1			
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability					
Metric	1: Methodology	Medium	$\times 1$	2	peer revied article, non-standard sources
Domain 2: Representativ	2				
Metric	2: Geographic Scope	High	$\times 1$	1	US
Metric	3: Applicability	Unacceptable	$\times 2$	8	Accidental release, not in scope
Metric	4: Temporal Representativeness	Low	$\times 2$	6	1979, 39 years old
Metric	5: Sample Size	High	$\times 1$	1	Sample size is sufficiently large to be representative.
Domain 3: Accessibility/					
Metric	6: Metadata Completeness	Medium	$\times 1$	2	Time period, number of samples, and mean provided.
Domain 4: Variability an					
Metric	7: Metadata Completeness	Medium	× 1	2	Discusse potential reasons why TCE was not found in certain places.
Overall Quality Determin	$\operatorname{ation}^\dagger$	Unacceptable		4	Metric Mean Score: 2.4.
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Source Citation:	Landrigan, P. J., Stein, G. F., Kominsky, exposure to trichloroethylene. Archives			e, A. S., 1987. C	ommon-source community and industrial			
Type of Data Source	Releases to the Environment; Reports f	for Data or Inform	ation Othe	r than Exposure	or Release Data;			
Hero ID	65261							
EVALUATION								
Domain	Metric Rating MWF <sup>*</sup> Score Comments							

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		A 2001. Sources, emission and to the Environment; Environment			hylene (	TCE) and related chemicals.
EXTRACTION			_			
Parameter			Data			
Life Cycle Stage:			Use			
Release Source:			Fugitive release	es		
Disposal /Treatm	ent Method:		fugitive air			
Environmental M	edia:		air			
Release Estimatio	on Method:		TRI reporting			
Annual Release Q	uantity (kg	/yr):	6708081			
Number of Sites:			783			
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
Domain 1: Reliab	oility					
	Metric 1:	Methodology	High	$\times 1$	1	EPA source
Domain 2: Repres	sentative					
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Release data from historical (pre-2000) TRI reports, EPA ob tains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001, 17 years old
	Metric 5:	Sample Size	High	$\times 1$	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Access	sibility/Clari	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only includes release media and amount released.
Domain 4: Variab	oility and Ur	ncertainty				
		Metadata Completeness	Low	$\times 1$	3	Not addressed.
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.3.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		A 2001. Sources, emission and the Environment; Environment			nylene (	TCE) and related chemicals.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Disposal /Treatm	ent Method		Stack air			
Environmental M			air			
Release Estimatio			TRI reporting			
Annual Release Q	uantity (kg)	/yr):	6841572			
Number of Sites:			783			
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	EPA source
Domain 2: Repres	sentative					
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Release data from historical (pre-2000) TRI reports, EPA ob- tains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001, 17 years old
	Metric 5:	Sample Size	High	$\times 1$	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Access	sibility/Clari	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only includes release media and amount released.
Domain 4: Variab	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.
Overall Quality D	eterminatio	n†	Unacceptable		4	Metric Mean Score: 2.3.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	, ·	A. 2001. Sources, emission and the Environment; Environment	*		hylene (	TCE) and related chemicals.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Disposal /Treatm		:	Surface water			
Environmental M			water			
Release Estimatio			TRI reporting			
Annual Release Q	uantity (kg	/yr):	758			
Number of Sites:			783			
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	EPA source
Domain 2: Repres	sentative					
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Release data from historical (pre-2000) TRI reports, EPA ob- tains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001, 17 years old
	Metric 5:	Sample Size	High	$\times 1$	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Access	sibility/Clari	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only includes release media and amount released.
Domain 4: Variab	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.
Overall Quality D	eterminatio	n†	Unacceptable		4	Metric Mean Score: 2.3.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		A. 2001. Sources, emission and the Environment; Environment			nylene (	TCE) and related chemicals.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Disposal /Treatm	ent Method	:	Underground I	njection		
Environmental M			Underground I	njection		
Release Estimatio			TRI reporting			
Annual Release Q	$\mathbf{g}_{\mathrm{uantity}}$ (kg,	/yr):	131			
Number of Sites:			783			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	oility					
	Metric 1:	Methodology	High	$\times 1$	1	EPA source
Domain 2: Repres	sentative					
×	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Release data from historical (pre-2000) TRI reports, EPA ob- tains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001, 17 years old
	Metric 5:	Sample Size	High	$\times 1$	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Access	sibility/Clari	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only includes release media and amount released.
Domain 4: Variab	oility and Ur	ncertainty				
		Metadata Completeness	Low	$\times 1$	3	Not addressed.
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.3.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		A 2001. Sources, emission and the Environment; Environment			nylene ('	TCE) and related chemicals.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Disposal /Treatme	ent Method	:	Land			
Environmental M			Land			
Release Estimatio			TRI reporting			
Annual Release Q	uantity (kg	/yr):	2003			
Number of Sites:			783			
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	EPA source
Domain 2: Repres	sentative					
F	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Release data from historical (pre-2000) TRI reports, EPA obtains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001, 17 years old
	Metric 5:	Sample Size	High	$\times 1$	1	Data is industry-wide TRI data with $783$ facilities reporting
Domain 3: Access	sibility/Clari	itv				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only includes release media and amount released.
Domain 4: Variab	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.3.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	, ·	A. 2001. Sources, emission and the Environment; Environment	*		nylene (	TCE) and related chemicals.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Disposal /Treatm		:	POTW Transfe	er		
Environmental M			Water			
Release Estimatio			TRI reporting			
Annual Release Q	uantity (kg	/yr):	22,827			
Number of Sites:			783			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	EPA source
Domain 2: Repres	sentative					
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Release data from historical (pre-2000) TRI reports, EPA ob- tains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001, 17 years old
	Metric 5:	Sample Size	High	$\times 1$	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Access	sibility/Clari	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only includes release media and amount released.
Domain 4: Variab	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.3.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	,	A 2001. Sources, emission and the Environment; Environment	*		nylene ('	TCE) and related chemicals.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Disposal /Treatm	ent Method:		Other Transfer	s		
Release Estimatio			TRI reporting			
Annual Release Q	uantity (kg/	/yr):	19,157,999			
Number of Sites:			783			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	EPA source
Domain 2: Repres	sentative					
Domain 2. Ropro.	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Release data from historical (pre-2000) TRI reports, EPA ob- tains TRI data directly rather than from secondary sources
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001, 17 years old
	Metric 5:	Sample Size	High	$\times 1$	1	Data is industry-wide TRI data with 783 facilities reporting
Domain 3: Access	ibility/Clari	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only includes release media and amount released.
Domain 4: Variab	ility and Un	ncertainty				
		Metadata Completeness	Low	$\times 1$	3	Not addressed.
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.3.

\* MWF = Metric Weighting Factor

with L	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.						
	s to the Environment; Reports for	Data or Informa	tion Othe	er than	Exposure or Release Data;		
EXTRACTION							
Parameter		Data					
Life Cycle Stage: Release Source: Environmental Media: Release Estimation Metho Daily Release Quantity (k	Use Emissions during Use (open top and closed systems) Unknown (assume air) Estimated (note units are g/m2 metal surface area) 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	$MWF^{\star}$	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	$\times 1$	1	US source		
Metric	· ·	Unacceptable	$\times 2$	8	Life cycle analysis is out of scope using air releases to defin inhalation exposure		
Metric Metric	1 1	Medium N/A	$\times 2$	4 N/A	2005, 13 years old but the data it relies on is older. No Comment.		
Wiethe		11/11		11/11			
Domain 3: Accessibility/0 Metric	-	High	$\times 1$	1	LCA modeling approach is clear and well documented.		
Domain 4: Variability and	Uncertainty	-					
Metric		High	$\times 1$	1	Variability and uncertainty addressed in great detail.		
Overall Quality Determin	$tion^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.0.		
		Continued on nex	kt page				

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	, , ,	· ·		· · ·				
Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 88147								
Metric Rating MWF <sup>*</sup> Score Comments								
	Iellweg, S.,Demou, E.,Scheringer, M.,M. vith LCA: examples of trichloroethylene nd Technology. Releases to the Environment; Reports fo 8147	Iellweg, S.,Demou, E.,Scheringer, M.,McKone, T. E.,Hur <i>i</i> th LCA: examples of trichloroethylene and perchloroeth nd Technology. Releases to the Environment; Reports for Data or Inform. 8147	Iellweg, S.,Demou, E.,Scheringer, M.,McKone, T. E.,Hungerbuhler, <i>i</i> th LCA: examples of trichloroethylene and perchloroethylene in m nd Technology. Releases to the Environment; Reports for Data or Information Other 8147	Iellweg, S.,Demou, E.,Scheringer, M.,McKone, T. E.,Hungerbuhler, K 2005. Co vith LCA: examples of trichloroethylene and perchloroethylene in metal degreasin nd Technology. Releases to the Environment; Reports for Data or Information Other than Exposu 8147				

\* MWF = Metric Weighting Factor

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 Hero ID	Releases to the Environment; Environmental Release Data; 3982628						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use/Manufactu	ıre			
Annual Release Qu	uantity (kg	/yr):	CA Statewide:		lbs $(199)$	99)	
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliabi	lity						
	Metric 1:	Methodology	High	$\times 1$	1	Cited from CARB	
Domain 2: Repres	entative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Air releases out of scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000, 18 years old, but data is much older.	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Accessi	bility/Clari	ity					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Release data does not include needed metadata.	
Domain 4: Variabi	ility and Ur	ocertainty					
Domain 4. Vallabi		Metadata Completeness	Medium	$\times 1$	2	Limited uncertainty discussion.	
Overall Quality De	eterminatio	$\mathrm{n}^\dagger$	Unacceptable		4	Metric Mean Score: 2.5.	

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		3. TSCA work plan chemicals problem the Environment; Environment		;		
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Release Source:			Vapor degreasi	ng		
Environmental M	edia:		Air	8		
Annual Release Q	uantity (kg	/yr):	Chart from 198	88-2011:1	988: 56	5,000,000 lbs2011: 2,600,000 lbs
Number of Sites:	- 、 -,	- /	Varies			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	Low	$\times 1$	3	Data source not cited
Domain 2: Repres	entative					
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Air releases out of scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Provides data from 1998 to 2010
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of exposures across years, but no characterization within each year.
Domain 3: Access	ibility/Clari	tv				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only provides release media
Domain 4: Variab	ility and Ur	cortainty				
Domain 4. Variab		Metadata Completeness	Low	$\times 1$	3	Report does not address variability or uncertainty
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.4.

\* MWF = Metric Weighting Factor

	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; 3970823						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Release Source:			Vapor deg	greasing			
Environmental Me	dia:		Air, Wate	er, Soil			
Release or Emission	n Factor:		Air: 5.97	percent '	Water:	5 percent Soil: 5 percent	
Release Estimation	Method:		Air: based	d on the i	finding o	of the PhD thesis from Julia von Grote (2003).	
Daily Release Quar						g/dSoil: N/A	
Annual Release Qu	antity (kg	/yr):	Air: 167 l	kgWater:	200  kg	Soil: 168 kg	
Number of Sites:			9				
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliabil	itv						
	Metric 1:	Methodology	High	$\times 1$	1	Releases assessed using EU ERC model, expected to be accurate	
Domain 2: Represe	entative						
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Germany (OECD)	
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
	Metric 4:	Temporal Representativeness	High	$\times 2$	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: Accessi	bility/Clar	ity					
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Model inputs, equations, and basis not given	
Domain 4: Variabil	lity and Ur	ncertainty					
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.	
Overall Quality De	tomminatio	n†	High		1.6		

<sup>\*</sup> MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>

Type of Data Source H	Echa, 2004. Summary risk assessment report: Trichloroethylene. Releases to the Environment; Completed Exposure or Risk Assessments; 3970815						
EXTRACTION Parameter			Data				
Life Cycle Stage: Release Source: Environmental Med Release Estimation Daily Release Quan Number of Sites:	Method:	ay):	Manufacture Production Air, Water Estimation 214 Many				
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliabili N	ty Metric 1:	Methodology	High	$\times 1$	1	EU report	
Domain 2: Represer	atativo						
_	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)	
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Report is from 2004, but date of data unknown	
N	Metric 5:	Sample Size	Low	$\times 1$	3	Single value given for local, regional, and continental releases, no discussion of statistics	
Domain 3: Accessib	ility/Clari	ity					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Report does not document methods, sources, or assumptions estimate releases	
Domain 4: Variabili	Domain 4: Variability and Uncertainty						
		Metadata Completeness	Low	$\times 1$	3	Not addressed.	
Overall Quality Det	ermination	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.1.	

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		Echa, 2004. Summary risk assessment report: Trichloroethylene. Releases to the Environment; Completed Exposure or Risk Assessments; 3970815						
EXTRACTION Parameter			Data					
Life Cycle Stage: Release Source: Environmental Me Release Estimatio Daily Release Qua Number of Sites:	n Method:	ay):	Manufacture Intermediate U Air, Water Estimation 68 Many	se				
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	lity Metric 1:	Methodology	High	× 1	1	EU report		
Domain 2: Repres	entative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Report is from 2004, but date of data unknown		
	Metric 5:	Sample Size	Low	$\times 1$	3	Single value given for local, regional, and continental releases, no discussion of statistics		
Domain 3: Access	ibility/Clari	ity						
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Report does not document methods, sources, or assumptions estimate releases $% \left( {{{\left( {{{\left( {{{\left( {{{\left( {{{\left( {{{\left( {{{c}}}} \right)}} \right.}$		
Domain 4: Variab	Domain 4: Variability and Uncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.		
Overall Quality D	eterminatio	n <sup>†</sup>	Unacceptable		4	Metric Mean Score: 2.1.		

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Echa, 2004. Summary risk assessment report: Trichloroethylene. Releases to the Environment; Completed Exposure or Risk Assessments; 3970815						
	3910813						
EXTRACTION Parameter			Data				
Farameter			Data				
Life Cycle Stage:			Use				
Release Source:			Handling				
Environmental Me	edia:		Air, Water				
Release Estimatio	n Method:		Estimation				
Daily Release Qua	antity (kg/d	ay):	627				
Number of Sites:			Many				
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliab	:1:+						
Domain 1. Renab	Metric 1:	Methodology	High	$\times 1$	1	EU report	
Domain 2: Repres							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)	
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Report is from 2004, but date of data unknown	
	Metric 5:	Sample Size	Low	$\times 1$	3	Single value given for local, regional, and continental releases, no discussion of statistics	
Domain 3: Access	ibility/Clar	itv					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Report does not document methods, sources, or assumptions estimate releases	
Domain 4: Variab	Domain 4: Variability and Uncertainty						
		Metadata Completeness	Low	$\times 1$	3	Not addressed.	
Overall Quality Determination <sup>†</sup>			Unacceptable		4	Metric Mean Score: 2.1.	

\* MWF = Metric Weighting Factor

Type of Data Source H	Type of Data Source Releases to the Environment; Completed Exposure or Risk Assessments;						
EXTRACTION Parameter			Data				
Life Cycle Stage: Release Source: Environmental Media: Release Estimation Method: Daily Release Quantity (kg/day): Number of Sites:			Use Metal Degreasi Air, Water Estimation 98083 Many	ng			
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliabili N	ty Metric 1:	Methodology	High	$\times 1$	1	EU report	
Domain 2: Represen	ntativo						
_	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)	
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
Ν	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Report is from 2004, but date of data unknown	
Ν	Metric 5:	Sample Size	Low	$\times 1$	3	Single value given for local, regional, and continental releases, no discussion of statistics	
Domain 3: Accessib	ility/Clari	ty					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Report does not document methods, sources, or assumptions estimate releases	
Domain 4: Variabili	Domain 4: Variability and Uncertainty						
1	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.	
Overall Quality Determination <sup>†</sup>			Unacceptable		4	Metric Mean Score: 2.1.	

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		Echa, 2004. Summary risk assessment report: Trichloroethylene. Releases to the Environment; Completed Exposure or Risk Assessments; 3970815						
EXTRACTION Parameter			Data					
Life Cycle Stage: Release Source: Environmental Me Release Estimatio Daily Release Qua Number of Sites:	n Method:	ay):	Use Adhesives Forr Air, Water Estimation 406 Many	nulation				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EU report		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Report is from 2004, but date of data unknown		
	Metric 5:	Sample Size	Low	$\times 1$	3	Single value given for local, regional, and continental releases, no discussion of statistics		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Report does not document methods, sources, or assumptions estimate releases		
Domain 4: Variab	Domain 4: Variability and Uncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.		
Overall Quality D	eterminatio	n†	Unacceptable		4	Metric Mean Score: 2.1.		

\* MWF = Metric Weighting Factor

Type of Data Source	Data Source Releases to the Environment; Completed Exposure or Risk Assessments;						
EXTRACTION Parameter			Data				
			Data				
Life Cycle Stage:			Use				
Release Source:			Adhesives Use				
Environmental Med	dia:		Air, Water				
Release Estimation	Method:		Estimation				
Daily Release Quar	ntity (kg/d	ay):	17088				
Number of Sites:			Many				
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domoin 1, Doliobil	:						
Domain 1: Reliabil	Metric 1:	Methodology	High	$\times 1$	1	EU report	
Domain 2: Represe					0		
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)	
	Metric 3:	Applicability	High Madiana	$\times 2$	2	Workplace that utilizes TCE	
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	Medium Low	$\times 2 \times 1$	$\frac{4}{3}$	Report is from 2004, but date of data unknown Single value given for local, regional, and continental releases,	
	Metric 5:	Sample Size	LOW	× 1	ა	no discussion of statistics	
Domain 3: Accessit	oility/Clari	itv					
	Metric 6:	-	Unacceptable	$\times 1$	4	Report does not document methods, sources, or assumptions estimate releases	
Domain 4: Variabil	Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.	
Overall Quality De	terminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.1.	

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		Echa, 2004. Summary risk assessment report: Trichloroethylene. Releases to the Environment; Completed Exposure or Risk Assessments; 3970815						
EXTRACTION Parameter			Data					
Life Cycle Stage: Release Source: Environmental Media: Release Estimation Method: Daily Release Quantity (kg/day): Number of Sites:			Use Consumer Product Formulation Air, Water Estimation 285 Many					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EU report		
Domain 2: Repres	sentative							
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Report is from 2004, but date of data unknown		
	Metric 5:	Sample Size	Low	$\times 1$	3	Single value given for local, regional, and continental releases, no discussion of statistics		
Domain 3: Access	- /	-						
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Report does not document methods, sources, or assumptions estimate releases		
Domain 4: Variab	ility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.1.		

\* MWF = Metric Weighting Factor

Type of Data Source F	e of Data Source Releases to the Environment; Completed Exposure or Risk Assessments;						
EXTRACTION Parameter			Data				
Life Cycle Stage: Release Source: Environmental Med Release Estimation Daily Release Quan Number of Sites:	Method:	ay):	Use Consumer Use Air, Water Estimation 10523 Many				
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliabili N	ty Metric 1:	Methodology	High	× 1	1	EU report	
Domain 2: Represen	atativo						
_	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)	
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
Ν	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Report is from 2004, but date of data unknown	
Ν	Metric 5:	Sample Size	Low	$\times 1$	3	Single value given for local, regional, and continental releases, no discussion of statistics	
Domain 3: Accessib	ility/Clari	ty					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Report does not document methods, sources, or assumptions estimate releases	
Domain 4: Variabili	Domain 4: Variability and Uncertainty						
		Metadata Completeness	Low	$\times 1$	3	Not addressed.	
Overall Quality Det	ermination	n†	Unacceptable		4	Metric Mean Score: 2.1.	

\* MWF = Metric Weighting Factor

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 Hero ID		Releases to the Environment; Environmental Release Data; 3970806						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Release Source:			Carbon b			ack, oil coalescing filter discharge stacks, dust		
Environmental Me	dia:		Air, Wate		any pot	ential fugitive sources.		
Release or Emissio			/		Water:	0.0000031 percent Soil: 0 percent		
Release Estimation			Estimatio			· ·		
Annual Release Qu		/yr):	$41,878 \mathrm{~kg}$	/yr with	potenti	al to be $112,725,000 \text{ kg/yr}$ worst case scenario.		
Release Days per Y	Year:		365					
Number of Sites:			1					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliabi	lity							
	Metric 1:	Methodology	High	$\times 1$	1	Releases based on mass balance, expected to be accurate an cover all releases		
Domain 2: Represe	entative							
Domain 2. Ropros	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014, 4 years old		
	Metric 5:	Sample Size	Low	$\times 1$	3	Single value, no statistics given		
Domain 3: Accessi	bility/Clar	itv						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	All metadata given		
Domain 4: Variabi	lity and Ur	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.		
Overall Quality De	eterminatio	n <sup>†</sup>	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.</li>

	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; 3970808							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Release Source:			Various					
Environmental Me	dia:		Air					
Release or Emission			48.68 percent					
Annual Release Qu	antity (kg	/yr):	$12170~\rm kg/yr$					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliabil	itv							
	Metric 1:	Methodology	Low	$\times 1$	3	Not described (information redacted)		
Domain 2: Represe	entative							
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Air releases out of scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	No date listed, but monitoring data was taken from $2014$		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Provides one data point of an annual relase value to air fo 2014.		
Domain 3: Accessi	bility/Clar	ity						
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only provides release media		
Domain 4: Variabi	lity and Ur	ncertainty						
		Metadata Completeness	Low	$\times 1$	3	Report does not address variability or uncertainty		
Overall Quality De	terminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.6.		

\* MWF = Metric Weighting Factor

	Wu, C.,Schaum, J 2000. Exposure assessment of trichloroethylene. Environmental Health Perspectives. Releases to the Environment; Environmental Release Data; 724225							
XTRACTION Parameter		Data						
Life Cycle Stage:		Use						
Release Source: Disposal /Treatment Metho	4.	Various Fugitivo	stockoin	nologgog	, surface water releases, underground injection,			
Disposal / Heatment Metho	и.				<i>I</i> transfers			
Environmental Media:		Air, Wate		1010				
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: 130,178 681-959						
VALUATION Domain	Metric	Dating	MWF*	Coore	Comments			
Domani	Metric	Rating	IVI VV F	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Data from US EPA			
Domain 2: Representative Metric 2:	Geographic Scope	High	$\times 1$	1	US			
Metric 3:		High	$\times 2$	2	Workplace that utilizes TCE			
Metric 4:	· · ·	Low	$\times 2$	6	2000, 18 years old, but data is much older.			
Metric 5:		Medium	$\times 1$	2	Moderately well characterized			
$D_{1} = \frac{1}{2} + \frac{1}{2$								
Domain 3: Accessibility/Cla Metric 6:		Low	$\times 1$	3	Minimal Metadata present.			
Metric 0.	metadata Completeness	LOW	^ I	J	minimai metadata present.			
Domain 4: Variability and U	Incertainty							
Metric 7:	-	Low	$\times 1$	3	Not addressed.			
Overall Quality Determinati	$\mathrm{on}^{\dagger}$	Medium		2.0				

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		the Environment; Environment							
Hero ID	3026800								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Global Emissic	ns					
Environmental Me	edia:		Air	110					
Release Estimatio	n Method:		Discussed, but	not nam	ed.				
Annual Release Q	uantity (kg	/yr):	197,000 - 260,0	00 metri	c tonsD	ata broken out by region and year.			
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab			N C 11	1	0				
	Metric 1:	Methodology	Medium	$\times 1$	2	Process explained and cited.			
Domain 2: Repres	entative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Europe			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Air releases out of scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995, 23 years old			
	Metric 5:	Sample Size	High	$\times 1$	1	Provides global emissions broken down by region and year.			
Domain 3: Access	ibility/Clari	ity							
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Alludes to emisssions to air, but does not specifically state.			
Domain 4: Variab	ility and Ur	acertainty							
Domain 4. Vallab	Metric 7:		High	$\times 1$	1	Discusses uncertainty and provides a potential variance percentage of +/- $5$			
Overall Quality Determination <sup><math>\dagger</math></sup>			Unacceptable		4	Metric Mean Score: 2.7.			

\* MWF = Metric Weighting Factor

Type of Data Source	U.S, E. P. A. 1980. Waste solvent reclamation. Releases to the Environment; Environmental Release Data; 3840001						
EXTRACTION Parameter			Data				
Life Cycle Stage: Release Source: Disposal /Treatment Method: Environmental Media: Release or Emission Factor: Release Days per Year: Waste Treatment Method: P2 Control & percent Efficiency:			Waste Solvent Reclamation Fugitive, process, storage distillation, purification Air, water Many sources in process cited. Example:Storage tank vent: 0.01 kg/ MgFugitive Emissions: 0.46 kg/Mg Continuous Recycling and recovery 40-99 percent recovery				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliabil	ity Metric 1:	Methodology	Medium	× 1	2	Well cited, well detailed, but looks to be extracted from a bool or manual with no attributes/citation.	
	entative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 6 3	No Comment. Recycling process for solvents such as TCE. Unknown N/a	
Domain 3: Accessil	bility/Clari Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Complete metadata	
Domain 4: Variabil	lity and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	No Comment.	
Overall Quality Determination <sup><math>\dagger</math></sup>		Medium		2.1			

Source Citation: Type of Data Source Hero ID	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION Parameter			Data				
Life Cycle Stage: Release Source:			Use/Manufacto Many	ure			
EVALUATION							
Domain		Metric	Rating	$MWF^*$	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	High	$\times 1$	1	US EPA Envirofacts	
Domain 2: Repres	entative						
Domain 2. Ropros	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Releases of TCE from facilities that use TCE	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Spans multiple years, majority coming from 2008 or more recent.	
	Metric 5:	Sample Size	High	$\times 1$	1	site-specific releases given	
Domain 3: Access	ibility/Clar	ity					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	No metadata given, including media of release	
Demain 4. W. 1	:1:41 TT	<b>t</b> - <b>t</b>					
Domain 4: Variab		Metadata Completeness	Low	$\times 1$	3	Not addressed.	
Overall Quality D	eterminatio	n†	Unacceptable		4	Metric Mean Score: 1.6.	

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 1995. Environmental research brief: Pollution prevention assessment for a manufacturer of locking devices. Releases to the Environment; Environmental Release Data; 3970197						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Waste so	lvent			
Disposal /Treatme			Shipped of	offsite for	disposa	al	
Annual Release Q		/yr):	28700  lb/	/yr			
Release Days per	Year:		1				
Number of Sites:			1				
Waste Treatment	Method:		Offsite di	sposal			
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	High	$\times 1$	1	US EPA	
Domain 2: Repres	entative						
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Waste releases from a degreaser using TCE	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995, 23 years old	
	Metric 5:	Sample Size	Low	$\times 1$	3	No Comment.	
Domain 3: Access	ibility/Clari	ity					
	Metric 6:	Metadata Completeness	Low	× 1	3	Does not include citations	
Domain 4: Variab	ility and Ur	ncertainty					
	Metric 7:	Metadata Completeness	Low	× 1	3	No Comment.	
Overall Quality D	eterminatio	n†	Medium		2.1		

<sup>\*</sup> MWF = Metric Weighting Factor
 <sup>†</sup> 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.</li>

Type of Data Source Relea	2014. Exposure assessment: Trichloroethylene. Releases to the Environment; Environmental Release Data; 3970837								
EXTRACTION Parameter			Data						
Life Cycle Stage: Release Source: Disposal /Treatment Method: Environmental Media: Release or Emission Factor: Daily Release Quantity (kg/day): Annual Release Quantity (kg/yr): Release Days per Year: Number of Sites:				Use Fugitive emissions ambient air, water air, water Water: 0.01 percent Air: 60 percent Water: 0.002 kg/dayAir: 12 kg/day Water: 0.3 kg/yrair: 1800 kg/yr 180 1					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Metri	: 1:	Methodology	Low	× 1	3	Unknown author, reads as if it is written by a manufacturer about their own process.			
Domain 2: Representatir Metri Metri Metri Metri	2: 3: 4:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High High Medium	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	2 2 2 2	EU Facility using small amounts of TCE in pharmaceutical pro ductions. 2014, 4 years old No Comment.			
Domain 3: Accessibility, Metri	Clar	*	Medium	× 1	2	Includes most metadata			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	× 1	3	No Comment.				
Overall Quality Determination <sup><math>\dagger</math></sup>			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.</li>

	2014. Exposure assessment: Trichloroethylene, Part 3. Releases to the Environment; Environmental Release Data; 3970842							
EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Use						
Release Source:		Fugitive e	missions					
Disposal /Treatment Method	:	ambient a						
Environmental Media:		air, water						
Release or Emission Factor:		Air: 4.38						
Daily Release Quantity (kg/d	av):	Air 157.7						
Annual Release Quantity (kg		Air: 1752						
Release Days per Year:				@ 4 day	ys per batch			
Number of Sites:		1		·				
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	Low	$\times 1$	3	Unknown author, reads as if it is written by a manufacturer about their own process.			
Domain 2: Representative								
Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU			
Metric 3:	Applicability	High	$\times 2$	2	Facility using TCE in the synthesis of vulcanization accelerat ing agents.			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014, 4 years old			
Metric 5:	Sample Size	Medium	$\times 1$	2	No Comment.			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Includes most metadata			
	^							
Domain 4: Variability and Ur								
Metric 7:	Metadata Completeness	Low	$\times 1$	3	No Comment.			
Overall Quality Determination <sup><math>\dagger</math></sup>				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.</li>

Source Citation: Type of Data Source Hero ID		Japanese Ministry of, Environment. 2004. Manual for PRTR release estimation models: Part II materials. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3986511						
EXTRACTION Parameter			Data					
Life Cycle Stage: Release Source: Environmental M Release or Emissio	Use/Manufacture Manufacture, storage, solvent use, cleaning Atmosphere Manufacture: 0.001 kg/tStorage: 0.23 kg/tSolvent: 979 kg/tCleaning: 838 kg/t							
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	not specified		
Domain 2: Repres	sentative							
-	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Air releases out of scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1996, 22 years old		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clari	ity						
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Unclear how the given data source is utilized or found.		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	Report does not address variability or uncertainty		
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 3.1.		

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		2014. Toxic release inventory: Trichloroethylene. Releases to the Environment; Environmental Release Data; 3860483								
EXTRACTION Parameter			Data							
Life Cycle Stage: Release Source: Disposal /Treatment Method: Environmental Media: Annual Release Quantity (kg/yr):			Use/Manufacture Landfill, Fugitive and Point Source Emissions, Surface Water, and Other Landfill, other Air, Water, Ground Landfill: 16,697 lbsFugitive Emissions: 1,202,177 lbsPoint Source Emis- sions: 779,765 lbs Surface Water: 14,406 lbsOther: 24,205 lbs							
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	EPA				
Domain 2: Repre	sentative									
	Metric 2: Metric 3:	Geographic Scope Applicability	High Medium	$\times 1 \times 2$	$\frac{1}{4}$	US Industry that works with TCE, but is focused on industry - wide big picture.				
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	High Low	$\times 2 \times 1$	$\frac{2}{3}$	2016, 2 years old Not well characterized				
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	No Comment.				
Domain 4: Variab			Low	× 1	3	No Comment.				
Overall Quality E	$\begin{array}{c} \text{Metric } i. \\ \text{Overall Quality Determination}^{\dagger} \end{array}$				1.9					
Source Citation:	area, conta	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.								
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Type of Data Source Hero ID	Releases to 2129107	b the Environment; Reports for	Data or Informa	tion Othe	er than	Exposure or Release Data;				
EXTRACTION Parameter			Data							
Life Cycle Stage: Release Source: Disposal /Treatm Environmental M	Study Post Emission Study sewer									
Environmental M	edia:		ground and gro	oundwate	er					
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	USGS				
Domain 2: Repres	sentative									
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Report details attempt to find the source of a contamination plume, Does not contain applicable occupational scenario.				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	sibility/Clar	itv								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Study is well documented and process is explained.				
Domain 4: Variab	vility and Ur	ocertainty								
Domain 4. Vallac		Metadata Completeness	Low	$\times 1$	3	Report does not address variability or uncertainty				
Overall Quality D	Determinatio	$\mathrm{n}^\dagger$	Unacceptable		4	Metric Mean Score: 2.0.				

\* MWF = Metric Weighting Factor

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 Hero ID	Releases to the Environment; Environmental Release Data; 2517711									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Processing							
Release Source:			R&D Facilities							
Disposal /Treatm		:	stack air							
Environmental M	edia:		Atmosphere							
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Journal article				
Domain 2: Repres	sentative									
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	Unacceptable	$\times 2$	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	$\times 2$	2	2014, 4 years old				
	Metric 5:	Sample Size	Low	$\times 1$	3	Qualitative data as ratios.				
Domain 3: Access	sibility/Clari	itv								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Study is well documented and method is explained.				
Domain 4: Variab	oility and Ur	ncertainty								
		Metadata Completeness	Low	$\times 1$	3	Report does not address variability or uncertainty				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.1.				

\* MWF = Metric Weighting Factor

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 Hero ID		b the Environment; Environment			1					
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Release							
Release Source:				owned tre	eatment	works (POTW)				
Disposal /Treatme	ent Method	:		erated gr	it cham	ber, primary clarifier, anaerobic tank, anterior				
Environmental Me	edia.		Air, wate	,	iy claii.	lier				
Release or Emissio			/		ınd dur	ing treatment:0.55 ug/m3 air1.5 mg/L water				
						G G, G,				
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliab	:1:+									
Domain 1. Kenab	Metric 1:	Methodology	High	$\times 1$	1	Journal article				
Domain 2: Repres	entative									
Domain 2. Repres	Metric 2:	Geographic Scope	Low	$\times 1$	3	China				
	Metric 3:	Applicability	Low	$\times 2$	6	Unknown occupational scenario, but potentially useful release data.				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017				
	Metric 5:	Sample Size	High	$\times 1$	1	Samples fully characterized and taken in multiple seasons.				
Domain 3: Access	ibility/Clar	i+.,								
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Samples fully characterized and taken in multiple seasons.				
Demain 4. W. i. l	:1:41 TT									
Domain 4: Variab		5	Medium	× 1	0	Thursday 1 works 1 (1) 14 works and				
	Metric 7:	Metadata Completeness	Mealum	× 1	2	Limited variability discussion.				
Overall Quality D	eterminatio	$n^{\dagger}$	Medium		1.8					

\* MWF = Metric Weighting Factor

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 Hero ID		the Environment; Environment				minerior science and recently spin				
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Processing							
Release Source:			Solvent use in s	emicond	uctor, ci	rcuit chip and circuit board manufacture.				
Disposal /Treatm		:	Venting							
Environmental M			Air							
Release or Emission Factor:			Median concer March 1997	itration:4	0 PPT	V TCE in July 2000200 PPTV TCE in				
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Journal article				
Domain 2: Repres	sentative									
-	Metric 2:	Geographic Scope	Low	$\times 1$	3	Taiwan				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Air releases out of scope				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001				
	Metric 5:	Sample Size	Medium	$\times 1$	2	Many samples taken from a broad cross-section of land.				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Data not well characterized, provides qualitative descriptions				
Domain 4: Variab	ility and Ur	ncertainty								
		Metadata Completeness	Low	$\times 1$	3	Report does not address variability or uncertainty				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.6.				

\* MWF = Metric Weighting Factor

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. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 2799543								
Type of Data Source Hero ID										
EXTRACTION										
Parameter			Data							
Life Cycle Stage: Release Source: Environmental Me	edia:		Study air from WWT Air	ΓP						
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliabi	U									
	Metric 1:	Methodology	High	$\times 1$	1	Journal article				
Domain 2: Repres	entative									
•	Metric 2:	Geographic Scope	Low	$\times 1$	3	China				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Studies removal of TCE from wastewater, out of scope for engineering				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013, 5 years old				
	Metric 5:	Sample Size	Medium	$\times 1$	2	Only one site was used for the study, data collected not fully characterized				
Domain 3: Accessi	ibility/Clari	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Study is well documented and method is explained.				
Domain 4: Variabi	ility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Variability and uncertainty is not addressed.				
Overall Quality De	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.2.				

\* MWF = Metric Weighting Factor

Source Citation:	0,	Devinny, J. S., Webster, T. S., Torres, E., Basrai, S. 1995. Biofiltration for removal of PCE and TCE vapors from contaminated ir. Hazardous Waste and Hazardous Materials.								
Type of Data Source Hero ID		Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;								
EXTRACTION										
Parameter			Data							
Life Cycle Stage: Release Source: Environmental Me	edia:		Study air from WWT Air	ΈΡ						
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliabi	v									
	Metric 1:	Methodology	High	$\times 1$	1	Journal article				
Domain 2: Repres	entative									
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Studies method for removing TCE from air streams, air releases out of scope				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995, 23 years old				
	Metric 5:	Sample Size	Medium	$\times 1$	2	Study used bench scale biofilters to study				
Domain 3: Access	ibility/Clar	ity								
Domain 0. Heeess	Metric 6:	Metadata Completeness	High	$\times 1$	1	Study is well documented and method is explained.				
Domain 4. V	ilitar and II-									
Domain 4: Variab		Metadata Completeness	Medium	$\times 1$	2	Limited discussion on the variability and uncertainty in the study.				
Overall Quality D	eterminatio	$\mathbf{n}^\dagger$	Unacceptable		4	Metric Mean Score: 2.3.				

\* MWF = Metric Weighting Factor

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 Hero ID		the Environment; Environment		;						
EXTRACTION										
Parameter			Data							
Life Cycle Stage: Release Source: Disposal /Treatme				semicond	uctor, ci	ircuit chip and circuit board manufacture.				
Environmental M	edia:		Air							
Release or Emissie	on Factor:		53.8  tons/yr in	n 2009						
Number of Sites:			1428							
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Journal article				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	Low	$\times 1$	3	Korea				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Air releases out of scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014				
	Metric 5:	Sample Size	High	$\times 1$	1	Large sample size across many sites.				
Domain 3: Access	sibility/Clari	ity								
	Metric 6:	-	High	$\times 1$	1	Study is well documented and method is explained. Data sets are well characterized				
Domain 4: Variab	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Variability and uncertainty is not addressed.				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.1.				

\* MWF = Metric Weighting Factor

Source Citation:		Vhittaker, 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 Hero ID	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3488855								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Release Source:			Dry Cleaning						
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliabi	ility								
	Metric 1:	Methodology	High	$\times 1$	1	Journal article			
Domain 2: Repres	entative								
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Covers waste designations at dry cleaners, water releases no addressed, all other releases out of scope. TCE not addresse quantitatively.			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017, 1 year old			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Questionaire pulled results from a representative sample size but does not address samples in a quantitative fashion.			
Domain 3: Access	ibility/Clar	itv							
	Metric 6:	-	High	$\times 1$	1	Study is well documented and method is explained. Data set are well characterized			
Domain 4: Variab	ility and Ur	ncertainty							
		Metadata Completeness	Low	$\times 1$	3	Variability and uncertainty is not addressed.			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.0.			

\* MWF = Metric Weighting Factor

	Den, W.,Huang, C.,Li, C. H 2004. Effects of cross-substrate interaction on biotrickling filtration for the control of VOC missions. Chemosphere.								
Type of Data Source R		the Environment; Reports for	Data or Informa	tion Othe	er than	Exposure or Release Data;			
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Release Source: Environmental Media	a:		Study VOC waste air air	• emissior	ns in gas	s-phase biological processes			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliabilit	U C		TT: 1	1	1				
N	fetric 1:	Methodology	High	$\times 1$	1	Journal article			
Domain 2: Represent	tative								
Μ	fetric 2:	Geographic Scope	Low	$\times 1$	3	China			
Μ	fetric 3:	Applicability	Unacceptable	$\times 2$	8	Studies method for controlling air emissings, air releases out of scope			
Μ	fetric 4:	Temporal Representativeness	Medium	$\times 2$	4	2004, 14 years old			
Μ	fetric 5:	Sample Size	High	$\times 1$	1	Experimental results are well characterized and described.			
Domain 3: Accessibi	lity/Clari	tx							
	fetric 6:	Metadata Completeness	High	$\times 1$	1	Study is well documented and method is explained. Data sets are well characterized			
Domain 4: Variabilit	v and Un	certainty							
	0	Metadata Completeness	Low	$\times 1$	3	Variability and uncertainty is not addressed.			
Overall Quality Dete	ermination	'n†	Unacceptable		4	Metric Mean Score: 2.3.			

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Oecd, 2009. Emission scenario document on adhesive formulation. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3827299							
EXTRACTION Parameter			Data					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	OECD document		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US and others		
	Metric 3:	Applicability	High	$\times 2$	2	ESD, not specific to TCE but includes information relevant to TCE		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Less than 10 years old		
	Metric 5:	Sample Size	N/A		N/A	N/A - ESD		
Domain 3: Access	ibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	All metadata given		
Domain 4: Variab	ility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Variability addressed through different application methods, uncertainty not addressed		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.1			

Source Citation: Type of Data Source Hero ID	,	Oecd, 2009. Emission scenario documents on coating industry (paints, lacquers and varnishes). Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3827298							
EXTRACTION Parameter			Data						
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	OECD document			
Domain 2: Repres	sentative								
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US and others			
	Metric 3:	Applicability	High	$\times 2$	2	ESD, not specific to TCE but includes information relevant to TCE			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Less than 10 years old			
	Metric 5:	Sample Size	N/A		N/A	N/A - ESD			
Domain 3: Access	ibility/Clar	itv							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	All metadata given			
Domain 4: Variab	ility and Ur	acortainty							
Domain 4. Variat	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Variability addressed through different application methods, uncertainty not addressed			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.1				

Source Citation: Type of Data Source Hero ID		U.S, E. P. A. 1995. Guidance document for the halogenated solvent cleaner NESHAP. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3827323							
EXTRACTION Parameter			Data						
Life Cycle Stage: Release Source: Disposal /Treatm	EPA Guidance Document Halogenated Solvent Cleaner users For compliance with NESHAP								
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	oility								
	Metric 1:	Methodology	High	$\times 1$	1	EPA			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	NESHAP covers air emissions, air releases out of scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995, 23 years old			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Detailed data and includes test methods. Does not cite any sources, but type of docment is not expected to.			
Domain 4: Variat	oility and Ur	ncertainty							
	-	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.4.			

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Carex, Canada. 2008. Priority occupational carcinogens for surveillance in Canada: Preliminary Priority List. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3978369					
EXTRACTION Parameter			Data			
Life Cycle Stage:			Country-scale	Releases		
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	Low	$\times 1$	3	Not specified
Domain 2: Repres	sentative					
Domain 2. Ropros	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Canada (OECD)
	Metric 3:	Applicability	Medium	$\times 2$	4	country wide release
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006, 12 years old
	Metric 5:	Sample Size	Low	$\times 1$	3	Single value, no statistics given
Domain 3: Access	ibility/Clari	ity				
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	media of release not given
Domain 4: Variab	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.6.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 1977. Control of volatile organic emissions from solvent metal cleaning. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3827321					
EXTRACTION Parameter			Data			
Life Cycle Stage:			EPA Guidance	Docume	ent	
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	EPA document
Domain 2: Repres	sentative					
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Covers control of air releases, air releases out of scope
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1977, 41 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Detailed data and includes test methods. Does not cite any sources, but type of docment is not expected to.
Domain 4: Variab	vility and U	acertainty				
Domain 4. Variab		Metadata Completeness	N/A		N/A	No Comment.
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.4.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 2001. Guide to industrial assessments for pollution prevention and energy efficiency. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3827322						
EXTRACTION Parameter			Data				
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	High	$\times 1$	1	EPA document	
Domain 2: Repres							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Information for in scope uses	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	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: Access	ibility/Clar	ity					
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Results provided but underlying data sources not clearly described	
Domain 4: Variab	ility and Ur	ncertainty					
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.	
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.8		

\* MWF = Metric Weighting Factor

Type of Data Source	U.S. Environmental Protection Agency. 2011. The 2011 National Emissions Inventory. Releases to the Environment; Environmental Release Data; 5352399						
EXTRACTION Parameter			Data				
Life Cycle Stage: Release Source: Environmental Mec Release or Emission Release Days per Y P2 Control & perce	n Factor: 'ear:	ıcy:	All Provides Provides Provides Provides	media of release d annual og	release ata perating	g time.	
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliabil	ity Metric 1:	Methodology	Medium	× 1	2	Submitters provide general method used to calculate emissions, but details not provided.	
Domain 2: Represe	ntative						
-	Metric 2:	Geographic Scope	High	$\times 1$	1	NEI is U.S. based data	
	Metric 3:	Applicability	High	$\times 2$	2	NEI includes industries included in the scopes of TCE.	
	Metric 4:	Temporal Representativeness	High	$\times 2$	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 require ments; statistical representativeness is unclear.	
Domain 3: Accessil	oility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	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: Variabil		ncertainty Metadata Completeness	Low	$\times 1$	3	NEI does not address variability or uncertainty in submitter provided data.	
Overall Quality De	terminatio	$\mathbf{n}^{\dagger}$	High		1.4		

Occupational Exposure

	ion: Kilburn, K. H. 1999. Neurobehavioral and respiratory findings in jet engine repair workers: a comparison of exposed and unexposed volunteers. Environmental Research.						
	ational Exposure; Monitoring Data						
Hero ID 1576	montal Exposure, montoring Date	,					
EXTRACTION							
Parameter		Data					
Life Cycle Stage:		Use					
Route of Exposure:		Inhalation	n				
Exposure Concentration (	Unit):	4800 (mg	/m3)				
Number of Sites:		1					
Type of Measurement or I	Method:	8-hr TWA	4				
Number of Workers:		6					
Type of Sampling:		area					
EVALUATION							
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliability							
Metric	1: Methodology	Low	$\times 1$	3	Not specified		
Domain 2: Representative							
Metric		High	$\times 1$	1	US (1 site in OK)		
Metric	3: Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
Metric	4: Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1993)$ , but after PEL		
Metric	5: Sample Size	Low	$\times 1$	3	single data point given for 6 workers, unclear what the data represents (e.g., mean, median, etc.)		
Domain 3: Accessibility/O	larity						
Metric		Low	$\times 1$	3	Data indicates "area" sample but no other metadata given		
Domain 4: Variability and	Uncertainty						
Metric	-	Low	$\times 1$	3	Not addressed		
Overall Quality Determina	$ation^{\dagger}$	Medium		2.1			

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 Hero ID	Occupatio 58349	nal Exposure; Monitoring Data;					
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Physical Form:			vapor				
Route of Exposur	e:		Inhalation	1			
Exposure Concent	tration (Uni	it):	6.1-11.8 (	ppm)			
Type of Measurer	nent or Met	hod:	TWA				
Number of Worke			23 (14  me)				
Type of Sampling				breathing	g zone a	ir samples	
Exposure Duratio	n:		unknown				
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	ility						
Domain 1. Renad	Metric 1:	Methodology	Low	$\times 1$	3	Described as "diffusive sampling" but otherwise not described	
Domain 2: Repres	sentative						
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan	
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1990), but after PEL	
	Metric 5:	Sample Size	Medium	$\times 1$	2	geometric mean and standard deviation given, but range and discrete sample values not provided	
Domain 3: Access	ibility/Clar	ity					
Domain 5. Access	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Data indicates PBZ samples but other metadata not given	
		r second second			~		
Domain 4: Variab	ility and U	ncertainty					
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed with respect to exposure data	
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	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.</li>

Source Citation:	0,0,7	Nagaya, T.,Ishikawa, N.,Hata, H. 1989. Urinary total protein and "beta"-2-microglobulin in workers exposed to trichloroethy- lene. Environmental Research.						
Type of Data Source Hero ID		Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Route of Exposur	e:		Inhalation	ı				
Exposure Concent		t):	15 (ppm)					
Number of Sampl		/	104					
	Type of Sampling:			s				
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Medium	$\times 1$	2	Sources documented, but not from frequently used source		
Domain 2: Repres	sentative							
1	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan (OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Prior to 1988		
	Metric 5:	Sample Size	N/A		N/A	$\rm N/A$ - information about use of TCE in semiconductor manufacturing, no quantitative data		
Domain 3: Access	sibility/Clar	itv						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Sources clearly documented		
Domain 4: Variab	ility and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		2.0			

	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. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 65131					
Type of Data Source						
EXTRACTION Parameter			Data			
Life Cycle Stage: Exposure Concentr Number of Workers Type of Sampling:	,	t):	Use 600 ppm (1939 (1979-1983) 7282 (over 1939 Estimation	,	00 ppm	(1955-1967)200 ppm (1968-1978)0 ppm
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliabil	ity					
	Metric 1:	Methodology	Medium	$\times 1$	2	Peer-reviewed article, using data not from a frequently used source
Domain 2: Represe	entative					
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Data from 1939-1983 (older than 20 years)
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessil	hility/Clari	ity				
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Metadata associated with exposure indices used to estimate exposure not provided
Domain 4: Variabil	ity and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality De	terminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.2.

\* MWF = Metric Weighting Factor

	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. Occupational Exposure; Monitoring Data; 65261							
Type of Data Source (								
EXTRACTION Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			vapor					
Route of Exposure:			Inhalation	า				
Exposure Concentra	ation (Uni	t):	117-357 (					
Number of Sites:			1	0, - )				
Type of Measureme	ent or Met	hod:	8-hr TWA	A				
Worker Activity:		degreasing	g using o	pen-top	liquid-vapor degreader with refirgerated free-			
			board chi	ller and a	at cold	degreasers		
Number of Workers	:		at least 10					
Type of Sampling:			personal breathing zone air samples					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabili	tv							
	Metric 1:	Methodology	High	$\times 1$	1	Method described and appears to be equivalent to NIOS methods		
Domain 2: Represe	ntative							
_	Metric 2:	Geographic Scope	High	$\times 1$	1	US data		
1	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
1	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1980), but after PEL		
1	Metric 5:	Sample Size	Medium	$\times 1$	2	Range of results given, but discrete data and other statistic not given		
Domain 3: Accessib	oility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Critical metadata given but missing sample durations and exposure frequency		
Domain 4: Variabili	ity and Ur							
1	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed with respect to exposure data		
		Con	tinued on r	next page	;			

	- continued from previous page						
Source Citation:	urce 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 I	Data;					
Hero ID	65261	,					
EVALUATION							
Domain	Metric	Rating M	IWF <sup>*</sup> Score	Comments			
Overall Quality I	$\operatorname{Determination}^\dagger$	Medium	1.7				

<sup>\*</sup> MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>

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. Occupational Exposure; Monitoring Data; 65261							
Type of Data Source Hero ID								
EXTRACTION Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			vapor					
Route of Exposure	<u>.</u>		Inhalatio	n				
Exposure Concent		it):	37-144 (n					
Number of Sites:			1	0/ -/				
Type of Measurem	nent or Met	hod:	8-hr TWA	A				
Worker Activity:		degreasin	g using o	pen-top	liquid-vapor degreader with refirgerated free-			
			board chi	ller and a	at cold	degreasers		
Number of Worker			at least 10					
Type of Sampling:			personal breathing zone air samples					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabi	lity							
	Metric 1:	Methodology	High	$\times 1$	1	Method described and appears to be equivalent to NIOS methods		
Domain 2: Repres	entative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US data		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1980)$ , but after PEL		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range of results given, but discrete data and other statistic not given		
Domain 3: Accessi	ibility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Critical metadata given but missing sample durations and exposure frequency		
Domain 4: Variabi	ility and U							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed with respect to exposure data		
		Con	tinued on r	next page	:			

	_	continued from prev	vious page				
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; Monitorin	g Data;					
Hero ID	65261						
EVALUATION							
Domain	Metric	Rating M	$WF^{\star}$ Score	Comments			
Overall Quality I	$\operatorname{Determination}^\dagger$	Medium	1.7				

<sup>\*</sup> MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>

Type of Data Source (	of Data Source Occupational Exposure; Monitoring Data;							
EXTRACTION Parameter			Data					
			Data					
Life Cycle Stage:			Use					
Route of Exposure:			Inhalation	ı				
Exposure Concentra	ation (Unit	t):	1.2-5.1 (p)	pm)				
Number of Sites:			23225					
Number of Workers	:		401000					
Type of Sampling:			survey					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabili	tv							
	Metric 1:	Methodology	Low	$\times 1$	3	Unknown testing methods		
Domain 2: Represen	ntative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
ľ	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
1	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years but after PEL		
I	Metric 5:	Sample Size	Medium	$\times 1$	2	Only range provided		
Domain 3: Accessib	oility/Clari	ty						
1	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure and sample type given		
Domain 4: Variabili	ity and Un	certainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality Det	Overall Quality Determination <sup><math>\dagger</math></sup>				1.9			

<sup>\*</sup> MWF = Metric Weighting Factor
 <sup>†</sup> 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.</li>

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals. Occupational Exposure; Monitoring Data; 35002							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Route of Exposur	e:		Inhalation	1				
Exposure Concent		t):	1-100 (pp	m)				
Type of Sampling	:		survey					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	Unknown testing methods		
Domain 2: Repres	sentative							
F	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years but after PEL		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Only range provided		
Domain 3: Access	ibility/Clari	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure and sample type given		
Domain 4: Variab	ility and Ur	ocertainty						
Domain 4. Vallab	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality D	Overall Quality Determination <sup>†</sup>				1.9			

\* MWF = Metric Weighting Factor

Source Citation:	<b>o</b> ,	I. W.,Verberk, M. M.,Sallé, H ırnal of Industrial Medicine.	H. J., 1991. Nerv	ve functio	on in wo	orkers with long term exposure to trichloroethene.
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Exposure Concent	tration (Uni	t):	80 (ppm)			
Number of Sample	es:		100			
Number of Sites:			1			
Type of Sampling	:		area			
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	Low	$\times 1$	3	Not described other than sampling using gas detection tube
Domain 2: Repres	entative					
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Study from Netherlands (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Data collected prior to PEL (1966)
	Metric 5:	Sample Size	Medium	$\times 1$	2	Means given but no other statistics
Domain 3: Access	ibility/Clari	ity				
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	No metadata provided
Domain 4: Variab	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed with respect to exposure data
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.4.

\* MWF = Metric Weighting Factor

Source Citation:	<b>o</b> ,	I. W.,Verberk, M. M.,SallÃⓒ, H ırnal of Industrial Medicine.	I. J 1991. Nerv	ve functio	on in wo	orkers with long term exposure to trichloroethene.
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Exposure Concent	ration (Uni	t):	70 (ppm)			
Number of Sample	es:	,	90			
Number of Sites:			1			
Type of Sampling:	:		area			
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliabi	ility					
	Metric 1:	Methodology	Low	$\times 1$	3	Not described other than sampling using gas detection tube
Domain 2: Repres	entative					
-	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Study from Netherlands (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1976)$ but after PEL
	Metric 5:	Sample Size	Medium	$\times 1$	2	Means given but no other statistics
Domain 3: Access	ibility/Clari	ity				
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	No metadata provided
Domain 4: Variab	ility and Ur	ncertainty				
		Metadata Completeness	Low	$\times 1$	3	Not addressed with respect to exposure data
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.2.

\* MWF = Metric Weighting Factor

Source Citation:	<b>o</b> ,		I. J 1991. Nerv	ve functio	on in wo	orkers with long term exposure to trichloroethene.
Type of Data Source Hero ID		ırnal of Industrial Medicine. nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Exposure Concent	ration (Uni	t):	35 (ppm)			
Number of Sample	es:		not provided			
Number of Sites:			1			
Type of Sampling	:		area			
Engineering Contr	rol & percer	t Exposure Reduction:	Local exhaust	installed		
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	Low	$\times 1$	3	Not described other than sampling using gas detection tube
Domain 2: Repres	entative					
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Study from Netherlands (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1976)$ but after PEL
	Metric 5:	Sample Size	Medium	$\times 1$	2	Means given but no other statistics
Domain 3: Access	ibility/Clar	ity				
		Metadata Completeness	Unacceptable	$\times 1$	4	No metadata provided
Domain 4: Variab	ility and Ur	ncertainty				
		Metadata Completeness	Low	$\times 1$	3	Not addressed with respect to exposure data
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.2.

\* MWF = Metric Weighting Factor

Source Citation:	Ulander, A AIHA Jou		1992. Asse	ssment o	f intern	nittent trichloroethylene exposure in vapor degreasing.
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Exposure Concent		t):	3-144 (mg	(m3); 16	6 mg/m	3 median
Number of Sample	es:		not provid	led		
Number of Sites:			19			
Number of Worker			31			
Type of Sampling:			personal l	oreathing	zone a	ir samples
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	Medium	$\times 1$	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Repres	entative					
1	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Study from Sweden (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1988-1989) but after PEL
	Metric 5:	Sample Size	Medium	$\times 1$	2	Median, mean, and range given, but discrete data not available
Domain 3: Accessi	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Indicates PBZ and full-shift exposure values but sample dura- tion, exposure duration, exposure frequency not given
Domain 4: Variabi	ility and U	ncertainty				
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited characterization of uncertainty/variability.
Overall Quality De	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.9	

\* MWF = Metric Weighting Factor

		. J.,Karacic, V.,Prpic-Majic, I lene after occupational exposure				y of human levels of trichloroethylene and tetra- alth.				
Type of Data Source	Occupational Exposure; Monitoring Data; 69136									
EXTRACTION Parameter			Data							
Life Cycle Stage: Exposure Concentr Number of Samples Number of Sites: Number of Workers	3:	t):	Use 25-40 (mg/m3) not provided 4 10							
Type of Sampling:			personal breatl	ning zone	e air san	nples				
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliabil	ity Metric 1:	Methodology	Medium	$\times 1$	2	Method described and appears to be acceptable (peer reviewed journal)				
Domain 2: Represe	ntativo									
-	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Europen study (EU countries are part of OECD)				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Data for use of TCE as a dry cleaning solvent, not a US us (spot cleaning only)				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1990) but after PEL				
·	Metric 5:	Sample Size	Medium	$\times 1$	2	range given but no other statistics				
Domain 3: Accessil	oility/Clari	ty								
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	No metadata given				
Domain 4: Variabil			T	-	0					
	Metric <i>(</i> :	Metadata Completeness	Low	× 1	3	Not addressed				
Overall Quality De	termination	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.8.				
		(	Continued on nex	t page						

- continued from previous page									
Source Citation:	Skender, L. J., Karacic, V., Prpic-Majic, chloroethylene after occupational exposu		*	U	an levels of trichloroethylene and tetra-				
Type of Data Source	V A A								
Hero ID	69136								
EVALUATION									
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments				

\* MWF = Metric Weighting Factor

	Ikeda, M. 1977. Metabolism of trichloroethylene and tetrachloroethylene in human subjects. Environmental Health Perspec- tives.							
Type of Data Source		nal Exposure; Monitoring Data;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Exposure Concentr		t):	10-170 (p					
Number of Samples	3:		not provid	led				
Number of Sites:			10					
Number of Workers	3:		12					
Type of Sampling:			area					
Exposure Duration			2-4 hrs					
Exposure Frequency	y:		1-2/mont	h				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabil	ity							
	Metric 1:	Methodology	Low	$\times 1$	3	Not described		
Domain 2: Represe	ntative							
-	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan (OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1977)$ but after PEL		
	Metric 5:	Sample Size	Medium	$\times 1$	2	range given but no other statistics		
Domain 3: Accessit	oility/Clari	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Only exposure type and duration given		
Domain 4: Variabil	ity and Ur	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality De	terminatio	$\mathbf{n}^{\dagger}$	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.</li>

Source Citation:	Ikeda, M tives.	1977. Metabolism of trichloroet	hylene and	tetrachlo	oroethyl	ene in human subjects. Environmental Health Perspec-
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Exposure Concent	tration (Uni	t):	200 (ppm	)		
Number of Sample	es:		not provi			
Number of Sites:			10			
Number of Worke	rs:		6			
Type of Sampling	:		area			
Exposure Duratio	Exposure Duration:			ent exp o	ver 8hr	/day
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	;];+					
Domain 1. Reliab	Metric 1:	Methodology	Low	$\times 1$	3	Not described
Domain 2: Repres	sentative					
Domain 2. Ropro.	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1977) but after PEL
	Metric 5:	Sample Size	Medium	$\times 1$	2	range given but no other statistics
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Only exposure type and duration given
Domain 4: Variab	ility and Ui	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		2.0	

\* MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>

	Ikeda, M. 1977. Metabolism of trichloroethylene and tetrachloroethylene in human subjects. Environmental Health Perspec- tives.							
	patic	onal Exposure; Monitoring Data;						
EXTRACTION	,							
Parameter			Data					
Life Cycle Stage:			Use					
Exposure Concentration	(Un	it):	20-40 (pp	m)				
Number of Samples:			not provi	ded				
Number of Sites:			10					
Number of Workers:			6					
Type of Sampling:			area					
Exposure Duration:			8 hr/day					
Exposure Frequency:			5  days/we	eek				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliability								
Metr	c 1:	Methodology	Low	$\times 1$	3	Not described		
Domain 2: Representati	ve							
Metr	c 2:	Geographic Scope	Medium	$\times 1$	2	Japan (OECD)		
Metr	c 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
Metr	c 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1977)$ but after PEL		
Metr	c 5:	Sample Size	Medium	$\times 1$	2	range given but no other statistics		
Domain 3: Accessibility	/Clai	rity						
Metr	c 6:	Metadata Completeness	Medium	$\times 1$	2	Only exposure type and duration given		
Domain 4: Variability a	nd U	ncertainty						
Metr	c 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality Determ	natio	$\mathrm{on}^{\dagger}$	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.</li>
Source Citation:	Ikeda, M tives.	1977. Metabolism of trichloroet	hylene and	tetrachlo	oroethyl	ene in human subjects. Environmental Health Perspec-
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Exposure Concent	ration (Uni	t):	50 (ppm)			
Number of Sample	es:		not provid	ded		
Number of Sites:			10			
Number of Worke	rs:		6			
Type of Sampling	:		area			
Exposure Duration	n:		Intermitte	ent exp c	ver 8hr	/day
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	:1:+					
Domain 1. Renad	Metric 1:	Methodology	Low	$\times 1$	3	Not described
Domain 2: Repres	entative					
Domain 2. Ropros	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1977) but after PEL
	Metric 5:	Sample Size	Medium	$\times 1$	2	range given but no other statistics
Domain 3: Access	ibility/Clar	itv				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Only exposure type and duration given
Domain 4: Variab	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^\dagger$	Medium		2.0	

Source Citation:	1989. Rel American	ationship between vapor exposu Journal of Industrial Medicine.				, S. N.,Li, G. L.,Nakasutka, H.,Watanabe, T.,Ikeda, M., excretion among workers exposed to trichloroethylene.		
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 75359							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Manufact	uring				
Exposure Concent		t):			2-47 (pp	om) women		
Number of Sample	es:		not provi	ded				
Number of Sites:			1	1.77				
Number of Worker Type of Sampling:			61 (men); personal	17 wom	en			
Exposure Duration			$3 \ge 8 \text{ hr s}$	hifts				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabi	lity							
Domain 1. Itenabi	Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)		
Domain 2: Repres	entative							
*	Metric 2:	Geographic Scope	Low	$\times 1$	3	China (non-OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1989) but after PEL		
	Metric 5:	Sample Size	Medium	$\times 1$	2	range given but no other statistics		
Domain 3: Access	ibility/Clar	ity						
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only sample type (PBZ) given		
Domain 4: Variab	ility and U	acortainty						
Domain 4. valiab	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
		1						
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		2.1			

Source Citation:	1989. Rela American	ationship between vapor exposu Journal of Industrial Medicine.				n, S. N.,Li, G. L.,Nakasutka, H.,Watanabe, T.,Ikeda, M excretion among workers exposed to trichloroethylene.
Type of Data Source Hero ID	Occupation 75359	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Exposure Concent	ration (Uni	t):	1-63 (ppn	n) men; 2	2-13 (pp	om) women
Number of Sample	es:		not provid	ded		
Number of Sites:			1			
Number of Worker			52 (men);	10  wom	en	
Type of Sampling:			personal			
Exposure Duration	n:		$3 \ge 8 $ hr s	hifts		
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliabi	lity					
Domain 1. Henabi	Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	Low	$\times 1$	3	China (non-OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1989) but after PEL
	Metric 5:	Sample Size	Medium	$\times 1$	2	range given but no other statistics
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only sample type (PBZ) given
Domain 4: Variab	ility and Ui	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		2.1	

Source Citation:		,Kihara, T.,Kamoi, R.,Taguchi, ntestinalis following trichloroeth				1988. A report of worker suffering from pneumatosi Health.
Гуре of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION Parameter			Data			
Life Cycle Stage:			Use			
Exposure Concent	ration (Uni	t):		geometri	c mean)	; 18-56 ppm (90 percent range)
Number of Sample	s:		not provi	ded		
Number of Sites:			1			
Worker Activity:						RI tank under ultrasonic waves to degrease;
						ng process for 1 minute at least 1/day exposed
Number of Worker	·c•		1 to nigher	concentr	ations t	han general air of working environment.
Type of Sampling:			area			
Sampling Location				g points	in unit	work area
			-			
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	Medium	$\times 1$	2	Method described and appears to be acceptable (peer reviewe journal)
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1988)$ but after PEL
	Metric 5:	Sample Size	Medium	$\times 1$	2	range and mean given but no discrete data
Domain 3: Accessi	hility/Clar	ity				
Domain 5. Accessi	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only sample type (area) given
Domain 4: Variabi	-				_	
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed
Overall Quality De	eterminatio	$n^{\dagger}$	Medium		2.0	
		9	tinued on r			

	- cont	inued from	previous	page				
Source Citation:	Ogata, M., Kihara, T., Kamoi, R., Taguc cystoides intestinalis following trichloro				A report of worker suffering from pneumatosis			
Type of Data Source	Occupational Exposure; Monitoring Da	Occupational Exposure; Monitoring Data;						
Hero ID	75409							
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			

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 Hero ID	Occupational Exposure; Monitoring Data; 75419								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Exposure Concen Number of Sampl Number of Sites:	es:	,	not provid unknown	eometric ded	mean);	13 ppm (75 percentile); 32 ppm (max)			
Type of Measurer		hod:	8-hr TWA		、 、				
Number of Worke Type of Sampling			22 (men); assumed a	· ·	nen)				
Type of Sampling	·		assumed a	area					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
Domain 1. Honab	Metric 1:	Methodology	Medium	$\times 1$	2	Method described and appears to be acceptable (peer reviewed journal)			
Domain 2: Repres	sentative								
1	Metric 2:	Geographic Scope	Low	$\times 1$	3	Data from China (non-OECD country) and Japan (OECD country)			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1987)$ but after PEL			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Geometric mean and 75 percent -tile given, no discrete data			
Domain 3: Access	sibility/Clar	ity							
Domain 9. reces.	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Sample type (PBZ) and exposure type given; missing worker activities, sample duration, and exposure frequency			
Domoir 4 V- 1	:1:4 TT								
Domain 4: Variab	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed			
	MEULC 1:	Metadata Completelless	LOW	^ 1	J	NUE AUTESSEU			
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	Medium		2.0				
		~	tinued on r						

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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 Hero ID	Occupational Exposure; Monitoring Data; 75419
EVALUATION	
Domain	Metric Rating MWF <sup>*</sup> Score Comments

Source Citation:		.,Goh, V. H.,Ong, C. N 1997. Industrial Medicine.	workers with exposure to trichloroethylene. American			
Type of Data Source Hero ID	Occupation 630431	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Exposure Concent	ration (Uni	t).	9 -131 pp	m (29.6 i	opm me	en)
Number of Sites:			3 -151 pp.	III (23.0 J	opin me	
Type of Measuren	ent or Met	hod	8-hr TWA			
Number of Worke			12			
Type of Sampling			personal			
Sampling Location			various lo	cations v	vithin tl	he facility
Exposure Duration			8 hr shift			
*						
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
Domain IV Homas	Metric 1:	Methodology	High	$\times 1$	1	Cite NIOSH method
Domain 2: Repres	ontativo					
Domain 2. Repres	Metric 2:	Geographic Scope	Low	$\times 1$	3	Singapore (non-OECD)
	Metric 3:	Applicability	High	$\times 1 \times 2$	$\frac{3}{2}$	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2 \times 2$	4	Data older than 10 years (1997) but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
		<u>^</u>				
Domain 3: Access						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Sample type (PBZ) and exposure type given; missing worker activities, sample duration, and exposure frequency
Domain 4: Variab	ility and Ur	ocertainty				
Domain 4. Variab	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
					-	
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.8	

Source Citation: Type of Data Source Hero ID		M.,Niu, Q.,Negri, S.,Ghittori, S., nal Exposure; Monitoring Data;	. 2001. Tric	hloroeth	ylene in	urine as biological exposure index. Industrial Health.
EXTRACTION Parameter			Data			
Life Cycle Stage: Exposure Concent Number of Sample Number of Sites: Type of Measuren Number of Worker Type of Sampling: Exposure Duration	es: nent or Met rs:	,		49 based	l on nui	3.31 (mg/m3) mber of workers
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabi	llity Metric 1:	Methodology	Medium	× 1	2	Method described and appears to be acceptable (peer reviewed journal)
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Italy (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	Medium Medium	$\times 2 \times 1$	$\frac{4}{2}$	Data older than 10 years (2000) but after PEL Range, arithmetic mean, geometric mean, ASD, GSD all given no discrete samples
Domain 3: Access		ity Metadata Completeness	Medium	× 1	2	Sample type (PBZ), exposure type given, sample duratio
Domain 4: Variab		-			_	given; missing worker activities and exposure frequency
	Metric 7:	Metadata Completeness	Low	× 1	3	Not addressed with respect to exposure data
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.9	

EXTRACTION Parameter		Data			
Life Cycle Stage:		Use			
Physical Form:		Vapor			
Route of Exposure:		inhalation	1		
Exposure Concentration (Un	it):	1-7ppm			
Number of Samples:		4			
Number of Sites:		1			
Type of Measurement or Me	thod:	Short-terr	m		
Worker Activity:		Ultrasoni	c Parts (	Cleaning	
Number of Workers:		1			
Type of Sampling:		Personal			
Exposure Frequency:		Infrequen			
PPE:		Respirato	r		
EVALUATION					
Domain	Metric	Rating	$\rm MWF^{\star}$	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	Not described, but NIOSH HHE, assumed to use NIOS method
Domain 2: Representative					
Metric 2:	Geographic Scope	High	$\times 1$	1	US
Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1978) but after PEL
Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Accessibility/Clar	ritv				
Metric 6:	-	Medium	$\times 1$	2	Critical metadata present
Domain 4: Variability and U	ncertainty				
Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed

		- co	ntinued from p	orevious	page	
Source Citation: Type of Data Source Hero ID	<i>'</i>	th hazard evaluation posure; Monitoring I	-	A-78-38-5	512: Trans V	World Airlines Corporation.
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments
Overall Quality I	$\operatorname{Determination}^\dagger$		High		1.6	

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\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Osha, 1989. 1988 OSHA Pel Project documentation: Trichloroethyle. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3986441							
EXTRACTION								
Parameter			Data					
EVALUATION								
Domain		Metric	Rating	$MWF^*$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	$\times 1$	1	OSHA documet		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Discussion on health effects and rule making, not workplace		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1988 - 30 years old		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	ility and U	acortainty						
Domaill 4. Vallat	Metric 7:	-	N/A		N/A	N/a		
Overall Quality D	eterminatio	n <sup>†</sup>	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

	(OEHHA 1999). nal Exposure; Monitoring Data; 	Data Manufact Vapor inhalation 0-200 ppr Multiple, 79 Varies Varies	n	from m	ultiple occupational studies
628		Manufact Vapor inhalation 0-200 ppr Multiple, 79 Varies	n	from m	ultiple occupational studies
n (Uni	t):	Manufact Vapor inhalation 0-200 ppr Multiple, 79 Varies	n	from m	ultiple occupational studies
n (Uni	t):	Manufact Vapor inhalation 0-200 ppr Multiple, 79 Varies	n	from m	ultiple occupational studies
n (Uni	t):	Vapor inhalation 0-200 ppr Multiple, 79 Varies	n	from m	ultiple occupational studies
n (Uni	t):	Vapor inhalation 0-200 ppr Multiple, 79 Varies	n	from m	ultiple occupational studies
n (Uni	t):	inhalation 0-200 ppr Multiple, 79 Varies	n	from m	ultiple occupational studies
n (Uni	t):	Multiple, 79 Varies		from m	ultiple occupational studies
X	, , ,	Multiple, 79 Varies		from m	ultiple occupational studies
		79 Varies	0		
		Varies			
		vancs			
	Metric	Rating	$MWF^{\star}$	Score	Comments
ric 1:	Methodology	Low	$\times 1$	3	Not specified
ive					
	Geographic Scope	High	× 1	1	US
ric 3:		0			Workplace that utilizes TCE
ric 4:		Medium	$\times 2$	4	2000 - 18 years old (after PEL)
ric 5:	Sample Size	Medium	$\times 1$	2	Only range provideds
/Clar	ity				
ric 6:	Metadata Completeness	Low	$\times 1$	3	Only sample type given
und Ur	ncertainty				
ric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed with respect to exposure data
inatio	$\mathbf{n}^{\dagger}$	Medium		2.0	
	ive ic 2: ic 3: ic 4: ic 5: /Clar ic 6: nd Ui ic 7:	ic 1: Methodology ive ic 2: Geographic Scope ic 3: Applicability ic 4: Temporal Representativeness ic 5: Sample Size /Clarity ic 6: Metadata Completeness nd Uncertainty	ic 1: Methodology Low ive ic 2: Geographic Scope High ic 3: Applicability High ic 4: Temporal Representativeness Medium ic 5: Sample Size Medium /Clarity ic 6: Metadata Completeness Low nd Uncertainty ic 7: Metadata Completeness Low	ic 1: Methodology  Low  × 1    ive	ic 1:MethodologyLow $\times 1$ 3iveic 2:Geographic ScopeHigh $\times 1$ 1ic 3:ApplicabilityHigh $\times 2$ 2ic 4:Temporal RepresentativenessMedium $\times 2$ 4ic 5:Sample SizeMedium $\times 1$ 2/Clarity

Source Citation: Type of Data Source Hero ID		7. WTC OSHA non-asbestos sa nal Exposure; Monitoring Data;	mpling data for	Southeas	st area.	
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Manufacture/U	Jse		
Route of Exposur	e:		inhalation			
Exposure Concent		t):	0  ppm			
Number of Sampl			37			
Type of Measurer	ment or Met	hod:	TWA			
Worker Activity:			Various			
Type of Sampling			Personal			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	Not described, but OSHA, assumed to use OSHA method
Domain 2: Repres	sentative					
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	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	$\times 2$	4	Data older than 10 years $(2002)$ but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Access	sibility/Clar	itv				
	0 /	Metadata Completeness	Medium	$\times 1$	2	Critical metadata present
Domain 4: Variab	oility and Ur	ncertainty				
		Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	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

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 Hero ID		nal Exposure; Reports for Data	or Information (	Other tha	n Expo	sure or Release Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Number of Sites:			2			
Worker Activity:			Degreasing			
Number of Worker	rs:		>1000			
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	High	$\times 1$	1	University of Cincinnati, NIOSH, DOE
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Retroactive look at a workplace scenario
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	2003, but uses older data
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessi	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Well documented, but little to no citations inline with the text
Domain 4: Variabi	ility and Ur	ncertainty				
		Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	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

	1982. Health hazard evaluation re Carolina.	eport no. HETA	-82-136-1	175, U.	S. Army Research Office, Research Triangle Park,
	ational Exposure; Monitoring Data;				
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 S	ze Distribution:	0.35-0.56  mg/r	n3		
Engineering Control & pe	rcent Exposure Reduction:	Exhaust Fans,			
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability					
Metric	1: Methodology	High	× 1	1	Not described, but NIOSH HHE, assumed to use NIOS method
Domain 2: Representative					
Metric		High	$\times 1$	1	US
Metric	3: Applicability	High	$\times 2$	2	Workplace that utilizes TCE
Metric	4: Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1982)$ but after PEL
Metric	5: Sample Size	Low	$\times 1$	3	Described as up to 1.34 ppm of TCE, no other sample dat given
Domain 3: Accessibility/	Clarity				
Metric	6: Metadata Completeness	Unacceptable	$\times 1$	4	Indicates both PBZ and area samples taken but not clear which is applicable to the TCE value given
Domain 4: Variability and					
Metric	7: Metadata Completeness	Low	$\times 1$	3	Not addressed
	(	Continued on nex	t page		

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	$\mathrm{MWF}^{\star}$	Score	Comments		
Overall Quality Determination <sup><math>\dagger</math></sup>		Unacceptable		4	Metric Mean Score: 2.0.		

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\*\* 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

	Driscoll, R 1989. Health hazard onal Exposure; Monitoring Data;	evaluation	report no	D. HETA	A 88-082-1971, Jostens Incorporated, Princeton, Illinoi										
EXTRACTION Parameter		Data													
Life Cycle Stage:		Use													
Physical Form:		Vapor													
Route of Exposure: Exposure Concentration (Unit):		inhalation	1												
		14.7 - 33.4	ppm												
Number of Samples:		15													
Number of Sites:		1													
Type of Measurement or Method:		TWA													
Worker Activity:		Cleaning	/degreasi	ng											
Number of Workers:															
Type of Sampling: Sampling Location: Engineering Control & percent Exposure Reduction:		Area, Personal Polishing and plating departments Local exhaust ventilation													
								PPE:		Gloves, goggles					
								Analytic Method:		NIOSH Method 1022					
EVALUATION															
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments										
Domain 1: Reliability															
Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method 1022										
Domain 2: Representative															
Metric 2:	Geographic Scope	High	$\times 1$	1	US										
Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE										
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1989)$ but after PEL										
Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given										
Domain 3: Accessibility/Cla	rity														
Metric 6:	Metadata Completeness	High	$\times 1$	1	All metadata present										
Domain 4: Variability and U	Incertainty														
	Cor	tinued on 1	next page	è											

Source Citation: Type of Data Source Hero ID	Seitz, T.,Driscoll, R 1989. Health hazard evaluation report no. HETA 88-082-1971, Jostens Incorporated, Princeton, Illinois. Occupational Exposure; Monitoring Data; 3970562						
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method	
Overall Quality D	Determination	n†	High		1.3		

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Source Citation:Okawa, M. T 1973. Health hazaType of Data SourceOccupational Exposure; MonitoriHero ID3970618		no. HH	E 72-74	-51, Western Electric Company, Dublic, California.
EXTRACTION Parameter	Data			
Life Cycle Stage:	Use			
Physical Form:				
Route of Exposure:		1		
Exposure Concentration (Unit):	6-106 ppr	n		
Number of Samples:	43			
Number of Sites:	1			
Worker Activity:	Paint spr	aying, cle	eaning,	washing
Type of Sampling:	Personal			
Engineering Control & percent Exposure Reduction:			tilation,	, vent hoods
PPE:	respirator			
Analytic Method:	NIOSH m	nethod		
EVALUATION				
Domain Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability Metric 1: Methodology	High	× 1	1	NIOSH report
				*
Domain 2: Representative	<b>TT</b> 1	_	_	
Metric 2: Geographic Scope	High	$\times 1$	1	US
Metric 3: Applicability	High	$\times 2$	2	Workplace that utilizes TCE
Metric 4: Temporal Representa		$\times 2$	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 Completen	ess High	$\times 1$	1	All metadata present
Domain 4: Variability and Uncertainty				
Metric 7: Metadata Completence	ess Medium	× 1	2	None discussed, but NIOSH method addresses variability uncertainty in the method
Overall Quality Determination <sup><math>\dagger</math></sup>	High		1.3	
	Continued on r	next page	<b>)</b>	

Source Citation: Type of Data Source Hero ID	Okawa, M. T 1973. Health haza Occupational Exposure; Monitor 3970618	_	no. HHE 72-74-51, West	ern Electric Company, Dublic, California
EVALUATION				
Domain	Metric	Rating	MWF <sup>*</sup> Score	Comments

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 $\star$  MWF = Metric Weighting Factor

Source Citation:R. A. G. AktiengesellschaftType of Data SourceOccupational Exposure; MoHero ID3970841		eport: Tri	chloroe	thylene.			
EXTRACTION Parameter	Data						
Life Cycle Stage:	Use						
Physical Form:		por					
Route of Exposure: Exposure Concentration (Unit):		n, dermal					
		mg/m3					
Number of Sites:	2						
Worker Activity:	repairing		coal mir	nes			
Sampling Location:	coal mine						
Exposure Duration:	<4 hours						
Exposure Frequency:	varies						
Engineering Control & percent Exposure Redu		Good mine ventilation					
PPE:	Protective	Protective gloves, suits and eye protection					
EVALUATION							
Domain Met	ric Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability							
Metric 1: Methodology	Low	$\times 1$	3	Not described			
Domain 2: Representative							
Metric 2: Geographic Sco	ope Medium	$\times 1$	2	Germany (OECD)			
Metric 3: Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
Metric 4: Temporal Repr	esentativeness Medium	$\times 2$	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	$\times 1$	1	Discrete samples given			
Domain 3: Accessibility/Clarity							
Metric 6: Metadata Com	pleteness Medium	$\times 1$	2	Only Sample type and exposure type give			
Domain 4: Variability and Uncertainty							
Metric 7: Metadata Com	pleteness Low	× 1	3	Not addressed			
Overall Quality Determination <sup><math>\dagger</math></sup>	Medium		1.9				
	Continued on a	next page	;				

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Source Citation: Type of Data Source Hero ID	R. A. G. Aktiengesellschaft. 2014. Chemical safety report: Trichloroethylene. Occupational Exposure; Monitoring Data; 3970841								
<b>EVALUATION</b> Domain	Metric	Rating MWF* Score	Comments						

	osure assessment: Trichloroethy nal Exposure; Monitoring Data;	lene, Part 2	2.				
XTRACTION Parameter		Data					
Life Cycle Stage:		Use					
Physical Form:			por				
Route of Exposure: Exposure Concentration (Unit):		inhalation	n, dermal	l			
		<LoD (14	4.6ug/m3	8) - 11 r	ng/m3		
Number of Samples:		29					
Number of Sites:		1					
Worker Activity:		loading, ι	inloading	g TCE s	storage tanks, and sampling		
Type of Sampling:		Personal,					
Sampling Location:		around si		fsite.			
Exposure Duration:		15-60 mir	1.				
Exposure Frequency:		daily					
PPE:		Gloves					
Analytic Method: PN			PN-89/Z-04016/03 and IR-TL-73				
VALUATION							
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliability							
Metric 1:	Methodology	Medium	$\times 1$	2	Polish method, assumed to be acceptable		
Domain 2: Representative							
Metric 2:	Geographic Scope	Medium	$\times 1$	2	Poland (OECD)		
Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	data from 2014		
Metric 5:	Sample Size	Medium	$\times 1$	2	Most samples are provided as a range, no discrete data give		
Domain 3: Accessibility/Clar	ity						
Metric 6:	Metadata Completeness	Medium	× 1	2	sample type and exposure type given, but missing other me data		
Domain 4: Variability and U	ncertainty						
Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
	Cor	tinued on 1	ext page				

		- continued from pre	evious page					
Source Citation: Type of Data Source Hero ID	2014. Exposure assessment: Trichloroethylene, Part 2. Occupational Exposure; Monitoring Data; 3970840							
<b>EVALUATION</b> Domain	Metric	Rating M	MWF* Score	Comments				
Overall Quality I	$\operatorname{Determination}^{\dagger}$	Medium	1.7					

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 Hero ID	Occupational Exposure; Monitoring Data; 3970823									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Physical Form:			liquid, va	por						
Route of Exposur	e:		inhalatior	n, dermal						
Exposure Concen	tration (Uni	t):	4.61  mg/m	n3 – 13.6	59  mg/r	n3 (90th percentile measured data)				
Number of Sampl		,	9941 area							
Number of Sites:			9	, <b>1</b>						
Type of Measurer	ment or Met	hod:	8 hr TWA	A						
Worker Activity:			Vapor deg	greasing						
Type of Sampling:			Personal,	area						
Analytic Method:		methodology NF X 43-267/INRS 029-01/09								
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliab	ility									
Domain 1. Honab	Metric 1:	Methodology	Medium	$\times 1$	2	Methods provided, sampling completed by UKAS acreddite lab; therefore, assumed to be acceptable				
Domain 2: Repres	sentative									
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Data from UK and France (OECD)				
	Metric 3:	Applicability	High	$\times 1 \times 2$	2	Workplace that utilizes TCE				
	Metric 4:	Temporal Representativeness	High	$\times 2 \times 2$	2	No date listed, but monitoring data was taken from 2009-201				
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given				
Domain 3: Access	sibility/Clari	ity								
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency				
Domain 4: Variab	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6					
		Con	tinued on r	next page	<u>)</u>					

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Occupational Exposure; Monitoring Data;							
3970823							
Metric	Rating	$MWF^{\star}$	Score	Comments			
n D	9. O. W. Deutschland. 2014. Chemical a closed systems where specific require occupational Exposure; Monitoring Da 970823	970823	970823	970823			

	Data Source Occupational Exposure; Monitoring Data;							
XTRACTION Parameter	Data							
Life Cycle Stage:	Use							
Physical Form:	liquid, va	por						
Route of Exposure:		inhalation		l				
Exposure Concentration (Un	it):	0.0004 - 1	.5 ppm					
Number of Samples:	,	47	* *					
Number of Sites:		1						
Type of Measurement or Met	hod:	TWA						
Worker Activity:		Filling Ba	arrels and	i fill tar	nk trucks and traincars.			
Number of Workers:	2							
Type of Sampling:	personal							
Sampling Location:	tank fillin	g statior	, barrel	l filling station				
Exposure Duration:			8					
Exposure Frequency:								
Engineering Control & percer	nt Exposure Reduction:	Ventilatio						
PPE:		TCE resis	stant glo	ves, gog	gles			
VALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	Low	$\times 1$	3	Not specified			
Domain 2: Representative								
Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU data (OECD)			
Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014, 4 years old			
Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given			
	:+							
Domain 3: Accossibility /Class								
Domain 3: Accessibility/Clar Metric 6:	Metadata Completeness	High	$\times 1$	1	All metadata present			
	Metadata Completeness	High	× 1	1	All metadata present			

Source Citation: Type of Data Source Hero ID	D. O. W. Deutschland. 2014. Chemical safety report: Use of trichloroethylene in packaging. Occupational Exposure; Monitoring Data; 3970813							
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality D	Determination	$\mathbf{n}^{\dagger}$	High		1.6			

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	Domo Caproleuna GmbH. 2015. Chemical safety report: Industrial use as an extractive solvent for the purification of capro- lactam from caprolactam oil.							
-	Occupational Exposure; Monitoring Data; 3970812							
XTRACTION			Data					
Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			liquid, va	por				
Route of Exposure:			inhalatior					
Exposure Concenti		t):	0.4-38 mg	,				
Number of Sites:	(	,	1	, , , , , , , , , , , , , , , , , , ,				
Type of Measurem	ent or Met	hod:	8 hour TV	WA				
Worker Activity:			Tank disc	harge, so	lvent ex	straction, and lab sample handling		
Number of Worker	s:		15	0,				
Type of Sampling:								
Sampling Location:								
Exposure Duration:								
Exposure Frequence		365						
Analytic Method:			German 7	Fechnical	Rule T	PRGS 402		
VALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabil	lity							
	Metric 1:	Methodology	Medium	$\times 1$	2	German Technical Rule TRGS 402, assumed to be acceptal		
Domain 2: Represe	entative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU data (OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015, but utilizes monitoring data from 2013		
	Metric 5:	Sample Size	Low	$\times 1$	3	unclear if sample values given are discrete samples or based a median, mean, etc.		
Domain 3: Accessi	bility/Clar	itv						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata		
Domain 4: Variabi	lity and Ur	ncertainty						

		6	ontinueu nom p	revious	page					
Source Citation:	1	roleuna GmbH. 2015. Ch n caprolactam oil.	emical safety repo	rt: Indus	strial us	se as an extractiv	e solvent for the purification of capro-			
Type of Data Source	Occupation	Occupational Exposure; Monitoring Data;								
Hero ID	3970812									
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score		Comments			
	Metric 7:	Metadata Completeness	s Low	$\times 1$	3	Not addressed				
Overall Quality I	Determination	$\mathbf{n}^{\dagger}$	Medium		1.8					

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ype of Data Source Occup	D. O. W. Deutschland. 2014. Chemical safety report: Uses of trichloroethylene in formulation. Occupational Exposure; Monitoring Data; 3970810						
XTRACTION Parameter			Data				
Life Cycle Stage:			Use				
Physical Form:			liquid, va	por			
Route of Exposure:			inhalation				
Exposure Concentration	(Un	it):		,		l: 0.0172 ppm. Range: ND - 1.9 ppm	
Number of Samples:	( -		49				
Type of Measurement or	Met	chod:	TWA				
Worker Activity:			Sampling	and mai	ntenanc	ce on tanks	
Type of Sampling:			Personal,				
Exposure Duration:			<4 hours				
Exposure Frequency:			6/month				
PPE:			Chem. Resistant gloves, safety glasses, safety shoes, and usual protective clothing.				
VALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliability							
Metri	e 1:	Methodology	Low	$\times 1$	3	Not specified	
Domain 2: Representativ	e						
Metri		Geographic Scope	Medium	$\times 1$	2	EU data (OECD)	
Metri		Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
Metri		Temporal Representativeness	High	$\times 2$	2	No date, but samples were pulled from 2011-2014	
Metri	c 5:	Sample Size	High	$\times 1$	1	Discrete samples given	
Domain 3: Accessibility	Clar	ity					
01		Metadata Completeness	High	$\times 1$	1	All metadata present	
Metri							
Metri Domain 4: Variability ar	d U	ncertainty					
		ncertainty Metadata Completeness	Low	× 1	3	Not addressed	
Domain 4: Variability a	e 7:	Metadata Completeness	Low	× 1	3	Not addressed	

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Source Citation: Type of Data Source Hero ID	D. O. W. Deutschland. 2014. Chemic Occupational Exposure; Monitoring I 3970810		trichloroethyle	ne in formulation.
<b>EVALUATION</b> Domain	Metric	Rating MWF*	Score	Comments

	Domo Cap lactam fro	se as an extractive solvent for the purification of capro					
	Occupational Exposure; Monitoring Data; 3970809						
XTRACTION			_				
Parameter			Data				
Life Cycle Stage:			Use				
Physical Form:			liquid, va	por			
Route of Exposure:			inhalation				
Exposure Concentration (Unit):				,		(some estimated).Dermal:0.34-2.7 mg/kg (es-	
			timated).		0,		
Type of Measurem	ent or Met	hod:	8 hour Ť	WA			
Worker Activity:			Varies				
Type of Sampling:							
Exposure Duration:							
Exposure Frequency:			Varies				
PPE:			Chem. R	esistant g	loves, sa	afety glasses, safety shoes, and usual protective	
			clothing.				
Analytic Method:			German t	echnical	rule TF	AGS 402	
VALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliabil	itv						
	Metric 1:	Methodology	Medium	$\times 1$	2	German Technical Rule TRGS 402, assumed to be acceptable	
Damain 9. Damara							
Domain 2: Represe	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU data (OECD)	
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015, but utilizes monitoring data from 2013	
	Metric 5:	Sample Size	Low	$\times 1$	3	unclear if sample values given are discrete samples or based a median, mean, etc.	
	h:1:4/Cl						
Domain 2. Accessi	0 /	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata	
Domain 3: Accessi	Metric 6:			· · -	_		
		^					
		ncertainty	ntinued on 1				

			inueu nom p		F0-				
Source Citation:	-		ical safety repo	rt: Indus	strial us	se as an extractive	solvent for the purification of capro-		
		n caprolactam oil.							
Type of Data Source	Occupational Exposure; Monitoring Data;								
Hero ID	3970809								
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score		Comments		
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed			
Overall Quality I	Determination	$n^{\dagger}$	Medium		1.8				

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Source Citation: Type of Data Source Hero ID	Spolana, a s. 2014. Chemical safety report: Trichloroethylene. e Occupational Exposure; Monitoring Data; 3970807								
EXTRACTION Parameter			Data						
Life Cycle Stage: Physical Form: Route of Exposure Exposure Concent		t):	Use liquid, va inhalatior 0-13.3 (ur	n, dermal	nd 0.2 -	19.2 mg/m3			
EVALUATION									
Domain		Metric	Rating	$MWF^*$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Low	× 1	3	Not specified			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Czech Republic (OECD)			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Samples from 2011-2013			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given			
Domain 3: Access	ibility/Clari	ty							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	Not addressed			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.7				
		oosure scenario: Use: Trichloro ucture in polyethylene based sep				solvent for removal of process oil and formation of th atteries.			
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Type of Data Source Oc		nal Exposure; Monitoring Data;							
EXTRACTION Parameter			Data						
Life Cycle Stage:			Use						
Physical Form:			liquid, va	por					
Route of Exposure:			inhalatior	-					
Exposure Concentrati	on (Uni	t):	Personal:	0.48-44.	8  mg/m	n3Area: 26.7-1001 mg/m3			
Number of Samples:	,	,	36		0,	3,			
Number of Sites:			1						
Type of Measurement or Method:			12 hour T	WA					
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 Respirators during certain tasks.						
PPE: Analytic Method:			EN 482:20		g certan	n tasks.			
rinaly the intention.			111 1011						
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability									
Me	etric 1:	Methodology	Medium	× 1	2	Badge monitoring			
Domain 2: Representa	ative								
Me	etric 2:	Geographic Scope	Medium	$\times 1$	2	EU data (OECD)			
Me	etric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
Me	etric 4:	Temporal Representativeness	High	$\times 2$	2	2014, 4 years old			
Me	etric 5:	Sample Size	Medium	$\times 1$	2	75th percentile given, no other statistics			
Domain 3: Accessibili	ty/Clar	ity							
Me	etric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata			
		Cor	tinued on r	next page	9				

		- cont	mueu nom p	revious	page					
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	Occupation	nal Exposure; Monitoring Dat	ta;							
Hero ID	3970806									
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 4: Varial	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed				
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	Medium		1.7					

	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 C		hal Exposure; Published Models	for Exposures of	r Release	es;		
EXTRACTION Parameter			Data				
Life Cycle Stage: Physical Form: Route of Exposure: Exposure Concentra Number of Sites:	tion (Unit	t):	Use liquid, vapor inhalation, der Estimated: 0.0 1		g/m3		
Type of Sampling: Analytic Method:	Type of Sampling: Estimation						
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliabilit M	ty Aetric 1:	Methodology	High	$\times 1$	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: Represen	ntative						
-	Aetric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)	
Ν	Aetric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
Ν	Aetric 4:	Temporal Representativeness	High	$\times 2$	2	No date, but references a risk assessment from $2014$	
N	Aetric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Accessibi	ility/Clari	ty					
		Metadata Completeness	Unacceptable	$\times 1$	4	Document does not contain necessary metadata to understand the model	
Domain 4: Variabili	ty and Un	certainty					
Ν	Aetric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed	
Overall Quality Dete	erminatio	n†	Unacceptable		4	Metric Mean Score: 1.8.	
		(	Continued on nex	t page			

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Source Citation:	Chimcomplex, S. A. Borzesti. 2014. ( degreasing agent in closed systems.	Chemical safety re	eport: Indu	strial use of tr	ichloroethylene (TCE) as a solvent as a			
Type of Data Source Hero ID	Occupational Exposure; Published Models for Exposures or Releases; 3970803							
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	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

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

	D. O. W. I analysis.	Deutschland. 2017. Chemical sa	afety report	: Use of	trichlo	roethylene as extraction solvent for bitumen in asphal			
ype of Data Source		nal Exposure; Monitoring Data;							
XTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Physical Form:			liquid, va	oor					
Route of Exposure:			inhalation						
Exposure Concentry		t).	2.6 - 2.73						
Number of Samples						nto one point)			
Number of Sites:	J.		1	1 10, 410.	ugou ii				
Type of Measurement or Method: Worker Activity: Type of Sampling:			8 hour TV	NA					
					coverv c	operations, etc.			
			Area			r · · · · · · · · · · · · · · · · · · ·			
Sampling Location:			Multiple						
Exposure Duration:			<8 hours						
Exposure Frequency:			Varies						
Engineering Contro	ol & percen	t Exposure Reduction:	SAFET T	ainer sys	$\operatorname{stem}$				
PPE:			Varies						
VALUATION									
<b>VALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments			
	ity	Metric	Rating	MWF*	Score	Comments			
Domain Domain 1: Reliabili	lity Metric 1:	Metric	Rating Medium	MWF* $\times 1$	Score	Comments German Technical Rule TRGS 402, assumed to be acceptable			
Domain Domain 1: Reliabili	Metric 1:								
Domain Domain 1: Reliabili Domain 2: Represe	Metric 1:								
Domain Domain 1: Reliabili Domain 2: Represe	Metric 1: entative	Methodology Geographic Scope Applicability	Medium	× 1	2	German Technical Rule TRGS 402, assumed to be acceptal			
Domain Domain 1: Reliabili Domain 2: Represe	Metric 1: entative Metric 2:	Methodology Geographic Scope Applicability	Medium	× 1 × 1	2	German Technical Rule TRGS 402, assumed to be acceptable EU data (OECD)			
Domain Domain 1: Reliabili Domain 2: Represe	Metric 1: entative Metric 2: Metric 3:	Methodology Geographic Scope	Medium Medium High	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \end{array}$	2 2 2	German Technical Rule TRGS 402, assumed to be acceptable EU data (OECD) Workplace that utilizes TCE			
Domain Domain 1: Reliabili Domain 2: Represe	Metric 1: entative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High High	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array}$	2 2 2 2	German Technical Rule TRGS 402, assumed to be acceptable EU data (OECD) Workplace that utilizes TCE data from 2013			
Domain Domain 1: Reliabili Domain 2: Represe Domain 3: Accessif	Metric 1: entative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High High	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array}$	2 2 2 2	German Technical Rule TRGS 402, assumed to be acceptable EU data (OECD) Workplace that utilizes TCE data from 2013			
Domain Domain 1: Reliabili Domain 2: Represe Domain 3: Accessif	Metric 1: entative Metric 2: Metric 3: Metric 4: Metric 5: bility/Clari Metric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	Medium Medium High High Medium	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	2 2 2 2 2	German Technical Rule TRGS 402, assumed to be acceptal EU data (OECD) Workplace that utilizes TCE data from 2013 All results indicated as less the the LOQ			

		601	tinueu nom p	revious	page			
Source Citation:	D. O. W. I analysis.	Deutschland. 2017. Chemic	al safety report:	Use of	trichlor	coethylene as extra	action solvent for bitumen in asphalt	
Type of Data Source								
Hero ID	3970802							
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score		Comments	
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality D	Determination	$\mathbf{a}^{\dagger}$	Medium		1.7			

Source Citation:		ficroporous, gmbh. 2014. Chem ylene separators for lead-acid ba		eport: T	richloro	ethylene used as degreasing solvent in the manufactur
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION			_			
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	por		
Route of Exposur	e:		inhalatior			
Exposure Concen		it):	36.9  mg/s			
Number of Sampl		,	22			
Number of Sites:			1			
Type of Measurer	ment or Met	hod:	8 hour TV	WA		
Worker Activity:			Chopping	, cutting	, windir	ng and packaging the product.
Type of Sampling	g:		Likely are	ea.		
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Low	$\times 1$	3	Not specified
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU data (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Sampling from 2014
	Metric 5:	Sample Size	Medium	$\times 1$	2	only 90th percentile given
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Sample type given, but no other metadata
Domain 4: Varial	oility and U	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	Medium		1.9	

		herlands, B. V 2014. Chemics f resin from dyed cloth.	al safety re	port Par	t A: Us	e of trichloroethylene as a solvent for the removal and			
	Occupation 3970833	nal Exposure; Monitoring Data;							
XTRACTION Parameter			Data						
Life Cycle Stage:			Use						
Physical Form:			liquid, va	por					
Route of Exposure:	:		inhalatior						
Exposure Concentr		t):	0.7-27.4 n						
Number of Samples		,	37	0,					
Number of Sites:			1						
Type of Measurement or Method:		Long term	n						
Worker Activity:			Operation	ns, Wash	ing clot	h, operating wax recovery unit, general office			
			work.						
Type of Sampling:			Personal						
Sampling Location:			Multiple						
Exposure Duration	:		< 8  hours						
PPE:			Standard	PPE					
VALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliabil	ity								
	Metric 1:	Methodology	Medium	$\times 1$	2	Well described, but method not cited			
Domain 2: Represe	entative								
-	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU data (OECD)			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016, 2 years old			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given			
Domain 3: Accessit	bility/Clar	ity							
	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type, sample type, worker activities given, no oth metadata			
Domain 4: Variabil	lity and Ur	ncertainty							
Domain 4. Variabii									

Source Citation:	recovery of resin from dyed cloth.				t A: Us	e of trichloroethyler	he as a solvent for the removal and
Type of Data Source	Occupation	al Exposure; Monitorin	ıg Data;				
Hero ID	3970833						
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score		Comments
	Metric 7:	Metadata Completene	ss Low	$\times 1$	3	Not addressed	
Overall Quality I	Determination	'nţ	High		1.6		

ource Citation:	Lewis, F. Pennsylva		luation rep	ort no.	HHE 8	0-87-708, Harowe Servo Contorls Inc., West Chest
'ype of Data Source Iero ID	Occupatio 3970663	nal Exposure; Monitoring Data;				
EXTRACTION Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	Dor		
Route of Exposure	0.		inhalatior		1	
Exposure Concent		t).		,		2.3 ppmCeiling:10.6 - 27.3 ppm
Number of Sample	· · ·		16		1010 11	
Number of Sites:			1			
Type of Measuren	nent or Met	hod:	Short-terr	m, 8 hou	r TWA	
Worker Activity:			Vapor deg	greasing		
Type of Sampling			Personal,	area		
Exposure Duratio			Varies			
Exposure Frequen	icy:		Varies			
PPE:			Standard	PPE		
VALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	No analytical method given, but completed by NIOSH
Domain 2: Repres	sentative					
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1980) but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Access	bility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Domain 4: Variab	ility and U	ncertainty				

		- continu		nevious	, page			
Source Citation:	Lewis, F. A 1980. Pennsylvania.	Health hazard evalu	uation repo	ort no.	HHE 80-87-708,	Harowe Serve	o Contorls Inc.,	West Chester,
Type of Data Source Hero ID	Occupational Exposur 3970663	e; Monitoring Data;						
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score		Comments	
Overall Quality D	$\operatorname{Petermination}^\dagger$		High		1.6			

ource Citation:	tive, Port	V.,Kawamoto, M. M., 1992. Hea Huron, Michigan. nal Exposure; Monitoring Data;	th hazard o	evaluatio	n report	t no. HETA 90-029-2212; United Technologies Autom			
Type of Data Source Iero ID	3970662	nai Exposure; Monitoring Data;							
EXTRACTION			_						
Parameter			Data						
Life Cycle Stage:			Use						
Physical Form:			vapor						
Route of Exposure	e:		inhalation	ı, dermal					
Exposure Concent	ration (Uni	t):	3.6-21.4 p	pm					
Number of Sample	es:		4						
Number of Sites:			1						
Type of Measurement or Method:			Long terr	n					
Worker Activity:			laminatio	n, cuttin	g lamin	ation			
Number of Workers:			132						
Type of Sampling:			Area						
Sampling Location:			Multiple						
Exposure Duration:			Varies						
Exposure Frequen	cy:		Varies NIOSH Method 1022						
Analytic Method:			NIOSH N	lethod 10	)22				
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method 1022			
Domain 2: Repres	entative								
Domain 2. Ropros	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1992) but after PEL			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given			
Domain 3: Access	ibility/Clari	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency			
Domain 4: Variab	ility and Ur	ncertainty							
		Con	tinued on 1	lext nage	<u>,</u>				

		<b>1</b>		1.9	
,		alth hazard e	evaluatio	n report	t no. HETA 90-029-2212; United Technologies Automo-
Occupation	nal Exposure; Monitoring Data:				
3970662	· , C ,				
	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Determination	$\mathbf{n}^{\dagger}$	High		1.4	
	tive, Port I Occupation 3970662 Metric 7:	Hills, B. W.,Kawamoto, M. M. 1992. Hea tive, Port Huron, Michigan. Occupational Exposure; Monitoring Data; 3970662 Metric	Hills, B. W.,Kawamoto, M. M 1992. Health hazard of tive, Port Huron, Michigan. Occupational Exposure; Monitoring Data; 3970662 Metric Rating Metric 7: Metadata Completeness Medium	Hills, B. W.,Kawamoto, M. M 1992. Health hazard evaluation tive, Port Huron, Michigan. Occupational Exposure; Monitoring Data; 3970662 Metric Rating MWF* Metric 7: Metadata Completeness Medium × 1	Occupational Exposure; Monitoring Data;     3970662     Metric   Rating   MWF*   Score     Metric 7:   Metadata Completeness   Medium   × 1   2

Source Citation:		t, R.,Polakoff, P. L., 1973. Heal Connecticut, Part 2.	th hazard o	evaluatio	n repor	t no. HHE 72-84-31, Dunham-Bush, Incroprated, West
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	nor		
Route of Exposur	·e·		inhalatior			
Exposure Concert		t).	170-420 n			
Number of Sampl			30	116/1110		
Number of Sites:			1			
Type of Measurer	nent or Met	hod	Short-ter	m		
Worker Activity:					ssembli	ng air conditioners
Number of Workers:		480		0001110111		
Type of Sampling			Personal,	area		
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	oility					
	Metric 1:	Methodology	High	$\times 1$	1	No analytical method given, but completed by NIOSH and includes well described process
Domain 2: Repres	sentative					
Domain 2. Hopro,	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1973) but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Domain 4: Variab	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	) eterminatio	$\mathbf{n}^{\dagger}$	High		1.6	
		Cor	tinued on r	ext page	<b>`</b>	

	- cor	tinued from	previous	page	
Source Citation:	Vandervort, R.,Polakoff, P. L. 1973. Hartford, Connecticut, Part 2.	Health hazard	evaluation	n report no. 1	HHE 72-84-31, Dunham-Bush, Incroprated, West
Type of Data Source	Occupational Exposure; Monitoring D	ata;			
Hero ID	3970657				
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments

Type of Data Source		. E.,Meyer, C. 1977. Health ha nal Exposure; Monitoring Data;	zard evalua	tion repo	ort no. I	HHE 77-3-420, Essex International, Kittaning, PA.			
EXTRACTION Parameter			Data						
Life Cycle Stage:			Use						
Physical Form:			liquid, va						
Route of Exposure:				, dermal					
Exposure Concentr		t):	1-15  ppm						
Number of Samples:			50						
Number of Sites:			1						
Type of Measurement or Method:			Short-terr						
	Worker Activity:				y of ele	ctronic chip boards			
Type of Sampling:			Personal,	Area					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliabil	itv								
	Metric 1:	Methodology	High	$\times 1$	1	No analytical method given, but completed by NIOSH an includes well described process			
Domain 2: Represe	ntative								
_	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1976)$ but after PEL			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given			
Domain 3: Accessil	oility/Clari	ity							
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Sample type given no other metadata			
Domain 4: Variabil	ity and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed			
Overall Quality De	terminatio	$\mathbf{n}^{\dagger}$	Medium		1.7				

Source Citation:	Kramkows Peru, Illine	7	evaluation	report n	o. HHE	E 78-56-511, Westclox-Division of General Time Corp.,
Type of Data Source Hero ID	Occupation 3970653	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	por		
Route of Exposure:		inhalation				
Exposure Concent		t):	5-61 ppm	,		
Number of Sampl		,	6			
Number of Sites:			1			
Type of Measurer	nent or Met	hod:	Long terr	n		
Worker Activity:			Degreasin	g.		
Type of Sampling	:		Personal,	Area		
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	-					
	Metric 1:	Methodology	High	$\times 1$	1	No analytical method given, but completed by NIOSH and includes well described process
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1978) but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Domain 4: Variab	ility and U	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6	

Source Citation:	Finely, M. Illinois.	Page, E 2005. Health hazard	evaluation 1	report no	. HETA	A 2003-0203-2952, Wallace Computer Services, Clinton
Type of Data Source Hero ID	Occupatio 3970650	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			vapor			
Route of Exposur	e:		inhalatior	n		
Exposure Concent		t):	ND - 25p			
Number of Sampl		,	23	•		
Number of Sites:			1			
Worker Activity:			Printing 1	Press		
Number of Worke	rs:		81			
Type of Sampling	:		Personal			
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	No analytical method given, but completed by NIOSH ar includes well described process
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2005, 13 years old (after PEL)
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Domain 4: Variab	ility and U	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6	

	977. Health hazard evalua posure; Monitoring Data;	tion report	no. HHE	2 76-101	l-376, FMC Corporation, Broomfield, Colorado.
EXTRACTION Parameter		Data			
Life Cycle Stage:		Use			
Physical Form:		liquid, va			
Route of Exposure:		inhalatior			
Exposure Concentration (Unit):		2-57  mg/s	m3		
Number of Samples:		10 1			
Number of Sites: Worker Activity:					_
				ing, En	graving, Painting,
Type of Sampling:		Personal,		,	
Engineering Control & percent Exposure Reduction:		Well Vent		oods	
PPE:		Appropria	ate PPE		
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliability Metric 1: Meth	odology	High	$\times 1$	1	No analytical method given, but completed by NIOSH an includes well described process
Domain 2: Representative	1. 0	TT· 1	1	1	
	raphic Scope	High	$\times 1$	1	US
	icability	High Medium	$\times 2$	2	Workplace that utilizes TCE
	poral Representativeness ble Size		$\times 2 \times 1$	4 1	Data older than 10 years (1976) but after PEL
Metric 5: Samj	Die Size	High	× 1	1	Discrete samples given
Domain 3: Accessibility/Clarity					
Metric 6: Meta	data Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Domain 4: Variability and Uncertai	ntv				
	idata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality Determination $^{\dagger}$		High		1.6	

posure; Monitoring Data;	Data								
	Use								
Physical Form:									
Route of Exposure:		por 1, dermal							
	099ppm	,							
	6								
	1								
Number of Sites: Type of Measurement or Method: Worker Activity: Number of Workers: Type of Sampling:			hift						
			, variou	ıs tasks					
			126, with 8 working with TCE						
			Personal, area						
Exposure Duration:		Short							
Exposure Frequency:		Frequent							
osure Reduction:	Local Exhaust Ventilation, Vent hoods Gloves, eye goggles, aprons, and dustmasks.								
	NIOSH m	nethod 25	549						
Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments					
hodology	High	$\times 1$	1	NIOSH method 2549					
graphic Scope	High	$\times 1$	1	US					
licability	High	$\times 2$	2	Workplace that utilizes TCE					
poral Representativeness	Medium	$\times 2$	4	2004, 14 years old (after PEL)					
ple Size	High	$\times 1$	1	Discrete samples given					
	Medium	$\times 1$	2	Most metadata given, missing exposure frequency					
		ble Size High	ble Size High × 1	High × 1 1					

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Source Citation:	Finely, M., Tapp, L 2004. Hea Wisconsin.	lth hazard evaluation	report n	o. HET	FA 2003-0029-2923, Ward Brodt Music Mall, Madison,
Type of Data Source	Occupational Exposure; Monito	ring Data;			
Hero ID	3970649	J ,			
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 4: Variab	pility and Uncertainty Metric 7: Metadata Complete	ness Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality D	$\operatorname{Determination}^{\dagger}$	High		1.4	

	7						
<b>KTRACTION</b> Parameter			Data				
Life Cycle Stage:			Use				
Physical Form:			Vapor				
Route of Exposure:			inhalatior				
Exposure Concentration (	Unit):		7.1-7.6 pp	m			
Number of Samples:			3				
Number of Sites:			1				
Type of Measurement or I	/lethod:		Long tern	n			
Worker Activity:			Welding				
Number of Workers:			15 Dama a 1				
Type of Sampling:		Deductions	Personal,				
Engineering Control & percent Exposure Reduction: PPE:		Local Exhaust Ventilation Half face respirator					
Analytic Method:		NIOSH M					
ALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliability							
Domain 1: Reliability Metric	1: Method	ology	High	$\times 1$	1	NIOSH Method No 1003	
	1: Method	ology	High	× 1	1	NIOSH Method No 1003	
Metric		ology ohic Scope	High High	× 1 × 1	1	NIOSH Method No 1003 US	
Metric Domain 2: Representative	2: Geograp 3: Applica	bility					
Metric Domain 2: Representative Metric	2: Geograp 3: Applica 4: Tempor	phic Scope bility al Representativeness	High	× 1	1	US	
Metric Domain 2: Representative Metric Metric	2: Geograp 3: Applica 4: Tempor	phic Scope bility al Representativeness	High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \end{array}$	$\frac{1}{2}$	US Workplace that utilizes TCE	
Metric Domain 2: Representative Metric Metric Metric	2: Geograf 3: Applica 4: Tempor 5: Sample	phic Scope bility al Representativeness	High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$1 \\ 2 \\ 4$	US Workplace that utilizes TCE 2003, 15 years old (after PEL)	
Metric Domain 2: Representative Metric Metric Metric Metric	2: Geograp 3: Applica 4: Tempor 5: Sample larity	phic Scope bility al Representativeness	High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$1 \\ 2 \\ 4$	US Workplace that utilizes TCE 2003, 15 years old (after PEL)	
Metric Domain 2: Representative Metric Metric Metric Metric Domain 3: Accessibility/C	2: Geograp 3: Applica 4: Tempor 5: Sample 'larity 6: Metada	bhic Scope bility al Representativeness Size ta Completeness	High High Medium High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 4 1	US Workplace that utilizes TCE 2003, 15 years old (after PEL) Discrete samples given	

Source Citation: Type of Data Source Hero ID	Burr, G 2003. Health hazard e Occupational Exposure; Monito 3970647	_	HETA 20	02-0184-2888	3, Aero-Classics, Ltd., Huron, Ohio.
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality I	$\operatorname{Determination}^{\dagger}$	High		1.4	

Source Citation:	Kinnes, G Pennsylva		luation rep	ort no.	HETA :	97-0214-2689, Dorma Door Controls, Inc., Reamstown
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			Vapor			
Route of Exposure	e:		inhalation	ı		
Exposure Concent		t):	0.71 - 3.5			
Number of Sample		,	3	11		
Number of Sites:			1			
Type of Measuren	ment or Met	hod:	Partial Sl	hift, TW	4	
Worker Activity:			Degrease	r		
Type of Sampling			Area			
Analytic Method:			NIOSH M	fethod 1	022	
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method 1022
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1998) but after PEL
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given
Domain 3: Access	sibility/Clar					
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variab						
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability, uncertainty in the method
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.4	
		Con	tinued on r	next page	è.	

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Source Citation:	Kinnes, G. M 1998. Health hazard evaluation Pennsylvania.	on report no.	HETA 97-0214-2689,	Dorma Door Controls, Inc., Reamstown		
Type of Data Source	Occupational Exposure; Monitoring Data;					
Hero ID	3970645					
EVALUATION						
Domain	Metric Ra	ating MWF*	Score	Comments		

ource Citation:	Gunter, B Colorodo.	. J.,Lucas, J. B 1975. Health	ı hazard ev	aluation	report	no. HHE 74-61-232, Gates Rubber Company, Denv
ype of Data Source fero ID	Occupation 3970644	nal Exposure; Monitoring Data;				
XTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	nor		
Route of Exposure	<b>۵.</b>		inhalation	L		
Exposure Concent		t).	<.05 mg/			
Number of Sample			4.00 mg/	mo		
Number of Sites:			1			
Worker Activity:			Rubber h	ose knitt	ing mad	chine
Number of Worke	rs:		6		0	
Type of Sampling	:		Personal			
Sampling Location	n:		Knitting	Station		
Exposure Duratio	n:		Full shift			
Engineering Contr	rol & percer	t Exposure Reduction:	Not asses	sed.		
PPE:			Cannot w	ear glove	s.	
VALUATION						
		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain		Moorie				
	;1;+	Moulo				
Domain Domain 1: Reliab	v		High	× 1	1	No method given, but HHE done by MOSH
	ility Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.
	Metric 1:		High	× 1	1	No method given, but HHE done by NIOSH.
Domain 1: Reliab	Metric 1:		High High	× 1 × 1	1	No method given, but HHE done by NIOSH.
Domain 1: Reliab	Metric 1: sentative	Methodology Geographic Scope Applicability				
Domain 1: Reliab	Metric 1: sentative Metric 2:	Methodology Geographic Scope Applicability Temporal Representativeness	High High Medium	× 1	1	US
Domain 1: Reliab	Metric 1: sentative Metric 2: Metric 3:	Methodology Geographic Scope Applicability	High High	$ \times 1 \ \times 2 $	$\frac{1}{2}$	US Workplace that utilizes TCE
Domain 1: Reliab Domain 2: Repres	Metric 1: metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$\begin{array}{c} 1 \\ 2 \\ 4 \end{array}$	US Workplace that utilizes TCE Data older than 10 years (1975) but after PEL
Domain 1: Reliab	Metric 1: metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$\begin{array}{c} 1 \\ 2 \\ 4 \end{array}$	US Workplace that utilizes TCE Data older than 10 years (1975) but after PEL
Domain 1: Reliab Domain 2: Repres Domain 3: Access	Metric 1: metric 2: Metric 2: Metric 3: Metric 4: Metric 5: ibility/Clar: Metric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High Medium High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c}1\\2\\4\\1\end{array}$	US Workplace that utilizes TCE Data older than 10 years (1975) but after PEL Discrete samples given
Domain 1: Reliab Domain 2: Repres	Metric 1: metric 2: Metric 2: Metric 3: Metric 4: Metric 5: ibility/Clar Metric 6: ility and Un	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness ncertainty	High High Medium High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c}1\\2\\4\\1\end{array}$	US Workplace that utilizes TCE Data older than 10 years (1975) but after PEL Discrete samples given
Domain 1: Reliab Domain 2: Repres Domain 3: Access	Metric 1: metric 2: Metric 2: Metric 3: Metric 4: Metric 5: ibility/Clar: Metric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High Medium High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c}1\\2\\4\\1\end{array}$	US Workplace that utilizes TCE Data older than 10 years (1975) but after PEL Discrete samples given

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 Hero ID   Occupational Exposure; Monitoring Data; 3970644     EVALUATION   Metric     Domain   Metric     Rating   MWF*   Score     Overall Quality Determination <sup>†</sup> High   1.6			omunaca nom p	1.8	
Hero ID 3970644   EVALUATION   Domain Metric Rating MWF* Score Comments	Source Citation:		Health hazard eva	luation report no	. HHE 74-61-232, Gates Rubber Company, Denver
EVALUATION Domain Metric Rating MWF* Score Comments	Type of Data Source	Occupational Exposure; Monitoring	; Data;		
Domain Metric Rating MWF* Score Comments	Hero ID	3970644			
	EVALUATION				
Overall Quality Determination <sup>†</sup> High 1.6	Domain	Metric	Rating	MWF <sup>*</sup> Score	Comments
	Overall Quality D	Petermination <sup>†</sup>	High	1.6	

'ype of Data Source	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. 9 Occupational Exposure; Monitoring Data;							
Hero ID 3970640								
EXTRACTION Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:				por				
Route of Exposur	re.		liquid, vaj inhalatior					
Exposure Concen		t):		,	5 ppmA	Area: 0.1 - 42.3 ppm		
Number of Sampl		-)-	23		• FF			
Number of Sites:								
Worker Activity:			Stripping	and recy	cling w	ire.		
Type of Sampling	g:		Personal,		0			
Exposure Duration:								
Exposure Frequency:								
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 M	fethod 1	501			
VALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domair 1. Dal' 1	,;];+							
Domain 1: Reliat	JIIIUy							
Domain 1: Reliab	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method 1501		
	Metric 1:	Methodology	High	× 1	1	NIOSH Method 1501		
Domain 1: Relian	Metric 1:	Methodology Geographic Scope	High High	× 1 × 1	1	NIOSH Method 1501 US		
	Metric 1: esentative	Geographic Scope Applicability	0					
	Metric 1: sentative Metric 2: Metric 3: Metric 4:	Geographic Scope Applicability Temporal Representativeness	High	× 1	1	US		
	Metric 1: sentative Metric 2: Metric 3:	Geographic Scope Applicability	High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \end{array}$	$\frac{1}{2}$	US Workplace that utilizes TCE		
	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$\begin{array}{c} 1 \\ 2 \\ 4 \end{array}$	US Workplace that utilizes TCE Data older than 10 years (1988) but after PEL		
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$\begin{array}{c} 1 \\ 2 \\ 4 \end{array}$	US Workplace that utilizes TCE Data older than 10 years (1988) but after PEL		
Domain 2: Repres	Metric 1: sentative Metric 2: Metric 3: Metric 4: Metric 5: sibility/Clari Metric 6:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High Medium High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c}1\\2\\4\\1\end{array}$	US Workplace that utilizes TCE Data older than 10 years (1988) but after PEL Discrete samples given		

Source Citation:	,	M. S.,Galson, S.,Hartle, R. W ncorporated, Ashtabula, Ohio.	1988. Hea	lth hazar	d evalu	ation report no. HETA 87-095-1927, G & L Recovery
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality I	Determination	$\mathbf{n}^{\dagger}$	High		1.4	

Source Citation:	Gilles, D., vania.	Philbin, E 1976. Health hazard	l evaluation	report n	o. HHE	E 76-61-337, TRW Incorporated, Philadelphia, Pennsyl
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	nor		
Route of Exposure	<b>.</b> .		inhalatior			
Exposure Concent		t).	76 - 90 pj	,		
Number of Sample			3	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Number of Sites:			1			
Type of Measuren	nent or Met	hod:	Long terr	n		
Worker Activity:			Machine		n	
Type of Sampling	:		Personal			
PPE:			Uniforms	, gloves		
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	No method given, but HHE done by NIOSH.
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1976) but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Access				_		
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency
Domain 4: Variab	-					
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6	
		Cor	tinued on 1	next page		

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Source Citation:	Gilles, D., Philbin, E. 1976. Health hazard vania.	d evaluation	report n	o. HHE 76-61-	337, TRW Incorporated, Philadelphia, Pennsyl-
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 3970635				
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments

Source Citation: Type of Data Source Hero ID		M. 2003. Health hazard evaluation and Exposure; Monitoring Data;	ation report	no. HE	FA 2001	1-0150-2917, IKI Manufacturing, Edgerton, Wisconsin.
EXTRACTION Parameter			Data			
Life Cycle Stage: Physical Form: Route of Exposure Exposure Concent Worker Activity: Number of Worker Type of Sampling: Analytic Method:	ration (Unit	t):	Use liquid, vaj inhalation 0.045 - 1.3 De-icer ca 10 Personal NIOSH M	n, dermal 5 ppm n filling.		
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabi	lity Metric 1:	Methodology	High	× 1	1	NIOSH Method 1500
Domain 2: Repres	entative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$egin{array}{c} 1 \\ 2 \\ 4 \\ 2 \end{array}$	US Workplace that utilizes TCE Data older than 10 years (2003) but after PEL Only given a range
Domain 3: Access	ibility/Clari Metric 6:	ty Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata
Domain 4: Variab			Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality D	eterminatio	n <sup>†</sup>	High		1.6	

Source Citation:	Chrostek, W. J. Levine M. S., 1981. Health hazard evaluation report no. HHE 30-153-881, Palmer Industrial Coatin Incorp., Williamsport, Pennsylvania.						
Type of Data Source Hero ID	Occupatio 3970632	nal Exposure; Monitoring Data;					
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Exposure Concen	1.1-10.4 r	ng/m31-7	7.3 mg/1	m3 TWA			
Number of Samp	13	116/11101	.0				
Number of Sites:	1						
Type of Measure	chod:	8 hour T	WA				
Type of Sampling	Personal						
	rol & percer	nt Exposure Reduction:	Minimal				
PPE:						rs, helmet, goggles	
Analytic Method	:		NIOSH M	fethod P	&CAM	127	
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	oility						
2011011111110110	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method P&CAM 127	
Domain 2: Repre	sentative						
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1981) but after PEL	
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency	
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability, uncertainty in the method	
Overall Quality I	Determinatio	$\mathrm{on}^\dagger$	High		1.4		

Source Citation:	Gilles, D.,. Illinois.	Anania, T. L.,Ilka, R 1977.	Health haz	ard evalu	uation r	eport no. HHE 77-12-418, Airtex Products, Fairfield		
Гуре of Data Source Hero ID		nal Exposure; Monitoring Data;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			liquid, va	nor				
Route of Exposur	·••		inhalatior					
Exposure Concen		t).	.44ppm	i, acrina				
Number of Sampl			1					
Number of Sites:			1					
Worker Activity:			Area besi	de degre	aser			
Type of Sampling	z:		Area	0				
Sampling Locatio			Area besi	de degre	aser			
Exposure Duratio	on:		Full shift					
Engineering Cont	rol & percer	t Exposure Reduction:	Local exh	aust ven	tilation,	vent hoods		
EVALUATION								
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments		
Domain 1: Reliab	,:1;+							
Domain 1. Renat	Metric 1:	Methodology	High	$\times 1$	1	No method given, but HHE done by NIOSH.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1977)$ but after PEL		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given		
Domain 3: Access	sibility/Clari	ity						
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency		
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency		
Domain 3: Access Domain 4: Varial	Metric 6:	Metadata Completeness	Medium Low	× 1 × 1	2	Most metadata given, missing exposure frequency Not addressed		
	Metric 6: pility and Ur Metric 7:	Metadata Completeness neertainty Metadata Completeness						

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Source Citation:	Gilles, D., Anania, T. L., Ilka, R. 1977. Illinois.	Health haz	ard evalu	ation report no.	HHE 77-12-418, Airtex Products, Fairfield,
Type of Data Source	Occupational Exposure; Monitoring Data	a;			
Hero ID	3970629				
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments

Source Citation: Type of Data Source Hero ID		P 1980. Health hazard evaluational Exposure; Monitoring Data;	on report no. HI	IE 80-48-	-689, M	iami Carey Inc., Monroe, Ohio.
EXTRACTION						
Parameter	Data					
Life Cycle Stage:			Use			
Exposure Concent	tration (Uni	t):	4.0-11.9 mg/m	3		
Worker Activity:			Hanging produ	cts to be	dip pai	inted.
Type of Sampling:			Personal, area			
Exposure Duratio		2 hours				
Exposure Frequer			6-8 hours/ $40$ h			
Engineering Control & percent Exposure Reduction:			Slot exhaust he	ood		
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	No method given, but HHE done by NIOSH.
Domain 2: Repres	sentative					
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1980) but after PEL
	Metric 5:	Sample Size	Medium	$\times 1$	2	range given but no other statistics
Domain 3: Access	sibility/Clari	ity				
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	No metadata given
Domain 4: Variab	oility and Ur	ncertainty				
		Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	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

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .
TRACTION Parameter		Data			
Life Cycle Stage:		Use			
Physical Form:		liquid, va			
Route of Exposure:	X X	inhalation			
Exposure Concentration (Unit	):	7 - 797 pp	om		
Number of Samples:		20			
Number of Sites:		1	0		
Worker Activity:		Degreaser			irectly affected.
Number of Workers:			directly	andod	frectiy affected.
Type of Sampling: Engineering Control & percent Exposure Reduction:		Personal Local Ext	aust von	tilation	
00 0 F	F				
VALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	No method given, but HHE done by NIOSH.
Domain 2: Representative					
Metric 2:	Geographic Scope	High	$\times 1$	1	US
Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1976) but after PEL
Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Accessibility/Clarit	ΣV				
	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Metric 6:					
	cortainty				
Domain 4: Variability and Un		Low	$\sim 1$	3	Not addressed
	certainty Metadata Completeness	Low	× 1	3	Not addressed

\* MWF = Metric Weighting Factor <sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation:	Fannick, N New York.		tion report	no. HHI	E 79-18-	627, Standard Folding Cartons, Inc., Jackson Heights
Type of Data Source Hero ID	Occupation 3970623	nal Exposure; Monitoring Data;				
EXTRACTION Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	por		
Route of Exposure:		inhalatior	n, dermal			
Exposure Concent	ration (Uni	t):	1.0 - 1.6			
Number of Samples:			4			
Number of Sites:			1			
Worker Activity:			Gluing ca	rdboard	boxes	
Type of Sampling:			Area			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	High	$\times 1$	1	No method given, but HHE done by NIOSH.
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1979) but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Access		ty				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata
Domain 4: Variab	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	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.</li>

		F.,Kramkowski, R. S.,Cromer, on, Kenton, Ohio.	J. W 197	74. Healt	th hazaı	rd evaluation report no. HHE 73-151-141, Essex Wire			
	cupation 0621	nal Exposure; Monitoring Data;							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Physical Form:			liquid, va	por					
Route of Exposure:			inhalation						
Exposure Concentration (Unit):			0-100 ppn						
Number of Samples:			12						
Number of Sites:			1						
Type of Measurement or Method:			short-tern	n					
Worker Activity:			Die cleani		easer				
Number of Workers:			311	0)0					
Type of Sampling:			Area						
Engineering Control & percent Exposure Reduction:			Some Local Exhaust Ventilation						
		-							
EVALUATION									
Domain		Metric	Rating	$MWF^*$	Score	Comments			
Domain 1: Reliability									
	tric 1:	Methodology	High	$\times 1$	1	No method given, but HHE done by NIOSH.			
Mee		Methodology	Ingn	~ 1	1	No method given, but fifth done by N10511.			
Domain 2: Representat	tive								
	tric 2:	Geographic Scope	High	$\times 1$	1	US			
	tric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	tric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1974)$ but after PEL			
Met	tric 5:	Sample Size	Medium	$\times 1$	2	range given but no other statistics			
Domain 3: Accessibility	w/Class	it v							
-	tric 6:	Metadata Completeness	Low	$\times 1$	3	Only sample type given			
Met	. 0.	Metadata Completeness	LOW	~ 1	J	Omy sample type given			
Domain 4: Variability a	and Ur	ncertainty							
-	tric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed			
Overall Quality Determ	ninatio	n <sup>†</sup>	Medium		1.8				
			mound		1.0				
		A	tinued on r						

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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 Wi Corporation, Kenton, Ohio.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970621
EVALUATION	
Domain	Metric Rating MWF* Score Comments
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.</li>

		L.,Reifschneider, R 1973. H Faylor Michigan.	Health hazard ev	aluation	report	no. HHE 72-42-76, Steel Tool and Engineering
Type of Data Source Oce		al Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, vapor			
Route of Exposure:			inhalation, der	mal		
Exposure Concentration	on (Unit	):	Em ratio given	. No con	centrati	on provided.
Number of Samples:			18			
Number of Sites:	1					
Worker Activity:			Degreasing, Ac			
Engineering Control &	z percent	t Exposure Reduction:	Some Local Ex	haust Ve	entilatio	n
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliability						
	etric 1:	Methodology	High	$\times 1$	1	No method given, but HHE done by NIOSH.
Domain 2: Representa	ative					
_	etric 2:	Geographic Scope	High	$\times 1$	1	US
Me	etric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
Me	etric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1972)$ but after PEL
Me	etric 5:	Sample Size	Low	$\times 1$	3	All discussed with respect to equivalent exposure
Domain 3: Accessibilit	ty/Clarit	ty				
Me	etric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	No metadata since no sampling details were given.
Domain 4: Variability						
Me	etric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality Determ	mination	1 <sup>†</sup>	Unacceptable		4	Metric Mean Score: 2.0.
		C	Continued on nex	t page		

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Hervin, R. L.,Reifschneider, R Company, Taylor Michigan.	1973. Health hazard ev	valuation report no.	. HHE 72-42-76, Steel Tool and Engineering
Occupational Exposure; Monitorin 3970620	g Data;		
Metric	Rating	$MWF^*$ Score	Comments
	Hervin, R. L.,Reifschneider, R Company, Taylor Michigan. Occupational Exposure; Monitorin 3970620	Hervin, R. L.,Reifschneider, R 1973. Health hazard ev Company, Taylor Michigan. Occupational Exposure; Monitoring Data; 3970620	Occupational Exposure; Monitoring Data; 3970620

\*\* 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

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation: Type of Data Source Hero ID		T. 1975. Health hazard evalua nal Exposure; Monitoring Data;	tion report	no. HH	E 74-96	-173, Richdel Corporation, Carson City, Nevada.			
EXTRACTION Parameter			Data						
Life Cycle Stage: Physical Form: Route of Exposure Exposure Concent Number of Sample Number of Sites: Worker Activity: Type of Sampling: Engineering Contr	ration (Uni es:	t): nt Exposure Reduction:	Use liquid, vaj inhalation 1.7 - 2.9 p 3 1 Degreasin Personal Some Loc	n, dermal opm g	ıst Vent	ilation			
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliabi	ility Metric 1:	Methodology	High	$\times 1$	1	No method given, but HHE done by NIOSH.			
Domain 2: Repres	ontativo								
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1975) but after PEL			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given			
Domain 3: Access	ibility/Clari	it v							
Domain 5. Access	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only sample type given			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Not addressed			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	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.</li>

Type of Data Source Occu Hero ID 39700 EXTRACTION Parameter Life Cycle Stage: Physical Form: Route of Exposure: Exposure Concentration Number of Samples: Number of Sites: Type of Measurement of Worker Activity: Type of Sampling: Analytic Method:	17 (Un		Data Use liquid, va inhalation 32-357 m 33 1 Short ter Degreasin Personal,	n, dermal g/m3 m, 8 hou ng						
ParameterLife Cycle Stage: Physical Form: Route of Exposure: Exposure Concentration Number of Samples: Number of Sites: Type of Measurement of Worker Activity: Type of Sampling:			Use liquid, va inhalatio: 32-357 m 33 1 Short ter Degreasin Personal,	n, dermal g/m3 m, 8 hou ng						
Life Cycle Stage: Physical Form: Route of Exposure: Exposure Concentration Number of Samples: Number of Sites: Type of Measurement of Worker Activity: Type of Sampling:			Use liquid, va inhalatio: 32-357 m 33 1 Short ter Degreasin Personal,	n, dermal g/m3 m, 8 hou ng						
Physical Form: Route of Exposure: Exposure Concentration Number of Samples: Number of Sites: Type of Measurement of Worker Activity: Type of Sampling:			liquid, va inhalation 32-357 m 33 1 Short ter Degreasin Personal,	n, dermal g/m3 m, 8 hou ng						
Physical Form: Route of Exposure: Exposure Concentration Number of Samples: Number of Sites: Type of Measurement of Worker Activity: Type of Sampling:			liquid, va inhalation 32-357 m 33 1 Short ter Degreasin Personal,	n, dermal g/m3 m, 8 hou ng						
Route of Exposure: Exposure Concentration Number of Samples: Number of Sites: Type of Measurement of Worker Activity: Type of Sampling:			inhalatio 32-357 m 33 1 Short ter Degreasin Personal,	n, dermal g/m3 m, 8 hou ng						
Exposure Concentration Number of Samples: Number of Sites: Type of Measurement of Worker Activity: Type of Sampling:			32-357 m 33 1 Short ter Degreasin Personal,	g/m3 m, 8 hou ng						
Number of Samples: Number of Sites: Type of Measurement of Worker Activity: Type of Sampling:			33 1 Short ter Degreasin Personal,	m, 8 hou 1g	r TWA					
Number of Sites: Type of Measurement of Worker Activity: Type of Sampling:	Met	chod:	1 Short ter Degreasin Personal,	ng	r TWA					
Type of Measurement of Worker Activity: Type of Sampling:	Met	bod:	Degreasir Personal,	ng	r TWA					
Worker Activity: Type of Sampling:			Degreasir Personal,	ng						
Type of Sampling:			Personal,							
				nica						
					NIOSH method P &CAM 127					
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliability										
Metr	c 1:	Methodology	High	$\times 1$	1	NIOSH method P &CAM 127				
Domain 2: Representati										
Metr		Geographic Scope	High	$\times 1$	1	IIC				
Metr		Applicability	High	$\times 1 \times 2$	$\frac{1}{2}$	US Workplace that utilizes TCE				
Metr		Temporal Representativeness	Medium	$\times 2 \times 2$	4	Data older than 10 years (1981) but after PEL				
Metr		Sample Size	High	$\times 1^{\times 2}$	4	Discrete samples given				
Weth	ι σ.	Sample Size	Ingn	× 1	1	Discrete samples given				
Domain 3: Accessibility	Clar	ity								
Metr		Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency				
Domain 4: Variability a	d U	ncertainty								
Metr		Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method				
Overall Quality Determi	natio	$\sim$	High		1.4					
		Co	ntinued on a	next page	)					

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Source Citation:	Ruhe, R. L., Watanabe, A., Stein, G. 1981. Collegeville, Pennsylvania.	Health	hazard eva	aluation report no.	HHE 80-49-808,	Superior Tube Company,
Type of Data Source	Occupational Exposure; Monitoring Data;					
Hero ID	3970617					
EVALUATION						
Domain	Metric	Rating	$MWF^{\star}$	Score	Comm	ents

\* 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.</li>

ource Citation:		th hazard evaluation report no. HETA 2004-0372-3054 hloroethylene, Entek International, Lebanon, Oregon.								
'ype of Data Source Iero ID		nal Exposure; Monitoring Data;	0	1		, , , , ,				
XTRACTION			_							
Parameter			Data							
Life Cycle Stage:			Use							
Physical Form:			liquid, va	por						
Route of Exposure:			inhalatior		l					
Exposure Concent	ration (Uni	t):	2.0 - 130.	0 ppm						
Number of Sample	es:		517							
Type of Measurement or Method:			Short term	m, 8 hou	r TWA					
Worker Activity:			Varied							
Number of Workers:			142							
Type of Sampling:			Personal, Area							
Sampling Location:			multiple							
Exposure Duration:			12 hour work day							
Exposure Frequen	cy:		3.5 d/w NMAM Method 1022							
Analytic Method:			NMAM N	Aethod 1	022					
VALUATION										
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliabi	lity									
	Metric 1:	Methodology	High	$\times 1$	1	NMAM Method 1022 completed by NIOSH				
Domain 2: Repres	entative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2004, 14 years old (after PEL)				
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given				
Domain 3: Access	ibility/Clar	ty								
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency				
Domain 4: Variab	ility and Ur	ncertainty								
		Con	tinued on r	ext nage	2					

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Source Citation:	,		/ /			h hazard evaluation report no. HETA 2004-0372-3054, hloroethylene, Entek International, Lebanon, Oregon.
Type of Data Source Hero ID		nal Exposure; Monitoring Data	0	exposed	10 1110	moroernylene, Entek International, Lebanon, Oregon.
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	High		1.4	

<sup>\*</sup> MWF = Metric Weighting Factor
 <sup>†</sup> 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.</li>

Parameter		Data							
I al ameter									
Life Cycle Stage:		Use							
Physical Form:			por						
Route of Exposure:	inhalatior								
Exposure Concentration (Unit):			4-9 mg/	m3Area	n: 1-16 mg/m3				
Number of Samples:		7							
Number of Sites:		1							
Type of Measurement or Method:			WA						
Worker Activity:			lishing a	nd degr	easing				
Number of Workers:									
Type of Sampling:			Area						
Exposure Duration:			6-8 hours						
Exposure Frequency:			5 days per week						
Engineering Control & perce	nt Exposure Reduction:	Ventilated open surface tanks NIOSH Method No. P&CAM 127							
Analytic Method:		NIOSH M	lethod N	o. P&C	CAM 127				
ALUATION									
Domain	Metric	Rating	$MWF^*$	Score	Comments				
Domain 1: Reliability									
Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method No. P&CAM 127				
Domain 2: Representative									
Metric 2:	Geographic Scope	High	$\times 1$	1	US				
Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE				
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1982) but after PEL				
Metric 5:	Sample Size	High	× 1	1	Discrete samples given				
Domain 3: Accessibility/Clar	ity								

Source Citation: Type of Data Source Hero ID	,	1982. Health hazard evalua nal Exposure; Monitoring Dat	1	o. HETA	82-040	0-119, Synthes Ltd. (USA), Monument, Colorado.
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality D	Determination	$\mathbf{n}^{\dagger}$	High		1.4	

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\* MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>

	Burton, N. C., Monesterskey, J.: 1996. Health hazard evaluation report no. HETA 96-0135-2612, Eagle Knitting Mills, Inc., Shawano, Wisconsin.							
ype of Data Source 0	Occupational Exposure; Monitoring Data; 3970594							
XTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			liquid, va	por				
Route of Exposure:			inhalatior					
Exposure Concentra		t):				Area: ND - 7.05 ppm		
Number of Samples		,	6			* *		
Number of Sites:			1					
Type of Measureme	ent or Met	hod:	8 hour TV	NA				
Worker Activity:			Sewing, s	pot clean	ing fab	ric		
Number of Workers	5:		85					
Type of Sampling:			Personal,	area				
Sampling Location:			multiple 53 hours/week					
Exposure Frequency								
	l & percer	nt Exposure Reduction:	Ceiling fa	ns				
PPE:			Johnson &	& Johnso	n Germ	n filter masks		
VALUATION								
		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain			0					
	ity	Medite						
Domain Domain 1: Reliabili	ity Metric 1:	Methodology	High	× 1	1	No method given, but HHE done by NIOSH.		
Domain Domain 1: Reliabili N	Metric 1:			× 1	1	No method given, but HHE done by NIOSH.		
Domain Domain 1: Reliabili Domain 2: Represen	Metric 1:	Methodology Geographic Scope		× 1 × 1	1	No method given, but HHE done by NIOSH.		
Domain Domain 1: Reliabili N Domain 2: Represen	Metric 1: ntative	Methodology Geographic Scope Applicability	High					
Domain Domain 1: Reliabili M Domain 2: Represer	Metric 1: ntative Metric 2:	Methodology Geographic Scope	High	× 1	1	US		
Domain Domain 1: Reliabili Domain 2: Represer	Metric 1: ntative Metric 2: Metric 3:	Methodology Geographic Scope Applicability	High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \end{array}$	$\frac{1}{2}$	US Workplace that utilizes TCE		
Domain Domain 1: Reliabili Domain 2: Represer	Metric 1: ntative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$1 \\ 2 \\ 4$	US Workplace that utilizes TCE Data older than 10 years (1996) but after PEL		
Domain Domain 1: Reliabili Domain 2: Represer	Metric 1: ntative Metric 2: Metric 3: Metric 4: Metric 5:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	High High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	$1 \\ 2 \\ 4$	US Workplace that utilizes TCE Data older than 10 years (1996) but after PEL		
Domain Domain 1: Reliabili Domain 2: Represer	Metric 1: ntative Metric 2: Metric 3: Metric 4: Metric 5: pility/Clari Metric 6:	Methodology Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High High Medium High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 4\\ 1\end{array}$	US Workplace that utilizes TCE Data older than 10 years (1996) but after PEL Discrete samples given		

			iniaca nom p		1.9				
Source Citation:	Burton, N. Shawano, V	,	Health hazard	evaluatio	on repo	ort no. HETA 96-0135-2612, Eagle Knitting Mills, Ir			
Type of Data Source	Occupation	Occupational Exposure; Monitoring Data;							
Hero ID	3970594								
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed			
Overall Quality I	Determination	$\mathbf{n}^{\dagger}$	High		1.6				

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<sup>★</sup> MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>

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 Hero ID		Occupational Exposure; Monitoring Data; 3970582						
EXTRACTION Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			liquid, va	por				
Route of Exposure	e:		inhalatior					
Exposure Concent		t):	Personal:	,	5  mg/m	13		
Number of Sample	es:	,	6		0,			
Number of Sites:			1					
Type of Measurem	nent or Met	hod:	TWA					
Worker Activity:			Painting,	degreasin	ıg			
Number of Worker			400					
Type of Sampling:	:		Personal					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabi	lity							
	Metric 1:	Methodology	High	$\times 1$	1	No method given, but HHE done by NIOSH.		
Domain 2: Repres	entative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1975) but after PEL		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given		
Domain 3: Access	- /							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency		
Domain 4: Variab	ility and Ui	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6			
		Con	tinued on r	next page	!			

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Source Citation:	Rosensteel, R. E.,Lucas, J. B., 1975. Health haza Wilmerding, Pennsyvlania.	rd evaluation re	eport no. HHE 74-28-212,	Westinghouse Air Brake Company,			
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 3970582						
EVALUATION							
Domain	Metric Rati	ng MWF* S	Score	Comments			

 $\star$  MWF = Metric Weighting Factor

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

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 Hero ID	Occupational Exposure; Monitoring Data; 3970554							
EXTRACTION Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			liquid, va					
Route of Exposure			inhalation	,				
Exposure Concent	(	t):	Personal:	4.5-5.2 p	opmAre	a: 1.1-5.3 ppm		
Number of Sample	es:		8					
Number of Sites:			1					
Type of Measurem	nent or Met	hod:	TWA					
Worker Activity:			Open top		er			
Type of Sampling:			Personal, area Around the degreaser					
Sampling Location	1:		Around t.	ne degrea	aser			
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabi	lity							
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH method 1022		
Domain 2: Represe	entative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1991) but after PEL		
	Metric 5:	Sample Size	High	× 1	1	Discrete samples given		
Domain 3: Accessi	ibility/Clar							
	Metric 6:	Metadata Completeness	Medium	× 1	2	Most metadata given, missing exposure frequency		
Domain 4: Variabi								
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability uncertainty in the method		
Overall Quality De	eterminatio	n†	High		1.4			
		Con	ntinued on r	next page	<u>,</u>			

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Source Citation:	Barsan, M. E., 1991. Health hazard evaluat. Decatur, Illinois.	ion report	no. HET	A 90-344-2	159, A.W. Cash Valve Manufacturing Corporation,		
Type of Data Source	ce Occupational Exposure; Monitoring Data;						
Hero ID	3970554						
EVALUATION							
Domain	Metric	Rating	$MWF^{\star}$	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.</li>

		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; 3970552							
EXTRACTION Parameter			Data					
Farameter			Data					
Life Cycle Stage:			Use					
Physical Form:			liquid, va	por				
Route of Exposure:			inhalation	n, dermal	, ingest	ion		
Exposure Concentration (Unit):		TWA - 0 mArea: .4	*		y while operating degreaser: N.D 233 pp-			
Number of Samples	3:		62		-			
Number of Sites:			1					
Type of Measureme	ent or Met	hod:	8  hour  T					
Worker Activity:			Degreasing 7200 total, 29 degreaser operators Personal, area					
Number of Workers	3:							
Type of Sampling:								
Sampling Location:			Around 10 different degreasers					
Exposure Duration:			Varies roll tops to degreasers, high temp safety switches					
Engineering Contro Analytic Method:	ol & percer	t Exposure Reduction:	roll tops f NIOSH M					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliabili	ity							
]	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method No. P&CAM 127		
Domain 2: Represe	ntative							
]	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
]	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
]	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1982) but after PEL		
]	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given		
Domain 3: Accessib	oility/Clari	ity						
]	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency		
		*	ntinued on 1		;			

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Source Citation:	Gorman, R.,Rinsky, R.,Stein, G.,Anderso Whitney Aircraft, West Palm Beach, Flor	,	4. Healt	h hazar	rd evaluation report no. HETA 82-075-1545, Pratt &
Type of Data Source	Occupational Exposure; Monitoring Data	;			
Hero ID	3970552				
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 4: Variab	ility and Uncertainty				
	Metric 7: Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method $% \mathcal{A} = \mathcal{A} = \mathcal{A} = \mathcal{A}$
Overall Quality D	$etermination^{\dagger}$	High		1.4	

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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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

	92. Health hazard evaluation rep nal Exposure; Monitoring Data;		ETA-90-2	23-2211	, Thomson Consumer Electronics, Marion, Indiana.
EXTRACTION Parameter		Data			
Life Cycle Stage:		Use			
Physical Form:		liquid, va	por		
Route of Exposure:		inhalation			
Exposure Concentration (Uni	it):	Personal:	0.01 - 11	ppmA	rea: 0.02 - 50 ppm
Number of Samples:		11			
Number of Sites:		1			
Worker Activity:		Degreasir	ıg		
Number of Workers:		1900			
Type of Sampling:		Personal,		1.4	
Sampling Location:		Degrease	rs 1, 2, 3,	and 4	
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method 1003
		_			
Domain 2: Representative Metric 2:	Coormanhia Coora	II: mh	× 1	1	IIG
Metric 2: Metric 3:	Geographic Scope Applicability	High High	$\times 1 \times 2$	$\frac{1}{2}$	US Workplace that utilizes TCE
Metric 3. Metric 4:	Temporal Representativeness	Medium	$\times 2 \times 2$	4 4	Data older than 10 years (1992) but after PEL
Metric 4. Metric 5:	Sample Size	High	$ \times 1 $	1	Discrete samples given
Metho 9.	Sample Size	Ingn	× 1	1	Discrete samples given
Domain 3: Accessibility/Clar					
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Domain 4: Variability and U	ncertainty				
	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability uncertainty in the method
Overall Quality Determination	$\mathbf{n}^{\dagger}$	High		1.4	

\* MWF = Metric Weighting Factor

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

ource Citation:	Love, J. H Washingto		zard evalua	tion rep	ort no.	HETA-81-065-938, METRO Bus Maintenance Shop
ype of Data Source ero ID	Occupatio 3859376	nal Exposure; Monitoring Data;				
XTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	por		
Route of Exposure	2:		inhalatior			
Exposure Concent		it):	ND - 3.8			
Number of Sample		,	3	0,		
Number of Sites:			1			
Type of Measurem	nent or Met	hod:	Short term	n		
Worker Activity:			Degreasin	g		
Number of Worker	s:		17 - 2 deg	greasing o	operator	°S.
Type of Sampling:			Area			
Sampling Location	1:		Degreaser			
Analytic Method:			NIOSH M	fethod N	o. P&C	ZAM 127
VALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method No. P&CAM 127
Domain 2: Repres	entative					
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1981) but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Accessi	bility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Domain 4: Variabi	ility and U	ncertainty				
Domain 4. variab	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variabilit
	Metric 7.					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 <sup>*</sup> Score Comments
Overall Quality I	Determination <sup>†</sup> High 1.4

\* MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>

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 Hero ID	Occupation 3545708	nal Exposure; Monitoring Data;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:				por				
Route of Exposure:			inhalation					
Exposure Concentration (Unit):			ND - 1.96	mg/m3				
Number of Samples:			14	0,				
Number of Sites:			19					
Type of Measurement or Method:			short term	n				
Worker Activity:			Dry clean	ing				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabi	lity							
	Metric 1:	Methodology	Medium	$\times 1$	2	Method described, in peer review journal assumed to use a ceptable methods		
Domain 2: Repres	entative							
_	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Greece (OECD country)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1998) but after PEL		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given		
Domain 3: Accessi	ibility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata		
Domain 4: Variabi	ility and Ui	ncertainty						
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Addressed through sampling multiple shops		
Overall Quality De	eterminatio	$\mathbf{n}^{\dagger}$	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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

]	ene and T		easing over	the Last	30 year	Reduction of Occupational Exposure to Perchloroethy- s: Influence of Technology Innovation and Legislation.		
Type of Data Source C	Occupational Exposure; Published Models for Exposures or Releases; 3045042							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			vapor					
Route of Exposure:			inhalation	L				
Type of Measurement or Method:			Estimatio	n Model				
Worker Activity:		Modeling	degrease	r expos	ure			
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabili	tv							
	Metric 1:	Methodology	High	$\times 1$	1	Published Journal Article: Journal of Exposure analysis and Environmental Epidemiology		
Domain 2: Represer	ntative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Data based on German facilities (OECD country).		
	Metric 3:	Applicability	High	$\times 2$	2	Degreaser exposure modeling		
Ν	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2003, 15 years old		
N	Metric 5:	Sample Size	N/A		N/A	N/A - modeled exposures		
Domain 3: Accessib	ility/Clari	ty						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Sources are cited, but does not provide details on how reported values were derived from cited sources.		
Domain 4: Variabili	ty and Ur	ocertainty						
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Variability in parameter values discussed, but no discussion of uncertainties.		
Overall Quality Det	. ,.	+	High		1.6			

<sup>\*</sup> MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>

	Niosh, 1997. Control of health and safety hazards in commercial drycleaners: chemical exposures, fire hazards, and ergonomic risk factors.								
	Occupation 3044963	nal Exposure; Monitoring Data;							
EXTRACTION Parameter			Data						
Life Cycle Stage:			Use						
Physical Form:	liquid, va	por							
Route of Exposure:				n, dermal					
Exposure Concentration (Unit):						- 3.11 ppm			
Number of Samples:				· · · · · · · · · · · · · · · · · · ·		5 FF			
Type of Measurement or Method:				n, TWA					
Worker Activity:				,	nents in	h drycleaning.			
Type of Sampling:			Personal	00		v 0			
Sampling Location:			Spotting	Station					
Engineering Control & percent Exposure Reduction:					ood, ma	akeup air unit			
PPE:				None					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliabili	ity								
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method 1003			
Domain 2: Represen	ntative								
I	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
I	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1997) but after PEL			
]	Metric 5:	Sample Size	High	× 1	1	Discrete samples given			
Domain 3: Accessib	oility/Clar	ity							
1	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency			
Domain 4: Variabil	ity and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability uncertainty in the method			
		Con	ntinued on r	next page	9				

Niosh, 1997. Control of risk factors.	health and safety h	azards in c	commerci	al drycleaners	s: chemical exposures, fire hazards, and ergonomic
Occupational Exposure;	Monitoring Data;				
3044963					
1	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
$\operatorname{Petermination}^\dagger$		High		1.4	
	risk factors. Occupational Exposure; 3044963	Niosh, 1997. Control of health and safety h risk factors. Occupational Exposure; Monitoring Data; 3044963 Metric	risk factors. Occupational Exposure; Monitoring Data; 3044963 Metric Rating	risk factors. Occupational Exposure; Monitoring Data; 3044963 Metric Rating MWF*	Occupational Exposure; Monitoring Data; 3044963 Metric Rating MWF* Score

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<sup>\*</sup> MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>

	Baumann, A., Page, E., Mueller, C., Burr, G., Hitchcock, E 2008. Evaluation of Neurological Dysfunction among Workers Exposed to Trichloroethylene.								
Type of Data Source		nal Exposure; Monitoring Data;							
EXTRACTION Parameter		Data							
Life Cycle Stage:			Use						
Physical Form:			liquid, va	por					
Route of Exposure:			inhalation						
Exposure Concentr	ation (Uni	t):	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						
Worker Activity:			Productio	on of Mic	roporou	is polyethylene battery separators			
Number of Workers:			142						
Type of Sampling:			Personal,						
Sampling Location:			Entire process						
Exposure Duration:			12 hr work day						
Exposure Frequenc	y:		3.5 days a week						
Analytic Method:			NIOSH NMAM Method 1022 [NIOSH 2006].						
EVALUATION									
Domain		Metric	Rating	$MWF^*$	Score	Comments			
Domain 1: Reliabil	ity								
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH NMAM Method 1022 [NIOSH 2006].			
Domain 2: Represe	ntative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Source dataed 2008, but data from earlier; older than 10 year but after PEL $$			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given			
Domain 3: Accessit	oility/Clar	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency			
Domain 4: Variabil	ity and Ur	ncertainty							
		Con	tinued on r	ext nage					

		. 1		1.9	
,		ırr, G.,Hitchcocl	к, Е 1	2008. I	Evaluation of Neurological Dysfunction among Workers
*	nal Exposure; Monitoring D	ata;			
2947998					
	Metric	Rating	MWF*	Score	Comments
Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Determination	$\mathbf{n}^{\dagger}$	High		1.4	
	Exposed to Occupation 2947998 Metric 7:	Baumann, A.,Page, E.,Mueller, C.,Bu Exposed to Trichloroethylene. Occupational Exposure; Monitoring D 2947998 Metric	Baumann, A.,Page, E.,Mueller, C.,Burr, G.,Hitchcool Exposed to Trichloroethylene. Occupational Exposure; Monitoring Data; 2947998 Metric Rating Metric 7: Metadata Completeness Medium	Baumann, A.,Page, E.,Mueller, C.,Burr, G.,Hitchcock, E Exposed to Trichloroethylene. Occupational Exposure; Monitoring Data; 2947998 Metric Rating MWF* Metric 7: Metadata Completeness Medium × 1	Occupational Exposure; Monitoring Data;         2947998         Metric       Rating         Metric 7:       Metadata Completeness         Medium       × 1       2

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<sup>\*</sup> MWF = Metric Weighting Factor
 <sup>†</sup> 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.</li>

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 Hero ID		nal Exposure; Published Models							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Physical Form:			vapor						
	Route of Exposure:			L					
Type of Measurement or Method:			Estimatio	n Model					
Worker Activity: Moo				degrease	r expos	ure			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	Journal of Exposure analysis and Environmental Epidemiology			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	Location of plants not indicated, but US-based study			
	Metric 3:	Applicability	High	$\times 2$	2	Degreaser exposure modeling			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1991, 27 years old			
	Metric 5:	Sample Size	N/A		N/A	N/A - modeled exposures			
Domain 3: Access	ibility/Clari	ty							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Transparent and well presented. Well documented.			
Domain 4: Variab	ility and Ur	certainty							
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Variability in machine types, but no discussion of uncertainties.			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6				

<sup>\*</sup> MWF = Metric Weighting Factor
 <sup>†</sup> 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.</li>

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 Hero ID	Occupation 2534318	nal Exposure; Monitoring Data;					
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Physical Form:			vapor				
Route of Exposure:			inhalation				
Exposure Concent		t):	ND- 11 ug/m3				
Number of Samples:			7				
Number of Sites:			1				
Type of Measurement or Method:			Short term				
Worker Activity:			Testing printer	VOC pr	oductio	n	
Type of Sampling	:		Area				
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	Medium	$\times 1$	2	Method described and in peer reviewed journal article, a sumed to be acceptable	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU (OECD)	
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Data taken inside test chamber, not expected to be represe tative of occupational exposures	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015, 3 years old	
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range, mean, and STD given	
Domain 3: Access	ibility/Clari	itv					
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only sample type given	
Domain 4: Variab	ility and Ur	certainty					
Domain 4. Variab	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed	
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.4.	
			Continued on nex				

Source Citation:	Kowalska, J.,SzewczyÅska, M.,PoÅnia office printers and photocopiers. Envir	/			olatile organic compounds emitted from
Type of Data Source	Occupational Exposure; Monitoring D	ata;			
Hero ID	2534318				
EVALUATION					
Domain	Metric	Rating	MWF* S	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

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation:									
Type of Data Source Hero ID		nal Exposure; Reports for Data	or Informat	ion Othe	er than	Exposure or Release Data;			
EXTRACTION									
Parameter	Data								
Life Cycle Stage:			Use						
Physical Form:				por					
Route of Exposure:			inhalatior	•					
Number of Sites:									
Worker Activity:			Etch and	strip res	ist circu	iit board			
Number of Worke		5,028							
EVALUATION									
Domain		Metric	Rating	$MWF^*$	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	Medium	$\times 1$	2	Peer-reviewed article, using data not from a frequently used source			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	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: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Sources clearly documented			
Domain 4: Variab	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.9				

\* MWF = Metric Weighting Factor <sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

	Strelec, F 2012. Trichloroethylene Overexposure in an Automotive Stamping Facility. Journal of Occupational and Environmental Hygiene.								
Type of Data Source (		nal Exposure; Monitoring Data;							
EXTRACTION Parameter			Data						
Life Cycle Stage:			Use						
Physical Form:			liquid, va	por					
Route of Exposure: Exposure Concentration (Unit): Number of Sites: Type of Measurement or Method:			inhalatior						
					.5 -832.	5 ppm ceiling			
			1						
			TWA, she	ort term					
Worker Activity:			Degreasin	g					
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: Reliabili	tv								
	Metric 1:	Methodology	High	$\times 1$	1	OSHA 1001			
Domain 2: Represe	ntative								
_	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
I	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
l	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012, 6 years old			
1	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given			
Domain 3: Accessib	oility/Clar	ity							
1	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency			
Domain 4: Variabili	ity and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variability uncertainty in the method			
		~							
		Con	tinued on r	next page	e e e e e e e e e e e e e e e e e e e				

				1.9.	
Source Citation:	Strelec, F. 2012. Trichloroethylene Ov ronmental Hygiene.	erexposure in	an Auto	motive Sta	mping Facility. Journal of Occupational and Envi-
Type of Data Source Hero ID	Occupational Exposure; Monitoring Dat 2128379	a;			
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Overall Quality D	$\operatorname{Petermination}^\dagger$	High		1.2	

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<sup>\*</sup> MWF = Metric Weighting Factor
<sup>†</sup> 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.</li>
	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 O		nal Exposure; Monitoring Data;					
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Physical Form:			liquid, va	por			
Route of Exposure:			inhalatior				
Exposure Concentrat	tion (Uni	t):	0.98 - 2.4				
Number of Samples:			40	-,			
Worker Activity:			Dry-clean	ing			
Type of Sampling:			Personal				
Sampling Location:			operator				
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliability	57						
	letric 1:	Methodology	Medium	$\times 1$	2	Method described and published Journal Article; therefore method assumed to be acceptable	
Domain 2: Represent	tative						
M	letric 2:	Geographic Scope	Low	$\times 1$	3	Iran (non-OECD)	
Μ	letric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE	
Μ	letric 4:	Temporal Representativeness	High	$\times 2$	2	2011, 7 years old	
М	letric 5:	Sample Size	Medium	$\times 1$	2	Mean and STD given but no discrete data	
Domain 3: Accessibil	lity/Clari	ty					
М	letric 6:	Metadata Completeness	Low	$\times 1$	3	Sample type given, but no other metadata	
Domain 4: Variabilit	y and Un	certainty					
	letric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed	
Overall Quality Dete	rminatio	$a^{\dagger}$	Medium		1.9		

Source Citation:		M. S., Albrecht, W. N 1989. on, Madisonville, Kentucky.	Health I	Hazard E	valuatior	n Report No. HETA-86-380-1957, York Internati
Type of Data Source Hero ID	Occupation 2072185	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, v	apor		
Route of Exposure	:			on, derma	1	
Exposure Concenti		t):	31.1 - 38			
Number of Sample		,	33			
Number of Sites:			1			
Type of Measurem	ent or Met	hod:	Full Shi	$^{ m ft}$		
Worker Activity:			Metal D	egreasing		
Number of Worker	s:		40			
Type of Sampling:			Persona			
Analytic Method:			NIOSH	Method 1	022	
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method 1022
Domain 2: Represe	entative					
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years $(1989)$ but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Accessi	bility/Clari	itv				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Domain 4: Variabi	lity and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	None discussed, but NIOSH method addresses variab uncertainty in the method
		Con	tinued on	next pag	e	

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Source Citation:	Crandall, M. S., Albrecht, W. N 1989. Corporation, Madisonville, Kentucky.	Health 1	Hazard Eva	aluation Report No.	HETA-86-380-1957, York International
Type of Data Source	Occupational Exposure; Monitoring Data;				
Hero ID	2072185				
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Overall Quality D	$\operatorname{vetermination}^\dagger$	High		1.4	

Source Citation:		V. J., Orris, P., Kramkowski, R., A lating Corporation, Freeport, Illi		D 1988	. Healt	th Hazard Evaluation Report No. HETA-86-121-1923,
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	por		
Route of Exposure	:		inhalatior	*		
Exposure Concent	ration (Uni	t):	82.1 - 84.2	2  ppm		
Number of Sample	es:		2			
Type of Measurem	ent or Met	hod:	TWA			
Worker Activity:			Metal De	greasing		
Number of Worker			87			
Type of Sampling:			area			
Analytic Method:			NIOSH M	fethod 10	003	
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method 1003
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1988) but after PEL
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given
Domain 3: Accessi	bility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency
Domain 4: Variabi	lity and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability/ uncertainty in the method
Overall Quality De	eterminatio	n†	High		1.4	
		Con	tinued on r	next page	,	

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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 <sup>*</sup> Score Comments								

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. Occupational Exposure; Completed Exposure or Risk Assessments; 1067092						
Type of Data Source Hero ID								
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Environment					
Physical Form:			gas/vapor					
Route of Exposur Type of Measuren		had	inhalation Estimation Mo	. d.al				
Worker Activity:	nent or met	nod:	Modeling ambi		sure to	VOCs		
wonker neurrey.			modeling amo	ient expe	Sure to			
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	$\times 1$	1	Model appears to based on sound approaches and is in peer reviewed journal, assumed to be of acceptable quality		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Relates to general ambient exposure to VOCs (not in scope)		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007, 11 years old		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Transparent and well presented. Well documented.		
Domain 4: Variab	vility and Ur	acertainty						
Domain 4. Vallat		Metadata Completeness	Medium	$\times 1$	2	Briefly discussed variations in the data.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.1.		

\* MWF = Metric Weighting Factor

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 Hero ID		nal Exposure; Monitoring Data;		0				
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Exposure Concen	tration (Uni	it):	0 - 1006 (	no units)				
Number of Sampl	(	,	10	,				
Number of Sites:			4					
Type of Measurer	ment or Met	bhod:	Short term	n				
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	Not described		
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US, Canada, and EU		
	Metric 3:	Applicability	Medium	$\times 2$	4	Use of TCE in workplace not clear		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999, 19 years old		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Mean, median, and range given		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata		
Domain 4: Variat	oility and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	Medium		2.1			

	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.						
	Occupation 832709	nal Exposure; Monitoring Data;					
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Route of Exposure			inhalation	ı			
Exposure Concentr	ration (Uni	t):	0 - 246 pp	ob			
Number of Sample			72				
Type of Measurem	ent or Met	hod:	Long-tern				
Worker Activity:			Steel Pro	duction			
Type of Sampling:			Area				
Sampling Location	:		Various a			·	
Analytic Method:			U.S. EPA	Method	TO-14		
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliabi	lity						
	Metric 1:	Methodology	High	$\times 1$	1	Method described and stated to be certified by EPA Method TO-14	
Domain 2: Represe	entative						
1	Metric 2:	Geographic Scope	Low	$\times 1$	3	Taiwan (non-OECD)	
	Metric 3:	Applicability	Medium	$\times 2$	4	Use of TCE in workplace not clear	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010, 8 years old	
	Metric 5:	Sample Size	Medium	$\times 1$	2	mean and 10th, 50th, and 90th percentile given	
Domain 3: Accessi	bility/Clar	itv					
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata	
Domain 4: Variabi	lity and U	ncertainty					
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed	
Overall Quality De	eterminatio	$\mathrm{n}^\dagger$	Medium		1.9		
		Con	tinued on r	next page	<u>,</u>		

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Source Citation:		cilities of a st	eel plant.		ssessment of exposure to the selected volatile organic of Environmental Science and Health, Part A: Toxic/			
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 832709							
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			

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 Hero ID		nal Exposure; Monitoring Data;	and Son I Onuti	011.			
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Physical Form:			gas/vapor				
Route of Exposure	e:		inhalation				
Exposure Concent	tration (Uni	t):	Average: 212.9	) ppb			
Number of Sites:			4				
Type of Sampling	:		Area				
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	ility						
Domain 1. Renab.	Metric 1:	Methodology	Medium	$\times 1$	2	Method described but unclear if it is equivalent to NIOSH/OSHA	
Domain 2: Repres	entative						
	Metric 2:	Geographic Scope	Low	$\times 1$	3	Taiwan (non-OECD)	
	Metric 3:	Applicability	Medium	$\times 2$	4	Use of TCE in workplace not clear	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2005, 13 years old (after PEL)	
	Metric 5:	Sample Size	Medium	$\times 1$	2	Average and STD given	
Domain 3: Access	ibility/Clari	ity					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	No metadata given	
Domain 4: Variab	ility and Ur	ncertainty					
		Metadata Completeness	Low	× 1	3	Not addressed	
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.4.	

\* MWF = Metric Weighting Factor

Type of Data Source C		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.						
Hero ID 7	Occupational Exposure; Monitoring Data; 730058							
EXTRACTION Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			liquid, va	por				
Route of Exposure:			inhalation					
Exposure Concentra	ation (Uni	t):	18 - 683 r					
Number of Samples:		,	60-80	0,				
Number of Sites:			21					
Type of Measuremen	nt or Met	hod:	TWA					
Worker Activity:			general fa	actory wo	orker - n	ot detailed activity given.		
Number of Workers:	:		21					
Type of Sampling:			Area					
Exposure Duration:			$5-90 \mathrm{~days}$					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabilit N	ty Metric 1:	Methodology	Medium	$\times 1$	2	Method described and peer reviewed journal, assumed to use		
						acceptable method		
Domain 2: Represen								
	Metric 2:	Geographic Scope	Low	$\times 1$	3	China (non-OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2009, 9 years old		
N	Metric 5:	Sample Size	Medium	× 1	2	range given but no other statistics		
Domain 3: Accessibi								
N	Metric 6:	Metadata Completeness	Medium	× 1	2	Exposure type and sample type given, no other metadata		
Domain 4: Variabili	ity and Ur							
N	Metric 7:	Metadata Completeness	Low	$\times 1$	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			U		
Hero ID	730058	,				
EVALUATION						
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Overall Quality I	$\operatorname{Determination}^\dagger$	Medium		1.8		

Source Citation:						P. A 2010. Statistical modeling of occupational ed database. Annals of Occupational Hygiene.		
Type of Data Source Hero ID		Occupational Exposure; Published Models for Exposures or Releases;						
EXTRACTION Parameter			Data					
Farameter			Data					
Life Cycle Stage:			Use					
Physical Form:			vapor					
Route of Exposure	:		inhalation					
Number of Sample			484					
Type of Measurem	ent or Met	hod:	short term, lon					
Worker Activity:			Variety of indu	stries				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabi	lity							
	Metric 1:	Methodology	High	$\times 1$	1	Peer reviewed article authored by employees of the CDC, N tional Cancer Institute, et al. Published in an Occupation Hygiene journal.		
Domain 2: Represe	ontativo							
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Model predicts exposures for non-specific work scenario, n applicable to any specific condition of use for TCE		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010, 8 years old		
	Metric 5:	Sample Size	N/A		N/A	N/A - modeled exposures		
Domain 3: Accessi	bility/Clari	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Transparent and well presented. Well documented.		
Domain 4: Variabi	lity and Un	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
Overall Quality De	etermination	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.0.		
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Source Citation:	Hein, M. J., Waters, M. A., Ruder, A. M. chlorinated solvent exposures for case-of-				2010. Statistical modeling of occupational base. Annals of Occupational Hygiene.
Type of Data Source	Occupational Exposure; Published Mod		0		
Hero ID	729521				
EVALUATION					
Domain	Metric	Rating	MWF <sup>*</sup> Sc	ore	Comments

\* MWF = Metric Weighting Factor

Х.,Н	lisanag		i, Y.,Nakaji	ma, T 2	2008. Ti	.,Liu, H.,Tsuchiyama, F.,Chen, J.,Okamura, A.,Huang, richloroethylene causes generalized hypersensitivity skin
Type of Data SourceOccuHero ID7294	-	nal Exposure; Monitoring Data;	Ĩ			
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	por		
Route of Exposure:			inhalation	n, dermal		
Exposure Concentration	n (Uni	t):	2.1-2330	m mg/m3		
Number of Sites:			4			
Type of Measurement of	or Met	hod:	TWA			
Type of Sampling:			Personal,			
Sampling Location:				and at s	site whe	ere he spends the most of his time.
Exposure Duration:			8-12 h			
Exposure Frequency:			6  day/we	ek		
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability						
	ric 1:	Methodology	Medium	$\times 1$	2	Method described and in peer reviewed journal article, as- sumed to be acceptable
Domain 2: Representat	ive					
_	ric 2:	Geographic Scope	Low	$\times 1$	3	China (non-OECD)
	ric 3:	Applicability	High	$\times 2$	$\overset{\circ}{2}$	Multiple sites that utilize TCE in the workplace.
	ric 4:	Temporal Representativeness	Medium	$\times 2$	4	source from 2008, but data collected in 2002-2003 (older than 10 years but after PEL)
Metr	ric 5:	Sample Size	Medium	$\times 1$	2	Range, mean, and STD given
Domain 3: Accessibility	/Clari	itv				
-	ric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata
Domain 4: Variability a	and Ur	ncertainty				
	ric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
					-	
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Source Citation:		akeuchi, Y.,Nakajim	na, T 2008. Trichlord	H., Tsuchiyama, F., Chen, J., Okamura, A., Huang, bethylene causes generalized hypersensitivity skin
Type of Data Source	Occupational Exposure; Monitoring	Data;		
Hero ID	729431			
EVALUATION				
Domain	Metric	Rating	MWF <sup>*</sup> Score	Comments
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	Medium	2.0	

\* MWF = Metric Weighting Factor

Source Citation:						rgeret, A 2006. Case-control study on renal cell sessment. Annals of Occupational Hygiene.
Type of Data Source	Occupation	nal Exposure; Monitoring Data;		t I: Expo	osure as	sessment. Annais of Occupational Hygiene.
Hero ID	729415					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, vapor			
Route of Exposure	e:		inhalation, der	mal		
Exposure Concent		t):	Estimated 0-10			
Number of Sites:	× ×	,	750			
Worker Activity:			Degreasing			
Number of Worke	rs:		12000			
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	:1:+					
Domain 1. Renad	Metric 1:	Methodology	Low	$\times 1$	3	Not specified
Domain 2: Repres	entative					
Domain = Teopros	Metric 2:	Geographic Scope	Medium	$\times 1$	2	UK study (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Multiple sites that utilize TCE in the workplace.
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Report from 2005, but cites older data (all after PEL)
	Metric 5:	Sample Size	Low	$\times 1$	3	Some ranges given, but some values with unknown statistic given
Domain 3: Access	ibility/Clari	ity				
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	No metadata given
Domain 4: Variab	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	Unacceptable		4	Metric Mean Score: 2.3.
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Source Citation:	Fevotte, J., Charbotel, B., Muller-Beau cancer and occupational exposure to t	0, , , , , , , , , , , , , , , , , , ,		, , ,	. 2006. Case-control study on renal cell Annals of Occupational Hygiene.
Type of Data Source Hero ID	Occupational Exposure; Monitoring D 729415	·			
EVALUATION					
Domain	Metric	Rating	MWF*	Score	Comments

\* MWF = Metric Weighting Factor

Source Citation:		Marinaccio, A.,Carelli, G 2005 Occupational and Environmenta			ional tr	cichloroethylene exposure on cytokine levels in workers.
Type of Data Source Hero ID	Occupation 700401	nal Exposure; Monitoring Data;				
EXTRACTION Parameter			Data			
1 arameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	por		
Route of Exposur	e:		inhalation	1		
Exposure Concent	tration (Uni	t):	Mean of 3	30.75 - 36	6.50 mg	/m3
Number of Sampl	es:		24			
Number of Sites:			1			
Worker Activity:			Degreasin	ıg		
Number of Worke	rs:		105			
Type of Sampling	:		Personal			
Analytic Method:			NIOSH M	fethod 10	)22	
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH Method 1022
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2005, 13 years old (after PEL)
	Metric 5:	Sample Size	Medium	$\times 1$	2	Mean and STD given but no discrete data
Domain 3: Access	ibility/Clar					
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata
Domain 4: Variab	ility and U	ncertainty				
	Metric 7:	Metadata Completeness	Medium	× 1	2	None discussed, but NIOSH method addresses variability uncertainty in the method
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6	
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Source Citation:	Iavicoli, I.,Marinaccio, A.,Carelli, G. 20 Journal of Occupational and Environme		-	ional trichloroe	thylene exposure on cytokine levels in workers.
Type of Data Source	Occupational Exposure; Monitoring Dat	ca;			
Hero ID	700401				
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments

Source Citation:		Stewart, P., Waters, M. 2007. Uurnal of Occupational and Envir			e to tric	hloroethylene in U.S. industry: A systematic literature
Type of Data Source Hero ID	Occupatio 699224	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			liquid, va	por		
Route of Exposure	e:		inhalatior			
Exposure Concent		t):	Range of	,	637 ppn	n
Number of Sample		,	1700 +	11	11	
Number of Sites:			Many			
Type of Measuren	nent or Met	hod:	short terr	n, long te	erm	
Worker Activity:			Many	, 0		
Type of Sampling	:		Personal,	area		
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	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 Hy- giene
Domain 2: Repres	entative					
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007, 11 years old (after PEL)
	Metric 5:	Sample Size	Medium	$\times 1$	2	Range, arthimetic mean, geometric mean, and geometric STD given
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata
Domain 4: Variab	ility and U					
	Metric 7:	Metadata Completeness	High	$\times 1$	1	Well addressed.

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Source Citation:	Bakke, B.,Stewart, P. review. Journal of Oc	,			to trichl	proethylene in U.S. industry: A systematic literature
Type of Data Source	Occupational Exposur	e; Monitoring Data;				
Hero ID	699224	, ,				
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Overall Quality I	$\operatorname{Petermination}^\dagger$		High		1.4	

Source Citation:		g, T.,Kuo-Hsiung, L.,Chih-Yu, C tegrated iron and steel facility.				Lung, C 2008. Volatile organic compound constituents rials.
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			vapor			
Route of Exposure	e:		inhalatior	n		
Exposure Concent		t):	104-427 p	opby		
Number of Sample	· · · · · · · · · · · · · · · · · · ·		15	I		
Number of Sites:			1			
Type of Measuren	nent or Met	hod:	short terr	n		
Worker Activity:			coke mak	ing, sinte	ring, ho	ot forming, and cold forming
Type of Sampling:			area	0,	0/	6, 6
Analytic Method:			US EPA I	Method 1	8	
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
Domain 1: Reliab	:1:+					
Domain 1. Renad	Metric 1:	Methodology	High	$\times 1$	1	Uesed Method certified by US EPA Method TO-14
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	Low	$\times 1$	3	Taiwan (non-OECD)
	Metric 3:	Applicability	Medium	$\times 2$	4	Use of TCE in workplace not clear
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008, less than 10 years old
	Metric 5:	Sample Size	Medium	$\times 1$	2	Average and STD given
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Only sample type given
Domain 4: Variab	ility and U	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		2.0	
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Source Citation:	Jiun-Horng, T.,Kuo-Hsiung, L.,Chih-Y from an integrated iron and steel facil	, , , , ,	,	, 0 0,	2008. Volatile organic compound constituents
Type of Data Source	Occupational Exposure; Monitoring D	0			
Hero ID	609426				
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments

		oensri, S.,Boontee, P.,Likhitsan, n two Thai metal cleaners expos				ansoui, S 2004. Generalized eruption accompanied by lustrial Health.		
	Occupational Exposure; Monitoring Data; 707342							
EXTRACTION Parameter			Data					
Life Cycle Stage:			Use					
Physical Form:			liquid, va					
Route of Exposure:			inhalation					
Exposure Concentr		t):	3.08 - 40	ppm				
Number of Samples	s:		11					
Number of Sites:			1					
Type of Measurem	ent or Met	hod:	short terr			1		
Worker Activity: Number of Workers			degreasin	g/cleanir	ig meta	1		
Type of Sampling:	5:		130 Area, Personal					
PPE:			cloth glov		duct m	nglr		
11L.			ciotii giov	es, ciotii	uust III			
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
	•,							
Domain 1: Reliabil	1ty Metric 1:	Methodology	Medium	$\times 1$	2	Math. I have that to account to the second second data and		
	Metric 1.	methodology	meanum	× 1	2	Method described, in peer review journal assumed to use ac ceptable methods		
Domain 2: Represe	entative							
_	Metric 2:	Geographic Scope	Low	$\times 1$	3	Thailand (non-OECD)		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2004, 14 years old (after PEL)		
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given		
Domain 3: Accessi	bility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata		
Domain 4: Variabil	lity and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed		
		1						
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Source Citation:	Pantucharoensri, S.,Boontee, P.,Lik hepatitis in two Thai metal cleaners	, , 0	, ,		ui, S 2004. Generalized eruption accompanied by ial Health.
Type of Data Source	Occupational Exposure; Monitoring	*	v		
Hero ID	707342	,,			
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Overall Quality I	$\operatorname{Petermination}^\dagger$	Medium		1.9	

Source Citation: Type of Data Source	Q.,Purdue inspection		, R. 2015.	Histori	cal occu	Ji, B. T.,Bassig, B.,Lu, W.,Xue, S.,Chow, W. H.,Lan, apational trichloroethylene air concentrations based on al Hygiene.
Hero ID	2799661	nai Exposure, monitoring Data,				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			vapor			
Route of Exposure			inhalation	1		
Exposure Concent		t):	Arithmeti	ic mean l	oroken o	put across industries: $<3 - 770 \text{ mg/m}3$
Number of Sample	es:		932			
Number of Sites:			70			
Type of Measuren		hod:	short tern	n		
Type of Sampling	:		area			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	Low	$\times 1$	3	Not known (likely method described but could not be verifie for all samples)
Domain 2: Repres	entative					
- • • • • • • • • • • • • • • • • • • •	Metric 2:	Geographic Scope	Low	$\times 1$	3	Shanghai, China (non-OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Covers multiple in scope uses
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015, 3 years old
	Metric 5:	Sample Size	Medium	$\times 1$	2	Mean and STD given but no discrete data
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata
Domain 4: Variab	ility and U	ocertainty				
	Metric 7:	Metadata Completeness	High	$\times 1$	1	Well addressed.
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.7	

Source Citation:		A. J., Whim, B. P., 1980. Occ lene in the drycleaning industry				loroethylene in metal cleaning processes and to tetra upational Hygiene.
Type of Data Source Hero ID	Occupation 632849	nal Exposure; Monitoring Data;				
EXTRACTION Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			vapor			
Route of Exposur	e:		inhalation	ı		
Exposure Concent	tration (Uni	t):	0-100 ppr ppm	n99 perc	ent < 1	$00~{\rm ppm97}~{\rm percent}<50~{\rm ppm91}~{\rm percent}<30$
Number of Sampl	es:		212			
Number of Sites:			25			
Type of Measuren	nent or Met	hod:	time weig	hted ave	rage	
Worker Activity:			Metal Cle	eaning		
Type of Sampling	:		personal			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	Medium	$\times 1$	2	Method described, in peer review journal assumed to use a ceptable methods
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	UK (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years (1980) but after PEL
	Metric 5:	Sample Size	Low	$\times 1$	3	Only qualitatively described
Domain 3: Access	ibility/Clari	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Exposure type and sample type given, no other metadata
Domain 4: Variab	ility and Ur					
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		2.0	
		Con	tinued on r	next page	<u>)</u>	

	cont	inued from	previous	page	
Source Citation:	Shipman, A. J., Whim, B. P., 1980. C chloroethylene in the drycleaning indust	-	*	v	ene in metal cleaning processes and to tetra Hygiene.
Type of Data Source	Occupational Exposure; Monitoring Da	ta;			
Hero ID	632849				
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments

		07. Health consultation: Evaluat tier, Los Angeles County, Califor				Iding on-site and adjacent to the Omega Chemical
Type of Data Source		nal Exposure; Monitoring Data;		y 110. Of	1004224	
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Physical Form:			vapor			
Route of Exposure:			inhalation			
Exposure Concentr	ation (Uni	t):	1.7 - 270 ug/m	.3		
Number of Samples	3:		60			
Number of Sites:			8			
Exposure Frequenc	y:		continuous			
Analytic Method:			US EPA Metho	od TO-1	5 SIM	
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliabil	itv					
	Metric 1:	Methodology	High	$\times 1$	1	US EPA Method TO-15 SIM
Domain 2: Represe	entative					
_	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Ambient and building measurements not related to work scenario
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007, 11 years old
	Metric 5:	Sample Size	Medium	$\times 1$	2	Moderately well characterized
Domain 3: Accessil	bility/Clari	ty				
	Metric 6:		Unacceptable	$\times 1$	4	Missing sampling data, type, etc.
Domain 4: Variabil	lity and Un	ncertainty				
		Metadata Completeness	Low	$\times 1$	3	not addressed
Overall Quality De	termination	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.6.
		(	Continued on nex	t page		

	- coi	ntinued from p	revious pa	age	
Source Citation:	Atsdr., 2007. Health consultation: Evalusite: Whittier, Los Angeles County, Cali				site and adjacent to the Omega Chemical
Type of Data Source	Occupational Exposure; Monitoring Dat	ia;	·		
Hero ID	3978063				
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments

\* MWF = Metric Weighting Factor

	F A 10			1 1 1/1	• 1	
Source Citation:	Fan, A. 19 and Toxico		ontamination and	1 health r	usk asse	ssment. Reviews of Environmental Contamination
		nal Exposure; Reports for Data	or Information (	)ther the	n Evno	sure or Bolosso Data
Hero ID	701917	has Exposure, Reports for Data	or miormation (	7tilei tila	ш Бхро	sure of Release Data,
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use Inhalation			
Route of Exposure Exposure Concent		+).		(orticlo)	noro 57	); below 100 ppm (pages $58$ and $59$ )
Number of Worker						ations 14-85 ppm (page 63); 2646 employ-
TAURDEL OF WOLKER						ring plant that used TCE as a degreasing
			agent (page 70		nulactu	The plant that used 1 CD as a degreasing
			agent (page re	).		
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	High	$\times 1$	1	Trusted author i.e., California Dept. of Health Services
Domain 2: Represe	entative					
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Covers exposure to contaminated groundwater
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Published 1988 (approx. 30 years old).
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessi	bility/Clari	tv				
	Metric 6:	-	High	$\times 1$	1	Transparent and well presented. Well documented.
Domain 4: Variabi	lity and Ur	ocertainty				
		Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality De	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4	Metric Mean Score: 2.5.
Overall Quality De	eterminatio	Ш.	Unacceptable		4	Metric Mean Score: 2.5.

\* MWF = Metric Weighting Factor

Source Citation:		Organic Compounds in Ground				K., Yunesian, M., Rastkari, N., Nazmara, S 2010. ndustry. Bulletin of Environmental Contamination
Type of Data Source Hero ID		nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Environment			
Physical Form:			liquid			
Route of Exposure			ingestion			
Exposure Concent		t):	97.7-1345.7 ug	/L		
Number of Sample	es:		24			
Number of Sites:			6			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliabi	1:+					
Domain 1. Kenabi	Metric 1:	Methodology	Medium	× 1	2	Method described, in peer review journal assumed to use a ceptable methods
Domain 2: Repres	entative					
rr	Metric 2:	Geographic Scope	Low	$\times 1$	3	Iran (non-OECD)
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Data for groundwater contamination
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010, 8 years old
	Metric 5:	Sample Size	Low	$\times 1$	3	Not well characterized
Domain 3: Accessi	bility/Clari	ty				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Basic metadata present
Domain 4: Variabi	lity and Ur	certainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.
Overall Quality De	etermination	a <sup>†</sup>	Unacceptable		4	Metric Mean Score: 2.7.
		(	Continued on nex	t page		

	<u> </u>	ontinued from pre	evious page	
Source Citation:		, , 0	, , , , ,	ian, M.,Rastkari, N.,Nazmara, S 2010. Bulletin of Environmental Contamination
Type of Data Source Hero ID	Occupational Exposure; Monitoring Da 2127942	ata;		
EVALUATION				
Domain	Metric	Rating	$MWF^*$ Score	Comments

\* MWF = Metric Weighting Factor

Type of Data Source Occ		A 2014. Degreasing with TCE nal Exposure; Reports for Data				
EXTRACTION Parameter			Data			
Life Cycle Stage: Physical Form: Route of Exposure: Engineering Control & PPE:	percen	t Exposure Reduction:	Closed- Solvent-	on, derm loop vapo	or degre gloves,	easers/up to 98 percent emission reduction long sleeves, coveralls, chemical splash eye pro- tors.
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability Met	ric 1:	Methodology	High	× 1	1	Cites frequently used sources
Domain 2: Representat	tive					
	ric 2:	Geographic Scope	High	$\times 1$	1	US
	ric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
	ric 4: ric 5:	Temporal Representativeness Sample Size	$_{ m N/A}$	$\times 2$	$^2$ N/A	2014 report No Comment.
Domain 3: Accessibility	v/Clari	ty				
	ric 6:	Metadata Completeness	High	$\times 1$	1	Transparent and well presented. Well documented.
Domain 4: Variability Met		certainty Metadata Completeness	Low	$\times 1$	3	Not addressed
Overall Quality Determ	ninatio	n <sup>†</sup>	High		1.3	

Source Citation:	adhesives,	dry cleaning, and degreasing us	es CASRI	N: 106-94	<b>l</b> -5.	r review draft 1-bromopropane: (n-Propyl bromide) spra
Type of Data Source Hero ID	Occupation 3355305	nal Exposure; Completed Expos	sure or Ri	sk Assess	sments;	
EXTRACTION Parameter			Data			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	EPA peer reviewed draft risk evaluation, assumed to use high quality data
Domain 2: Repres	sentative					
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Data is for 1-BP; however, has information (worker activities process descriptions, etc.) directly applicable to TCE occupa- tional scenarios
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Report from 2016
	Metric 5:	Sample Size	N/A		N/A	N/A - sample data for 1-BP not TCE
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	All data sources clearly documented
Domain 4: Variab	vility and U	ncertainty				
		Metadata Completeness	High	$\times 1$	1	Detailed uncertainty section
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.0	
Type of Data Source	Ruijten, M. W., Verberk, M. M., Sall©, H. J 1991. Nerve function in workers with long term exposure to trichloroethen British Journal of Industrial Medicine. Occupational Exposure; Monitoring Data;					
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Hero ID EXTRACTION	65298					
Parameter	Data					

ALUATION					
Domain	Metric	Rating	$MWF^*$	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	Not specified
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	European Study (OECD)
Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE
Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Both pre- and post-PEL data
Metric 5:	Sample Size	Low	$\times 1$	3	mean given, no other statistics
Domain 3: Accessibility/Clar	rity				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Moderately well documented
Domain 4: Variability and U	ncertainty				
Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion of uncertainty or variability
Overall Quality Determination	$\mathrm{on}^\dagger$	Medium		2.2	

Type of Data Source (		Chemicals Bureau. 2004. Europ nal Exposure; Completed Expos				report: Trichloroethylene. EUR 21057 EN.		
EXTRACTION Parameter			Data					
Life Cycle Stage:			MFG					
Physical Form:			liquid, va	por				
Route of Exposure:			inhalation	<b>^</b>	l			
Exposure Concentra	ation (Uni	t):				)Max 128 (ppm)98.5 percent sample <10 ppm		
Number of Samples			837		- (1 1			
Number of Sites:			1					
Type of Measureme	nt or Met	hod:	8-hr TW	A				
Worker Activity:					mainte	nance, and overall plant employees.		
Number of Workers	:		75  staff +					
Type of Sampling:			PBZ					
Sampling Location:			Everywhere					
PPE:					orotectiv	ve equipment when doing maintenance on pro-		
			duction li					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliabili	tv							
	Metric 1:	Methodology	Low	$\times 1$	3	Specific methods not provided for exposures. Peer-review by the Scientific Committee on Toxicity, Ecotoxicity, and the Environment (CSTEE)		
Domain 2: Represe	ntative							
_	Metric 2:	Geographic Scope	Medium	$\times 1$	2	European Study (OECD)		
1	Metric 3:	Applicability	High	$\times 2$	2	Workplace occupational scenario within scope of risk evalution.		
1	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Data is from 1991, 27 years old		
1	Metric 5:	Sample Size	Medium	$\times 1$	2	837 data points, well characterized with statistics but no d crete data points beyond max.		
Domain 3: Accessib	ility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Sample type, duration, time period, and other metrics privided.		
		Com	tinued on 1	next page	9			

Source Citation: Type of Data Source Hero ID	1	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Occupational Exposure; Completed Exposure or Risk Assessments; 3827429							
EVALUATION									
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments			
Domain 4: Variab	U	0							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.			
Overall Quality D	Determination	$\mathbf{n}^{\dagger}$	Medium		2.2				

	Chemicals Bureau. 2004. Europ onal Exposure; Completed Expos				t: Trichloroethylene. EUR 21057 EN.			
EXTRACTION Parameter		Data						
Life Cycle Stage:		Recycling						
Physical Form:		liquid, vapor						
Route of Exposure:		inhalation						
Exposure Concentration (Un	it):	<1 to 9ppmn	nean. 2.7 1	mac				
Number of Samples:		unknown	, . 1					
Number of Sites:		1						
Type of Measurement or Me	thod:	unknown						
Number of Workers:		unknown						
Type of Sampling:		Area						
Sampling Location:		unknown						
Exposure Duration:		unknown						
Exposure Frequency:		unknown						
Bulk and Dust Particle Size		unknown						
Engineering Control & perce	nt 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-reviewee by the Scientific Committee on Toxicity, Ecotoxicity, and th Environment (CSTEE)			
Domain 2: Representative								
Metric 2:	Geographic Scope	Medium	$\times 1$	2	European Study (OECD)			
Metric 3:	Applicability	High	$\times 2$	2	Workplace occupational scenario within scope of risk evaluation.			
Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Data is from unknown time period			
Metric 5:	Sample Size	Low	$\times 1$	3	Unknown sample size.			
Domain 3: Accessibility/Cla	rity							
		Continued on ne	ext page					

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Source Citation: Type of Data Source Hero ID	*	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Occupational Exposure; Completed Exposure or Risk Assessments; 3827429							
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Dataset provides method but does not detail the sample type			
Domain 4: Varial	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.			
Overall Quality I	Determinatio	$\mathrm{n}^\dagger$	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

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Type of Data Source Occup	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Occupational Exposure; Completed Exposure or Risk Assessments; 3827429							
EXTRACTION Parameter		Data						
Life Cycle Stage:		Metal Cle	eaning -H	SE insp	pectors			
Physical Form:		liquid, va		1				
Route of Exposure:		inhalation						
Exposure Concentration (	Unit):	24 sample	es < 30 p	om.All s	samples $< 50$ ppm			
Number of Samples:	,	25			* **			
Number of Sites:		12						
Type of Measurement or	Method:	8-hr TWA	Ι					
Worker Activity:		degreasin	g operate	ors				
Number of Workers:		unknown						
Type of Sampling:		PBZ						
Sampling Location:		unknown						
Exposure Duration:		unknown						
Exposure Frequency:		unknown unknown unknown						
Bulk and Dust Particle S	ze Distribution:							
Engineering Control & pe	rcent Exposure Reduction:							
PPE:		unknown						
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability								
Metric	1: Methodology	Low	$\times 1$	3	Specific methods not provided for exposures. Peer-reviewee by the Scientific Committee on Toxicity, Ecotoxicity, and th Environment (CSTEE)			
Domain 2: Representative								
Metric		Medium	$\times 1$	2	European Study (OECD)			
Metric		High	$\times 2$	2	Workplace occupational scenario within scope of risk evaluation.			
Metric	4: Temporal Representativeness	Low	$\times 2$	6	Data is from 1984s-1994			
Metric	Medium	$\times 1$	2	25 data points, but does not provide a true range of data-jus a percenentage of data points that are under set concentratio metrics.				
	Cor	ntinued on r	next page	è				

Source Citation: Type of Data Source Hero ID	*	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Occupational Exposure; Completed Exposure or Risk Assessments; 3827429						
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 3: Access	0 /	ity Metadata Completeness	Medium	$\times 1$	2	Sample type and exposure type provided but other key metrics are not.		
Domain 4: Variat	U	ncertainty Metadata Completeness	Low	$\times 1$	3	Not addressed.		
Overall Quality I	Determinatio	n <sup>†</sup>	Medium		2.2			

Type of Data Source Occ	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Occupational Exposure; Completed Exposure or Risk Assessments; 3827429								
EXTRACTION Parameter			Data						
Life Cycle Stage:			Metal Cle	aning - ]	ndustry	v data			
Physical Form:			liquid, va			,			
Route of Exposure:			inhalation						
Exposure Concentratio	n (Uni	t):		t sample		ppm,94 percent samples $<50$ ppm96 percent			
Number of Samples:			306						
Number of Sites:			50						
Type of Measurement of	or Met	hod:	8-hr TWA	1					
Worker Activity:			degreasin	g operate	$\mathbf{ors}$				
Number of Workers:			unknown						
Type of Sampling:			PBZ						
Sampling Location:			unknown						
Exposure Duration:			unknown						
Exposure Frequency:			unknown unknown						
Bulk and Dust Particle									
Engineering Control &	percer	t Exposure Reduction:	unknown unknown						
PPE:									
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability									
Met	ric 1:	Methodology	Low	× 1	3	Specific methods not provided for exposures. Peer-reviewee by the Scientific Committee on Toxicity, Ecotoxicity, and the Environment (CSTEE)			
Domain 2: Representat	ive								
-	ric 2:	Geographic Scope	Medium	$\times 1$	2	European Study (OECD)			
	ric $3$ :	Applicability	High	$\times 2$	2	Workplace occupational scenario within scope of risk evalua			
Witte		r proceeding	9-1		-	tion.			
Met	ric 4:	Temporal Representativeness	Low	$\times 2$	6	Data is from 1970s-1994			
Met	ric 5:	Sample Size	Medium	× 1	2	306 data points, but does not provide a true range of data-jus a percenentage of data points that are under set concentration metrics.			
		Con	tinued on r	evt nage					

Source Citation: Type of Data Source Hero ID	*	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Occupational Exposure; Completed Exposure or Risk Assessments; 3827429						
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 3: Access	sibility/Clari Metric 6:	ty Metadata Completeness	Medium	× 1	2	Sample type and exposure type provided but other key metrics are not.		
Domain 4: Variał	U	ncertainty Metadata Completeness	Medium	$\times 1$	2	Limited discussion about how the range of exposure can be influenced.		
Overall Quality I	Determination	$\mathbf{n}^{\dagger}$	Medium		2.1			

Гуре of Data Source Осс	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Occupational Exposure; Completed Exposure or Risk Assessments; 3827429										
EXTRACTION Parameter					Data						
Life Cycle Stage:			Use as int	termedia	te: man	ufacture of HCFC 133a and HFC 134a					
Physical Form:			liquid, va	por							
Route of Exposure:			inhalation	1							
Exposure Concentration	n (Un	it):				$(0.2 \text{ ppm}) \max (11.5 \text{ ppm})$ .Maintenance mean					
			(0.2  ppm)								
Number of Samples:				)perators	: 219M	aintenance Operators: 41					
Number of Sites:			unknown								
Type of Measurement	or Met	hod:	8-hr TWA								
	Worker Activity: Number of Workers:		process a	nd maint	enace of	perators					
			unknown PBZ								
	Type of Sampling: Sampling Location:										
				unknown							
Exposure Duration: Exposure Frequency:			unknown unknown unknown unknown unknown								
Bulk and Dust Particle	Sizol	Distribution									
		nt Exposure Reduction:									
PPE:	percer										
EVALUATION											
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments					
Domain 1: Reliability											
Met	ric 1:	Methodology	Low	× 1	3	Specific methods not provided for exposures. Peer-reviewe by the Scientific Committee on Toxicity, Ecotoxicity, and th Environment (CSTEE)					
Domain 2: Representa	ive										
Met	ric 2:	Geographic Scope	Medium	$\times 1$	2	European Study (OECD)					
Met	ric 3:	Applicability	High	$\times 2$	2	Workplace occupational scenario within scope of risk evalution.					
Met	ric 4:	Temporal Representativeness	Low	$\times 2$	6	Data is from 1991-1994					
Met	ric 5:	Sample Size	Medium	$\times 1$	2	280 data points, but only provides mean and max.					
		Con	tinued on r	next page	)						

Source Citation: Type of Data Source Hero ID	-	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Occupational Exposure; Completed Exposure or Risk Assessments; 3827429						
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 3: Access	0 /	ity Metadata Completeness	Medium	× 1	2	Sample type and exposure type provided but other key metrics are not.		
Domain 4: Variab	oility and Ur Metric 7:	-	Low	$\times 1$	3	Not addressed.		
Overall Quality D	Determinatio	$\mathrm{n}^\dagger$	Medium		2.2			

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 Hero ID	Occupation 5176415	nal Exposure; Monitoring Data;							
EXTRACTION Parameter			Data						
Life Cycle Stage:			MFG						
Physical Form:			liquid, va	por					
Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity:			inhalation						
			BDL - 6.9	) ppm					
			57						
			unknown						
			Task, 8-h		L				
			Manufact	uring					
Type of Sampling:			Personal 8 hours						
Exposure Duration:									
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliabi	lity								
	Metric 1:	Methodology	Low	$\times 1$	3	No method provided by the HSIA Industry organization			
Domain 2: Repres	entative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that MFGs TCE			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data is from 2016 ( $<10$ years)			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete samples given			
Domain 3: Accessi	ibility/Clar								
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Most metadata given, missing exposure frequency			
Domain 4: Variabi	ility and Ui								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not addressed.			
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.6					
		Cor	tinued on 1	next page					

enated Solvents Industry .	Alliance, Inc. 20	018. Re: 1	Docket no	EPA-HO-OPPT-2016-0737	FDA HO OPPT 2016 0737
				. EI II IIQ OI I I 2010 0101	. ы А-нқ-От г 1-2010-0757-
oational Exposure; Monito 15	ring Data;				
Metric	Ra	ting M	WF* Scor	re Co	omments
	15		15	15	15

 $\star$  MWF = Metric Weighting Factor

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

## Facility

Source Citation: Type of Data Source Hero ID		U.S, E. P. A. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals. Facility; Reports for Data or Information Other than Exposure or Release Data; 35002								
EXTRACTION Parameter			Data							
Life Cycle Stage:	Life Cycle Stage:		Manufacture							
Process Descripti	on:		No							
Total Annual U.S. Volume (and percent of PV):		145,000	,000  kg/s	yr						
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliab	oility									
	Metric 1:	Methodology	High	$\times 1$	1	EPA document				
Domain 2: Repre	sentative									
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	Low	$\times 2$	6	1992				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Nearly 30+ yrs old				
	Metric 5:	Sample Size	Low	$\times 1$	3	single value, no statistics				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Cites sources for all data used.				
Domain 4: Varial	bility and U	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion of uncertainty or variability				
Overall Quality Determination <sup><math>\dagger</math></sup>			Low		2.3					
					2.3					

Source Citation: Type of Data Source Hero ID		U.S, E. P. A. 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals. Facility; Reports for Data or Information Other than Exposure or Release Data; 35002								
EXTRACTION Parameter			Data							
Life Cycle Stage:			Import							
Process Descripti	on:		No							
Total Annual U.S. Volume (and percent of PV):		19,800,0	000 kg/yı	r						
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliab	oility									
	Metric 1:	Methodology	High	$\times 1$	1	EPA document				
Domain 2: Repre	sentative									
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	Low	$\times 2$	6	1985				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Over 30 yrs old				
	Metric 5:	Sample Size	Low	$\times 1$	3	single value, no statistics				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Cites sources for all data used.				
Domain 4: Varial	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion of uncertainty or variability				
Overall Quality Determination <sup><math>\dagger</math></sup>			Low		2.3					
		14	LOW		2.0					

Source Citation: Type of Data Source Hero ID		U.S, E. P. A 2001. Sources, emission and exposure for trichloroethylene (TCE) and related chemicals. Facility; Reports for Data or Information Other than Exposure or Release Data; 35002								
EXTRACTION Parameter			Data							
Life Cycle Stage:			Export							
Process Descripti			No							
Total Annual U.S. Volume (and percent of PV):		10,600,0	000 kg/yı	r						
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliab	oility									
	Metric 1:	Methodology	High	$\times 1$	1	EPA document				
Domain 2: Repre	sentative									
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	Low	$\times 2$	6	1985				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Over 30 yrs old				
	Metric 5:	Sample Size	Low	× 1	3	single value, no statistics				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Cites sources for all data used.				
Domain 4: Varial	bility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion of uncertainty or variability				
Overall Quality Determination <sup><math>\dagger</math></sup>			Low		2.3					

Source Citation:	with LCA:	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 Hero ID	Facility; Published Models for Exposures or Releases; 88147									
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Degreasing No							
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Well cited.				
Domain 2: Repres	entative									
Domain <b>_</b> , respice	Metric 2:	Geographic Scope	Low	$\times 1$	3	Unknown				
	Metric 3:	Applicability	Medium	$\times 2$	4	2005				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	< 15 years old				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	ibility/Clari	tv								
Domain of Treess	Metric 6:	Metadata Completeness	High	$\times 1$	1	Cites sources for all data used.				
Domain 4: Variab	ility and Ur	aartainty								
Domain 4. Variab		Metadata Completeness	Low	$\times 1$	3	No discussion of uncertainty or variability				
Overall Quality Determination <sup>†</sup>			Low		2.3					

Source Citation: Type of Data Source Hero ID	Nih, 2016. Report on carcinogens: Trichloroethylene. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982332									
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Manufacture Manufacture of TCE No 2002: 330,000,000 lbs 2							
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	ICIS sourced data				
Domain 2: Repres	Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size			$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US TCE Producers First published in 2000, but updated 2014 No Comment.				
Domain 3: Access	ibility/Clari Metric 6:	ity Metadata Completeness	High	$\times 1$	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 D	Overall Quality Determination <sup><math>\dagger</math></sup>				1.3					

Source Citation: Type of Data Source Hero ID		Hsia,. 2008. Chlorinated solvents - The key to surface cleaning performance. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982144								
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Possible Physical Form:			Use Degreasing Yes Liquid, Vapor							
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Halogenated Solvents Industry Alliance document.				
Domain 2: Repres	Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size			$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US Operation that uses TCE 2008 - 10 years old No Comment.				
Domain 3: Access	ibility/Clari Metric 6:	ty Metadata Completeness	Low	× 1	3	Nothing cited/documented				
Domain 4: Variab	ility and Ur Metric 7:	certainty Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality D	Overall Quality Determination <sup>†</sup>				1.3					

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 Hero ID		eports for Data or Information (	Other than	Exposur	e or Rel	lease Data;				
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Manufact	ure						
Life Cycle Description (Subcategory of Use):			85 percen	t metal o	leaning	, 15 percent other				
Process Description	Process Description:				0	· · ·				
Total Annual U.S. Volume (and percent of PV):			USA proc	duces 150	,000,00	0 pounds annually				
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliab	ility									
Domain 1. Hendy	Metric 1:	Methodology	High	$\times 1$	1	IARC/WHO document				
Domain 2: Repres	ontativo									
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Data from World Health Organization, includes both US and non-US, OECD countries				
	Metric 3:	Applicability	High	$\times 2$	2	information covers in scope uses				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Report from 2014, but cites data over 20 years old				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	ibilitv/Clari	tv								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Sources, methods, assumptions clearly documented				
Domain 4: Variab	ility and Ur	certainty								
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality D	Overall Quality Determination <sup><math>\dagger</math></sup>				1.7					

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 Hero ID		eports for Data or Information (						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	tion (Subca	tegory of Use):	Manufact	ure of po	lyethyle	ene battery separators		
	Process Description:			1	0 0			
Number of Sites:								
Operating Days per Year and Batches per Day:		365						
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliabi	lity							
	Metric 1:	Methodology	High	$\times 1$	1	Clear description of operation, procedures, etc.		
Domain 2: Repres	entative							
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014, 4 years old		
	Metric 5:	Sample Size	High	$\times 1$	1	Reasonably well characterized.		
Domain 3: Access	ibility/Clari	ty						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Basic Metadata present.		
Domain 4: Variab	ility and Ur	certainty						
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Addressed in a general sense.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.3			

	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		eports for Data or Information (	Other than	Exposure	e or Rel	lease Data;		
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Description (Subcategory of Use):			Resin Ext	traction f	rom Fa	bric		
Process Description:			Yes					
Number of Sites:			1					
Possible Physical Form:			Liquid, va	apor				
Chemical Concentration:			Pure					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliabil	lity							
	Metric 1:	Methodology	High	$\times 1$	1	Reliable, trusted source		
Domain 2: Represe	entative							
_	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accessi	bility/Clari	ty						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Well documented		
Domain 4: Variabi	lity and Un	certainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality De	etermination	$\mathbf{n}^{\dagger}$	High		1.1			

	Parker Hannifin, Manufacturing. 2014. Chemical safety report: Use of trichloroethylene as a process solvent for the manufac- turing of hollow fibre gas separation membranes out of polyphenylene oxide (PPO).								
Type of Data Source		eports for Data or Information (							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Description (Subcategory of Use):						as a process solvent for manufacturing hollow ebranes out of polyphenylene oxide.			
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Yes	separatio	ii iiiciiik	soluties out of polyphenylene oxide.			
			20.3  tonn	es TCE 1	nade in	EU			
			1						
Possible Physical Form:			Liquid, va	apor					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliabil	itv								
	Metric 1:	Methodology	High	$\times 1$	1	Reliable, trusted source			
Domain 2: Represe	entative								
_	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013, 5 years old.			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessi	bility/Clari	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Moderately well documented			
Domain 4: Variabi	lity and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality De	terminatio	$\mathrm{n}^\dagger$	High		1.3				

Type of Data Source	Pubchem, 2017. PubChem: Trichloroethylene. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970252								
EXTRACTION Parameter			Data						
1 al allieter			Data						
Life Cycle Stage:			Manufa						
Life Cycle Descript		tegory of Use):	Manufa	cture					
Process Description			Yes						
Total Annual U.S.	Volume (a	nd percent of PV):				1981: 258,182 lbs1985: 170,196,866 lbs1991: 0,000,000 lbs			
Number of Sites:			,	producer		0,000,000 Ibs			
Possible Physical F	orm		Liquid,		a				
i ossible i nysicai i	01111.		Elquid,	vapor					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
ויויות וי ת	• ,								
Domain 1: Reliabil	Metric 1:	Methodology	High	$\times 1$	1	Pubmed source that compiles data from many other reliable sources such as EPA, NIOSH, and OSHA			
						Sources such as 1111, 110011, and 00111			
Domain 2: Represe	ntative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Industry that makes TCE			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	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: Accessil	oility /Clari	t							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Well documented			
·			0		-				
Domain 4: Variabil	ity and Ur	certainty							
	Metric 7:	Metadata Completeness	N/A		N/A	N/a			
Overall Quality De	termination	$\mathbf{n}^{\dagger}$	High		1.6				

\* MWF = Metric Weighting Factor

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Type of Data Source	Atsdr,. 2014. Draft toxicological profile for trichloroethylene. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982339								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):		Manufacture Manufacture Yes 1960: 354,000,000 lbs1970: 612,000,000 lbs1980: 267,000,000 lbs1987:							
Number of Sites:		All US Lake Cl	produce harles, L	rs: DO	t. 320,000,000 lbs2011: est. 270,000,000 lbs W Chemical in Freeport, TX,PPG Industries,				
Possible Physical F	form:		Liquid,	Vapor					
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliabil	lity Metric 1:	Methodology	High	$\times 1$	1	US Dept. of Health and Human Services - Agency for Toxic Substances and Disease Registry			
Domain 2: Represe	entative								
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Industry that makes TCE			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014, 4 years old.			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessi	bility/Clari	itv							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Well documented			
Domain 4: Variabi	lity and Ur	ocertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality Determination <sup>†</sup>		High		1.0					

Type of Data Source	Jordan, B. ruce C 1994. Memorandum: Transmittal of alternative control technology documents. Facility; Reports for Data or Information Other than Exposure or Release Data; 3860917								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Descript Process Description		tegory of Use):	EPA Industry Guida No	ance on V	VOC rec	luction			
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliabil	ity Metric 1:	Methodology	High	$\times 1$	1	EPA			
Domain 2: Represe	entative								
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Report is on control of emissions to air from industrial wastew ater. Releases to air out of scope and fate of TCE after entering industrial wastewater stream outside perview of engineers			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1994, 24 years old			
	Metric 5:	Sample Size	Low	$\times 1$	3	No Comment.			
Domain 3: Accessil	bility/Clari	tv							
	. ,	Metadata Completeness	Low	$\times 1$	3	Sources cited, but not well described or attributed to data.			
Domain 4: Variabil	lity and Un	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality De	termination	n†	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

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

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 Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3970830									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Manufact	ure						
Life Cycle Descrip	tion (Subca	ategory of Use):	Manufact	ure and	use of T	CCE				
Process Descriptio			Yes							
Total Annual U.S.	Volume (a	nd percent of PV):	Global Co	onsumpti	on: 429	500 tonnes				
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliabi	1;+									
Domain 1. Kenabi	Metric 1:	Methodology	Medium	$\times 1$	2	Company that produces TCE				
Domain 2: Repres	ontativo									
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU				
	Metric 3:	Applicability	High	$\times 2$	2	Industry that makes TCE				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014, 4 years old				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Accessi	bility/Clar	itv								
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Primary source, but no documentation provided.				
Domain 4: Variabi	lity and U	acortainty								
Domain 4. variabi		Metadata Completeness	N/A		N/A	No Comment.				
0 11 0 11 0		÷	High							
Overall Quality De	Overall Quality Determination <sup><math>\dagger</math></sup>				1.4					

Source Citation: Type of Data Source Hero ID		Spin,. 2017. SPIN substances in preparations in nordic countries tetrachloroethylene, Part 2. Facility; Reports for Data or Information Other than Exposure or Release Data; 3981134								
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):			Manufacture Manufacture of TCE No 2014 TCE in preparationsSE: 22 tonnesNO: 17.1 tonnesDK: 1.9 ton- nesFI: –							
EVALUATION										
Domain		Metric	Rating	$MWF^*$	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	Methods not specified				
Domain 2: Repres	sentative									
Domain _ Ropro	Metric 2:	Geographic Scope	Medium	$\times 1$	2	SE, FI, DK, NO (OECD countries)				
	Metric 3:	Applicability	High	$\times 2$	2	in scope uses				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014, 4 years old				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	ibility/Clari	itv								
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	No metadata given				
Domain 4: Variab	ility and Ur	ncertainty								
		Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	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

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation: Type of Data Source Hero ID		nada. 2008. Priority environmer eports for Data or Information (				ance in Canada: Preliminary priority list. lease Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descri	otion (Subca	ategory of Use):	Variety			
Process Descripti			No			
Total Annual U.S	. Volume (a	nd percent of PV):	Canada:	710  tonn	es	
Number of Sites:			49			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	School of Environmental Health, Department of Health Car & Epidemiology, and Department of Geography, Canada
Domain 2: Repres	sentative					
- •	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Canada (OECD)
	Metric 3:	Applicability	High	$\times 2$	2	in scope uses
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2008, 10 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Sources documented, but no other metadata
Domain 4: Varial	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	Medium		1.9	

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

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 chlorina-
	tion 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., Mil-
	itary) without providing actual production totals" environmental regu-
	lations 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 stan- dards).
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 pro-
	duction 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	$MWF^{\star}$	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	Medium	$\times 1$	2	Peer reviewed article, uses acceptable but not frequently used sources
		Continued on n	ext page	!	

		– continu	ied from p	previous	page					
Source Citation:	and 1,1,1-1	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 Hero ID	Facility; R 194808	Facility; Reports for Data or Information Other than Exposure or Release Data; 194808								
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 2: Repres	sentative									
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	in scope uses				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	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: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Sources, methods, assumptions clearly documented				
Domain 4: Variab	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Medium		1.7					

 $\star$  MWF = Metric Weighting Factor

<sup>†</sup> 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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 2017. Preliminary information on manufacturing, processing, distribution, use, and disposal: Trichloroethylene. Facility; Reports for Data or Information Other than Exposure or Release Data; 3827394								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufact	ure					
Life Cycle Descrip	otion (Subca	tegory of Use):	TCE Mai	nufacture	and In	nport			
		nd percent of PV):	2012: 220	0,536,812	lbs201	3: 198,987,532 lbs2014: 191,996,578 lbs2015:			
Number of Sites:			171,929,4 13	00 lbs					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	EPA			
Domain 2: Repres	sentative								
Domain = 100prox	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Industry that makes TCE			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017, 1 year old			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clari	tv							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Basic Metadata present.			
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.1				

Type of Data Source Fa	1989. Alternative control technology document – Halogenated solvent cleaners. Facility; Reports for Data or Information Other than Exposure or Release Data; 3860356								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descriptio	on (Subcat	tegory of Use):	Degreas	ing					
Process Description:		/	Yes, des	scription	of mult	iple degreasing systems			
Batch Size:			Varies						
Operating Days per	Year and	Batches per Day:	Varies						
Possible Physical For	rm:		Liquid,	vapor					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliabilit	v								
	fetric 1:	Methodology	High	$\times 1$	1	EPA			
Domain 2: Represen	tative								
- N	fetric 2:	Geographic Scope	High	$\times 1$	1	US			
Ν	fetric 3:	Applicability	High	$\times 2$	2	Industry that uses TCE			
N	fetric 4:	Temporal Representativeness	Low	$\times 2$	6	1989, 29 years old			
N	fetric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessibi	lity/Clarit	ty							
N	fetric 6:	Metadata Completeness	High	$\times 1$	1	Sources are well cited. Meta data complete.			
Domain 4: Variabilit	y and Un	certainty							
		Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.6					

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	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliability							
Metric 1:	Methodology	High	$\times 1$	1	EPA document		
Domain 2: Representative							
Metric 2:	Geographic Scope	High	$\times 1$	1	US		
Metric 3		High	$\times 2$	2	information for solvent recovery		
Metric 4		Low	$\times 2$	6	1995, 23 years old		
Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accessibility/Cla	rity						
Metric 6:		High	$\times 1$	1	Sources, methods, assumptions clearly documented		
Domain 4: Variability and U	Incertainty						
Metric 7:	-	N/A		N/A	No Comment.		
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.6			

for Data or Information ( of Use): cent of PV):	Other than Data Use Solvents (	Exposure (for clean	e or Rel	and 1,1,1-trichloroethane. Environmental Forensics. ease Data; degreasing) a pounds in 1996						
cent of PV):	Use Solvents ( approxim									
cent of PV):	Use Solvents ( approxim									
cent of PV):	Solvents ( approxim									
cent of PV):	approxim									
,	* *	ately 115	million	pounds in 1996						
Metric	2									
Metric										
Metric										
	Rating	$\mathrm{MWF}^{\star}$	Score	Comments						
odology	Medium	$\times 1$	2	Peer reviewed article, uses acceptable but not frequently used sources						
raphic Scope	High	$\times 1$	1	US						
icability	High	$\times 2$	2	in scope uses						
ooral Representativeness	Low	$\times 2$	6	Report is from 2000 (less than 20 years old) but most data cited is older than 20 years $% \left( 1,1,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2$						
ble Size	N/A		N/A	No Comment.						
data Completeness	High	$\times 1$	1	Sources, methods, assumptions clearly documented						
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness			N / A	No Comment.						
	1N/A		1 <b>N</b> / A	No Comment.						
Overall Quality Determination <sup><math>\dagger</math></sup>			1.7							
	raphic Scope icability boral Representativeness ble Size data Completeness	odology Medium raphic Scope High icability High ooral Representativeness Low ble Size N/A data Completeness High	odology     Medium × 1       raphic Scope     High × 1       icability     High × 2       boral Representativeness     Low × 2       ble Size     N/A       data Completeness     High × 1       nty     data Completeness     N/A	odologyMedium $\times 1$ 2raphic ScopeHigh $\times 1$ 1icabilityHigh $\times 2$ 2boral RepresentativenessLow $\times 2$ 6ble SizeN/AN/AN/Adata CompletenessHigh $\times 1$ 1ntydata CompletenessN/AN/A						
Source Citation: Type of Data Source Hero ID		Newmoa,. 2001. Pollution prevention technology profile - Closed loop vapor degreasing. Facility; Reports for Data or Information Other than Exposure or Release Data; 3044986								
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EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Descrip	otion (Subca	ategory of Use):	Use Batch Va	por degre	easer					
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Northeast Waste Management Officials' Association - uses high-quality non-standard sources				
Domain 2: Repres	entative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Workplace that utilizes TCE				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data older than 10 years but less than 20 years $% \left( 1-\frac{1}{2}\right) =0$				
	Metric 5:	Sample Size	N/A		N/A	N/A - only process description information given				
Domain 3: Access	ibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	sources clearly documented				
Domain 4: Variab	ility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion of uncertainty or variability				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6					

Source Citation:	To-Know A	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. Facility; Reports for Data or Information Other than Exposure or Release Data;									
Type of Data Source Hero ID	Facility; R 3378218	eports for Data or Information (	Other than Expo	sure or F	Release	Data;					
EXTRACTION Parameter			Data								
Life Cycle Stage: Life Cycle Descrip Process Description		tegory of Use):	EPA EPA List of Cl No	nemicals							
EVALUATION											
Domain		Metric	Rating	$MWF^*$	Score	Comments					
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	EPA					
			0								
Domain 2: Repres	sentative Metric 2:	Geographic Scope	High	$\times 1$	1	US					
	Metric 2: Metric 3:	Applicability	Unacceptable	$\times 1 \times 2$	8	List of chemicals subject to emergency planning, no informa- tion relevant to TCE conditions of use					
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015, 3 years old					
	Metric 5:	Sample Size	N/A		N/A	No Comment.					
Domain 3: Access	sibility/Clari	ity									
		Metadata Completeness	High	$\times 1$	1	Sources cited and clearly described.					
Domain 4: Variat	oility and Ur	ncertainty									
		Metadata Completeness	N/A		N/A	No Comment.					
Overall Quality I	Oeterminatio	$\mathbf{n}^{\dagger}$	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

	Dyer, M Geology.	2003. Field investigation into th	e biodegradation	n of TCE	and B7	$\Gamma EX$ at a former metal plating works. Engineering
Type of Data Source		eports for Data or Information (	Other than Expo	sure or H	Release	Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Groundwater			
Life Cycle Descript	ion (Subca	tegory of Use):	Groundwater S	Study		
Process Description	n:		No			
Number of Sites:			1			
Possible Physical F	orm:		Liquid			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliabili	itv					
	Metric 1:	Methodology	High	$\times 1$	1	Journal article
Domain 2: Represe	ntative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	UK
1	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Field work looking at biodegradation of TCE in groundwate near a closed metal plating factory. Outside scope.
1	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2003, 15 years old
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessit	oility/Clari	ity				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Sources cited and clearly described.
Domain 4: Variabil	ity and Ur	ncertainty				
	Metric 7:		N/A		N/A	No Comment.
Overall Quality De	terminatio	$\mathbf{n}^{\dagger}$	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

Source Citation: Type of Data Source Hero ID	/	U.S, E. P. A. 1977. Control of volatile organic emissions from solvent metal cleaning. Facility; Reports for Data or Information Other than Exposure or Release Data; 3827321								
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Descrip Process Description Possible Physical	on:	tegory of Use):	EPA Guidance to in No Vapor	spectors	on VOC	C reduction				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EPA document				
Domain 2: Repres	sentative Metric 2: Metric 3:	Geographic Scope Applicability	High Unacceptable	$\begin{array}{c} \times \ 1 \\ \times \ 2 \end{array}$	$\frac{1}{8}$	US Old 1977 guidelines on controling VOCs from metal cleaning.				
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	Low N/A	$\times 2$	$^{6}$ N/A	Outdated, no new data 1977, 42 years old No Comment.				
Domain 3: Access		ity Metadata Completeness	Low	× 1	3	Sources cited, but not well described or attributed to data.				
Domain 4: Variab		ncertainty Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality D	eterminatio	n <sup>†</sup>	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

Source Citation: Type of Data Source Hero ID	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Facility; Completed Exposure or Risk Assessments; 3827429								
EXTRACTION Parameter			Data						
Life Cycle Stage:			Manufact	ure					
Process Description	on:		No						
*		nd percent of PV):	EU: 51,00	00,000-22	5,000,00	00 kg			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	EU Chemicals Bureau peer reviewed risk assessment for TCE			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	European Study (OECD)			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace scenario within scope of risk evaluation.			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Most data from <1996			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Provides a large range of possible values and is uncertain.			
Domain 3: Access	ibility/Clar	itv							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Cleary documented sources and reasonably articulated as- sumptions, but not fully transparent			
Domain 4. Vh	ilitar and II-								
Domain 4: Variab	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Discusses un containte in according to disting and invested in			
	metric 7:	metadata Completeness	meannin	× 1	2	Discusses uncertainty in overall production and importation			
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	Medium		1.9				

Source Citation: Type of Data Source Hero ID	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Facility; Completed Exposure or Risk Assessments; 3827429								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	ption (Subca	ategory of Use):	Metal De	greasing					
Process Description			No						
Total Annual U.S	. Volume (a	nd percent of PV):	EU: 63,14	10,000kg					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
Domain 1. Honad	Metric 1:	Methodology	High	$\times 1$	1	EU Chemicals Bureau peer reviewed risk assessment for TCE			
Domain 2: Repres	sentative								
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	European Study (OECD)			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace scenario within scope of risk evaluation.			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Most data from $<1996$			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Provides annual use across all of the EU			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Cleary documented sources and reasonably articulated as- sumptions, but not fully transparent			
Domain 4: Variat	oility and Ui	ncertainty							
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Discusses uncertainty in amount used in production.			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.9				

Source Citation: Type of Data Source Hero ID	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Facility; Completed Exposure or Risk Assessments; 3827429								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	ption (Subca	ategory of Use):	Adhesives	3					
Process Description			No						
Total Annual U.S	. Volume (a	nd percent of PV):	EU: 6,930	),000kg					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
Domain 1. Itenae	Metric 1:	Methodology	High	$\times 1$	1	EU Chemicals Bureau peer reviewed risk assessment for TCE			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	European Study (OECD)			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace scenario within scope of risk evaluation.			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Most data from $<1996$			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Provides annual use across all of the EU			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Cleary documented sources and reasonably articulated as- sumptions, but not fully transparent			
Domain 4: Variat	oility and Ui	ncertainty							
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Discusses uncertainty in amount used in production.			
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	Medium		1.9				

Source Citation: Type of Data Source Hero ID	European Chemicals Bureau. 2004. European Union risk assessment report: Trichloroethylene. EUR 21057 EN. Facility; Completed Exposure or Risk Assessments; 3827429								
EXTRACTION Parameter			Data						
Farameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	ption (Subca	ategory of Use):	Intermedi	ate					
Process Description			No						
Total Annual U.S	. Volume (a	nd percent of PV):	EU: 45,00	00,000 kg					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^\star$	Score	Comments			
Domain 1: Reliab	ility								
Domain 1. Henat	Metric 1:	Methodology	High	$\times 1$	1	EU Chemicals Bureau peer reviewed risk assessment for TCE			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	European Study (OECD)			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace scenario within scope of risk evaluation.			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Most data from $<1996$			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Provides annual use across all of the EU			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Cleary documented sources and reasonably articulated as- sumptions, but not fully transparent			
Domain 4: Variat	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Discusses uncertainty in amount used in production.			
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	Medium		1.9				

Source Citation: Type of Data Source Hero ID	Snedecor, G.,Hickman, J. C.,Mertens, J. A.: 2004. Chloroethylenes and chloroethanes. Facility; Reports for Data or Information Other than Exposure or Release Data; 3859422								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Descrip Process Descriptio Total Annual U.S. Number of Sites:	on:	ategory of Use): nd percent of PV):	Maufactu Manufact Yes 2004:Dow 2	ure	tonsPP	G: 91,000 tons			
EVALUATION					~				
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Kirk-Othmer ecyclopedia of chemical technology (frequently used source)			
Domain 2: Repres	entative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	USA			
	Metric 3:	Applicability	High	$\times 2$	2	Workplace scenario within scope of risk evaluation.			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2004 data (>10 but <20 years old)			
	Metric 5:	Sample Size	High	$\times 1$	1	Discrete data for each US production facility			
Domain 3: Access	ibility/Clari Metric 6:	ity Metadata Completeness	High	$\times 1$	1	In-text citations for all sources used and fully transparent			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Not discussed			
Overall Quality D	eterminatio	n <sup>†</sup>	High		1.4				

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 Hero ID		tand formation of the porous strategy and formation of the porous strategy and						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	ategory of Use):	Battery S	eparator	s			
Process Description			Yes					
	. Volume (a	and percent of PV):	10-100  me	etric tons	3			
Number of Sites:			1					
Possible Physical	Form:		liquid, va	por				
EVALUATION								
Domain		Metric	Rating	$MWF^*$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Medium	$\times 1$	2	Data from site using TCE, assumed to have reliable process description information		
Domain 2: Repres	entative							
1	Metric 2:	Geographic Scope	Medium	$\times 1$	2	UK based company		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace scenario within scope of risk evaluation.		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2014 ( $<10$ years old)		
	Metric 5:	Sample Size	High	$\times 1$	1	All data is fully characterized		
Domain 3: Access	ibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data provided directly from manufacturer on the facility's process.		
Domain 4: Variab	ility and U	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	$\mathrm{n}^{\dagger}$	High		1.3			

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID		02. In-depth survey report: Con eports for Data or Information (				posure (PCE) in vapor degreasing operations, site #3. ease Data;
EXTRACTION			_			
Parameter			Data			
Life Cycle Stage:			Surrogate	Use		
Life Cycle Descrip	otion (Subca	ategory of Use):	OTVD			
Process Description	on:		Yes			
Number of Sites:			1			
Batch Size:			255 gallor	ı capacity	У	
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH (frequently used source)
Domain 2: Repres	sentative					
*	Metric 2:	Geographic Scope	High	$\times 1$	1	USA
	Metric 3:	Applicability	High	$\times 2$	2	Process description for directy applicable workplace scenario
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data from 2002 (>10 years) that is expected to be similar to current degreasing processes.
	Metric 5:	Sample Size	Low	$\times 1$	3	single value, no statistics
Domain 3: Access	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	NIOSH assessment that clearly describes assessment methods
Domain 4: Variab	oility and U	ncertainty				
		Metadata Completeness	N/A		N/A	No Comment.
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.5	

Source Citation:	U.S, E. P. substances	,	The U.S.	solvent	cleanin	g industry and the transition to non ozone depleting		
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3982140							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Descrip	· · · · · · · · · · · · · · · · · · ·	ategory of Use):	Use Solvent cl	eaning				
Process Description	on:		Yes					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabi	lity							
Domain 1. Renabl	Metric 1:	Methodology	High	$\times 1$	1	US EPA (frequently used source)		
Domain 2: Repres	entative							
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	USA		
	Metric 3:	Applicability	High	$\times 2$	2	Workplace scenario within scope of risk evaluation.		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	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: Access	ibility/Clar	ity						
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Assessment clearly documents where data is coming from and is fully transparent		
Domain 4. Variah	ility and U	agentainty						
Domain 4: Variab	-	Metadata Completeness	N/A		N/A	No Comment.		
0 110 11: 5	,	+	TT: 1		1.0			
Overall Quality D	eterminatio	n'	High		1.3			

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 Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 5071453								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Surrogate	e 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	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliabi	lity								
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH (frequently used source)			
Domain 2: Repres	entative								
× ×	Metric 2:	Geographic Scope	High	$\times 1$	1	USA			
	Metric 3:	Applicability	High	$\times 2$	2	Process description for directy applicable workplace scenario			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	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: Accessi	bility/Clar	itv							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	NIOSH assessment that clearly describes assessment methods.			
Domain 4: Variabi	ility and Ui	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality Determination <sup><math>\dagger</math></sup>			High		1.3				

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 Hero ID	(PCE) in vapor degreasing operations, site $\#1$ . EPHB 250-19b. Facility; Reports for Data or Information Other than Exposure or Release Data; 5071461								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Surrogate	e Use					
Life Cycle Description (Subcategory of Use):			Vacuum and OTV Degreasing						
Process Description:			Yes						
Number of Sites:			1						
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
Domain 1. Renab	Metric 1:	Methodology	High	$\times 1$	1	NIOSH (frequently used source)			
Domain 2: Repres	entative								
Domain 2. Ropros	Metric 2:	Geographic Scope	High	$\times 1$	1	USA			
	Metric 3:	Applicability	High	$\times 2$	2	Process description for directy applicable workplace scenario			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	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: Access	ibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	NIOSH assessment that clearly describes assessment methods.			
Domain 4: Variab	ility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality Determination <sup><math>\dagger</math></sup>			High		1.3				

				Orris, P; Daniels, W. 1981. Health Hazard Evaluation Report 80-201-816: Peterson/Puritan Company. HE 80-201-816. Facility; Reports for Data or Information Other than Exposure or Release Data; 5099140						
		Data								
		Surroga	te Use							
Life Cycle Stage: 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:										
	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments					
v										
etric 1:	Methodology	High	$\times 1$	1	NIOSH (frequently used source)					
ative										
etric 2:	Geographic Scope	High	$\times 1$	1	USA					
etric 3:	Applicability	High	$\times 2$	2	Process description for directy applicable workplace scenario					
etric 4:	Temporal Representativeness	Low	$\times 2$	6	Data from 1980 $(>20 \text{ years})$					
etric 5:	Sample Size	N/A		N/A	No Comment.					
lity/Clari	ty									
etric 6:	Metadata Completeness	High	$\times 1$	1	NIOSH assessment that clearly describes assessment methods.					
v and Un	certainty									
		N/A		N/A	No Comment.					
Overall Quality Determination <sup><math>\dagger</math></sup>				1.6						
	v etric 1: etric 2: etric 2: etric 3: etric 4: etric 5: ity/Clari etric 6: y and Un etric 7:	Image: Additional and the second of the second s	n (Subcategory of Use): Use- pa Yes blume (and percent of PV): unknow 1 Metric Rating Veric 1: Methodology High eative etric 2: Geographic Scope High etric 3: Applicability High etric 4: Temporal Representativeness Low etric 5: Sample Size N/A ity/Clarity etric 6: Metadata Completeness High y and Uncertainty etric 7: Metadata Completeness N/A	Yes $Metric$ Rating   Metric Rating   MWF* Metric   Metric Rating   MWF* MWF*   Metric 1: Methodology   High × 1   etric 2: Geographic Scope   High × 1   etric 3: Applicability   High × 2   etric 4: Temporal Representativeness   Low × 2   etric 5: Sample Size   N/A Metric 6:   Metadata Completeness High   w and Uncertainty N/A	n (Subcategory of Use): blume (and percent of PV): Metric Rating MWF* Score Metric Rating MWF* Score Metric 1: Methodology High $\times 1$ 1 ative etric 2: Geographic Scope High $\times 1$ 1 etric 3: Applicability High $\times 2$ 2 etric 4: Temporal Representativeness Low $\times 2$ 6 etric 5: Sample Size N/A N/A ity/Clarity etric 6: Metadata Completeness High $\times 1$ 1 y and Uncertainty etric 7: Metadata Completeness N/A N/A					

\* MWF = Metric Weighting Factor