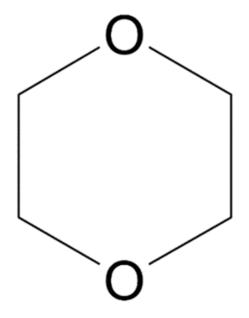


Final Risk Evaluation for 1,4-Dioxane

Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Releases and Occupational Exposure Data

CASRN: 123-91-1



This document is a compilation of tables for the data extraction and evaluation for 1,4-Dioxane. Each table shows the data point or set or information element that was extracted and evaluated from a data source in accordance with Appendix D of the *Application of Systematic Review in TSCA Risk Evaluations*. If the source contains more than one data set or information element, the review provides an overall confidence score for each data set or information element that is found in the source. Therefore, it is possible that a source may have more than one overall quality/ confidence score.

Table of Contents

	Page
Releases to the Environment	3
Occupational Exposure	52
Facility	134

Explanatory Notes

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

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

Releases to the Environment

·						
Source Citation:		998. 1, 4-Dioxane. Priority exist				
Type of Data Source		o the Environment; Completed I	Exposure or	Risk As	sessmen	ats;
Hero ID	3827412					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Commerc	ial Hea		
Life Cycle Descrip	otion (Subca	ategory of Use):	Lab use	iai Osc		
Release Days per		atogory or obo).	50			
Waste Treatment			Sewage T	reatment	Plant	
			J			
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	ility					
Domain 1. Itenab	Metric 1:	Methodology	High	\times 1	1	NICNAS
Domain 2: Repres		G 1: G	3.6 11		0	
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3: Metric 4:	Applicability Temporal Representativeness	High Medium	$\times 2 \times 2$	2 4	occupational scenario within the scope of the risk evaluation 1998
	Metric 4:	Sample Size	N/A	X 2	N/A	No Comment.
	1,100110 0.	Sumpre Size	-1/11		11/11	The Comment
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1\right) $
Domain 4: Variab	ility and II-	naartainty				
Domain 4: Variac	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
	1.100110 1.	Titotada Compionos				Zamesa diseassion of variability and uncorreling
Overall Quality D	eterminatio	m^\dagger	High		1.5	
- · · · · · · · · · · · · · · · · · · ·			G		-	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID		Nicnas, 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7. Releases to the Environment; Completed Exposure or Risk Assessments; 3827412						
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Days per Year: Number of Sites: Waste Treatment Method:			Commercial, Potential Consumer Use Film processing (film cement use) 50 10 Sewage Treatment Plant					
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliabi	lity Metric 1:	Methodology	High	× 1	1	NICNAS		
			-					
Domain 2: Represe	entative Metric 2:	Geographic Scope	Medium	× 1	2	Australia		
	Metric 3:	Applicability	High	$\times 1 \times 2$	$\frac{2}{2}$	occupational scenario within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accessi	hility/Clar	itx						
Domaii 5. Accessi	Metric 6:	Metadata Completeness	High	\times 1	1	Clear documentation of data sources, methods, results and assumptions		
Domain 4. 171:	liter and II-	a containte						
Domain 4: Variabi	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty		
Overall Quality De	eterminatio	$\mathbf{n^\dagger}$	High		1.5			

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source		Nicnas, 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7. Releases to the Environment; Completed Exposure or Risk Assessments; 3827412						
EXTRACTION Parameter			Data					
Release Days per Y Number of Sites:	Life Cycle Description (Subcategory of Use): Release Days per Year:			Processing Pharmaceutical manufacture 50 1 Sewage Treatment Plant				
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliabil	lity Metric 1:	Methodology	High	× 1	1	NICNAS		
Domain 2: Represe	entative							
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia		
	Metric 3: Metric 4: Metric 5:	Applicability Temporal Representativeness Sample Size	High Medium N/A	$\begin{array}{c} \times \ 2 \\ \times \ 2 \end{array}$	2 4 N/A	occupational scenario within the scope of the risk evaluation 1998 No Comment.		
Domain 3: Accessi	hility/Clar	itv	,		,			
	Metric 6:	Metadata Completeness	High	\times 1	1	Clear documentation of data sources, methods, results and assumptions		
Domain 4: Variabi	lity and Ur Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty		
Overall Quality De	eterminatio	\mathbf{n}^{\dagger}	High		1.5			

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source R	Carex, Canada. 2017. Profiles & estimates: 1,4-Dioxane. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3978382						
EXTRACTION			ъ.				
Parameter			Data				
Life Cycle Stage:			Industrial	l Use			
Life Cycle Description			Basic che	mical mf	g		
Annual Release Quar	ntity (kg/	/yr):	5 tonnes				
EVALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliability	У						
M	letric 1:	Methodology	High	\times 1	1	National Pollutant Release Inventory (NPRI)	
Domain 2: Represent	tative						
-	letric 2:	Geographic Scope	Medium	\times 1	2	Canada	
M	Ietric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation	
	Ietric 4:	Temporal Representativeness	High	$\times 2$	2	2015	
M	letric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Accessibil	lity/Clari	tv					
	letric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$	
Domain 4: Variabilit	v and Un	ncertainty					
	Ietric 7:		Low	× 1	3	Does not address variability or uncertainty	
Overall Quality Dete	ermination	n [†]	High		1.4		

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		c release inventory: 1,4-Dioxane				
Type of Data Source Hero ID	Releases to 3860452	the Environment; Environment	tal Release	Data;		
EXTRACTION	3000402					
Parameter			Data			
Life Cycle Stage:			Disposal			
Release Source:			All indus			
Disposal /Treatme		:			ction W	ells, Landfills, Air
Environmental Me			Water, la			
Release or Emissic						ltiple release and disposal categories
Release Estimation		/ \	Self-repor			
Annual Release Qu	uantity (kg	/yr):	1,291,650	lb/yr to	tai on- a	and off-site disposal or other release
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	High	\times 1	1	US EPA, TRI, 'trusted source
Domain 2: Repres	ontativo					
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015
	Metric 5:	Sample Size	Low	× 1	3	No statistics
Domain 3: Accessi	٠,		3.6 1:		0	
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes most critical metadata, TRI methodology can be reviewed separately $$
Domain 4: Variabi	ility and Ur	ncertainty				
Domain 1. Variab		Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
	1.100110 1.	1.100adata Completeness	2011	/\ <u>1</u>		2000 Not actions variablely of anothermy
Overall Quality De	eterminatio	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 .

0.2		rents study. o the Environment; Completed I	Exposure or	Risk A	ssessmer	nts;		
EXTRACTION			ъ.					
Parameter			Data					
Life Cycle Stage:			Processing, Use, Disposal					
Release Source:			Multiple,	see p. 3	7			
Disposal /Treatment Method:			Incinerati WWT, U			very, fuel blending, WWT - tanks, POTW, sal		
Environmental Media:			Land, wa		1			
Release or Emission Fa	actor:			reported		es and total loading by waste type (waste wa-		
Release Estimation Me	ethod:					CRA 3007 Questionairre		
Annual Release Quant		/vr):				41 for brekadown by management practice		
Number of Sites:		7 5 - 7 ·	27	6/ 3 -	, see p.	11 101 STORMOWN Sy management praesice		
Waste Treatment Meth	nod:		Multiple					
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability								
	ric 1:	Methodology	High	× 1	1	US EPA Solvents Study, trusted source		
Domain 2: Representa	tive							
Me	ric 2:	Geographic Scope	High	\times 1	1	US		
Mer	ric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation		
Mer	ric 4:	Temporal Representativeness	Low	$\times 2$	6	1993 RCRA 3007 Questionairre		
Me	ric 5:	Sample Size	Low	× 1	3	Distribution of samples is qualitative or characterized by no statistics $$		
Domain 3: Accessibilit	v/Clar	itv						
	ric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$		
Domain 4: Variability	and U	ncertainty						
-	ric 7:	Metadata Completeness	Medium	\times 1	2	Limited discussion of variability and uncertainty		
		*				<u> </u>		
		Con	tinued on r	next pag	e			

Source Citation: Type of Data Source Hero ID	1996. Solvents study. Releases to the Environment; Completed Exposure or Risk Assessments; 3860540				
EVALUATION Domain	Metric	Rating I	MWF* Score	Comments	
Overall Quality I	Determination [†]	Medium	1.8		

^{*} MWF = Metric Weighting Factor

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

	Dow Chemical, Company. 1989. Dow Chemical information submitted to EPA pursuant to section 8(e) of the Toxic Substances Contract Act (TSCA).					
	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;					
EXTRACTION						
Parameter		Data				
Life Cycle Stage:		Processing				
Release Source:		Process so	olvent/st	abilizer	in chlorinated solvents	
Disposal /Treatment Method	d:	Aqueous	waste str	eam		
Environmental Media:		Water				
Release or Emission Factor:		Not speci	fied			
Release Estimation Method:		laborator				
Waste Treatment Method:			degreas		ed to solvent-waste separator; or organic va- eartions may be treated by activated carbon	
P2 Control & percent Efficie	ency:	Reports removal efficiency of activated sludge stream and carbon adsorption, see p. 27				
EVALUATION						
Domain	Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Dow Chemical information request response	
Domain 2: Representative						
Domain 2. Representative	G 1. G		_	1	US	
Motric 2.	Coographic Scope	High	× 1			
Metric 2:	0 1	High High	× 1 × 2			
Metric 3:	Applicability	High	\times 2	2	occupational scenario within the scope of the risk evaluation	
	Applicability Temporal Representativeness	_			occupational scenario within the scope of the risk evaluation 1985	
Metric 3: Metric 4: Metric 5:	Applicability Temporal Representativeness Sample Size	High Low	$\begin{array}{c} \times \ 2 \\ \times \ 2 \end{array}$	2 6	occupational scenario within the scope of the risk evaluation 1985 Distribution of samples is qualitative or characterized by no	
Metric 3: Metric 4:	Applicability Temporal Representativeness Sample Size	High Low	$\begin{array}{c} \times \ 2 \\ \times \ 2 \end{array}$	2 6	occupational scenario within the scope of the risk evaluation 1985 Distribution of samples is qualitative or characterized by no	
Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Cla Metric 6:	Applicability Temporal Representativeness Sample Size rity Metadata Completeness	High Low Medium	× 2 × 2 × 1	2 6 2	occupational scenario within the scope of the risk evaluation 1985 Distribution of samples is qualitative or characterized by no statistics	
Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Cla	Applicability Temporal Representativeness Sample Size rity Metadata Completeness Uncertainty	High Low Medium	× 2 × 2 × 1	2 6 2	occupational scenario within the scope of the risk evaluation 1985 Distribution of samples is qualitative or characterized by no statistics	

		minimus nom previ	ous page			
Source Citation:	Dow Chemical, Company. 1989. Dow Chemical information submitted to EPA pursuant to section 8(e) of the Toxic Substances Contract Act (TSCA).					
Type of Data Source Hero ID	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3861185					
EVALUATION						
Domain	Metric	Rating MW	F* Score	Comments		
Overall Quality I	${\rm Petermination}^{\dagger}$	Medium	1.9			

 $[\]begin{tabular}{l} $^\star \, MWF = Metric \, Weighting \, Factor \\ $^\dagger \, If \, any \, individual \, metrics \, are \, deemed \, Unacceptable, \, then \, the \, overall \, rating \, is \, also \, unacceptable. \, Otherwise, \, the \, overall \, rating \, is \, based \, on \, the \, following \, scale: \\ \end{tabular}$ High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID		1995. OPPT chemical fact sheets: 1, 4-Dioxane fact sheet: Support document. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3860496						
EXTRACTION Parameter			Data					
Release or Emission				Manufacturing, processing, and use TRI-reporting industries Air, water, land 1992 TRI - Total 1.13 million pounds released, 680 thousand pounds to atmosphere, 450 thousand pounds to surface waters, and 33 hundred pounds were released onto the land. Self-reported by industry for TRI				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	vility Metric 1:	Methodology	High	× 1	1	US EPA OPPT Chemical Fact Sheet, trusted source		
Domain 2: Repres	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 6 2	US occupational scenario within the scope of the risk evaluation 1995 literature search Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions		
Domain 4: Variab	oility and Un Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty		
Overall Quality D	Determinatio	\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 .

	A 2015. TSCA work plan cher o the Environment; Completed I				and initial assessment. 1,4-Dioxane. ats;			
EXTRACTION Parameter		Data						
Life Cycle Stage:		Manufacturing, processing, and use						
Release Source:			d on					
- ,	Disposal /Treatment Method:							
Environmental Media: Release or Emission Factor:			Environmental releases of 1,4-dioxane to air and water may contribute to ecological and general population exposures. The potential for release of 1,4-dioxane to air is high due to the high vapor pressure of 1,4-dioxane and disposal through incineration. Industrial and commercial use of 1,4-dioxane and presence in consumer products suggest releases to water are possible					
			Reports releases from TRI, notes generally decreasing total releases from 1988 to 2007					
Release Estimation Method:		Self-reported by industry for TRI						
Annual Release Quantity (kg	/vr):	Multiple estimates from TRI, see document						
Number of Sites:	, ,	39 to 45			,			
EVALUATION								
Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical			
Domain 2: Representative								
Metric 2:	Geographic Scope	High	$\times 1$	1	US			
Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015			
Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with unce tain statistics. It is unclear if analysis is representative.			
Domain 3: Accordibility/Clar	itv							
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness		High	× 1	1	Clear documentation of data sources, methods, results and a sumptions			
Domain 4: Variability and Un	ncertainty							

Source Citation: Type of Data Source Hero ID	,	U.S, E. P. A 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane. Releases to the Environment; Completed Exposure or Risk Assessments; 3809027							
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality I	High		1.1						

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation: Atsdr., 2012. Toxicological profile for 1,4-dioxane. Type of Data Source Releases to the Environment; Environmental Release Data; 3982333								
XTRACTION Parameter		Data						
Life Cycle Stage:		Manufacturing, processing, and use						
Life Cycle Description (Subcategory of Use):				0 00001112	, and as			
Release Source:			rting ind	ustries				
Disposal /Treatment Method	:	Incinerati	on, POT	W				
Environmental Media:					1,4-dioxane to air and water may contribute			
			kane to a	r is high gh incin	oppulation exposures. The potential for release in due to the high vapor pressure of 1,4-dioxane heration. Industrial and commercial use of 1,4-onsumer products suggest releases to water are			
Release or Emission Factor:	Reports releases from TRI, notes generally decreasing total releases from 1988 to 2007							
Release Estimation Method:		Self-reported by industry for TRI						
Annual Release Quantity (kg	/yr):	Multiple estimates from TRI, see document						
VALUATION								
Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability								
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	ATSDR Toxicological Profile			
Metric 1:	Methodology	High	× 1	1	ATSDR Toxicological Profile			
· ·	Methodology Geographic Scope	High High	× 1 × 1	1	ATSDR Toxicological Profile US			
Metric 1: Domain 2: Representative	3.0							
Metric 1: Domain 2: Representative Metric 2:	Geographic Scope	High	× 1	1	US			
Metric 1: Domain 2: Representative Metric 2: Metric 3:	Geographic Scope Applicability	High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \end{array}$	1 2	US Scenario within the scope of the risk evaluation			
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2	US Scenario within the scope of the risk evaluation 2012			
Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2	US Scenario within the scope of the risk evaluation 2012			
Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	High High High High	× 1 × 2 × 2 × 1	1 2 2 1	US Scenario within the scope of the risk evaluation 2012 TRI Sites			

Source Citation: Type of Data Source Hero ID	,	Atsdr., 2012. Toxicological profile for 1,4-dioxane. Releases to the Environment; Environmental Release Data; 3982333							
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
	Metric 7:	Metadata Completeness	High	× 1	1	States that TRI data isn't 100 percent reliable since only certain sites are required to report.			
Overall Quality D	High		1.1						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source Rele	Type of Data Source Releases to the Environment; Environmental Release Data;								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr): Number of Sites:			Manufacturing, processing, and use All stages TRI-reporting industries 46 percent Air27 percent Surface water26 percent underground injection Self-reported by industry for TRI 309,000 lb 53						
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Met	ric 1:	Methodology	High	× 1	1	Department of Health and Human Services NTP			
Met Met	tive cric 2: cric 3: cric 4: cric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 1	US Scenario within the scope of the risk evaluation 2016 TRI Sites			
•	Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness			× 1	2	Includes media and total releases			
	Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness			× 1	3	Does not address variability or uncertainty			
Overall Quality Determination †			High		1.3				

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:						nura, F.,Ohtoshi, K 2008. Investigation of 1,4-dioxane nicipal solid waste. Chemosphere.
Type of Data Source Hero ID	Releases to 3579380	o the Environment; Environment	tal Release	Data;		
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Disposal			
Life Cycle Descrip	tion (Subca	ategory of Use):	Disposal			
Release Source:	tion (bubet	atogory or obo).	Incinerati	on, landf	ill leach	nate
Release or Emissic	n Factor:					in leachate
Number of Sites:			2 landfills	-,		
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	High	× 1	1	Research paper from Chemosphere
Domain 2: Repres	entative					
•	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan
	Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008
	Metric 5:	Sample Size	High	× 1	1	38 samples from landfill sites
Domain 3: Access	ibility/Clar	ity				
Bolliam 6. Heess	Metric 6:	Metadata Completeness	High	\times 1	1	Includes total leachate produced/day, emission factors for diosane form samples
Domain 4: Variab	ility and II.	ncortainty				
Domain 4. Variab	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
	10110110 1.	Metadata Compieteness	111811	^ 1	1	cical documentation of variability and uncertainty
Overall Quality De	eterminatio	$ m n^\dagger$	High		1.1	

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:		,			ices emi	ssions for 2012 and projections for 2015.
Type of Data Source Hero ID	Releases to 3982361	the Environment; Environment	tal Release	Data;		
EXTRACTION						
Parameter			Data			
Life Cycle Stage:	Life Cycle Stage:			uring, pr	ocessing	g, and use
Life Cycle Descrip	otion (Subca	ategory of Use):	All stages	O, 1		g) · · · · · · · · ·
Annual Release C			4.8 tonne	s in 2012	(Actua	d)6 tonnes in 2015 (projected)
Number of Sites:			2			
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	× 1	1	Chemistry Industry Assocation of Canada
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Canada
	Metric 3:	Applicability	Low	$\times 2$	6	Unsure what scenario data is for
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	sibility/Clari	itv				
	Metric 6:	Metadata Completeness	Low	× 1	3	Includes annual release for the two sites, but no other data
Domain 4: Varial	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality I	eterminatio	$ m 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 .

Source Citation: Type of Data Source Hero ID		Chemistry Industry Association of, Canada. 2017. All substances emissions for 2011 and projections for 2014. Releases to the Environment; Environmental Release Data; 3982362							
EXTRACTION			Data						
Parameter			Data						
Life Cycle Stage:			Manufact	uring, pr	ocessing	g, and use			
Life Cycle Descrip			All stages	S					
Annual Release Q	uantity (kg	/yr):	7.25 tonn	es in 201	1 (actua	al)7.3 tonnes in 2014 (projected)			
Number of Sites:			1						
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility								
Domain 1. Itemas	Metric 1:	Methodology	High	× 1	1	Chemistry Industry Assocation of Canada			
Domain 2: Repres	sentative								
Bomam 2. Itopros	Metric 2:	Geographic Scope	Medium	\times 1	2	Canada			
	Metric 3:	Applicability	Low	$\times 2$	6	Unsure what scenario data is for			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2011			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	itv							
	Metric 6:	Metadata Completeness	Low	× 1	3	Includes annual release for the site, but no other data			
Domain 4: Variab	oility and Ui	ncertainty							
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty			
Overall Quality D	eterminatio	${ m n}^{\dagger}$	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 .

Source Citation:		P 2002. Gulf States Chemical: anup program: Approved for clea				Florida: Jefferson County: Northeast district: Site lead: WC # 131
Type of Data Source Hero ID		the Environment; Environment			2002. 11	π 101.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Disposal			
Life Cycle Descrip	tion (Subc	eterory of Use):	Disposal			
Release Source:	Mon (Subca	stegory or ose).	•	om leakir	or tanks	s, tank rinsate
Environmental Me	edia:		Water	JIII ICAKII	ig talik.	5, tank imsate
Release or Emissic			7.2 ug/L	detected	in samı	pling
			, , =6/ =		,	ro
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
D ' 1 D l' 1	.1.,					
Domain 1: Reliabi	Metric 1:	Methodology	High	× 1	1	Florida DEP
	Metric 1.	Methodology	IIIgii	X 1	1	Florida DEP
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	\times 1	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2011
	Metric 5:	Sample Size	High	\times 1	1	Multiple wells sampled
D						
Domain 3: Accessi	٠,	·	N.C. 11		0	
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes some sampling information, but not much information about the processes performed at the plant
Domain 4: Variab	-					
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
O11 O111 D		†	High		1.9	
Overall Quality De	Overall Quality Determination [†]				1.3	

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation: U.S, E. P. A 2006. Treatment Tech Type of Data Source Releases to the Environment; Environ			Fundan	nentals and Field Applications.		
EXTRACTION Parameter	Data					
Life Cycle Stage:	Manufact	uring, pr	ocessing	g, and use		
Life Cycle Description (Subcategory of Use):	All stages	3				
Release Source:	2002 TRI					
Environmental Media:				Water is primary concern.		
Annual Release Quantity (kg/yr):	, ,	, .	tal (lists	s amounts for each media)		
Number of Sites:	11 listed			(5)		
Waste Treatment Method:				emediation, adsorption (GAC)		
P2 Control & percent Efficiency:				d final contaminant concentrations for different		
	sites and	sites and technologies				
EVALUATION						
Domain Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability						
Metric 1: Methodology	High	× 1	1	EPA Office of Solid Waste and Emergency Response		
Domain 2: Representative						
Metric 2: Geographic Scope	High	\times 1	1	US		
Metric 3: Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation		
Metric 4: Temporal Representative	eness Medium	$\times 2$	4	2006		
Metric 5: Sample Size	High	× 1	1	TRI Sites		
Domain 3: Accessibility/Clarity						
Metric 6: Metadata Completeness	Medium	× 1	2	Includes media and total releases		
Domain 4: Variability and Uncertainty						
Metric 7: Metadata Completeness	High	× 1	1	States that TRI data isn't 100 percent reliable since only certain sites are required to report.		
Overall Quality Determination †	High		1.3			

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source	Adeq., 2012. Tucson International Airport Area (TIAA) overview: EPA cercla site. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982201							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:	Life Cycle Stage:			d use				
Waste Treatment Method:			Advanced Oxi (GAC) to treat			nt system, Granular activated carbon groundwater		
EVALUATION								
Domain		Metric	Rating	MWF^*	Score	Comments		
Domain 1: Reliabil	itv							
	Metric 1:	Methodology	High	× 1	1	Arizona DEQ, EPA		
Domain 2: Represe	entative							
•	Metric 2:	Geographic Scope	High	\times 1	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Groundwater remediation activities (out of scope)		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accessib	oility/Clari	tv						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - No Sampling		
Domain 4: Variabil	ity and Un	eartainty						
		Metadata Completeness	N/A		N/A	N/A - No Sampling		
Overall Quality De	termination	n [†]	Unacceptable		4.0	Metric Mean Score: 2.0.		

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

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		Adeq,. 2017. National priorities list (NPL) sites (federal superfund): Tucson International Airport area (TIAA) overview. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982191								
EXTRACTION Parameter			Data							
Life Cycle Stage: Waste Treatment		Processing, and use Advanced Oxidation Treatment system, Granular activated carbon (GAC) to treat contaminated groundwater								
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Arizona DEQ, EPA				
Di- 9. D	4-4:		-							
Domain 2: Repres	Metric 2:	Geographic Scope	High	× 1	1	US				
	Metric 2: Metric 3:	Applicability	Unacceptable	\times 1 \times 2	8	Groundwater remediation activities (out of scope)				
	Metric 4:	Temporal Representativeness	High	$\stackrel{\wedge}{\times} \stackrel{2}{2}$	$\frac{3}{2}$	2012				
	Metric 5:	Sample Size	N/A	~ 2	N/A	No Comment.				
Domain 3: Access	sibility/Clari	itv								
Domain 6. Necess	Metric 6:	Metadata Completeness	N/A		N/A	N/A - No Sampling				
Domain 4: Variab	sility and Ur	acortainty								
Domain 4. Variab		Metadata Completeness	N/A		N/A	N/A - No Sampling				
Overall Quality D	eterminatio	${ m n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.0.				

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

 $^{^{\}star}$ 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 .

	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453						
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subca Release Source: Disposal /Treatment Method Daily Release Quantity (kg/c Annual Release Quantity (kg Number of Sites: Waste Treatment Method: P2 Control & percent Efficien	Use Multiple Subcategories NAICS code provided for each site Pollution prevention method listed for each site Pollution prevention method listed for each site Lists current year and prior year releases 51 sites in the table with Dioxane releases Pollution prevention method listed for each site Pollution prevention method listed for each site, shows decrease in emissions before and after			nod listed for each site and listed for each site or year releases Dioxane releases and listed for each site			
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	USEPA Envirofacts		
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 1	US Scenarios within the scope of the risk evaluation Range: 2007-2015 TRI Sites		
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Includes releases, NAICS, and P2/Efficiency		
Domain 4: Variability and Un Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty		
Overall Quality Determination	${f n}^{\dagger}$	High		1.3			

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source	Environment Canada, Health Canada. 2010. Screening assessment for the challenge 1,4-dioxane. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3981144							
EXTRACTION								
Parameter			Data					
- Tarameter			Data					
Life Cycle Stage:			Disposa	.1				
Life Cycle Descripti	ion (Subca	tegory of Use):	Disposa	.l				
Release Source:			2006 TI	RI				
	Environmental Media:					injection		
Annual Release Qua	antity (kg/	/yr):	56 tonn	es air, 22	2 tonnes	s water, 64 tonnes UI		
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliabili		26.4.1.1	TT: 1					
	Metric 1:	Methodology	High	× 1	1	Environment Canada/Health Canada		
Domain 2: Represe	ntative							
-	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	$\stackrel{-}{2}$	Scenarios within the scope of the risk evaluation		
]	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010		
1	Metric 5:	Sample Size	High	\times 1	1	TRI Sites		
Domain 3: Accessib	vility/Clari	tv						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions		
Domain 4. V:-1:1	ites and II-	· contoint.	· ·					
Domain 4: Variabil	ity and Un Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty		
	MENIC 1:	Metadata Completeness	THEIL	^ I	1	clear documentation of variability and uncertainty		
Overall Quality Det	termination	n^{\dagger}	High		1.0			
• 0			Ü					

^{*} 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 .

		ent Canada, Health Canada. 201					
0.1	eleases to 981144	the Environment; Reports for	Data or Information Other than Exposure or Release Data;				
	961144						
EXTRACTION			D 4				
Parameter			Data				
Life Cycle Stage:			Disposal				
Life Cycle Descriptio	on (Subca	ategory of Use):	Disposal				
Release Source:			2006 NPI	RI Canad	a		
Environmental Media	a:		air, water				
Annual Release Quar	ntity (kg/	/yr):	13,800 kg	air, 6,50	0 kg wa	ater	
EVALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
D	_						
Domain 1: Reliability	y Ietric 1:	Methodology	High	× 1	1	For the second Compute /Horlish Computer	
N	tetric 1.	Wethodology	IIIgii	X 1	1	Environment Canada/Health Canada	
Domain 2: Represent	tative						
÷	letric 2:	Geographic Scope	Medium	\times 1	2	Canada	
M	letric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation	
M	letric 4:	Temporal Representativeness	High	$\times 2$	2	2010	
M	letric 5:	Sample Size	N/A		N/A	No Comment.	
D ' 9 A '1'	/CI						
Domain 3: Accessibil	lity/Clari letric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as-	
1V1	ietric o.	Metadata Completeness	High	× 1	1	clear documentation of data sources, methods, results and assumptions	
D . 4 W . 1 W.	1.77						
Domain 4: Variabilit			TT: 1	1	1		
M	letric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty	
Oronall Ovality Deta		†	II: odo		1 1		
Overall Quality Dete	ermmatio:	11.	High		1.1		

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source						andards for non-RCRA solvent waste. er than Exposure or Release Data;	
Hero ID	3982116						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Disposa	.1			
Life Cycle Stage. Life Cycle Descrip	otion (Subce	atogory of Uso):	Disposa				
Waste Treatment		negory or ose).	_		nt treat	ment methods for non-wastewater streams based	
Waste Treatment	wicehou.					in the stream	
EVALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility						
Domain 1. Renab	Metric 1:	Methodology	High	× 1	1	California Department of Health Services	
Domain 2: Repres		G 1: G	TT: 1	1	1		
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation	
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	$\frac{\text{Low}}{\text{N/A}}$	\times 2	6 N / A	1989 N. G.	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions	
D . 4 37 . 1	.1., 1.77						
Domain 4: Variab	-		II: ala	v 1	1		
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty	
Overall Quality D	lotorminotic	nt	Uiah		1.5		
Overall Quality D	eterminatio	11.	High		1.5		

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	Adeq,. 2017. National priorities list (NPL) sites (federal superfund): Air Force plant 44 (AFP-44)/Raytheon project area. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982188							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Processing, and	d use				
Waste Treatment Method:			Advanced Oxi (GAC) to treat			nt system, Granular activated carbon groundwater		
EVALUATION								
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments		
Domain 1: Reliabi	ility							
	Metric 1:	Methodology	High	\times 1	1	Arizona DEQ, EPA		
Domain 2: Repres	entative							
Domain 2. Repres	Metric 2:	Geographic Scope	High	\times 1	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Groundwater remediation activities (out of scope)		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	ibility/Clari	tv						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - No Sampling		
Domain 4: Variab	ility and Ur	ncertainty						
		Metadata Completeness	N/A		N/A	N/A - No Sampling		
Overall Quality De	eterminatio	n [†]	Unacceptable		4.0	Metric Mean Score: 2.0.		

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

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation: U.S, E. P. A 1978. OAQPS guideline serie ceutical products. Type of Data Source Releases to the Environment; Environment					ile orga	nic emissions from manufacture of synthesized pharma-		
Hero ID 3970050			tai Reiease	Data;				
EXTRACTION Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Description	on (Subca	itegory of Use):	Industrial					
Release Source:	Release Source: Environmental Media:					ion units, storage and transfer, filters, extrac- zers (first 4 majority of emissions)		
Environmental Medi			Air, contr	act haul				
Release Estimation Method: Annual Release Quantity (kg/yr):					n factors/equations for releases from storage process equipment.			
		2 metric tons to air, 41 metric tons to contract haulEmission estimates from reactors for 4 companies with different control tech in Table 3-1 (in Mg/yr, not dioxane specific just VOCs). Other tables have emissions						
Number of Sites:			from other steps in process, but do not list dioxane. 800 Pharmaceutical plants in the US and territories					
P2 Control & percer	nt Efficien	acy:	tion vents	s, vent so rything ϵ	crubber else: C	apor return lines, vent condensers, conserva- rs, pressure tanks, carbon adsorbers, floating ondensers, scrubbers, and carbon adsorbers. fficencies in Ch.4		
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliabilit	-	M. J. J. J.	TT: 1	4	1			
IV	Metric 1:	Methodology	High	× 1	1	EPA OAQPS		
Domain 2: Represen	ntative							
-	Metric 2:	Geographic Scope	High	\times 1	1	US		
N	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation		
Λ	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1978		
3	Metric 5:	Sample Size	Medium	\times 1	2	Some data from 26 sites. Some information is general to al sites		
N								
Domain 3: Accessibi	ility/Clari	ity						

Source Citation:		U.S, E. P. A 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharmaceutical products.							
Type of Data Source Hero ID	Releases to 3970050	Releases to the Environment; Environmental Release Data; 1970050							
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1\right) $			
Domain 4: Varial	v	ncertainty Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty - states generalizations are difficult since there is a lot of variability between plants and volumes of chemicals used			
Overall Quality I	Determinatio	\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 .

Source Citation: Type of Data Source Hero ID	U.S, E. P. A 1992. The toxics release inventory. Hazardous Waste and Hazardous Materials. Releases to the Environment; Environmental Release Data; 3982118							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Manufa	cturing, 1	processi	ing, and use		
Life Cycle Descrip	tion (Subca	ategory of Use):	All stag	es				
Annual Release Q	uantity (kg	/yr):	1,092,862 lbs total in 1988		888			
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliabi	ility							
	Metric 1:	Methodology	High	× 1	1	EPA, TRI		
Domain 2: Repres	entative							
1	Metric 2:	Geographic Scope	High	\times 1	1	US		
	Metric 3:	Applicability	Low	\times 2	6	General overview of TRI, Gave a total release of dioxane for one year		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1992		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accessi	ibility/Clar	itv						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	ility and Ur	ncertainty						
	Metric 7:	· ·	N/A		N/A	No Comment.		
Overall Quality De	eterminatio	$ m n^\dagger$	Low		2.3			

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		ised Risk Assessment for the Air					
Type of Data Source Hero ID	Releases to the Environment; Published Models for Exposures or Releases; 1261630						
	1201030						
EXTRACTION			Data				
Parameter			Data				
Life Cycle Stage:			Disposal				
Life Cycle Descrip	ption (Subca	ategory of Use):	Disposal				
Release Source:			Waste ma	anagemer	nt units,	, landfill	
Release Estimation	on Method:		CHEMDA	AT8 Mod	eling		
EVALUATION							
Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	sility						
Domain 1. Itenab	Metric 1:	Methodology	High	$\times 1$	1	EPA, OSW	
Domain 2: Repres		G	*** 1	_	_		
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3: Metric 4:	Applicability	High Medium	$\times 2 \times 2$	2	Model for emissions from waste disposal	
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	Medium N/A	× 2	$\frac{4}{N/A}$	1999 No Comment.	
	Metric 5.	Sample Size	IV/A		IV/A	No Comment.	
Domain 3: Access	sibility/Clari	ity					
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$	
Domain 4: Variab	ility and II-	agantainte					
Domain 4: Variat	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty	
	1/100110 /.	Metadata Completeness	111811		1	cical documentation of variability and uncertainty	
Overall Quality D	eterminatio	n^{\dagger}	High		1.2		
O TOTALL SCALING E					1.2		

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

	002. European Union risk assessn to the Environment; Completed l				
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Sub-Environmental Media: Release or Emission Factor Release Estimation Method Daily Release Quantity (kg Release Days per Year: Number of Sites:	Manufacture, Processing Manufacture, Processing air, water, incineration emission factors for different industries (Tables 3.2, 3.3, 3.5) derived from US emissions factors, TRI and industry data daily releases for different industries (Tables 3.2, 3.3, 3.5) days/year for different industries (Tables 3.2, 3.3, 3.5) 5			s factors, TRI and industry data s industries (Tables 3.2, 3.3, 3.5)	
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1	: Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative Metric 2 Metric 3 Metric 4 Metric 5	: Applicability : Temporal Representativeness	Medium High Medium Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 4 2	EU Scenarios within the scope of the risk evaluation 2002 Some datasets are represented as ranges with averages and 90th percentile, some are just ranges. The report provides recommended final values, but it is unclear how they got them.
Domain 3: Accessibility/Cl Metric 6		Medium	× 1	2	Some datasets are represented as ranges with averages and 90th percentile, some are just ranges. The report provides recommended final values, but it is unclear how they got them.
Domain 4: Variability and Metric 7		High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determinat	ion^\dagger	High		1.6	
	Cor	ntinued on r	next page)	

Source Citation: Type of Data Source Hero ID	0 /	Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Releases to the Environment; Completed Exposure or Risk Assessments; 196351								
EVALUATION										
Domain	Metric	Rating MWF* Score	Comments							

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID	Aca,. 2015. Re: TSCA Work Plan Chemical Problem Formulaton and Initial Assessment for 1,4-Dioxane. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3809105								
EXTRACTION Parameter				Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Disposal /Treatment Method: Environmental Media: Annual Release Quantity (kg/yr): Number of Sites:				Manufacturing, processing, and use All stages incineration, UI, waste broker water, air, land 87,166 lb/y to air19,134 to surface water1,035,300 to UI and waste broker 41					
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabi	lity Metric 1:	Methodology	High	× 1	1	2015 PF (US EPA)			
	Metric 2: Metric 3:	Geographic Scope Applicability	High High	× 1 × 2	1 2	US Scenarios within the scope of the risk evaluation			
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	$_{ m N/A}$	$\times 2$	$\frac{2}{N/A}$	2015 No Comment.			
Domain 3: Accessi			High	× 1	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Variabi	ility and Ur Metric 7:	ncertainty Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality De	eterminatio	${ m n}^{\dagger}$	High		1.0				

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:		ution prevention search results,				
Type of Data Source		the Environment; Environment	tal Release	Data;		
Hero ID	3860453					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Processin	σ Use Γ)isposal	
Life Cycle Descrip	tion (Subca	ategory of Use):	Processin	· ,		
Annual Release Q						facilities, shows previous year and percent re-
•	- \ -,		duction.		_	
Number of Sites:			51			
P2 Control & perc	cent Efficien	icy:	List pollu	ition prev	rention	info and percent reduction between 2 years
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabi	:1;+					
Domain 1. Renabi	Metric 1:	Methodology	High	× 1	1	EnviroFacts
-						
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2009-2015
-	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	ibility/Clar	itv				
Domain 9. 1100035.	Metric 6:	Metadata Completeness	Medium	\times 1	2	Povides total release and some P2 information.
-		-				
Domain 4: Variab	-					
	Metric 7:	Metadata Completeness	Low	× 1	3	Just lists data.
		+	***			
Overall Quality De	eterminatio	n'	High		1.4	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:	U.S, E. P.	A 1992. The toxics release inv	entory. H	azardous	s Waste	and Hazardous Materials.				
Type of Data Source	Releases to	the Environment; Environmen	tal Releas	e Data;						
Hero ID	3982118									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Disposa	1						
Life Cycle Descrip	tion (Subca	ategory of Use):	Disposa							
Annual Release Q			1,092,86							
		•		-						
EVALUATION										
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	:1;+									
Domain 1. Renab	Metric 1:	Methodology	High	× 1	1	EPA, TRI				
-	WICUIC I.	Wethodology	111511	× 1		11171, 1161				
Domain 2: Repres	entative									
•	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	Low	\times 2	6	Unsure what scenario data is for				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1987-1988				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	ibility/Clari	itaz								
Domain 5. Access	Metric 6:	Metadata Completeness	Low	× 1	3	Provides total release for two years				
	11100110 0.	Wichadata Comprehensi	<u> Low</u>			1 TOVINGES COURT FORCESS FOR TWO YOURS				
Domain 4: Variab	ility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	× 1	3	Just lists data.				
Overall Quality D	eterminatio	n^{\dagger}	Low		2.5					

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:						essing, Distribution, Use, and Disposal: 1,4-Dioxane.
Type of Data Source Hero ID	Releases to 3986663	the Environment; Reports for	Data or Inf	ormation	Other	than Exposure or Release Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Manufact	uring, pr	ocessins	g. use
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufact		,	· · · · · · · · · · · · · · · · · · ·
Annual Release Q			4,224,670	O, x		D) 4-2-2
Number of Sites:	,		, ,		proc21	other uses (2015 TRI)
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Damain 1. Daliah	:1:4					
Domain 1: Reliab	Metric 1:	Methodology	High	× 1	1	EPA Use Dossier
	Metric 1.	Wethodology	IIIgii	^ 1	1	EFA USE DOSSIEI
Domain 2: Repres	sentative					
•	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 2. Aggos	ibility /Class	14				
Domain 3: Access	Metric 6:	Metadata Completeness	High	× 1	1	Lists data sources
	14100110 0.	Metadata Compieteness	111811	^ 1	1	Disto data soutces
Domain 4: Variab	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
	_	+				
Overall Quality D	eterminatio	n'	High		1.1	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID Releases to the Environment; Environmental Release Data; 3986892 EXTRACTION Parameter Data Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release or Emission Factor: Data EVALUATION Domain N. C. State University. 2017. Identification and reduction of pollution so Release Data; Release Data; Use Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release or Emission Factor: Metric Rating MWF* Score	Ources in textile wet processing. Comments
Hero ID 3986892 EXTRACTION Parameter Data Life Cycle Stage: Use Life Cycle Description (Subcategory of Use): Industrial Use - Textiles Release or Emission Factor: 0.65 lb/hr	Comments
EXTRACTION Parameter Data Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release or Emission Factor: Use Industrial Use - Textiles 0.65 lb/hr EVALUATION	Comments
Parameter Data Life Cycle Stage: Use Life Cycle Description (Subcategory of Use): Industrial Use - Textiles Release or Emission Factor: 0.65 lb/hr EVALUATION	Comments
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release or Emission Factor: Use Industrial Use - Textiles 0.65 lb/hr EVALUATION	Comments
Life Cycle Description (Subcategory of Use): Release or Emission Factor: Industrial Use - Textiles 0.65 lb/hr EVALUATION	Comments
Life Cycle Description (Subcategory of Use): Release or Emission Factor: Industrial Use - Textiles 0.65 lb/hr EVALUATION	Comments
Release or Emission Factor: 0.65 lb/hr EVALUATION	Comments
	Comments
	Comments
Domain Metric Rating MWF* Score	Comments
Domain 1: Reliability	
·	Department of Textile ChemistrySchool of TextilesNorth Car-
	olina State University
Domain 2. Paraccontativa	
Domain 2: Representative Metric 2: Geographic Scope High \times 1 1 \cup	US
S S S S S S S S S S S S S S S S S S S	Scenarios within the scope of the risk evaluation
	1986
	No Comment.
Domain 3: Accessibility/Clarity	
	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1\right) $
Domain 4: Variability and Uncertainty	
· · · · · · · · · · · · · · · · · · ·	clear documentation of variability and uncertainty
· · ·	· ·
Overall Quality Determination † High 1.6	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

				on of Gr	ound-W	ater Flow in the Vicinity of a Former Waste-Oil
		ear Westville, Indiana, 1997"200		D	1	
Type of Data Source Hero ID	3827393	the Environment; Published M	odels for Expost	ires or K	eleases;	
	3021333					
EXTRACTION			ъ.			
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descript	tion (Subca	ategory of Use):	Use			
Ziio Oyele Zeselip	(54500	acegory or ese).	0.50			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliabil		26 (1 1 1	TT: 1			
	Metric 1:	Methodology	High	× 1	1	USGS, USDOI, EPA
Domain 2: Represe	entative					
-	Metric 2:	Geographic Scope	High	\times 1	1	US
	Metric 3:	Applicability	Unacceptable	\times 2	8	More for fate modeling than releases. Use is for waste-oil refinery (out of scope)
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessi			TT:l.	v. 1	1	
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
D 4. W . 1 . 1 . 1	1:4 1 77					
Domain 4: Variabi	Metric 7:	Metadata Completeness	Uich	× 1	1	along the company of the control of
	metric /:	Metadata Completeness	High	х 1	1	clear documentation of variability and uncertainty
Overall Quality De	eterminatio	${f n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.0.

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

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		U.S, E. P. A 2016. Micro auto gasification system: Emission characterization. Releases to the Environment; Environmental Release Data; 3970140							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Disposal						
Life Cycle Descrip	otion (Subca	ategory of Use):	Military waste (out of scope)						
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	\times 1	1	EPA			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	\times 1	1	US			
	Metric 3:	Applicability	Unacceptable	\times 2	8	Release data for military waste (food waste, standard waste, etc). Most dioxane samples non-detect			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016			
	Metric 5:	Sample Size	High	\times 1	1	8 tests, multiple waste types			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$			
Domain 4: Variab	vility and H	ncertainty							
Domain 4. Variat	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality D	eterminatio	${f n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 1.7.			

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

^{*} MWF = Metric Weighting Factor

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

Source Citation:		Commission Joint Research, Cen						
Type of Data Source		the Environment; Completed I	Exposure or Risk Assessments;					
Hero ID	3970671							
EXTRACTION			_					
Parameter			Data					
Life Cycle Stage:			Manufact	uring. Pi	rocessin	g		
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufact	- ,		9		
Release or Emissi		, , , , , , , , , , , , , , , , , , ,				nation from 2002 EU Risk Assessment (HERO		
			ID: 19635	51)				
EVALUATION						_		
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau		
Domain 2: Repres	contativo							
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	× 1	2	EU		
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
D : 0 4	:1:1:4 /C1	•1						
Domain 3: Access	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as-		
	Metric 0.	Metadata Completeness	IIIgii	× 1	1	clear documentation of data sources, methods, results and assumptions		
D	:1:4 1 TT							
Domain 4: Variab	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty		
	TATEUTIC 1.	Motadata Completeness	111811	^ I	1	clear documentation of variability and uncertainty		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.4			
Overall Quality L		••	111811		1.1			

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

		A 1990. Madison County Sa Iadiosn: District: Northeast: Sit				heast Rocky Ford Rd (County Rd 591): Madison, FL:			
0.1	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982214								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Disposal						
Life Cycle Descript	ion (Subce	atagary of Usa).	uncertain						
Disposal /Treatmen			landfill						
Release or Emission		•		n 3 2 11g/	L prese	nt in onsite extraction wells			
P2 Control & perce		icv.				ment system that can treat dioxane			
12 Control & perce	one Emerch	icy.	neced to j	pat III IIC	w orcao	ment system that can treat dioxane			
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabil	itar								
	Metric 1:	Methodology	High	\times 1	1	EPA			
	_								
Domain 2: Represe		G G		_	_				
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Medium	$\times 2$	4	Disposal, but missing a lot of useful information			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessib	bility/Clari	itv							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variabil			/ -						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality De	terminatio	n [†]	High		1.3				
Overan Quanty De		11	111g11		1.0				

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:	U.S, E. P. A 1986. Peak Oil-Bay Drum Company: State Rd 574 and Faulkenburg Rd: Tampa, FL: County: Hillsborough:								
Type of Data Source Hero ID		District: Southwest: Site lead: EPA HWC# 021. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982213							
EXTRACTION			D 4						
Parameter			Data						
Life Cycle Stage:			Disposal						
Life Cycle Descrip	otion (Subca	ategory of Use):	Disposal						
Release Source:			Drum Recyclin debris	g, then a	deposi	tory for roofing shingles and construction			
Release or Emission Factor:			Up to 390 ug/I	in area	monito	ring wells			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	\times 1	1	EPA			
Domain 2: Repres	sentative								
1	Metric 2:	Geographic Scope	High	\times 1	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Releases related to 1,1,1-TCA, out of scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016			
	Metric 5:	Sample Size	Low	× 1	3	2 samples			
Domain 3: Access	sibility/Clari	itv							
	Metric 6:	Metadata Completeness	Low	× 1	3	only gives one data point			
Domain 4: Variab	oility and Ur	ncertainty							
		Metadata Completeness	Low	\times 1	3	no discussion			
Overall Quality D	Determination	\mathbf{n}^{\dagger}	Unacceptable		4.0	Metric Mean Score: 2.3.			

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

^{*} MWF = Metric Weighting Factor

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

		Nc, Denr. 1995. Case study: Hoechst Celanese Corporation. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 982112							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	tion (Subca	ategory of Use):	Textiles						
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabi	lity								
	Metric 1:	Methodology	High	× 1	1	NCDENR			
Domain 2: Represe	entative								
-	Metric 2:	Geographic Scope	High	\times 1	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Releases related to 1,1,1-TCA, out of scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessi	bility/Clari	itv							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variabi	lity and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality De	eterminatio	${f n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.7.			

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

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID	,	U.S, E. P. A 1995. 1995 Toxics release inventory public data release overview. Releases to the Environment; Environmental Release Data; 3982106							
EXTRACTION Parameter	Data								
	Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release or Emission Factor:				Manufacturing, processing, and use All stages TRI releases from 1995				
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EPA			
Domain 2: Repres	contativo								
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	\times 2	2	TRI data include occupational scenarios within scope, although data not broken down by sites or industries.			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995			
	Metric 5:	Sample Size	High	× 1	1	TRI Sites			
Domain 3: Access	sibility/Clar	itv							
	Metric 6:	Metadata Completeness	Low	× 1	3	TRI data only include release media; no other metadata included.			
Domain 4: Variab	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality D	eterminatio	${ m nn}^\dagger$	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 .

Source Citation:						ch and toxics: A guide for local communities.
Type of Data Source	Releases to	the Environment; Reports for	Data or Informa	tion Othe	er than	Exposure or Release Data;
Hero ID	3982107					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Disposal			
Release Source:			BASF facility	in Bodofr	A MA	
nelease source.			DASF facility	iii bedoii	u, MA	
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	Medium	× 1	2	Golden Empire Health Planning Center
Domain 2: Repres	sentative					
Bollion 2. Itopros	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	\times 2	8	Does not provide engineering information. More relevant for community exposures
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1985
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	ibility/Clar	itv				
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variab	-		37/4		37/4	
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4.0	Metric Mean Score: 2.8.

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

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		A 1993. Categories of released to the Environment; Environmen			to the	Toxic Release Inventory: 1990 data.
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Descrip Release or Emission		ategory of Use):	Manufact All stages TRI relea	5		g, and use
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabi	llity Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Repres	ontativo					
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	$\times 2$	2	TRI data include occupational scenarios within scope.
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1990
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	Low	× 1	3	TRI data only include release media; no other metadata included.
Domain 4: Variab	ility and U	ncertainty				
Domain 1. Variab	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality De	eterminatio	${f n}^\dagger$	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 .

Source Citation:	Sapphire, For 1,4-Di		en"s Chem	ical Eval	uation	Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission	
Type of Data Source Hero ID	Releases to the Environment; Completed Exposure or Risk Assessments; 3809038						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Manufact	uring, pr	ocessing	g, and use	
Life Cycle Descrip		ategory of Use):	All stages				
Release or Emission	on Factor:					directly to the environment (38.4 percent to and 12.4 percent to land)	
Annual Release Q	uantity (kg	/vr):	821,067 lk		t to an	and 12.4 percent to land)	
Number of Sites:		, <i>y</i> - <i>y</i> -	51	(===)			
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliabi	lity						
	Metric 1:	Methodology	Medium	× 1	2	Ferro Corp submission for VCCEP	
Domain 2: Repres	entative						
	Metric 2:	Geographic Scope	High	\times 1	1	US	
	Metric 3:	Applicability	High	\times 2	2	TRI data include occupational scenarios within scope, although data not broken down by sites or industries.	
	Metric 4:	Temporal Representativeness	Medium	\times 2	4	2007	
	Metric 5:	Sample Size	High	× 1	1	TRI Sites	
Domain 3: Access	ibility/Clar	itv					
	Metric 6:	Metadata Completeness	Low	× 1	3	TRI data only include release media; no other metadata included.	
Domain 4: Variab	ility and Uı	ncertainty					
		Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty	
Overall Quality De	eterminatio	\mathbf{n}^{\dagger}	High		1.6		

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Occupational Exposure

		D-4-					
		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form:		Manufacture Manufacture of Dioxane Liquid					
ration (Uni	t):	1,000 - 2,	000 ppm:	200 - 30	00 ppm		
Number of Sites:							
Number of Workers: Exposure Duration:				posed ((not including 1,1,1-trichloroethane mfg)		
n:		3-5 min15	5 min				
	Metric	Rating	MWF^{\star}	Score	Comments		
ility Metric 1:	Methodology	High	× 1	1	NIOSH report		
	Coographia Coopa	Ui ah	v 1	1	US		
		0	–		occupational scenario within the scope of the risk evaluation -		
Metric 5.	Аррисавину	Medium	X 2	4	exposure data" is from toxicology studies, not worker exposure during manufacture		
Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1977		
Metric 5:	Sample Size	N/A		N/A	No Comment.		
ibility/Clar	ity						
Metric 6:	Metadata Completeness	High	\times 1	1	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
:1:4 1 TT	a containte						
Metric 7:	Metadata Completeness	High	× 1	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized		
eterminatio	${ m n}^{\dagger}$	Medium		1.8			
	Occupatio 62937 otion (Subcatration (University of the content of	Occupational Exposure; Reports for Data 62937 otion (Subcategory of Use): cration (Unit): rs: n: Metric ility Metric 1: Methodology sentative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size ibility/Clarity Metric 6: Metadata Completeness ility and Uncertainty	Occupational Exposure; Reports for Data or Information (2937 Data Manufact Manufact Liquid 1,000 - 2, 4 rs: 2,500 in t n: 3-5 min18 Metric 1: Methodology High Metric 2: Geographic Scope Metric 3: Applicability Medium Metric 4: Temporal Representativeness Low Metric 5: Sample Size N/A ibility/Clarity Metric 6: Metadata Completeness High ility and Uncertainty Metric 7: Metadata Completeness High	Occupational Exposure; Reports for Data or Information Other 62937 Data	Manufacture Manufacture Manufacture of Dioxane Liquid 1,000 - 2,000 ppm200 - 30 4 2,500 in the US exposed (3-5 min15 min Metric Rating MWF* Score High × 1 1 Metric 2: Geographic Scope High × 1 1 Metric 3: Applicability Medium × 2 4 Metric 4: Temporal Representativeness Metric 5: Sample Size Metric 6: Metadata Completeness High × 1 1 Sility Add Uncertainty Metric 7: Metadata Completeness High × 1 1 Mility and Uncertainty Metric 7: Metadata Completeness High × 1 1 Metric 7: Metadata Completeness High × 1 1		

 $^{^{\}star}$ 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 .

Type of Data Source Oc		998. 1, 4-Dioxane. Priority exist nal Exposure; Completed Expos				port No. 7.
EXTRACTION Parameter			Data			
Life Cycle Stage:			Commerc	ial Use		
Life Cycle Description	n (Subca	ategory of Use):	Lab use			
Physical Form:	`	<i>,</i>	Not speci	fied		
Route of Exposure:			Inhalation	n		
Exposure Concentration (Unit):			1.8 ppm ((highest)		
Type of Measurement or Method:			TWA			
Worker Activity:			solvent ex			LC
Type of Sampling:			personal			
Engineering Control &	& percer	at Exposure Reduction:	film cupb	oards/ho	ods, dil	lution ventilation
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability						
•	etric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Representa	ative					
	etric 2:	Geographic Scope	Medium	$\times 1$	2	Australia
${ m M}\epsilon$	etric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
${ m M}\epsilon$	etric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998
Me	etric 5:	Sample Size	N/A		N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.
Domain 3: Accessibili	itv/Clari	itv				
	etric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability	and Ur	ncertainty				
_	etric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Deter	minatio	$^{-}$ n †	High		1.5	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID		998. 1, 4-Dioxane. Priority exist nal Exposure; Completed Expos				port No. 7.
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Descrip Physical Form: Route of Exposure Exposure Concent Type of Measuren Worker Activity: PPE:	e: cration (Uni	t):	Commerce Film Cements Not special Inhalation <1ppm pbz Film cements No PPE to	nent fied n ent appli		nsumer use
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabi	ility Metric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Repres	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High Medium N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	2 2 4 N/A	Australia occupational scenario within the scope of the risk evaluation 1998 N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality D	eterminatio	${f n}^{\dagger}$	High		1.5	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:	ToxNet Ha	azardous Substances Data, Bank	. 2017. HS	DB: 1,4-1	Dioxane	o.
Type of Data Source		nal Exposure; Reports for Data	or Informat	tion Othe	er than	Exposure or Release Data;
Hero ID	3970270					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Industrial	l Use		
Physical Form:			Not speci	fied		
Route of Exposure	e:		Inhalation		l	
Number of Worke	rs:		50-99 per	plant429	9,330 in	the US
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
D D !! !	•••					
Domain 1: Reliab		26.1.1.1	TT: 1	1	1	Taga was a second secon
	Metric 1:	Methodology	High	× 1	1	$2012\ \mathrm{TSCA}$ IUR Data (per plant data), NIOSH NOES (Total worker data)
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Industrial Use
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	NIOSH NOES from 1981-1983
	Metric 5:	Sample Size	Medium	× 1	2	$2012\ \mathrm{TSCA}$ IUR Data (per plant data), NIOSH NOES (Total worker data)
Domain 3: Access	ibility/Clar	ity				
Domain 5. Access	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variab	ility and H	ncortainty				
Domain 4. Varian	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable
	1.100110 1.	The contraction of the contracti	2011			1.0 and and approach
Overall Quality D	eterminatio	m [†]	Medium		1.8	
Overall squality D			modium		1.0	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

	1978. Occupational health guideline ational Exposure; Reports for Data			or than	Expansion Polonce Data:
Hero ID 39781		or illiorilla	tion Othe	er unam	Exposure of Release Data,
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Industria	l Use		
Life Cycle Description (S	ubcategory of Use):	Textile p	rocessing	Wood	pulping; Histology; Scintillation
Physical Form:		Not speci			
Engineering Control & percent Exposure Reduction:					pulping: Local exhaust ventilation, general di-
		lution ver eral dilut			y: local exhaust ventilationScintillation: Gen-
		erai dilut	ion venti	ation	
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability					
Metric	e 1: Methodology	High	\times 1	1	NIOSH and OSHA
Domain 2: Representativ	0				
Metric		High	× 1	1	US
Metric	9	High	× 2	2	Wetting and dispersing agent in textiles, wood pulping, preparation of histological samples, and liquid scintillation medium
Metri	24: Temporal Representativeness	Low	$\times 2$	6	1978
Metri	e 5: Sample Size	N/A		N/A	N/A - no sampling data
Domain 3: Accessibility/	Clarity				
Metric		High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability an	d Uncortainty				
Metric	· ·	Low	× 1	3	No discussion/not applicable
10160110	. Metadata Completeness	LOW			no discussion, not applicable
Overall Quality Determine	nation [†]	Medium		1.8	
• •					

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Carex, Canada. 2017. Profiles & estimate Occupational Exposure; Reports for Data 3978382	,		er than	Exposure or Release Data;
EXTRACTION Parameter	Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Number of Workers:	Industrial Packaging Not speci Inhalation 40 mg/m European Mixing at 3,600 Car	g final pr fied n 3 n Model nd baggin	ng final	products in the workplace
EVALUATION Domain Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1: Methodology	High	× 1	1	CAREX Canada
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size	Medium High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	2 2 2 N/A	Canada Industrial Use 2016 N/A - no sampling data
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness	Medium	× 1	2	Mentions a "European occupational exposure assessment" for the models, but doesn't specify the assessment or the models
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness	Low	× 1	3	No discussion/not applicable
Overall Quality Determination †	High		1.5	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		nada. 2017. 1,4-Dioxane– Occup				
Type of Data Source		nal Exposure; Reports for Data	or Informa	tion Othe	er than	Exposure or Release Data;
Hero ID	3978383					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Industria	l Use		
Physical Form:			Not speci			
Number of Worke	ers:				- 200Pl	lastic product MFG - 200
						F
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility					
Domain 1. Renad	Metric 1:	Methodology	High	× 1	1	CAREX Canada
	WICUIC 1.	Wethodology	IIIgii			CAILEA Canada
Domain 2: Repres	sentative					
1	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Canada
	Metric 3:	Applicability	High	$\times 2$	2	Industrial Use
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017
	Metric 5:	Sample Size	N/A		N/A	N/A - no sampling data
Domain 3: Access	sibility/Clar	ity				
Domain 5. Access	Metric 6:	Metadata Completeness	Medium	× 1	2	Assessment or report clearly documents results, methods, and
		Weddadd Completeness	Wiedfalli	, , <u>, , , , , , , , , , , , , , , , , </u>		assumptions. Data sources are generally described but not fully transparent.
Domain 4: Variab	sility and II-	naartainty				
Domain 4: Variac	Metric 7:	Metadata Completeness	Low	× 1	3	The assessment does not address variability or uncertainty.
	TATEUTIC 1.	Metadata Completeness	LOW	^ 1	<u>.</u>	The assessment does not address variability of differentity.
Overall Quality D	eterminatio	m [†]	High		1.5	
Overall Quality D			111911		1.0	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

		A., Wood, S. M., Suarez, L., Kilia nal and Environmental Medicine		1978. N	Iortality	follow-up of workers exposed to 1,4-dioxane. Journal of
Type of Data Source O		nal Environmental Medicine nal Exposure; Monitoring Data;	? .			
EXTRACTION			D-4-			
Parameter			Data			
Life Cycle Stage:			Manufa			
Physical Form:			Not spe			
Route of Exposure:	· · /TT ·		Inhalati		\	
Exposure Concentrate Number of Sites:	tion (Unit	t):	< 25 pp	om (estin	nation)	
Worker Activity:			I Dogowib			hree groups - 1) control operators who monitor
Number of Workers:				operator		plant from enclosed room, also take samples; 2) and cars); 3) maintenance personnel who repair
EVALUATION						
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments
Domain 1: Reliabilit	37					
	letric 1:	Methodology	High	× 1	1	Journal of Occupational Medicine, trusted source
Domain 2: Represent	tative					
_	letric 2:	Geographic Scope	High	\times 1	1	US
\mathbf{M}	letric 3:	Applicability	High	$\times 2$	2	direct occupational scenario
\mathbf{M}	Ietric 4:	Temporal Representativeness	Low	$\times 2$	6	1978
M	letric 5:	Sample Size	High	× 1	1	Full characterization
Domain 3: Accessibil	lity/Clari	tv				
	Ietric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1\right) +\left(1\right) \left(1\right) \left(1\right) +\left(1\right) \left(1\right) \left($
Domain 4: Variabilit	v and Un	certainty				
	letric 7:	Metadata Completeness	High	× 1	1	clearly documented
		†	High		1.4	
Overall Quality Dete	erminatio	1'	mgm		1.4	

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Source Citation:	Buffler, P. A., Wood, S. M., Suarez Occupational and Environmental	, , , , , , , , , , , , , , , , , , ,	1978. Mortality follow	r-up of workers exposed to 1,4-dioxane. Journal
Type of Data Source	Occupational Exposure; Monitorin	ng Data;		
Hero ID	62914			
EVALUATION				
Domain	Metric	Rating	MWF [⋆] Score	Comments

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:				1978. N	Iortality	y follow-up of workers exposed to 1,4-dioxane. Journal of
Type of Data Source Hero ID		nal and Environmental Medicine nal Exposure; Monitoring Data;	2.			
EXTRACTION			D. /			
Parameter			Data			
Life Cycle Stage:			Process			
Physical Form:			Not spe			
Route of Exposur			inhalati			
Exposure Concent Number of Sites:	tration (Uni	t):	< 25 pp	om (estin	nation)	
Worker Activity:			1 Diovana	n nrocoss	ing subi	unit within vinyl-chloride vinyldiene department
Number of Worke	rs:		65	e process.	ing subt	umt within vinyi-emoride vinyidiene department
rumor or vyorm						
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
D : 1 D !: 1	•1•.					
Domain 1: Reliab		Methodology	II: mb	× 1	1	
	Metric 1:	Wethodology	High	X 1	1	Journal of Occupational Medicine, trusted source
Domain 2: Repres	sentative					
Ī	Metric 2:	Geographic Scope	High	\times 1	1	US
	Metric 3:	Applicability	High	\times 2	2	direct occupational scenario
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1978
	Metric 5:	Sample Size	High	× 1	1	Full characterization
Domain 3: Access	ibility/Class	14				
Domain 5: Access	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as-
	wicoric o.	Wickadata Completeness	111611	/\ I	1	sumptions
Domain 4: Variab	-		TT:l.	v. 1	1	
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented
Original Original	latammainati-	†	II: ala		1.4	
Overall Quality D	eterminatio	11.	High		1.4	

 $^{^{\}star}$ 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 .

		A.,SzewczyÅska, M.,WoŰnica, rs]. Medycyna Pracy.	A 2014. [Oc	cupation	al expos	sure to airborne chemical substances in paintings
	Occupation 2539080	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descript	ion (Subca	ategory of Use):	Painting Studi	.О		
Physical Form:			Vapor			
Route of Exposure:			inhalation			
Exposure Concentr		t):	110 to 1,055 m	$_{\rm ng/m3~de}$	epending	g on activity
Number of Samples	s:		5			
Number of Sites:			2			
Type of Measureme	ent or Met	hod:	GC-FID			
Worker Activity:			cleaning of the			of image
Type of Sampling:			Sampling tube	e, method	is listed	
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliabil	itv					
	Metric 1:	Methodology	Medium	× 1	2	OECD source. OECD nations expected to use acceptable methods.
Domain 2: Represe	ntative					
=	Metric 2:	Geographic Scope	Medium	\times 1	2	OECD, Poland
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Out of scope
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014
	Metric 5:	Sample Size	Low	× 1	3	Unclear - most of paper is not in English
Domain 3: Accessib	oility/Clari	ity				
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Most of paper is not in English; therefore, needed metadata are not provided.
Domain 4: Variabil	ity and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	× 1	3	Unclear - most of paper is not in English

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Source Citation:	Jezewska, A.,SzewczyÅska, M.,WoŰnica, conservators]. Medycyna Pracy.	A 2014. [Oc	cupationa	al expos	sure to airborne chemical substances in paintings
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 2539080				
EVALUATION					
Domain	Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments
Overall Quality I	${ m Petermination}^{\dagger}$	Unacceptable		4.0	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, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:		mical data reporting: 1,4-Dioxai				
Type of Data Source	-	nal Exposure; Reports for Data	or Informat	tion Othe	er than	Exposure or Release Data;
Hero ID	3860451					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Manufact	uring		
Physical Form:			liquid	arms		
Number of Sites:			1			
Number of Worker	rs:		50 to 99			
EVALUATION						
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments
D ' 1 D !' 1	•1•,					
Domain 1: Reliabi		24 1 1 1	TT: 1	1	1	Wa PDI app
	Metric 1:	Methodology	High	× 1	1	US EPA CDR, trusted source
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Access	٠,		-			
	Metric 6:	Metadata Completeness	Low	× 1	3	CDR Site data - underlying methods, sources, assumptions not transparaent
Domain 4: Variab	ility and III	naartainty				
Domain 4. variab	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable
	TVICUITO 1.	Metadata Completeness	HOW	^ 1		no discussion, not applicable
Overall Quality D	eterminatio	m [†]	High		1.6	
Overan Quanty D		.11	111811		1.0	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

						and initial assessment. 1,4-Dioxane.
0.2	Occupation 3809027	nal Exposure; Completed Expos	ure or Risk	Assessm	ents;	
EXTRACTION	5003021					
Parameter			Data			
Life Cycle Stage:			Manufact	uring		
Physical Form:			Vapor			
Route of Exposure			Inhalation	-	,	0 / 0
Exposure Concentr				pical - 0.2	mg/m	3; worst case 10 mg/m3
Type of Measureme	ent or Met	hod:	TWA			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliabil	litz					
	Metric 1:	Methodology	High	\times 1	1	TSCA Work Plan Chemical
Domain 2: Represe						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessi	hility/Clari	itv				
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$
Domain 4: Variabil	lity and Ur	ocortainty				
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented - this data point exists within a range (see other data from this source) $$
Overall Quality De	eterminatio	n [†]	High		1.1	

^{*} MWF = Metric Weighting Factor

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

Type of Data Source		A 2015. TSCA work plan cher nal Exposure; Completed Expos				and initial assessment. 1,4-Dioxane.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Processin	g		
Physical Form:			Vapor			
Route of Exposure:			Inhalation	n		
Exposure Concentra	ation (Unit	t):	TWA: typ	oical - 40	mg/m3	3; worst case 180 mg/m3
Type of Measureme	ent or Metl	hod:	TWA		-,	
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabili	ity					
	Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Represe	entative					
-	Metric 2:	Geographic Scope	High	\times 1	1	US
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015
]	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessit	oility/Clari	tv				
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variabil	ity and Un	ncertainty				
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented - this data point exists within a range (see other data from this source) $$
Overall Quality De	termination	${ m n}^{\dagger}$	High		1.1	

^{*} MWF = Metric Weighting Factor

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

Type of Data Source Occ		A 2015. TSCA work plan cher nal Exposure; Completed Expos				and initial assessment. 1,4-Dioxane.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Description	(Subca	ategory of Use):	Cleaning	agent		
Physical Form:	`	,	Vapor	Ü		
Route of Exposure:			Inhalation	n		
Exposure Concentration	on (Uni	t):	TWA: typ	oical - 15	mg/m3	B; worst case 50 mg/m3
Type of Measurement	or Met	hod:	TWA			
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
D . 1 D !: 1:!!:						
Domain 1: Reliability Mer	tric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
	0110 1.	Wethodology	111611			10011 Work I fan Onemea
Domain 2: Representa	tive					
	tric 2:	Geographic Scope	High	$\times 1$	1	US
Me	tric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
Me	tric 4:	Temporal Representativeness	High	$\times 2$	2	2015
Me	tric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibilit	v/Clari	itv				
	tric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4. Vanishilitas	and II-	aganta intr				
Domain 4: Variability Me	tric 7:	Metadata Completeness	High	× 1	1	clearly documented - this data point exists within a range (see other data from this source) $$
Overall Quality Determ	minatio	n [†]	High		1.1	

 $^{^{\}star}$ 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 .

	P. A 2015. TSCA work plan cheronal Exposure; Completed Expos				and initial assessment. 1,4-Dioxane.
EXTRACTION Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Sub	category of Use):	Paint			
Physical Form:		Vapor			
Route of Exposure:		Inhalation	n		
Exposure Concentration (U:	,	TWA: typ	pical - 2 1	mg/m3;	worst case 11 mg/m3
Type of Measurement or Me	ethod:	TWA			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative					
Metric 2:	Geographic Scope	High	$\times 1$	1	US
Metric 3:	9 1	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
Metric 4:		High	$\times 2$	2	2015
Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Cla	arity				
Metric 6:	•	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and U	Incertainty				
Metric 7:		High	× 1	1	clearly documented - this data point exists within a range (see other data from this source) $$
Overall Quality Determinat	ion^\dagger	High		1.1	

 $^{^{\}star}$ 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 .

	P. A 2015. TSCA work plan cheronal Exposure; Completed Expos				and initial assessment. 1,4-Dioxane.
EXTRACTION Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (Sub	category of Use):	Lab Solve	ent		
Physical Form:		Vapor			
Route of Exposure:		Inhalation	1		
Exposure Concentration (U:	nit):	TWA: typ	oical - 5 i	mg/m3;	worst case 25 mg/m3
Type of Measurement or Me	ethod:	TWA		-,	
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative					
Metric 2:	Geographic Scope	High	× 1	1	US
Metric 3:	9 1	High	$\stackrel{\wedge}{\times} \stackrel{1}{2}$	2	occupational scenario within the scope of the risk evaluation
Metric 4:		High	$\times 2$	2	2015
Metric 5:		Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Cla	ority				
Metric 6:	•	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and U	Incertainty				
Metric 7:		High	× 1	1	clearly documented - this data point exists within a range (see other data from this source) $$
Overall Quality Determinat	ion [†]	High		1.1	

 $^{^{\}star}$ 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 .

	P. A 2017. Information on the varional Exposure; Reports for Data				
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (S Physical Form: Route of Exposure: Worker Activity:	ubcategory of Use):	Aerosol Inhalat " Durin		Dust nal ation " .	Magnetication During heat-generating prowelding, or sanding During fires
Engineering Control & period PPE:	rcent Exposure Reduction:	-Ventila quired of - 2 Consistant eye pro	ation and confined aponent l clothing tection, o	contian spaces HP: Sup and glo chemical	ament practices-Special procedures for permit re- oplied air respirator, eye protection, chemical re- oves- 2-Component LP: Air purifying respirator, I resistant clothing and gloves- OCF: eye protec- clothing and gloves
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric	1: Methodology	High	× 1	1	ЕРА
Domain 2: Representativ Metric Metric Metric Metric	2: Geographic Scope3: Applicability4: Temporal Representativeness	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US occupational scenario within the scope of the risk evaluation 2016 No Comment.
Domain 3: Accessibility/ Metric		High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability an Metric	· ·	Low	× 1	3	Document does not address variability or uncertainty
	Cor	ntinued or	n next pa	ıge	

- continued from previous page

Source Citation: Type of Data Source Hero ID	,	U.S, E. P. A 2017. Information on the various spray polyurethane foam products. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3970070						
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments		
Overall Quality D	Determination [†]		High		1.2			

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		rc,. 1981. Prudent practices for handling hazardous chemicals in laboratories. ccupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 982104						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	ategory of Use):	Laborat	orv				
Route of Exposur		legory or ese).		on, derm	nal			
		nt Exposure Reduction:		nended:				
PPE:		r	Recomn	nended:	Nitrile 1	rubber for gloves and other materials		
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Damain 1. Daliah	:1:4							
Domain 1: Reliab	Metric 1:	Methodology	High	× 1	1	National Research Council		
	Metric 1:	Wethodology	IIIgii	X 1	1	National Research Council		
Domain 2: Repres	sentative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1981		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 2. Agges	ibility/Clam	:+						
Domain 3: Access	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions		
	.1							
Domain 4: Variab			TT: 1	-	1			
	Metric 7:	Metadata Completeness	High	× 1	1	Clearly documented		
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	High		1.5			

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		2007. Occupational health hazask assessment methods, and exa				California: Identification of chemicals of concern,		
Type of Data Source Hero ID		Occupational Exposure; Completed Exposure or Risk Assessments;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Descrip	otion (Subca	ategory of Use):	Manufacturing All life cycle st		ing, use			
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility							
Bolliam 1. Iteliab	Metric 1:	Methodology	High	× 1	1	California Environmental Protection Agency Office of Environmental Health		
Domain 2: Repres	sentative							
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	Unacceptable	\times 2	8	Doesn't provide data applicable to risk assessment (primarily provides recommended exposure limits)		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	ibility/Clar	itx						
Domain 5. Access	Metric 6:	Metadata Completeness	High	\times 1	1	Clear documentation of data sources, methods, results and assumptions		
D : 4 W : 1	.1., 1.77							
Domain 4: Variab		Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions		
Overall Quality D	eterminatio	${f n}^\dagger$	Unacceptable		4.0	Metric Mean Score: 2.0.		

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

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:		09. Health consultation: Indoor 04100152, Part 2.	air quality: Ray	theon are	ea: St. l	Petersburg, Pinellas County, Florida: EPA facility		
Type of Data Source Hero ID	Occupation 3982212	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3982212						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:	(0.1		Processing/use					
Life Cycle Descrip	ption (Subca	ategory of Use):	Processing/use)				
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	oility							
	Metric 1:	Methodology	High	× 1	1	Florida Department of Health		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	\times 1	1	US		
	Metric 3:	Applicability	Unacceptable	\times 2	8	Exposure data for general population. Didn"t end up sampling for $1,4$ -dioxane		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2009		
	Metric 5:	Sample Size	High	\times 1	1	Full characterization		
Domain 3: Access	sibility/Clar	ity						
Domain 5. Access	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions		
Domain 4. Vanish	iliter and III	a containte						
Domain 4: Variab		Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$		
Overall Quality D	Determinatio	$ m n^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 1.7.		

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

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		04. Personal protective equipment nal Exposure; Reports for Data		tion Othe	er than	Exposure or Release Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage: Life Cycle Descrip PPE:	otion (Subca	ategory of Use):	Manufact All life cy General i or process	cle stage	s on abou	g, use t types of PPE use in industry. Not chemical
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	OSHA
		G0				
Domain 2: Repres		G 1: G	TT: 1	-	1	
	Metric 2: Metric 3:	Geographic Scope Applicability	High Low	$\times 1 \times 2$	1 6	US Very general description of recommendations for PPE in industry. Nothing specific to dioxane.
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2004
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$
Domain 4: Variab	vility and II	ocertainty				
Domain 4. Variat	Metric 7:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Overall Quality D)eterminatio	\mathbf{n}^{\dagger}	Medium		1.8	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:	U.S, E. P. ceutical pr		ies: Contr	col of vol	atile org	ganic emissions from manufacture of synthesized pharma-			
Type of Data Source Hero ID	Occupation 3970050	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3970050							
EXTRACTION Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	otion (Subca	ategory of Use):				aceuticals			
Number of Sites:						ants in the US and territories			
Number of Worke	rs:		Usuany	< 25 en	ıpıoyees	s per site			
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	× 1	1	EPA OAQPS			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	\times 1	1	US			
	Metric 3:	Applicability	High	\times 2	2	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1978			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Variab	ility and II	ncertainty							
Domain 1. Variab	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty - states generalizations are difficult since there is a lot of variability between plants and volumes of chemicals used			
Overall Quality D	eterminatio	${f n}^\dagger$	High		1.5				

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		02. European Union risk assessmal Exposure; Completed Expos				nd Priority List.
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Descrip PPE:	otion (Subca	ategory of Use):		cle stage assessed tely to rec	s withou	g, use at taking into account influence of PPE. But, posure by 85 percent for dermal and 90 percent
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Repres	entative					
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002
	Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variab	ility and Ui	ncertainty				
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality D	eterminatio	$ m n^{\dagger}$	High		1.4	

^{*} MWF = Metric Weighting Factor

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

	2002. European Union risk assessn tional Exposure; Completed Expos				nd Priority List.
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Sul Route of Exposure: Exposure Concentration (UN) Number of Samples: Type of Measurement or Noworker Activity: Type of Sampling: Exposure Duration: Exposure Frequency:	Jnit):	4.1). Also 5 sets of 6 EASE Mo Productionarea and	ure of Dendata from the estimated and the estima	n differe es expos h n rang samplin ling, dru samplir	umming, cleaning, and maintenance.
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1	: Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative Metric 2 Metric 3 Metric 3	3: Applicability 4: Temporal Representativeness	Medium High Medium Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 4 2	EU Scenarios within the scope of the risk evaluation 2002 Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Accessibility/C Metric 6		High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Metric	· ·	High	× 1	1	clear documentation of variability and uncertainty
	Cor	ntinued on 1	next page)	

Source Citation: Type of Data Source Hero ID	0 / 1	Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Occupational Exposure; Completed Exposure or Risk Assessments; 196351				
EVALUATION Domain	Metric	Rating	MWF* Score	Comments		
Overall Quality I	Determination [†]	High	1.4			

^{*} MWF = Metric Weighting Factor

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

	02. European Union risk assessm nal Exposure; Completed Expos				nd Priority List.
EXTRACTION					
Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subca Route of Exposure: Exposure Concentration (Uni	,	Inhalation worst case	ion of pront of and deserted inhalated	rmal	containing 1,4-dioxane mg/m3Typical inhalation: 40 mg/m3Dermal:
Number of Sites: Type of Measurement or Met Worker Activity:	hod:	bagging o	odel the subs of the pro	duct. Ir	o a mixture, mixing and finally drumming or a case of 1,4-dioxane the highest exposure prob-
Exposure Duration: Exposure Frequency:		ably occu 6-8 hr for 225 days/	full shif		of the substance and drumming of the product.
EVALUATION					
Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU
Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002
Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and U	acortainty				
Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
	Cor	tinued on 1	next page	 e	

Source Citation: Type of Data Source Hero ID	Ecjrc,. 2002. European Union risk a Occupational Exposure; Completed 196351			y List.
EVALUATION Domain	Metric	Rating M	IWF* Score	Comments
Overall Quality D	Determination [†]	High	1.4	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Ecjrc, 2002. European Un Type of Data Source Occupational Exposure; Co Hero ID 196351				d Priority List.
EXTRACTION Parameter	Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit): Number of Samples: Type of Measurement or Method: Worker Activity: Type of Sampling: Exposure Duration: Exposure Frequency:	Inhalation Exposure 5 data set EASE an medicine stationary	n and dented the data available to the data available the data amplitudes amplitudes and pender full shift	rmal ailable, e o 305 fo ng armaceur rsonal se	tical production, use as a solvent
EVALUATION Domain Met	ric Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1: Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative Metric 2: Geographic Sco Metric 3: Applicability Metric 4: Temporal Repr Metric 5: Sample Size	High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	2 2 4 2	EU Scenarios within the scope of the risk evaluation 2002 Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Accessibility/Clarity Metric 6: Metadata Com	pleteness High	× 1	1	Clear documentation of data sources, methods, results and assumptions ${\bf r}$
Domain 4: Variability and Uncertainty Metric 7: Metadata Com	pleteness High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination †	High Continued on 1	next page	1.4	

	C	•	
continued	from	previous	page

ean Union risk assessment report: 1,4-dioxane. 2nd Priority List. ure; Completed Exposure or Risk Assessments;	Source Citation: Type of Data Source Hero ID	
		EVALUATION
Metric Rating MWF* Score Comments	Metric	Domain
Metric Rating MWF* Score Comments	Metric	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:						nd Initial Assessment for 1,4-Dioxane.
Type of Data Source Hero ID	3809105	nal Exposure; Reports for Data	or Inform	iation Ot	ner tna	n Exposure or Release Data;
EXTRACTION						
Parameter	er					
Life Cycle Stage:			Manufa	cturing,	processi	ing. use
Life Cycle Descrip	tion (Subca	ategory of Use):		cycle sta		
Route of Exposur			Inhalati		0	
Exposure Concent		t):	summa	rizes expe	osure da	ata from ECB 2002 (HERO ID 196351)
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Damain 1. Daliah	:1:4					
Domain 1: Reliab	Metric 1:	Methodology	High	× 1	1	2015 PF (US EPA)
	Medile 1.	Wethodology	Iligii	^ 1	1	2013 FF (US EFA)
Domain 2: Repres	sentative					
1	Metric 2:	Geographic Scope	High	\times 1	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
D	:1-:1:4/01					
Domain 3: Access	Metric 6:	Metadata Completeness	II: mb	× 1	1	
	Metric 6:	Metadata Completeness	High	X 1	1	Clear documentation of data sources, methods, results and assumptions $$
Domain 4: Variab	ility and II-	acontainte				
Domain 4: Varian	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
	MICUIL 1.	Metadata Completeness	THEH	^ 1	1	clear documentation of variability and uncertainty
Overall Quality D	eterminatio	$_{\mathbf{n}^{\dagger}}$	High		1.0	
Overall Quality D	erenmmario	11	mgn		1.0	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	,	Cameo, Chemicals. 2016. Chemical datasheet: dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3981005								
EXTRACTION										
Parameter	Data									
Life Cycle Stage: Life Cycle Descrip PPE:	otion (Subca	stegory of Use):	Manufacturing, processing, use All life cycle stages Generic PPE recommendations							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliabi	ility Metric 1:	Methodology	High	× 1	1	CAMEO Chemicals (NOAA)				
Domain 2: Repres	ontativa									
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US				
	Metric 3:	Applicability	High	\times 2	2	General information that likely applies to all scenarios				
	Metric 4:	Temporal Representativeness	High	\times 2	2	2017				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	ibility/Clari	ity								
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.				
Domain 4: Variab	ility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality Determination [†]					1.0					

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		L. 1981. Carcinogenicity and mulerivatives. Science of the Total		lvents I (Glycidyl	ethers, dioxane, nitroalkanes, dimethylformamide				
Type of Data Source Hero ID	U	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 61633								
EXTRACTION										
Parameter			Data							
Life Cycle Stage: Life Cycle Descrip	Manufacturing All life cycle st	, -	ing, use							
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	U.S. Dept. of Health and Human Sciences, Food & Drug Administration				
						mmstration				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	\times 1	1	US				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Primarily use as a stabilizer for TCE, which is out of scope. Mostly health information.				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1981				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	ribility/Clar	itaz								
Domain 5. Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.				
			,							
Domain 4: Variab	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality D	eterminatio	n^{\dagger}	Unacceptable		4.0	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.

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:	Niosh,. 19	94. NIOSH pocket guide to cher	nical hazar	ds.		
Type of Data Source		nal Exposure; Reports for Data	or Informat	tion Othe	er than i	Exposure or Release Data;
Hero ID	2328101					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Manufact	uning nu	o oogging	* 1100
Life Cycle Descrip	tion (Subce	storory of Uso):	All life cy			z, use
PPE:	Mon (Subca	negory or ose).	Generic F			ations
112.			Generie i	I L reco	immende	
EVALUATION						
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments
Daniel 1. Deliebi	:1:4					
Domain 1: Reliab		Mathadalama	TT:l.	1	1	Niogu
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Repres	entative					
1	Metric 2:	Geographic Scope	High	\times 1	1	US
	Metric 3:	Applicability	High	$\times 2$	2	General information that likely applies to all scenarios
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1994
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	ibility/Clar	itv				
Domain 5. Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
		<u>*</u>				
Domain 4: Variab	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
0 11 0 11 5		+	3.6.11			
Overall Quality D	eterminatio	n'	Medium		1.7	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	estimate co	Kupczewska-Dobecka, M., Czerczak, S., Jakubowski, M., Maciaszek, P., Janasik, B. 2010. [Application of predictive model to estimate concentrations of chemical substances in the work environment]. Medycyna Pracy. Occupational Exposure; Published Models for Exposures or Releases; 1583051								
EXTRACTION Parameter			Data							
Parameter			Data							
Life Cycle Stage:	Life Cycle Stage:			, process	ing, use					
Life Cycle Descrip			All life cycle st							
Type of Measurer	nent or Met	hod:	Potentially info	ormation	about 1	EASE Model, but not in English				
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	High	× 1	1	EASE Model, used by EU				
Domain 2: Repres	sentative									
1	Metric 2:	Geographic Scope	Medium	\times 1	2	EU				
	Metric 3:	Applicability	Unacceptable	\times 2	8	Unknown - paper in different language, but likely applicable. In any case, this source is not useful.				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	sibility/Clari	itv								
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.				
Domain 4: Variab	aility and Ur	ncertainty								
Domain 4. Variat	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality D	Determination	n [†]	Unacceptable		4.0	Metric Mean Score: 2.2.				

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^{*} MWF = Metric Weighting Factor

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

		C.,Driscoll, R. J., 1997. Health ort Wayne, Indiana.	hazard eva	duation	report n	o. HETA-95-0293-2655, Dana Corporation, Spicer Axle		
Type of Data Source O		al Exposure; Monitoring Data;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Description (Subcategory of Use):			MWF					
Exposure Concentrate	tion (Uni	t):	0.14 to 0 MWF, no			a)0.24 to 0.53 (PBZ)These are exposures to ically		
Number of Samples:			6 PBZ, 4		•	v		
Worker Activity:						ex drill, lunch tables (for area)Transfer lines, ple, screw machine-lathing, and apex drill (for		
Type of Sampling:	Type of Sampling:				samplin	ng		
Exposure Duration:			7 hours					
Analytic Method:			NIOSH Method 0500 - PVC filters at 2 L/min					
EVALUATION								
Domain		Metric	Rating	MWF^*	Score	Comments		
Domain 1: Reliabilit	v							
· · · · · · · · · · · · · · · · · · ·	letric 1:	Methodology	High	× 1	1	NIOSH HHE		
Domain 2: Represen	tative							
•	letric 2:	Geographic Scope	High	\times 1	1	US		
M	letric 3:	Applicability	Medium	\times 2	4	Scenario is within the scope, but samples are for MWF, not Dioxane. Could possible still use data to estimate dioxane exposures from MWF use		
N	letric 4:	Temporal Representativeness	Low	$\times 2$	6	1997		
N	letric 5:	Sample Size	High	\times 1	1	workers sampled at the factory		
Domain 3: Accessibi	litr /Clari	+						
	letric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$		
Domain 4: Variabilit	v and Ur	certainty						
	letric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty		
				next page				

				1 0	
Source Citation:	Burton, N. C., Driscoll, R. J. 1997 Division, Fort Wayne, Indiana.	7. Health hazard eva	luation r	eport no. H	ETA-95-0293-2655, Dana Corporation, Spicer Axle
Type of Data Source	Occupational Exposure; Monitoria	ng Data;			
Hero ID	3859373	,			
EVALUATION					
Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality I	Determination [†]	Medium		1.7	

^{*} MWF = Metric Weighting Factor

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

Source Citation:	Haz, Map.	2017. Haz-Map: Agent name:	1,4-Dioxane.			
Type of Data Source		nal Exposure; Reports for Data	or Information (Other tha	n Expo	sure or Release Data;
Hero ID	3970253					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			All stages			
Life Cycle Descrip	otion (Subca	ategory of Use):	All stages			
Elic Cycle Bescrip	otion (babee	togory or obe).	TIII BUUGGO			
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	× 1	1	TOXNet/Hazmap
Domain 2: Repres	contativo					
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Some physical property and health information, but not exposure
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	ibility/Clari	ity				
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variab			3T / A		DT / A	
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4.0	Metric Mean Score: 2.0.

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

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		02. European Union risk assessmal Exposure; Completed Expos				d Priority List.	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Exposure Concentration (Unit):			All stages All life cycle stages Summary of exposure data from 2002 EU Risk Assessment (HERO ID: 196351)				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau	
Domain 2: Repres	contativo						
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	× 1	2	EU	
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002	
	Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.	
Domain 3: Access	sibility/Clar	itv					
Domain o. Access	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions	
Domain 4: Variab	vility and U	ncertainty					
Domain 1. Variati	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty	
Overall Quality D	Overall Quality Determination [†]				1.4		

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:	Echa,. 201	7. Uses by professional workers:	1,4-Dioxane.			
		nal Exposure; Reports for Data	or Information C	Other tha	n Expo	sure or Release Data;
Hero ID	3970673					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:	Manufacturing	. process	ing. use			
Life Cycle Descript	ion (Subca	tegory of Use):	Manufacturing	, 1	0,	
Worker Activity:						worker activites, but no data.
·					J	
EVALUATION						
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments
Domain 1: Reliabil	itz					
	Metric 1:	Methodology	High	× 1	1	ECHA/REACH
	WICUIC 1.	Wethodology	mgn	^ I		ECHA/REACH
Domain 2: Represe	entative					
•	Metric 2:	Geographic Scope	Medium	\times 1	2	EU
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Generic use descriptions, no useful information
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Unknown, but probably recent
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessi	hility/Clari	tv				
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
		•	,		,	
Domain 4: Variabil	lity and Un	ncertainty				
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
0 110 21 5		t	TT , 11		4.0	
Overall Quality De	eterminatio	n'	Unacceptable		4.0	Metric Mean Score: 2.5.

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^{*} MWF = Metric Weighting Factor

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

Source Citation: Iarc,.	1999. IARC Monograph	s on the evaluation	on of carcino	genic ris	sks to h	umans: 1,4-Dioxane.
	ational Exposure; Repo	rts for Data or In	formation O	ther tha	n Expos	sure or Release Data;
Hero ID 39708	50					
EXTRACTION						
Parameter		Da	ıta			
Tif C 1 C		A 11				
Life Cycle Stage:	1 (CTT)		stages			
Life Cycle Description (S Route of Exposure:	ubcategory of Use):		life cycle standation, oral.		l.i	otustion.
Exposure Concentration	(TIm:4).					Vorking Group
Exposure Concentration	(Omt):	NO	data were a	vanabie	to the v	working Group
EVALUATION						
Domain	Metric		Rating	\mathbf{MWF}^{\star}	Score	Comments
Damain 1. Daliabilita						
Domain 1: Reliability Metri	1: Methodology	Hig	rh	× 1	1	IARC
Metr	1: Methodology	пів	311	X 1	1	IARC
Domain 2: Representativ	2					
Metri		Hig	gh	× 1	1	US
Metri	0 1	_	acceptable	$\times 2$	8	No exposure or release data. Lots of human health data
Metri			dium	$\times 2$	4	1999
Metri		N/	A		N/A	No Comment.
Domain 3: Accessibility,		1				
Metri	6: Metadata Comple	teness N/.	A		N/A	No Comment.
Domain 4: Variability a	d Uncortainty					
Metri	_	teness N/.	Λ		N/A	No Comment.
Metri	7. Metadata Comple	teness IV/.	А		1 V / A	No Comment.
Overall Quality Determi	ation^\dagger	Un	acceptable		4.0	Metric Mean Score: 2.3.
• • • • • • • • • • • • • • • • • • •		<u> </u>	. r		-	

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 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:	Niosh,. 201	13. 1, 4- Dioxane.							
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;								
Hero ID	3978115	3978115							
EXTRACTION									
Parameter			Data						
Tif G 1 G			A 33						
Life Cycle Stage:	(0.1		All stages						
Life Cycle Descript	tion (Subca	itegory of Use):	All stages						
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabil	lity								
	Metric 1:	Methodology	High	\times 1	1	NIOSH			
D D									
Domain 2: Represe		G 1: G	TT: 1	1	1	***			
	Metric 2: Metric 3:	Geographic Scope	High	$\times 1 \times 2$	1	US			
	Metric 3: Metric 4:	Applicability	Unacceptable Medium	$\times 2 \times 2$	8	Physical properties			
	Metric 4: Metric 5:	Temporal Representativeness Sample Size		× 2	$\frac{4}{\mathrm{N/A}}$	Unknown, but probably recently updated No Comment.			
	metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessi	bility/Clari	ity							
	. ,	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variabi	-		/-		/-				
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
0 11 0 11: 10		†	TT		4.0				
Overall Quality De	eterminatio	n'	Unacceptable		4.0	Metric Mean Score: 2.3.			

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

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source	,	Niosh,. Dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;						
Hero ID	3978116							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			All stages					
Life Cycle Descrip	tion (Subca	tegory of Use):	All stages					
Route of Exposure			_	absorpt	ion, ing	estion, skin and/or eye contact		
EVALUATION								
Domain		Metric	Rating	MWF^*	Score	Comments		
Domain 1: Reliabi	:1:+							
Domain 1. Kenabi	Metric 1:	Methodology	High	× 1	1	NIOSH		
	11100110 11	Memodology	111811	~ 1		110011		
Domain 2: Repres	entative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Pocket guide, physical properties and health information		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	ibility/Clari	tv						
Domain of Heeese.	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
			•		•			
Domain 4: Variab	Domain 4: Variability and Uncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality De	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4.0	Metric Mean Score: 2.0.		

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

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:	Niosh,,Dps	se,. 1994. Dioxane, Part 2.							
Type of Data Source	Occupation	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;							
Hero ID	3978117	3978117							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			All stages						
Life Cycle Descrip	otion (Subca	ategory of Use):	All life cycle st	ages					
Type of Measuren			NIOSH Metho	_					
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility								
Domain 1. Itenab	Metric 1:	Methodology	High	× 1	1	NIOSH			
			8						
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	NIOSH method for sampling dioxane, but no exposure data			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1994			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ibility/Clari	ity							
Domain of Heeses	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab			/-		/.				
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	${f n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.7.			

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^{*} MWF = Metric Weighting Factor

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Source Citation: Type of Data Source Hero ID		Echa,. Links to registration dossiers. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 4121210						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			All stages					
Life Cycle Descrip	tion (Subca	ategory of Use):	All life cycle st	ages				
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliabi	lity							
	Metric 1:	Methodology	High	× 1	1	ECHA/REACH		
Domain 2: Repres	entative							
•	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Generic worker descriptions, but not useful		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accessi	bility/Clari	ity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	Domain 4: Variability and Uncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality De	eterminatio	$ ho^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.2.		

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Source Citation:		Niosh,. 2011. NIOSH manual of analytical methods: Formic acid.						
Type of Data Source		Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;						
Hero ID	3986439							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			All stages					
Life Cycle Descrip	tion (Subca	ategory of Use):	All life cycle st	ages				
Type of Measuren			NIOSH Method	0	r Formi	ic Acid		
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	\times 1	1	NIOSH		
Domain 2: Repres	contativo							
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	NIOSH method for sampling formic acid. Uses dioxane as an		
		, , , , , , , , , , , , , , , , , , ,	-			optional reagent, but no exposure data		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1994		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	ibility/Clar	itar						
Domain 5. Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
	11100110 01	nieuddau compieteness	1./11		11/11	The Commont.		
Domain 4: Variab	ility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	${f n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.7.		

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	2010. Monitoring data in workers tional Exposure; Monitoring Data;		uations.			
	3986437					
EXTRACTION						
Parameter		Data				
Life Cycle Stage:		Use				
Life Cycle Description (Su	bcategory of Use):	Deepwater Hor	rizon Res	ponse v	vorkers	
Exposure Concentration (Unit):	all but one nor	n-detect ((0.2 ppb)	b)	
Number of Samples:		17				
Number of Sites:		6 locations				
Type of Measurement or I	Iethod:	EPA TO-15 Su				
Worker Activity:				ed to oil	spill cleanup (dispersant operations and	
		in-situ burning	3)			
Exposure Duration:		30-480 min				
EVALUATION						
Domain	Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliability						
Metric	1: Methodology	High	× 1	1	NIOSH	
Domain 2: Representative						
Metric	2: Geographic Scope	High	$\times 1$	1	US	
Metric	- ·	Unacceptable	$\times 2$	8	Out of scope	
Metric	4: Temporal Representativeness	High	$\times 2$	2	2010	
Metric	5: Sample Size	High	× 1	1	Samples of various activities	
Domain 3: Accessibility/C	lanitu					
Metric		N/A		N/A	No Comment.	
	-	,		,		
Domain 4: Variability and						
Metric	7: Metadata Completeness	N/A		N/A	No Comment.	
Overall Quality Determina	Unacceptable		4.0	Metric Mean Score: 1.9.		
	(Continued on nex	t page			

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continued	from	previous	page

Source Citation: Type of Data Source Hero ID	Niosh,. 2010. Monitoring data in workers from health evaluations. Occupational Exposure; Monitoring Data; 3986437					
EVALUATION						
Domain	Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments	

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 $^{^{\}star}$ MWF = Metric Weighting Factor

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Type of Data Source Occup	T. Ryan, D. Hubbard. 2016. 3-D Printing Hazards: Literature Review & Preliminary Hazard Assessment. Occupational Exposure; Monitoring Data; 5080530							
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity: Exposure Duration: Engineering Control & percent Exposure Reduction:			Use Printing inhalation 27 ppbv 1 1 1.4-L TO-15 canister placed directly adjacent to the 3-D printer, with a short (1 ft) piece of Tygon tubingfixed to the inlet of the canister extendinginto the 3- D printer point of operation,underneath the hinged, unventilatedand interlocked guard. 8 hours Provide local exhaust ventilation system. Ventilation should be sufficient to effectively remove and prevent buildup of any dusts or fumes that may be generated during handling or thermal processing.					
EVALUATION Domain	Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability Metri	c 1: Methodology	High	× 1	1	Study authors are qualified, sampling method well described, and authors used an accredited IH lab for analysis.			
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size			$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 2	US 3D Printing 2016 only one sample			
Domain 3: Accessibility, Metri	-	s High	× 1	1	Describes sample point			
Domain 4: Variability an	d Uncertainty	Continued on 1	next page)				

Source Citation: Type of Data Source Hero ID		D. Hubbard. 2016. 3-D Printing nal Exposure; Monitoring Data		iterature	Review	v & Preliminary Hazard Assessment.
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality I	Determination	n [†]	High		1.2	

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Source Citation:	Osha,. 201	6. Chemical exposure health da	ta: Full data set			
Type of Data Source	Occupation	nal Exposure; Monitoring Data;				
Hero ID	3986510	, , , , ,				
EXTRACTION						
Parameter			Data			
Tife Co. 1. Co.			,			
Life Cycle Stage:			unknown			
Life Cycle Descrip	otion (Subca	ategory of Use):	unknown			
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	ility					
Domain 1. Renab	Metric 1:	Methodology	High	× 1	1	OSHA
	Metric 1.	Wethodology	Iligii	^ 1	1	OSHA
Domain 2: Repres	sentative					
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	\times 2	8	Looks like it should be an excel file with exposure data, but it's all smooshed together in a text file and not useful
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	unknown, but probably recent
	Metric 5:	Sample Size	High	\times 1	1	CEHD
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variab	-					
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality D	eterminatio	${f n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.1.

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Source Citation:		005. Appendix D.3 Chronic RE (OEHHA 1999).	LS and toxicity s	ummarie	s using	the previous version of Hot Spots Risk Assessment			
Type of Data Source Hero ID	Occupation 3982628	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3982628							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Descrip	tegory of Use):	All stages All life cycle st	ages						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	\times 1	1	ОЕННА			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Human Health, physical properties data			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999			
	Metric 5:	Sample Size	High	\times 1	1	CEHD			
Domain 3: Access	ibility/Clari	tv							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	Domain 4: Variability and Uncertainty								
	-	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	n [†]	Unacceptable		4.0	Metric Mean Score: 2.1.			

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Source Citation:	Ndcee, 1998. Engineering and technical services for join group on acquisition pollution prevention (JG-APP) pilot projects: Potential alternatives report JP-A-1-1: Alternatives to lead-containing dry film lubricants for antigalling/antifretting, anti-								
Type of Data Source	seizing, and assembly aid application.								
Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3982114								
	0002111								
EXTRACTION Parameter			Data						
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Description (Subcategory of Use):			Lubricant	-					
	(10 00 00								
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	oility								
	Metric 1:	Methodology	Medium	$\times 1$	2	National Defense Center for Environmental Excellence			
Domain 2: Repres	contativo								
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	$\stackrel{\wedge}{\times} 2$	2	Dry film lubricants for primarily aerospace applications			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
D : 0 4									
Domain 3: Access	٠,		DT / A		NT / A	X 6			
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variability and Uncertainty									
Domain 1. Variati	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
		-	,						
Overall Quality D	Oeterminatio	$^{\mathrm{n}^{\dagger}}$	High		1.5				
. •			-						

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Source Citation:	Hanley, K., Trout, D., Burt, S., Mouradian, R 1995. Health hazard evaluation report no. HETA-90-0277-2487, Johnson Controls, Greenfield, Ohio.						
Type of Data Source Hero ID		nal Exposure; Monitoring Data;					
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use):			Use car seat mfg				
EVALUATION							
Domain		Metric	Rating	MWF^{\star}	Score	Comments	
Domain 1: Reliab	ility						
Domaii 1. Iteliab	Metric 1:	Methodology	High	× 1	1	NIOSH	
Domain 2: Repres	entative						
Bolliam 2. Ropres	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	Unacceptable	\times 2	8	Use not in scope, related to 1,1,1-TCA. Polyurethane foam, but not spray application	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995	
	Metric 5:	Sample Size	High	× 1	1	119 shift workers	
Domain 3: Access	ibility/Clar	itv					
Domain 5. Access	Metric 6:	Metadata Completeness	Low	× 1	3	qualitative assessment, not PBZ, Area samples, etc	
Domain 4: Variab	ility and Ur	acortainty					
Domain 4. Variab	Metric 7:	Metadata Completeness	Low	× 1	3	qualitative assessment, not PBZ, Area samples, etc	
Overall Quality Determination [†]			Unacceptable		4.0	Metric Mean Score: 2.6.	

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Type of Data Source	Corporatio	M.,Herrera-Moreno, V 1995. on, Independence, Kansas. nal Exposure; Monitoring Data;	Health hazard evaluation report no. HETA-95-0296-2547, Automotive Controls						
EXTRACTION									
Parameter			Data						
Life Cycle Stage:	45.		Use						
Life Cycle Descript		tegory of Use):	Vapor degreasi	ng					
Route of Exposure		4).	Inhalation	. (l\1:		(CDEI)0 5 to 51 (A)			
Exposure Concentration Number of Sample		ι):	21 pbz12 area	n (poz)1.	г.ө ррш	(STEL)2.5 to 51 ppm (Area)			
Number of Sample Number of Sites:	·5.		1						
Worker Activity:			various activiti	es. trav o	cleaning	r			
Exposure Duration	ı:		full-shift15-mir			,			
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabi	lity								
	Metric 1:	Methodology	High	× 1	1	NIOSH			
Domain 2: Represe	entative								
•	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Vapor degreasing with 1,1,1-TCE, not in scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995			
	Metric 5:	Sample Size	High	× 1	1	21 pbz12 area			
Domain 3: Accessi	bility/Clari	ity							
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$			
Domain 4: Variabi	lity and Ur	ncortainty							
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality De	Overall Quality Determination †		Unacceptable	_	4.0	Metric Mean Score: 2.1.			
			Continued on nex	4					

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Source Citation:	Krake, A. M., Herrera-Moreno, V 1995. Corporation, Independence, Kansas.	Health hazard ev	raluation report no.	HETA-95-0296-2547, Automotive Controls
Type of Data Source	Occupational Exposure; Monitoring Data;			
Hero ID	3859374			
EVALUATION				
Domain	Metric	Rating	MWF* Score	Comments

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Source Citation:	Hills, B., Klincewicz, S., Blade, L. M., Sack, D 1989. Health hazard evaluation report no. HETA-87-367-1987, BMY Corpora-								
T 45 G	tion, A Division of Harsco Corporation, York, Pennsylvania.								
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 3859375								
	3839373								
EXTRACTION			5 .						
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	otion (Subca	ategory of Use):	Touch-up paint	t					
Route of Exposur		, , , , , , , , , , , , , , , , , , ,	inhalation						
Exposure Concent	tration (Uni	t):	n.d. to 1.7 ppr	n (pbz)					
Number of Sampl	es:		17 pbz						
Number of Sites:			1						
Worker Activity:			various activiti	es					
Exposure Duratio	n:		full-shift						
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility								
Domain 1. Iteliab	Metric 1:	Methodology	High	× 1	1	NIOSH			
		G.							
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	not in scope			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1987			
	Metric 5:	Sample Size	High	× 1	1	17 pbz			
Domain 2. Access	.:la:1:4/Clam								
Domain 3: Access	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as-			
		Modada Completeness	111811			sumptions			
D . 4 W . 1	.1								
Domain 4: Variab	-		TT:l.	v. 1	1				
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality D	eterminatio	${ m n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.1.			
			r		-				
			Y 1	,					
		C	Continued on nex	t page					

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Source Citation:	Hills, B., Klincewicz, S., Blade, L. M., Sack, D 1989. Health hazard evaluation report no. HETA-87-367-1987, BMY Corporation, A Division of Harsco Corporation, York, Pennsylvania.						
Type of Data Source Hero ID							
EVALUATION							
Domain	Metric	Rating	MWF* Score	Comments			

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	Love, J. R Washington		zard evaluation	report no	o. HE	ΓΑ-81-065-938, METRO Bus Maintenance Shop,			
		nal Exposure; Monitoring Data;							
0.2	3859376								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descript	ion (Subca	tegory of Use):	Degreasing						
Route of Exposure:	,	,	inhalation						
Exposure Concentra	ation (Uni	t):	3 n.d.7 not ana	alyzed for	r dioxan	ne			
Number of Samples	3:		10 area						
Number of Sites:			1						
Type of Measureme	ent or Met	hod:	Gas Chromato	graphy w	/flame	ionization			
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabili	ity								
	Metric 1:	Methodology	High	\times 1	1	NIOSH			
D : 0 D									
Domain 2: Represe		G 1: G	TT: 1	4	1	****			
	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3: Metric 4:	Applicability Temporal Representativeness	Unacceptable Low	$\times 2 \times 2$	8 6	not in scope			
	Metric 4:	Sample Size	Low High	× 2 × 1	1	1981			
<u> </u>	Metric 5.	Sample Size	Iligii	× 1	1	10 samples			
Domain 3: Accessib	oility/Clari								
	Metric 6:	Metadata Completeness	Low	× 1	3	non-detects or not analyzed			
Domain 4: Variabil	ity and Un	certainty							
	Metric 7:	Metadata Completeness	Low	× 1	3	non-detects or not analyzed			
Overall Quality De	termination	n [†]	Unacceptable		4.0	Metric Mean Score: 2.6.			

Source Citation:	Love, J. R., Kern, M 1981. Health Washington, DC.	hazard evaluation rep	port no. HETA-8	1-065-938, METRO Bus Maintenance Shop,
Type of Data Source	Occupational Exposure; Monitoring Da	ata;		
Hero ID	3859376			
EVALUATION				
Domain	Metric	Rating N	MWF* Score	Comments

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

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	Fidler, A. T., Crandall, M. S., Kerndt, P. R 1988. Health hazard evaluation report no. HETA-86-051-1911, National Cover of Atlanta, Inc., Lawrenceville, Georgia. Occupational Exposure; Monitoring Data; 3859377							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Worker Activity: Exposure Duration:			Use Silkscreening inhalation n.d to 3.89 ppm (pbz)n.d. to 3.5 ppm (STEL)n.d. to 0.42 ppm (area) 34 pbz3 STEL24 area 1 various activities Full-shift					
EVALUATION		Matric	Dation	MANUE	C	Community		
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliabi	lity Metric 1:	Methodology	High	× 1	1	NIOSH		
Domain 2: Represe	entative							
•	Metric 2:	Geographic Scope	High	\times 1	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	not in scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1988		
	Metric 5:	Sample Size	High	× 1	1	60 samples		
Domain 3: Accessi	bility/Clari	itv						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions		
Domain 4: Variabi	lity and Ur	acortainty						
Domain 4. variabi	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty		
Overall Quality De	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4.0	Metric Mean Score: 2.1.		
		(Continued on nex	t page				

	C		
 continued 	from	previous	page

	1988.	Health ha	azard ev	valuation report no.	${\rm HETA}\text{-}86\text{-}051\text{-}1911, \ {\rm N}$	ational Cover
of Atlanta, Inc., Lawrenceville, Georgia.						
Occupational Exposure; Monitoring Data;						
3859377						
Metric	Rat	ing N	MWF*	Score	Comments	
	of Atlanta, Inc., Lawrenceville, Georgia. Occupational Exposure; Monitoring Data; 3859377	of Atlanta, Inc., Lawrenceville, Georgia. Occupational Exposure; Monitoring Data; 3859377	of Atlanta, Inc., Lawrenceville, Georgia. Occupational Exposure; Monitoring Data; 3859377	of Atlanta, Inc., Lawrenceville, Georgia. Occupational Exposure; Monitoring Data; 3859377	of Atlanta, Inc., Lawrenceville, Georgia. Occupational Exposure; Monitoring Data; 3859377	Occupational Exposure; Monitoring Data; 3859377

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

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID	Reh, B. D 1995. Health hazard evaluation report no. HETA-94-0298, Gen Corp Automotive, Wabash, Indiana. Occupational Exposure; Monitoring Data; 3970466							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	tion (Subca	ategory of Use):	1,1,1-TCE use	in auto i	mfg			
EVALUATION								
Domain		Metric	Rating	MWF^{\star}	Score	Comments		
Domain 1: Reliabi	lity							
	Metric 1:	Methodology	High	× 1	1	NIOSH		
Domain 2: Represe	entative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	not in scope		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995		
	Metric 5:	Sample Size	N/A		N/A	N/A - No data for dioxane		
Domain 3: Accessi	ibility/Clari	itv						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variabi	ility and Ur	ocertainty						
Domain 1. Variable		Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality Determination †		Unacceptable		4.0	Metric Mean Score: 2.7.			

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

^{*} MWF = Metric Weighting Factor

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

-					
			84-108-18	321, Nie	mand Industries, Inc., Statesville, NC.
	tional Exposure; Monitoring Data:	;			
Hero ID 397495	4				
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Use			
Life Cycle Description (St	bcategory of Use):	adhesive for pa	aperwoun	ıd packa	aging
Exposure Concentration (7-14 ppm	1		
Number of Samples:	,	22			
Exposure Duration:		8-hr TWA			
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability	4 26 1 1 1	TT: 1			
Metric	1: Methodology	High	× 1	1	NIOSH
Domain 2: Representative					
Metric		High	$\times 1$	1	US
Metric		Unacceptable	$\times 2$	8	not in scope
Metric		Low	$\times 2$	6	1987
Metric	5: Sample Size	High	× 1	1	22 samples
Domain 3: Accessibility/0	Jonitar				
Metric	<u> </u>	High	\times 1	1	Clear documentation of data sources, methods, results and assumptions
D 4 4 77 1 1 22	TT				
Domain 4: Variability and	<u> </u>	TT: 1	1	-1	
Metric	7: Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determin	ation^\dagger	Unacceptable		4.0	Metric Mean Score: 2.1.

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

 $[\]star$ MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		Atsdr,. 2012. 1,4- Dioxane - ToxFAQs. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978119								
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			General public	exposure	es					
EVALUATION										
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments				
Domain 1: Reliab	v									
	Metric 1:	Methodology	High	$\times 1$	1	ToxFAQs				
Domain 2: Repres										
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Consumer exposure information				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	sibility/Clar									
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.				
Domain 4: Variab										
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality D	eterminatio	\mathbf{n}^{\dagger}	Unacceptable		4.0	Metric Mean Score: 2.0.				

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

^{*} MWF = Metric Weighting Factor

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

Source Citation:	Niosh,. 201	14. International chemical safety	cards (ICDC):	1, 4-diox	ane.				
0.2	Occupation	nal Exposure; Reports for Data	or Information C	Other tha	n Expo	sure or Release Data;			
Hero ID	3978147								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:	Life Cycle Stage:								
Life Cycle Descript	ion (Subca	tegory of Use):	All life cycle st	ages					
Route of Exposure:		,	inhalation, der						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliabil	Domain 1: Reliability								
	Metric 1:	Methodology	High	× 1	1	NIOSH			
Domain 2: Represe	entative								
•	Metric 2:	Geographic Scope	High	\times 1	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	No engineering information.			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessil	hility/Clari	tv							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variabil	lity and Un								
		Metadata Completeness	N/A		N/A	No Comment.			
	1,100110 1.	modada Completeness	/		-1/11	110 Commons.			
Overall Quality De	Unacceptable		4.0	Metric Mean Score: 2.0.					

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

 $^{^{\}star}$ 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 .

	Sapphire, Group. 2007. Voluntary Children's Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1,4-Dioxane.									
	Occupational Exposure; Completed Exposure or Risk Assessments; 3809038									
EXTRACTION										
Parameter	Data									
Life Cycle Stage:										
Life Cycle Descript	ion (Subca	ategory of Use):	All life cy		S					
Exposure Concentr	ation (Uni	t):				s multiple datasets of PBZ sampling				
Number of Sites:			52 compa	`	4 TRI)					
Worker Activity:			various ac	tivities						
Number of Workers	Workers: $<10,000$									
EVALUATION										
Domain		Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliabil	itv									
	Metric 1:	Methodology	Medium	× 1	2	Ferro Corp submission for VCCEP				
Domain 2: Represe	entative									
-	Metric 2:	Geographic Scope	High	\times 1	1	US				
	Metric 3:	Applicability	High	\times 2	2	In scope, many of the sources for pbz data are other HERO sources already extracted				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007				
	Metric 5:	Sample Size	High	× 1	1	Multiple				
Domain 3: Accessi	bility/Clar	ity								
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1\right) $				
Domain 4: Variabil	lity and Ur	ncertainty								
		Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty				
Overall Quality De	terminatio	${f n}^{\dagger}$	High		1.3					

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:		awa, M. J. Coye. 1982. Healt l, California.	h Hazard	Evaluat	ion Rep	ort, No. HETA-80-144-1109, Film Processing Industry,				
Type of Data Source		nal Exposure; Monitoring Data;								
Hero ID	1316845	, , , , , , , , , , , , , , , , , , , ,								
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Film C							
Life Cycle Descrip		ategory of Use):	Film C							
Route of Exposur			inhalati							
Exposure Concent	`	it):		n 1 ppm						
Number of Sampl	es:		4 pbz, 1	l area						
Number of Sites:	. 36.		2							
Type of Measurer	nent or Met	shod:	pbz, are							
Worker Activity: Number of Worke			splicing	,						
			4							
Type of Sampling Exposure Duratio				pbz, area 6 hr						
Exposure Durano	11.		O III							
EVALUATION										
		Matria	D - 45	MAXID	C	Community				
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility									
Domain 1. Itenab	Metric 1:	Methodology	High	× 1	1	NIOSH				
=	WICOITC 1.	Welliodology	111511	× 1	-	WOOT				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Film cement, film splicing				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1982				
	Metric 5:	Sample Size	High	$\times 1$	1	2 sites, 3 workers				
.										
Domain 3: Access	٠,	·	*** 1	_						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions				
Domain 4: Variab	ility and II	ncortainty								
Domain 4. variac	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty				
	TATEULIC 1.	Metadata Completeness	111811	^ I	1	clear documentation of variability and uncertainty				
Continued on next page										

				1 . 6 .	
Source Citation:	M. T. Okawa, M. J. Coye. 1982. Heal Hollywood, California.	th Hazard	Evaluati	on Report, No.	HETA-80-144-1109, Film Processing Industry,
Type of Data Source	Occupational Exposure; Monitoring Data	ι;			
Hero ID	1316845				
EVALUATION					
Domain	Metric	Rating	MWF^{\star}	Score	Comments
Overall Quality D	${ m Petermination}^{\dagger}$	High		1.4	

 $^{^{\}star}\,\mathrm{MWF}=\mathrm{Metric}\,\,\mathrm{Weighting}\,\,\mathrm{Factor}$ $^{\dagger}\,\,\mathrm{If}\,\,\mathrm{any}\,\,\mathrm{individual}\,\,\mathrm{metrics}\,\,\mathrm{are}\,\,\mathrm{deemed}\,\,\mathrm{Unacceptable},\,\mathrm{then}\,\,\mathrm{the}\,\,\mathrm{overall}\,\,\mathrm{rating}\,\,\mathrm{is}\,\,\mathrm{also}\,\,\mathrm{unacceptable}.\,\,\mathrm{Otherwise},\,\mathrm{the}\,\,\mathrm{overall}\,\,\mathrm{rating}\,\,\mathrm{is}\,\,\mathrm{based}\,\,\mathrm{on}\,\,\mathrm{the}\,\,\mathrm{following}\,\,\mathrm{scale};$ High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source (6. Analytical Reports and Data nal Exposure; Monitoring Data;	Summaries	from Wo	orker Me	onitoring at the US Facility for 1,4-Dioxane Production.
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Descripti Route of Exposure: Exposure Concentra Number of Samples Number of Sites: Type of Measureme Exposure Duration: Analytic Method:	t):	Manufacturing Manufacturing Inhalation provided in report, most less than 2 ug/sample 28 1 absorbant tubes, OVM badges lists time in minutes for each sample NIOSH 1602				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliabili	ty Metric 1:	Methodology	High	× 1	1	AIHA Accredited Laboratory for Industrial Hygiene, NIOSH 1602
I I	mtative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{matrix} 1 \\ 2 \\ 4 \\ 1 \end{matrix}$	US Domestic Manufacture up to 2011 Representative sample size
Domain 3: Accessib	oility/Clari Metric 6:	ity Metadata Completeness	High	× 1	1	Provides method, supporting data
Domain 4: Variabili	ity and Ur Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	some discussion of variability
Overall Quality Det	Overall Quality Determination [†]				1.3	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

	BASF. 2017. Information in response to the "Preliminary information on manufacturing, processing, distribution, use, and disposal: 1,4-dioxane" document.								
	atio	nal Exposure; Monitoring Data;							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufact	uring					
Life Cycle Description (S	ubca	ategory of Use):	Manufact						
Route of Exposure:		,	Inhalation	1					
Exposure Concentration (Unit):			0.39 ppm STEL)0.2	`		L)<0.056 ppm (8-hr TWA)38 ppm (15-min WA)			
Number of Samples:			4	11 (,			
Number of Sites:			1						
Worker Activity:			Routine d	luties, ne	eutraliza	ation, evaporator dump			
Exposure Duration:			15 min S7	ΓEL, 8 h	r TWA				
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability									
Metric	1:	Methodology	Medium	× 1	2	Monitoring by BASF			
Domain 2: Representativ	2								
Metric		Geographic Scope	High	× 1	1	US			
Metri		Applicability	High	$\stackrel{\wedge}{\times} \stackrel{1}{2}$	2	Domestic Manufacture			
Metrie		Temporal Representativeness	High	$\stackrel{\wedge}{\times} \stackrel{2}{2}$	2	2017			
Metric		Sample Size	Medium	× 1	2	small sample size (4 points)			
Domain 3: Accessibility/			т.						
Metri	6:	Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.			
Domain 4: Variability an	4 IJ:	ncertainty							
Metric		Metadata Completeness	Low	\times 1	3	No discussion.			
		-							
Overall Quality Determin	atic	en^\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 .

*											
Source Citation:		2018. Roofing: A Guide to the									
Type of Data Source Hero ID	Occupation 5080509	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5080509									
EXTRACTION											
Parameter			Data								
Life Cycle Stage:			Use								
Life Cycle Descrip	otion (Subca	ategory of Use):	Spray pol	lvurethan	e foam						
Worker Activity:	(-square-foothouse with a medium-pitch roof "					
-			has a roo	f area of	about 1	,500 squarefeet					
EVALUATION											
Domain		Metric	Rating	MWF^{\star}	Score	Comments					
D : 1 D !: 1											
Domain 1: Reliab	Metric 1:	Mathadalamı	Low	× 1	3						
-	Metric 1:	Methodology	LOW	X 1	<u> </u>	General estimates for roofing. Data sources not specified.					
Domain 2: Repres	sentative										
_	Metric 2:	Geographic Scope	High	\times 1	1	US					
	Metric 3:	Applicability	High	$\times 2$	2	Spray Polyurethane Foam					
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018					
	Metric 5:	Sample Size	N/A		N/A	No Comment.					
Domain 3: Access	sibility/Clar	ita									
Domain 5. Access	Metric 6:	Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.					
		-									
Domain 4: Variab	oility and U	ncertainty									
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.					
Overall Quality D	otorminetio	m†	Medium		1.8						
Overan Quanty L	etermmatio	MI.	Mediulli		1.0						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:	HomeAdvi	isor. 2018. How Much Do Aspha	alt Shingles	& Roofs	Cost T	o Install Or Replace?.					
Type of Data Source	Occupation	nal Exposure; Reports for Data	or Informa	tion Othe	er than i	Exposure or Release Data;					
Hero ID	5080525	5080525									
EXTRACTION											
Parameter			Data								
Life Cycle Stage:			Use								
Life Cycle Descrip	otion (Subca	ategory of Use):	Spray po	lvurethar	e foam						
Worker Activity:	, , , , , , , , , , , , , , , , , , ,	reger, er ebe).				500 square feet of roofing					
v											
EVALUATION											
Domain		Metric	Rating	MWF^{\star}	Score	Comments					
Domain 1: Reliab	Domain 1. Daliabilita										
Domain 1. Renau	Metric 1:	Methodology	Low	× 1	3	General estimates for roofing. Data sources not specified.					
	MEGIIC 1.	Wethodology	LOW	^ 1	- 3	General estimates for rooting. Data sources not specified.					
Domain 2: Repres	sentative										
•	Metric 2:	Geographic Scope	High	$\times 1$	1	US					
	Metric 3:	Applicability	High	$\times 2$	2	Spray Polyurethane Foam					
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018					
	Metric 5:	Sample Size	N/A		N/A	No Comment.					
Domain 3: Access	zibility/Clar	ity									
Domain 5. Access	Metric 6:	Metadata Completeness	Low	\times 1	3	No discussion of methods, results, assumptions, etc.					
		-									
Domain 4: Variab	oility and Ur										
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.					
O 11 O 124 - D	\		M - 1:		1.0						
Overall Quality D	eterminatio	on'	Medium		1.8						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	OMG Roofing Products. 2018. Product Data Specifications: OMG Olybond500 Insulation Adhesive. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5080523								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	tion (Subca	ategory of Use):	Spray pol	yurethan	e foam				
Worker Activity:		- · · · · ·	Mix A-sic	le and B-	side in	1:1 ratio			
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabi	Domain 1: Reliability								
	Metric 1:	Methodology	Medium	× 1	2	Company Product Specification Sheet			
Domain 2: Represe	entative								
Domain 2. Repres	Metric 2:	Geographic Scope	High	\times 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Spray Polyurethane Foam			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessi	bility/Clar	itv							
	Metric 6:	Metadata Completeness	Low	\times 1	3	No discussion of methods, results, assumptions, etc.			
Domain 4: Variabi	ility and II-	agent o intr							
Domain 4: variabi	Metric 7:	Metadata Completeness	Low	\times 1	3	No discussion.			
Overall Quality Determination [†]					1.6				

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		4. Safety Data Sheet: OlyBond								
Type of Data Source		nal Exposure; Reports for Data	or Inform	ation Ot	her than	n Exposure or Release Data;				
Hero ID	5080527									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrip	tion (Subca	ategory of Use):		olyuretha	ane foar	m				
Worker Activity:	cross (Subsec					in B-Side				
EVALUATION	EVALUATION									
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments				
D : 1 D !: 1:										
Domain 1: Reliabi	Metric 1:	Madhadalama	III:l.	1	1	ana				
	Metric 1:	Methodology	High	× 1	1	SDS				
Domain 2: Represe	entative									
•	Metric 2:	Geographic Scope	High	\times 1	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Spray Polyurethane Foam				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Accessi	hility/Class	14								
Domain 5. Accessi	Metric 6:	Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.				
	Metric 0.	Metadata Completeness	LOW	× 1	<u> </u>	No discussion of methods, results, assumptions, etc.				
Domain 4: Variabi	ility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.				
		1								
Overall Quality De	eterminatio	n'	High		1.5					

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source Oc	į I J									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Description	ı (Subca	tegory of Use):	Dry Film	Lubrica	tion					
Physical Form:										
Route of Exposure:			inhalation	1						
Exposure Concentration	ion (Uni	t):	< 0.031 tc	50 ppm						
Number of Samples:			25							
Number of Sites:			1							
	Type of Measurement or Method:			area						
	Worker Activity:			,	lication	- also provides specific activity descriptions				
Type of Sampling:			personal/	area						
Exposure Duration: Engineering Control & percent Exposure Reduction:			varied Local exhaust hood							
PPE:				Tyvek lab coat, butyl gloves, " face respirator with organic vapor car-						
1115.	FFE:					h side shields, butyl gloves				
Analytic Method:			NIOSH 1602/Direct Read (MiniRAE 2000)							
EVALUATION										
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliability										
_	etric 1:	Methodology	Medium	\times 1	2	Monitoring by DoE/KCNSC				
Domain 2: Representa		Caramanhia Ca	TT:J	1	4	TTG.				
	etric 2: etric 3:	Geographic Scope Applicability	High High	$\times 1 \times 2$	$\frac{1}{2}$	US				
	etric 3:	Temporal Representativeness	ніgn High	$\times 2 \times 2$	$\frac{2}{2}$	Dry film lubricants 2010 - 2014				
	etric 5:	Sample Size	High	× 2 × 1	1	Having individual samples allows full characterization of dis-				
IVIC		Sample Size	IIIgii	× 1		tribution				
Domain 3: Accessibili	tv/Clari	itv								
	etric 6:	Metadata Completeness	Medium	\times 1	2	Includes the most critical information, but lacks some metadata (exposure frequency, some sample durations are unclear)				
		Con	tinued on r	next page	9					

Source Citation: Type of Data Source Hero ID	M. Stites. 2018. [RE: Discussion Follow-up]. Occupational Exposure; Monitoring Data; 5099258							
EVALUATION								
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments		
Domain 4: Variab	Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness					Data do not inform variability in exposures		
Overall Quality Determination [†]			High		1.4			

 $^{^\}star$ 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 .

pe of Data Source	M. Stites. 2018. [FW: 1,4-Dioxane]. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5099257									
XTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Sites: Number of Workers: Type of Sampling: Engineering Control & percent Exposure Reduction:			Use							
			Dry Film	Lubricat	tion					
			8							
			up to 10: Approximately 3-4 employees work in the chemical material area where the dry film lubricant is formulated. Another 5-6 employees work in the paint shop where the dry film lubricant is spray applied.							
			8-hr TW	-	shop wi	there the dry min rubilicant is spray applied.				
			Engineering controls (powered vented hoods) are employed which provide inhalation protection and dermal protection is provided by requiring chemical resistant gloves, safety glasses with side shields and lab apron when handling 1,4-Dioxane. Any exposure that might occur is well below regulatory action levels (reference previously provided personal and area monitoring data).							
VALUATION Domain		Metric	Rating	MWF*	Score	Comments				
Domain		Wedite	raumg	1/1///	Deore	Comments				
Domain 1: Reliabil	ity									
	Metric 1:	Methodology	Medium	\times 1	2	Information provided by DoE/KCNSC				
Domain 2: Represe	ontativo									
•	Metric 2:	Geographic Scope	High	× 1	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Dry film lubricants				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Accessib	hility/Clari	tv								
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.				
			•		· ·					
Domain 4: Variabil		•	DT / A		NT / A	X 6				
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.				
		Con	tinued on 1	next page	9					

Source Citation: Type of Data Source Hero ID		M. Stites. 2018. [FW: 1,4-Dioxane]. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5099257							
EVALUATION Domain		Metric	Rating	MWF* Score	Comments				
Overall Quality I	${ m Determination}^{\dagger}$		High	1.2					

^{*} MWF = Metric Weighting Factor

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

Facility

	Type of Data Source Facility; Reports for Data or Information Other than Exposure or Release Data;								
EXTRACTION Parameter		Data							
Life Cycle Stage: Life Cycle Description (Some Process Description: Total Annual U.S. Volume Number of Sites: Possible Physical Form:	Manufa Manufa 10 milli (1 smal	Manufacture Manufacture Manufacture of dioxane via dehydrogenation of ethylene glycol 10 million pounds (1 large)5 million pounds (1 large)1 million pounds (1 small) 2 large and 2 small facilities Liquid							
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliability Metric	1: Methodology	High	× 1	1	NIOSH report				
Domain 2: Representative Metric Metric Metric Metric	2: Geographic Scope3: Applicability4: Temporal Representativeness	High High Low N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 6 N/A	US occupational scenario within the scope of the risk evaluation 1977 No Comment.				
Domain 3: Accessibility/		High	× 1	1	Clear documentation of data sources, methods, results and assumptions				
	Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness			1	clear documentation of variability and uncertainty				
Overall Quality Determination [†]				1.5					

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source	Nicnas,. 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7. Facility; Completed Exposure or Risk Assessments; 3827412								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV):			Commerce Laborator 500 kg						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliabil	lity Metric 1:	Methodology	High	× 1	1	NICNAS			
Domain 2: Represe	ntativo								
-	Metric 2:	Geographic Scope	Medium	× 1	2	Australia			
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998			
	Metric 5:	Sample Size	N/A		N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.			
Domain 3: Accessi	bility/Clar	itv							
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$			
Domain 4: Variabi	lity and Ur	ncertainty							
		Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty			
Overall Quality Determination [†]			High		1.5				

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source Fac		998. 1, 4-Dioxane. Priority exist completed Exposure or Risk Asse		al assessn	nent rep	port No. 7.				
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: Chemical Concentration:			Commercial, Potential Consumer Use Film Cement Film is cut with special tool, the adhesive applied with a small brush (manually). Film joined and heated to 35 deg C to dry 12 L (1 site) Up to 10 film labs in Aus 10-50 percent							
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliability	etric 1:	Methodology	High	× 1	1	NICNAS				
Me Me	ative etric 2: etric 3: etric 4: etric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High Medium N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	2 2 4 N/A	Australia occupational scenario within the scope of the risk evaluation 1998 N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.				
Domain 3: Accessibili Me	ty/Clari etric 6:	ty Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions				
Domain 4: Variability	and Un	certainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty				
Overall Quality Determination [†]			High		1.5					

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		Nicnas, 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7. Facility; Completed Exposure or Risk Assessments; 3827412								
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:				Processing Pharmaceutical intermediate Used in the reaction medium to produce pharmaceuticals 100 kg						
EVALUATION										
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	NICNAS				
Domain 2: Repres	sentative									
Domain 2. Ropros	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Australia				
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998				
	Metric 5:	Sample Size	N/A		N/A	$\rm N/A.$ Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$				
Domain 4: Variah	Domain 4: Variability and Uncertainty									
		Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty				
Overall Quality Determination †			High		1.5					

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source I	ToxNet Hazardous Substances Data, Bank. 2017. HSDB: 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970270								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Manufacture Manufacture of dioxane via dehydrogenation of ethylene glycol Manufactured commercially by dehydration and ring closure of diethylene glycol. Concentrated sulfuric acid is catalyst. Continuous process, dioxane vaporized and passed through an acid trap and two distillation columns to remove water and purify.						
Number of Sites:			1						
Chemical Concentra	ation:		90 per	cent					
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliabili	ty Metric 1:	Methodology	High	× 1	1	Process Description: Ullman's Encyclopedia of Industrial Chemistry Site: 2012 CDR			
Domain 2: Represer	ntative								
•	Metric 2:	Geographic Scope	High	\times 1	1	US			
I	Metric 3:	Applicability	High	\times 2	2	Manufacturing			
	Metric 4:	Temporal Representativeness	High	\times 2	2	2012			
	Metric 5:	Sample Size	N/A		N/A	Not applicable			
Domain 3: Accessib	ility/Clari	itv							
	Metric 6:	Metadata Completeness	High	\times 1	1	Cites sources clearly			
Domain 4: Variabili	iter and II-	agorto intr							
Domain 4: Variabili I	nty and Or Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable			
Overall Quality Determination [†]			High		1.2				

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID		rents study. Completed Exposure or Risk Asso	essments;				
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: Site Daily Throughput: Possible Physical Form:			Processing, Use, Disposal Multiple, see p. 37 for a breakdown of the 27 total sites Mutliple, see p. 37 and 28. Contains one or two-sentence descriptions of use of chemical within each industry 101,577 kg/yr use for all 27 sites; contains breakdown of use by industry on p. 45 27, includes site locations Can be estimated based on total use and # of sites liquid solvent				
EVALUATION Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliabi	ility Metric 1:	Methodology	High	× 1	1	US EPA Solvents Study, trusted source	
Domain 2: Repres	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 6 3	US occupational scenario within the scope of the risk evaluation 1993 RCRA 3007 Questionairre Distribution of samples is qualitative or characterized by no statistics	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions	
Domain 4: Variab	ility and Un Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty	
Overall Quality D	eterminatio	${ m n}^{\dagger}$	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 .

Type of Data Source F	Type of Data Source Facility; Reports for Data or Information Other than Exposure or Release Data;								
EXTRACTION Parameter		Data	Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Sites: Possible Physical Form:			Manufacturing, processing, and use Manufacturing, use (non-incorporative activities), paints and coatings, laundry and dishwashing products 1 (manufacturing); 25-99 (non-incorp use); unknown for other uses liquid						
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliabilit	ty Metric 1:	Methodology	High	× 1	1	US EPA CDR, trusted source			
Domain 2: Represen	tativa								
-	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	$\overline{2}$	occupational scenario within the scope of the risk evaluation			
N	Aetric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
N	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.			
Domain 3: Accessibi	ility/Clari	ter							
	Metric 6:	Metadata Completeness	Low	× 1	3	CDR Site data - underlying methods, sources, assumptions not transparaent			
Domoirs 4: 37: 1:112	t o 1 TT	a containte							
Domain 4: Variabilit	ty and Un Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable			
Overall Quality Determination [†]			High		1.6				

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source Fa	1995. OPPT chemical fact sheets: 1, 4-Dioxane fact sheet: Support document. Facility; Reports for Data or Information Other than Exposure or Release Data; 3860496								
EXTRACTION Parameter			Data						
Life Cycle Stage:			Manufact	_					
Life Cycle Description	n (Subca	tegory of Use):	manufact						
Process Description:	1 (1 (DII)				arious uses, see p. 2			
Total Annual U.S. Vo	olume (ai	and percent of PV):			0 and 1	8,300,000 pounds (as of 1990)			
Number of Sites:			3 (as of 1	992)					
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability									
v	etric 1:	Methodology	High	× 1	1	US EPA OPPT Chemical Fact Sheet, trusted source			
Domain 2: Represent									
	etric 2:	Geographic Scope	High	$\times 1$	1	US			
	etric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation			
	etric 4:	Temporal Representativeness	Low	$\times 2$	6	1995 literature search			
Me	etric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.			
Domain 3: Accessibil	ity/Clari	tv							
	etric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Variability	y and Un								
· ·	y and on etric 7:	•	Medium	× 1	2	Limited discussion of variability and uncertainty			
1/10	CULIC 1.	Metadata Completeness	MEGINIII	^ 1		Eminica discussion of variability and uncertainty			
Overall Quality Deter	rminatio	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 .

grou	ndwa ity; C 024 Subc me (a	ter plumes at US Air Force insta Completed Exposure or Risk Asso ategory of Use):	Data Manufact manufact Between	uring, pr uring, uso 1 and 10	ocessing	4-dioxane with trichloroethylene in chlorinated solvent egrated Environmental Assessment and Management. g, and use bilizer in chlorinated solvents			
Type of Data Source Hero ID EXTRACTION Parameter Life Cycle Stage: Life Cycle Description Total Annual U.S. Volu	Subc	Completed Exposure or Risk Associategory of Use):	Data Manufact manufact Between	uring, pr uring, uso 1 and 10	ocessing	g, and use			
Parameter Life Cycle Stage: Life Cycle Description of Total Annual U.S. Volu	me (a		Manufact manufact Between	uring, use 1 and 10	e as sta				
Life Cycle Stage: Life Cycle Description Total Annual U.S. Volu	me (a		Manufact manufact Between	uring, use 1 and 10	e as sta				
Life Cycle Description Total Annual U.S. Volu	me (a		manufact Between I liquid	uring, use 1 and 10	e as sta				
Life Cycle Description Total Annual U.S. Volu	me (a		manufact Between I liquid	uring, use 1 and 10	e as sta				
Total Annual U.S. Volu	me (a		Between i liquid	1 and 10					
Possible Physical Form		-	-		Between 1 and 10 million pounds annually				
	ı:		3.5 percer						
Chemical Concentration:			3.5 percent by volume for use as stabilizer						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability									
Meta	ic 1:	Methodology	High	× 1	1	US Air Force Engineering Dept, trusted source			
Di 0. D									
Domain 2: Representat Meta		Geographic Scope	High	× 1	1	US			
Met		Applicability	High	\times 1 \times 2	2	occupational scenario within the scope of the risk evaluation			
Met		Temporal Representativeness	High	$\stackrel{\wedge}{\times} \stackrel{2}{2}$	2	2012			
Metr		Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.			
Domain 3: Accessibility	/Clar	ritx							
-	ic 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Variability a	nd II	ncortainty							
Met		Metadata Completeness	Medium	× 1	2	Discusses variability, but not uncertainy			
		1.12tadata Comptotonos	manan			2.0000000 Tellisoning, but not uncertainly			
Overall Quality Determ	Overall Quality Determination [†]				1.2				
• •			High						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	and initial assessment. 1,4-Dioxane.							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Manufacturing, processing, and use entire life cycle source contains description of manufacturing, processing, and multiple uses					
Total Annual U.S. Volume (and percent of PV): Number of Sites: Possible Physical Form:			Between 1 and 10 million pounds annually (as of 2006) Lists one manufacturing site (BASF), which also reports processing and use of chemical liquid, vapor					
EVALUATION								
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliabi	lity Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical		
Domain 2: Represe	ontotivo							
Domain 2. Represe	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	High	$\times 2$	$\overline{2}$	2015		
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.		
Domain 3: Accessi	hilitar/Clan	:+						
Domain 5. Accessi	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions		
D								
Domain 4: Variabi	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusses variability, but not uncertainy		
Overall Quality Determination [†]			High		1.2			

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source Facility;	Atsdr., 2012. Toxicological profile for 1,4-dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982333									
EXTRACTION Parameter		Data								
Life Cycle Stage: Life Cycle Description (Sub Process Description: Total Annual U.S. Volume Number of Sites:	Manufacturing Manufacturing Manufactured in a closed system by acid catalyzed conversion of diethylene glycol via dehydration and ring closure 1-10 million lbs in 2002 2 sites (DOW in TX and Ferro Corp in LA)									
EVALUATION										
Domain	Metric	Rating	MWF*	Score	Comments					
Domain 1: Reliability Metric 1	: Methodology	High	× 1	1	ATSDR Toxicological Profile					
Domain 2: Representative Metric 2 Metric 3 Metric 4	: Applicability : Temporal Representativeness	High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2	US Scenario within the scope of the risk evaluation 2012					
Metric 5	: Sample Size	High	× 1	1	TRI Sites					
Domain 3: Accessibility/Cl Metric 6	•	High	× 1	1	Clear documentation of data sources, methods, results and assumptions					
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness			× 1	2	Discusses variability, but not uncertainy					
Overall Quality Determination †				1.1						

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source		12. Toxicological profile for 1,4-c eports for Data or Information 6		Exposur	e or Rel	lease Data;
Hero ID	3982333					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:	Life Cycle Stage:			uring, pr	ocessing	g, and use
Life Cycle Descrip	tion (Subca	ategory of Use):	entire life			5,
Number of Sites:	`	,				cilities by state that produce, process, or use
			Dioxane.	Also idei	ntifies li	fecycle stage. Based on TRI data from 2007
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	ilita					
Domain 1. Itenab	Metric 1:	Methodology	High	× 1	1	ATSDR Toxicological Profile
Domain 2: Repres	ontativo					
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	$\times 2$	$\stackrel{1}{2}$	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 2. Agges	ibility /Clan	i+				
Domain 3: Access	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
D . 4 77 . 1	.1., 1					
Domain 4: Variab	ility and Ui Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Discusses variability, but not uncertainy
	1.100110 11	Titotaduu Compioeness	1/10/11/11			2.35cdoses (arabino), but not uncertainly
Overall Quality D	eterminatio	on^\dagger	High		1.1	
• 0			J			

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		. Report on carcinogens: 1,4-Di									
Type of Data Source Hero ID	Facility; R 3982327	Facility; Reports for Data or Information Other than Exposure or Release Data; 3982327									
EXTRACTION											
Parameter			Data								
Life Cycle Stage:			Manufa	cturing	nrocessi	ing, and use					
Life Cycle Descrip	tion (Subca	ategory of Use):	entire li		ргоссыя	ing, and abo					
		nd percent of PV):		·	between	n 1994 and 2006					
Number of Sites:			1 mfg, 2	26 US Su	ppliers	(2009)					
EVALUATION											
Domain		Metric	Rating	MWF^*	Score	Comments					
D ' 1 D!' l	•1•,										
Domain 1: Reliab	Metric 1:	Methodology	High	× 1	1	Donata and a City and the second Continuous Continuous NITED					
	Metric 1:	Wethodology	підп	X 1	1	Department of Health and Human Services NTP					
Domain 2: Repres	sentative										
•	Metric 2:	Geographic Scope	High	\times 1	1	US					
	Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation					
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016					
	Metric 5:	Sample Size	N/A		N/A	No Comment.					
Domain 3: Access	ibility/Clar	ity									
Domain 5. Access	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions					
D ' 4 37 ' 1	.1., 1.7.										
Domain 4: Variab	ility and Ui Metric 7:	ncertainty Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty					
	MICHIEL 1.	Metadata Completeness	111811	^ 1	1	clear documentation of variability and uncertainty					
Overall Quality Determination [†]			High		1.0						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source	Ec,. 2004. Recommendation from the Scientific Committee on Occupational Exposure Limits for 1,4-dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3827409									
EXTRACTION										
Parameter	Parameter									
Life Cycle Stage:			Manufact	uring						
Life Cycle Descript	ion (Subca	ategory of Use):	Manufact	uring						
Process Description	n: `	,	acid-catal	lysed con	version	ofdiethylene glycol by ring closure in a closed				
Total Annual U.S. Volume (and percent of PV):			system 10,000 to	nnes/yr ((global)					
EVALUATION										
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliabil	ity									
	Metric 1:	Methodology	High	× 1	1	European Commission Employment, Social Affairs and Inclusion				
Domain 2: Represe	entative									
-	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Global mfg data (not just US mfg)				
	Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Paper is from 2004, but global PV data is from 1995				
	Metric 5:	Sample Size	High	× 1	1	Global Data for all producers at the time				
D	-:1:4/C1:	·								
Domain 3: Accessil	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions				
Domain 4. V:-1:1	liter and IT-	a containte								
Domain 4: Variabil	nty and Ur Metric 7:	Metadata Completeness	Medium	v 1	2	States that in managed the make a least on its larger than				
	metric /:	Metadata Completeness	Medium	× 1		States that in general the global production is decreasing				
Overall Quality Determination †			Medium		1.7					

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source I	Environment Canada, Health Canada. 2010. Screening assessment for the challenge 1,4-dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3981144								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:	Life Cycle Stage:			ure, impo	ort, pro	cessing, use			
Life Cycle Descripti			entire life						
Total Annual U.S. Volume (and percent of PV):			10,000-10	0,000 kg	mfg10,0	000-100,000 kg import 10,000-100,000 kg used			
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability									
	Metric 1:	Methodology	High	× 1	1	Environment Canada/Health Canada			
Domain 2: Represen	ntative								
Ī	Metric 2:	Geographic Scope	Medium	\times 1	2	Canada			
I	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
_	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accessib	oility/Clari	ity							
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$			
Domain 4: Variabili	ity and Ur	ncertainty							
	Metric 7:		High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality Determination [†]			High		1.1				

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

eutical pr acility; R	roducts.		ol of vol	atile org	ganic emissions from manufacture of synthesized pharma-						
acility; R		O41 41	U.S, E. P. A 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharmaceutical products.								
	Facility; Reports for Data or Information Other than Exposure or Release Data; 3970050										
		Data									
Life Cycle Stage:											
	ategory of Use):										
					ns: reaction(s), product separation, purification,						
			_	es inio	on equipment used on page 2-1 and Ch 3, PFD						
Number of Sites:				tical pla	ants in the US and territories						
				~							
	Metric	Rating	MWF'*	Score	Comments						
ty											
Tetric 1:	Methodology	High	× 1	1	EPA OAQPS						
tative											
Metric 2:	Geographic Scope	High	$\times 1$	1	US						
Metric 3:		High	$\times 2$	2	Scenarios within the scope of the risk evaluation						
Aetric 4:	Temporal Representativeness	Low	$\times 2$	6	1978						
Metric 5:	Sample Size	N/A		N/A	No Comment.						
ility/Clar	ity										
Metric 6:	Metadata Completeness	High	\times 1	1	Clear documentation of data sources, methods, results and assumptions						
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness			× 1	1	clear documentation of variability and uncertainty - states generalizations are difficult since there is a lot of variability between plants and volumes of chemicals used						
Overall Quality Determination [†]				1.5							
: : : : : : : : : : : : : : : : : : :	tative fetric 2: fetric 3: fetric 4: fetric 5: lity/Clar fetric 6: ty and Un fetric 7:	Metric Metric 1: Methodology tative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size Metric 6: Metadata Completeness ty and Uncertainty Metric 7: Metadata Completeness	Metric Rating Metric 1: Methodology High tative Metric 2: Geographic Scope Metric 3: Applicability High Metric 4: Temporal Representativeness Low Metric 5: Sample Size Mithy/Clarity Metric 6: Metadata Completeness High ty and Uncertainty Metric 7: Metadata Completeness High Metric 7: Metadata Completeness High	Metric Rating MWF* Metric 1: Methodology High × 1 Itative Metric 2: Geographic Scope High × 1 Metric 3: Applicability High × 2 Metric 4: Temporal Representativeness Low × 2 Metric 5: Sample Size N/A Metric 6: Metadata Completeness High × 1 Metric 7: Metadata Completeness High × 1	Use Industrial Use - Pharma Series of batch operation and drying. Gives info Figure 2-1 800 Pharmaceutical pla Metric Rating MWF* Score Weltric 1: Methodology High × 1 1 tative fletric 2: Geographic Scope High × 1 1 fletric 3: Applicability High × 2 2 fletric 4: Temporal Representativeness Low × 2 6 fletric 5: Sample Size N/A N/A llity/Clarity fletric 6: Metadata Completeness High × 1 1 ty and Uncertainty fletric 7: Metadata Completeness High × 1 1 ty and Uncertainty fletric 7: Metadata Completeness High × 1 1						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Facility; Completed Exposure or Risk Assessments; 196351									
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Number of Sites:				Manufacturing Manufacturing dehydration and ring closure of diethylene glycol. Process temperature varies from 130-200°C, under atmospheric pressure. The process is con- tinuous 1 site in EU						
EVALUATION										
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliabil	ity Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau				
Domain 2: Represe	entative									
·	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Medium High Medium N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	2 2 4 N/A	EU Scenarios within the scope of the risk evaluation 2002 No Comment.				
Domain 3: Accessil	bility/Clari	ity								
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions				
	Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		High	× 1	1	clear documentation of variability and uncertainty				
Overall Quality Determination †			High		1.4					

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Facility; Completed Exposure or Risk Assessments; 196351								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Chemical Concentration:			Manufacturing, processing, use All life cycle stages Gives various concentrations for different uses (pg. 37).						
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau			
		37							
Domain 2: Repres	Metric 2:	Geographic Scope	Medium	× 1	2	EU			
	Metric 3:	Applicability	High	$\times 2$	$\overline{2}$	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions $% \left(1\right) =\left(1\right) \left(1$			
Domain 4: Variab	ility and Ur	ncertainty							
	-	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality Determination †			High		1.4				

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID		Aca,. 2015. Re: TSCA Work Plan Chemical Problem Formulaton and Initial Assessment for 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3809105									
EXTRACTION											
Parameter											
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV): Number of Sites: Chemical Concentration:			Manufacturing, Processing Manufacturing, Processing 1-10 million pounds (2006 CDR) 1 mfg25-99 Proc >90 percent								
EVALUATION											
Domain		Metric	Rating	MWF^{\star}	Score	Comments					
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	2015 PF (US EPA)					
Domain 2: Repres	ontativo										
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US					
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation					
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015					
	Metric 5:	Sample Size	N/A		N/A	No Comment.					
Domain 3: Access	ibility/Clar	ity									
Bolliam 9. Necess	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions					
Domain 4: Variab	ility and II	ocertainty									
Domain 4. Variab	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty					
Overall Quality Determination [†]			High		1.0						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		2017. PubChem: 1,4-Dioxane.		_		_				
Type of Data Source Hero ID	Facility; R 3970246	Facility; Reports for Data or Information Other than Exposure or Release Data; 3970246								
EXTRACTION										
Parameter			Data							
Life Cycle Stage:	Life Cycle Stage:									
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufact Manufact							
Process Description			Dehydrat	ion and		sure of diethylene glycol. Concentrated acid				
					Contin	nuous process.				
Chemical Concent	tration:		>90 perce	ent						
EVALUATION										
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	High	× 1	1	NIH - PubChem				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	\times 1	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	sibility/Clar	itv								
	Metric 6:	Metadata Completeness	High	\times 1	1	Lists data sources				
Domain 4: Variab	sility and II.	acortainty.								
Domain 4. Variao	Metric 7:	Metadata Completeness	Medium	\times 1	2	Limited discussion of variability and uncertainty				
		r				· · · · · · · · · · · · · · · · · · ·				
Overall Quality D	eterminatio	${f n}^{\dagger}$	High		1.1					

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	,	U.S, E. P. A 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3986663									
EXTRACTION Parameter			Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Number of Sites:				Manufacture, Import Manufacture, Import Conc. Sulfuric acid used as catalyst. Temps from 130 to 200 deg C, pressure from 25-110 kPa. Continuous. 1 mfg1 import							
EVALUATION											
Domain		Metric	Rating	MWF*	Score	Comments					
Domain 1: Reliabi	ility Metric 1:	Methodology	High	× 1	1	EPA Use Dossier					
Domain 2: Repres	entative										
•	Metric 2: Metric 3:	Geographic Scope Applicability	High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \end{array}$	$\frac{1}{2}$	US Scenarios within the scope of the risk evaluation					
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	High N/A	\times 2	$_{ m N/A}^2$	2017 No Comment.					
Domain 3: Access	ibility/Clari Metric 6:	ity Metadata Completeness	High	× 1	1	Lists data sources					
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty					
Overall Quality Determination †			High		1.1						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

		A 2017. Preliminary Information Operation of Contraction (essing, Distribution, Use, and Disposal: 1,4-Dioxane.
0.2	86663	ports for Data of Information (Juner unam	DAPOSUIV	or reci	icase Dava,
EXTRACTION						
Parameter			Data			
Life Cycle Stage:				uring, pr	ocessing	z, use
Life Cycle Description	n (Subcat	tegory of Use):	Manufact	uring, pr	ocessing	g, use
Number of Sites:			25 mfg0 i	mport13	proc21	other uses (2015 TRI)
Chemical Concentration	ion:		Provides	table of S	SDS's w	ith some conc. Information
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliability	,					
· ·	etric 1:	Methodology	High	× 1	1	EPA Use Dossier
Domain 2: Representa	ativo					
*	etric 2:	Geographic Scope	High	× 1	1	US
	etric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation
	etric 4:	Temporal Representativeness	High	$\times 2$	$\overline{2}$	2017
Me	etric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibili	ity/Clarit	tv				
	etric 6:	Metadata Completeness	High	× 1	1	Lists data sources
Domain 4: Variability	v and Un	certainty				
	etric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Omenall Omelity Day		.t	TT:1.		1.1	
Overall Quality Deter	rminatior	1'	High		1.1	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:	Ashford, F	a. D., 2001. Ashford's Dictionary	y of Industrial C	hemicals					
Type of Data Source	Facility; R	eports for Data or Information (Other than Expo	sure or I	Release 1	Data;			
Hero ID	3859379	3859379							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			All stages						
Life Cycle Descrip	otion (Subce	atagary of Usa).	All life cycle st	-a mos					
Life Cycle Descrip	onon (Subca	itegory or ose).	All life cycle st	ages					
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	Denoting 1. Delichtifier								
Domain 1. Renab	Metric 1:	Methodology	High	× 1	1	Ashford's Dictionary of Industrial Chemicals			
	WICUIC I.	Wethodology	111611			Asinord's Dictionary of Industrial Chemicals			
Domain 2: Repres	sentative								
•	Metric 2:	Geographic Scope	Medium	$\times 1$	2	England			
	Metric 3:	Applicability	Unacceptable	\times 2	8	Just some basic physical properties information. Nothing useful.			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1994			
	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	-	=							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	${f n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.8.			

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

^{*} MWF = Metric Weighting Factor

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

Source Citation:	Echa,. 201	Echa,. 2017. 1,4-Dioxane.							
Type of Data Source	Facility; R	Facility; Reports for Data or Information Other than Exposure or Release Data;							
Hero ID	3970664								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufacture, I	mnort					
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufacture, I						
		nd percent of PV):	MFG/import:		onnes (EU)			
		,	, 1	,	`	,			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliab	Demois 1. Delichilites								
Domain 1. Renab	Metric 1:	Methodology	High	× 1	1	ECHA			
	WICUIC 1.	Wethodology	IIIgii	× 1		ECHA			
Domain 2: Repres	sentative								
_	Metric 2:	Geographic Scope	Medium	\times 1	2	EU			
	Metric 3:	Applicability	Unacceptable	\times 2	8	MFG/import estimate for the EU (1000 \pm tonnes), other general hazard and use information.			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
D	:1::1::4/(01:	·							
Domain 3: Access	. ,	Metadata Completeness	N/A		N/A	No Comment.			
	Wictife 0.	Wetadata Completeness	11/11		11/11	No Comment.			
Domain 4: Variab	ility and Ur	ncertainty							
		Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	${ m n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.2.			

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

^{*} MWF = Metric Weighting Factor

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

Source Citation: Type of Data Source Hero ID		Oecd Exisiting Chemical Database. 1999. SIDs initial assessment profile: 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970845							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufacturing	, process	ing, use				
Life Cycle Descrip	otion (Subca	tegory of Use):	Manufacturing	, process	ing, use				
Total Annual U.S.	. Volume (ar	nd percent of PV):	8,000 - 10,000	tons (wo	rldwide	production)			
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliability									
	Metric 1:	Methodology	High	× 1	1	SIDS Initial Assessment profile			
Domain 2: Repres	sentative								
Bolliam 2. Ropres	Metric 2:	Geographic Scope	Medium	× 1	2	Australia			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	No useful information			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ibility/Clari	tv							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	ility and Ur								
Domain 4. Variab		Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	n [†]	Unacceptable		4.0	Metric Mean Score: 2.5.			

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

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:		nission of the European, Commu				nendation on the results of risk evaluation and the			
Type of Data Source Hero ID		Facility; Reports for Data or Information Other than Exposure or Release Data;							
EXTRACTION Parameter	Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use):			Manufacturing, processing, use Manufacturing, processing, use						
EVALUATION									
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments			
Domain 1: Reliability									
	Metric 1:	Methodology	High	× 1	1	The Commission of the European Communities			
Domain 2: Repres	sentative								
Bolliam 2. Repres	Metric 2:	Geographic Scope	Medium	× 1	2	EU			
	Metric 3:	Applicability	Unacceptable	× 2	8	Recommendations in response to 2002 EU Risk Assessment			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ribility/Clari	tv							
Domain 5. Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
D : 4 37 : 1	.1.4								
Domain 4: Variab	Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	Determinatio	n [†]	Unacceptable		4.0	Metric Mean Score: 2.5.			

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

 $^{^{\}star}$ MWF = Metric Weighting Factor

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

Source Citation:	and Sealar the Consu	Franz, C.,Bennett, S.,DeLeo, P. C.,Collatz, M.,Kelly, K.,Nekoomaram, J.,Wieroniey, S 2015. Comments of the Adhesive and Sealant Council, the American Coatings Association, the American Chemistry Council, the American Cleaning Institute, the Consumer Specialty Products Association, and Waste Management on the 1,4-dioxane problem formulation and initial assessment.								
Type of Data Source Hero ID	Facility; R 3986506	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986506								
EXTRACTION Parameter	Data									
Life Cycle Stage: Life Cycle Description (Subcategory of Use):			All stages All life cycle st	ages						
EVALUATION										
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	oility									
	Metric 1:	Methodology	High	\times 1	1	Public Comment from Industry Groups				
Domain 2: Repres	contativo									
Domain 2. Repres	Metric 2:	Geographic Scope	High	\times 1	1	US				
	Metric 3:	Applicability	Unacceptable	\times 2	8	General comments on previous problem formulation. No useful information				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	eibility/Clar	ity								
Domain 5. Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.				
D ' 4 37 ' 1	.1., 1.77									
Domain 4: Variab	Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.				
	1.100110 1.	Trouseur Comproveness	/		11/11	1.0 Common.				
Overall Quality D	Oeterminatio	\mathbf{n}^{\dagger}	Unacceptable		4.0	Metric Mean Score: 2.0.				

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

^{*} MWF = Metric Weighting Factor

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

Source Citation:	MakerBot	MakerBot Industries LLC. 2015. Safety data sheet: PLA 3D printer filament/MakerBot PLA.									
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;										
Hero ID	5160198										
EXTRACTION											
Parameter			Data								
Life Creale Stame			Use								
Life Cycle Stage: Life Cycle Descrip	tion (Subas	togory of Uso).	Ose Printing	e							
Chemical Concent		itegory or ose).	_	,	mical th	hat contains dioxane					
Chemical Concent	ration.		> 50 pci	cent ene	iiiicai ti	nati contains dioxanc					
EVALUATION											
Domain		Metric	Rating	\mathbf{MWF}^{\star}	Score	Comments					
D	1:4										
Domain 1: Reliabi	Metric 1:	Mathadalam	II: od	× 1	1	ana					
-	Metric 1:	Methodology	High	X 1	1	SDS					
Domain 2: Repres	entative										
1	Metric 2:	Geographic Scope	High	\times 1	1	US					
	Metric 3:	Applicability	High	\times 2	2	3D printing					
	Metric 4:	Temporal Representativeness	High	\times 2	2	2016					
	Metric 5:	Sample Size	N/A		N/A	No Comment.					
Domain 3: Access	ibility/Clari	itar									
Domain 5. Accessi	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.					
	MICHIC O.	Wetadata Completeness	11/11		11/11	NO Comment.					
Domain 4: Variability and Uncertainty											
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.					
Overall Quality De	eterminatio:	n'	High		1.0						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Type of Data Source Polycapi Facility;	Y. He, S. Kilsby, C. J. Tuck, R. D. Wildman, S. D. R. Christie, S. Edmondson, H. Yang. 2013. Processing Biodegradable Polycaprolactone through 3D Printing. 24th International SFF Symposium - An Additive Manufacturing Conference. Facility; Reports for Data or Information Other than Exposure or Release Data; 5080531								
EXTRACTION Parameter		Data							
Life Cycle Stage:		Use							
Life Cycle Description (Sub	category of Use):	Printing							
Process Description:					0.8 percent 1,4-dioxane. Ink samples settled for 0rpm. Slides soaked in 2-propanol and dried.				
		2mL of in							
Chemical Concentration:			U		ixed with PCL flakes to 5-10 percent PCL				
		oolo pere	, , , , ,	011011 111	mice with 1 c2 hance to 0 10 percent 1 c2				
EVALUATION									
Domain	Metric	Rating	MWF^{\star}	Score	Comments				
Domain 1: Reliability									
Metric 1	: Methodology	High	× 1	1	Research article				
D : 0 D + 1:									
Domain 2: Representative Metric 2	: Geographic Scope	Medium	× 1	2	UK				
Metric 2 Metric 3		High	$\stackrel{\wedge}{\times} \stackrel{1}{2}$	$\frac{2}{2}$	3D printing				
Metric 4	= =	High	× 2	2	2013				
Metric 5		N/A		N/A	No Comment.				
Domain 3: Accessibility/Cl	nit.								
Metric 6		N/A		N/A	No Comment.				
Wietile 0	. Howadana Compresentess	11/11		11/11	110 Commons.				
Domain 4: Variability and	Uncertainty								
Metric 7	: Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality Determination [†]		High		1.2					

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		ro, P. A. Netti, E. Torino. 2015. A/Dioxane/Water Ternary Syst				n and Thermodynamic Assessment of Phase Equilibria Biomedical Field. Langmuir.
Type of Data Source Hero ID	Facility; R 3538358	eports for Data or Information (Other than	Exposur	e or Re	lease Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descrip	otion (Subca	ategory of Use):	Printing			
Process Description	\	negory or ose).	0	llets add	ed to di	ioxane and heated in a silicone oil bath. Con-
						rapors from escaping during heating.
Chemical Concentration:					PLLA (0.5 percent , 1 percent , and 1.5 percent	
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	:1:+					
Domain 1. Itenab.	Metric 1:	Methodology	High	× 1	1	Research article
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Italy
	Metric 3:	Applicability	High	$\times 2$	2	3D printing
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	ibility/Clari	itv				
Domain 9. Heeess	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4. V:-1	:liter and II-	a containt.				
Domain 4: Variab	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
	metric 7:	Metadata Completeness	IN/A		IN/A	NO Comment.
Overall Quality D	eterminatio	n^{\dagger}	High		1.2	
- •						

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation:		D. Wildman, C. J. Tuck, S. D. actone ink for Material Jetting.			dson. 20	016. An Investigation of the Behavior of Solvent based
Type of Data Source Hero ID	Facility; R 3829109	eports for Data or Information (Other than	Exposur	e or Rel	lease Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Stage: Life Cycle Descrip	otion (Subas	storory of Uso):	Ose Printing			
Process Description		ntegory or ose).	0	e dissolv	ed in 99	8.8 percent 1,4-dioxane. Ink samples settled for
1 Toccss Description	<i>3</i> 11.					Orpm. Slides soaked in 2-propanol and dried.
			2mL of in			
Chemical Concent	tration:					ed with PCL (5 wt percent)
			-			,
EVALUATION						
Domain		Metric	Rating	MWF^{\star}	Score	Comments
Domain 1: Reliab	:1:+					
Domain 1. Kenab	Metric 1:	Methodology	High	× 1	1	Research article
		2.22.22.20	6			
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	UK
	Metric 3:	Applicability	High	$\times 2$	2	3D printing
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	sibility/Clari	ity				
Domain 9. Recess	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
		r	/		, -	
Domain 4: Variab	oility and Ur					
-	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
		+				
Overall Quality D	eterminatio	\mathbf{n}^\intercal	High		1.2	

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID		Independent Lubricant Manufacturers, Association. 2014. RE: Proposition 65 warning regulation. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982411							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	otion (Subca	ategory of Use):	MWF						
Chemical Concent		8	<1 ppb						
EVALUATION									
Domain		Metric	Rating	MWF^*	Score	Comments			
Domain 1: Reliability									
	Metric 1:	Methodology	Medium	× 1	2	Public Comment from Industry Groups			
Domain 2: Repres	sentative								
Bolliani 2. Repre.	Metric 2:	Geographic Scope	High	\times 1	1	US			
	Metric 3:	Applicability	High	× 2	2	MWF			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clari	itv							
Domain 6. Necess	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4. V:-1	:1:4 on d II	a containt.							
Domain 4: Variab	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality Determination [†]			High		1.2				

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

Source Citation: Type of Data Source Hero ID	Spin,. 2017. SPIN substances in preparations in nordic countries 1,4,-dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3981126								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV):				Manufacturing, processing, use Manufacturing, processing, use PV for different Nordic countries by industry in 2010-2014					
EVALUATION									
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	SPIN			
Domain 2: Repres	contativo								
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	× 1	2	Nordic Countries			
	Metric 3:	Applicability	Medium	$\times 2$	4	Many industries listed are not in scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010-2014			
	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	Domain 4: Variability and Uncertainty								
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality Determination [†]			Medium		1.7				

^{*} MWF = Metric Weighting Factor † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 .

	Sapphire, For 1,4-Die	-	en"s Chem	ical Eval	uation	Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission			
0.2	Facility; Completed Exposure or Risk Assessments; 3809038								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufact	uring					
Life Cycle Descript	ion (Subca	ategory of Use):	Manufact						
Process Description		<i>y</i> ,	3 method		5				
Total Annual U.S.	Volume (a	nd percent of PV):	mfg: 1 mi	illion lbs	(2003)i	mport: <50,000 lbs (2001)			
Number of Sites:			1 site in U	- 10					
Chemical Concentr	ation:		99.90 per	cent					
EVALUATION									
Domain		Metric	Rating	MWF^{\star}	Score	Comments			
Domain 1: Reliabil	lity								
	Metric 1:	Methodology	Medium	× 1	2	Ferro Corp submission for VCCEP			
Domain 2: Represe	entative								
_	Metric 2:	Geographic Scope	High	\times 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	In scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007			
	Metric 5:	Sample Size	High	× 1	1	Multiple			
Domain 3: Accessi	bility/Clar	ity							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variabi	lity and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality De	Overall Quality Determination [†]		High		1.4				

 $^{^{\}star}$ 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 .