

Office of Chemical Safety and Pollution Prevention

# Final Risk Evaluation for 1-Bromopropane (*n*-Propyl Bromide)

## Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Release and Occupational Exposure Data

CASRN: 106-94-5



August 2020

This document is a compilation of tables for the data extraction and evaluation for 1-Bromopropane. 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.

The document includes sources that contain environmental release data that were evaluated by EPA. However, environmental release data for the air pathway were not integrated because this pathway was determined to be out of scope during development of the risk evaluation. See Section 1.4 of the final Risk Evaluation for further explanation.

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### **Explanatory Notes**

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

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

Releases to the Environment

Source Citation: Type of Data Source Hero ID	Japanese l Releases te 3980936	Japanese Ministry of, Environment. 2017. 1-Bromopropane. Releases to the Environment; Environmental Release Data; 3980936							
EXTRACTION Parameter			Data						
Life Cycle Stage: Environmental Media: Annual Release Quantity (kg/yr):			Use Air (majo 1,300 t in	Use Air (majority, 93.7-99 percent ), 160 t to waste, 0.23 t to sewage 1,300 t in 2011 under PRTR (5,000 t production and import)					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	oility Metric 1:	Methodology	Medium	× 1	2	Methodology not well described but the source is a trusted govt publication			
Domain 2: Repre	sentative								
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU			
	Metric 3:	Applicability	High	$\times 2$	2	Uses are within scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2011 estimates			
	Metric 5:	Sample Size	Low	$\times 1$	3	Only a single data point			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Metadata limited			
Domain 4: Varial	bility and U Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Not discussed			
Overall Quality Determination <sup>†</sup>		Medium		1.9					

Source Citation:	Camp, Inc. 2000. Final report: Beyond pollution prevention: Removal of organochlorines from industrial feedstocks and								
Type of Data Source Hero ID	Releases to the Environment; Environmental Release Data; 3981054								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Uso						
Life Cycle Descrit	otion (Subca	ategory of Use):	Various s	olvent us	es				
Annual Release Q	uantity (kg	/yr):	1.5 MM I	b in 2000	(Great	Lakes Region)			
·						5 ,			
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Boliah	ility								
Domain 1. Renab	Metric 1:	Methodology	High	$\times 1$	1	Estimation methodology well described in doc			
Domain 2. Poppo	antativa								
Domain 2. Repres	Metric 2.	Geographic Scope	High	$\times 1$	1	US (Croot Lakes)			
	Metric 3:	Applicability	High	$\times 2$	2	Uses are within scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000 estimate			
	Metric 5:	Sample Size	Low	$\times 1$	3	Only a single data point			
Domain 3: Access	ibility/Clar	ity							
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Contains some metadata			
Domain 4: Variah	ility and U	acertainty							
Domain 1. Variat	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not discussed			
		I I I I I I I I I I I I I I I I I I I			-				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.8				
• 0									

Source Citation: Type of Data Source Hero ID	CARB. 20 Releases to 2991110	11. Development of updated AF o the Environment; Environment	RB solvent of tal Release	cleaning e Data;	emissior	ns inventories. Final Report: Agreement No. 06-322.		
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source:			Use Vapor Degreasing Batch-loaded vapor degreaser, aerosol surface preparation process,					
Environmental Mo Release or Emissio Release Estimatio Number of Sites:	edia: on Factor: n Method:		Air 10.43 lb/employee-yr Emission inventory 213					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Release data methodology is well described and expected to be accurate for the selected facilities		
Domain 2: Repres	sentative		TT: 1	-	-			
	Metric 2: Metric 3:	Geographic Scope Applicability	High High	$\times 1 \times 2$	$\frac{1}{2}$	US data (CA) Release data are for OES within scope (with uncertainty on the sub externa of democracy)		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001 report		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Emission inventory with over 200 samples, but distribution characterized only by average and std dev. Values		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Study provides air emission factor without other metadata		
Domain 4: Variab	ility and Un Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Not discussed		
Overall Quality Determination <sup>†</sup>			Medium		1.8			

Source Citation: Type of Data Source Hero ID	Trinity Consultants. 2015. Emission Report, NPB Response Addendum. Releases to the Environment; Environmental Release Data; 5018570								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr): Number of Sites:			Use Dry Cleaning, Vapor Degreasing, Spray Adhesive Air Solvent inventory or similar data Variable depending on use, facility, and year 1 or more for each use						
<b>EVALUATION</b> Domain	Metric Rating MWF <sup>*</sup> Score Comments								
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Release data methodology is well described and expected to be accurate for the selected facilities			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US data			
	Metric 3:	Applicability	High	$\times 2$	2	Release data are for OES within scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2009 - 2014 data			
	Metric 5:	Sample Size	Medium	× 1	2	Facility-level annual emission estimates provided for multiple years, but unclear whether selected facilities are representative			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Study provides air emission estimates without other metadata			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	× 1	3	Not discussed				
Overall Quality Determination <sup>†</sup>			High		1.6				

Source Citation:U.S. EPA.Type of Data SourceReleases toHero ID3045012	1981. AP-42. Compilation of at o the Environment; Environment	ir pollutant tal Release	emission Data;	factors	s. Chapter 4. 6: Solvent degreasing.			
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source:		Use Vapor Degreasing Waste solvent evaporation, solvent carryout, solvent bath evaporation, spray evaporation, and agitation						
Environmental Media:		Air Calil alaa		a				
Release or Emission Factor: Release Estimation Method:	use or Emission Factor: ase Estimation Method:			Cold cleaning VOC emissions are 3.2 - 57.1 percent of emissions com- pared to OTVDs (see document for emission factor in kg/yr-unit) Solvent purchase records				
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Estimation methodology is described, AP-42 is a well estab- lished document			
Domain 2: Representative								
Metric 2:	Geographic Scope	High	$\times 1$	1	US data			
Metric 3:	Applicability	High	$\times 2$	2	Release data are for OES within scope			
Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1981 publication			
Metric 5:	Sample Size	Low	$\times 1$	3	EF estimates not characterized by statistics			
Domain 3: Accessibility/Clar	ity	_		_				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	EF are provided without other metadata			
Domain 4: Variability and Un Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	Not discussed			
Overall Quality Determination <sup>†</sup>		Medium		2.1				

Source Citation:	ce Citation: Newmoa, 2001. Pollution prevention technology profile - Closed loop vapor degreasing.							
Type of Data Source Hero ID	Releases to 3044986	o the Environment; Reports for	Data or Inf	ormation	Other	than Exposure or Release Data;		
EXTRACTION								
Parameter			Data					
Life Cruele Sterrey			Uas					
Life Cycle Stage:	tion (Sube	atorory of Uso).	Use Vapor De	orrossing				
P2 Control & per	cent Efficier	nev:	98 percen	t when s	witching	g from OTVD to closed-loop degreaser		
						German Contraction and Contraction and Contraction		
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1, Poliah	;];+							
Domain 1. Kenab	Metric 1.	Methodology	Low	× 1	3	Estimation method not specified		
	Methe 1.	Methodology	LOW	~ 1	5	Estimation method not specified		
Domain 2: Repres	sentative							
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US data		
	Metric 3:	Applicability	High	$\times 2$	2	Estimate is for a use within scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001 publication		
	Metric 5:	Sample Size	Low	$\times 1$	3	No statistics provided; single point estimate only		
	·1.·1·. /C1	•,						
Domain 3: Access	Motrie C	Matadata Completeness	Low	V 1	9			
	Metric 6:	Metadata Completeness	LOW	× 1	3	Underlying data sources are not trasparent		
Domain 4. Variah	ility and U	ncertainty						
Domain 4. Variab	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not discussed		
		T T T T T T T T T T T T T T T T T T T			-			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		2.1			
e								

Source Citation:	Wadden, R. A., Scheff, P. A., Franke, J. E., 1989. Emission Factors for Trichloroethylene Vapor Degreasers. American Industrial									
Type of Data Source Hero ID	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3051984									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Uso							
Life Cycle Descrit	otion (Subca	ategory of Use):	Vapor I	Degreasir	າຍ					
P2 Control & per	cent Efficier	icy:	90 perce	ent emiss	sion red	uction for OTVD with LEV				
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1, Doliah	:1:4									
Domain 1: Kellad	Metric 1	Methodology	Low	× 1	3	Estimation method not specified				
		memodology	Low	× 1	0	Estimation method hot specified				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US data				
	Metric 3:	Applicability	High	$\times 2$	2	Estimate is for a use within scope				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Data more than 20 years old				
	Metric 5:	Sample Size	Low	$\times 1$	3	Only a single estimate without additional information on dis- tribution/statistics				
Domain 3. Access	vibility/Clar	ity								
Domain 0. Meeebs	Metric 6:	Metadata Completeness	Low	$\times 1$	3	No metadata provided				
		Å				-				
Domain 4: Variab	oility and U	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Not discussed				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Low		2.3					

Occupational Exposure

Source Citation:	Toraason, M.,Lynch, D. W.,Debord, D. G.,Singh, N.,Nemhauser, J 2003. Assessment of DNA strand breaks in leukocytes of workers occupationally exposed to 1 bromopropage. Toricological Sciences							
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 1733747							
EXTRACTION								
Parameter			Data					
			TT					
Life Cycle Stage:	ntion (Suba	torow of Uco).	Use Sprov Ad	hoging				
Physical Form:		tegory of Use).	Liquid	mesive				
Route of Exposur	·e·		Inhalatio	n				
Exposure Concen	tration (Uni	it):	0.2 - 271		e 1)4 -	42.7 ppm (site 2)[Individual data points not		
Enposare concon	(011		available:	only ran	ge repo	rted		
Number of Sampl	les:		41 worker	rs (site 1)	and 22	2 workers (site 2)		
Number of Sites:			2	· · · ·				
Type of Measurer	ment or Met	hod:	8-hr TW	4				
Worker Activity:			Sprayers	and othe	r activit	ties		
Number of Worke	ers:		41 worker	rs (site $1$ )	and 22	2 workers (site 2)		
Type of Sampling	g:		Personal					
Sampling Locatio	n:		worker breathing zone					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1. Rolinh	,ili+.							
Domain 1. Henat	Metric 1:	Methodology	High	$\times 1$	1	Data from HHE, but no description in this source (1 page sum- mary only). Assumes a NIOSH method is used.		
Domain 2: Repre	sentative	~						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US - because the data came from HHE, these sites would be U.S. sites		
	Metric 3:	Applicability	High	$\times 2$	2	Applies to condition of use within scope of risk eval		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Document published March 2003; date of sampling unknown		
	Metric 5:	Sample Size	Low	$\times 1$	3	63 samples. No statistics provided.		
Domain 3: Access	sibility/Clar	ity						
Domain 5. Access	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Specifies data are PBZ TWA samples, but contains no other metadata		
	Continued on next page							

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Source Citation:	Toraason, of workers	Toraason, M.,Lynch, D. W.,Debord, D. G.,Singh, N.,Nemhauser, J 2003. Assessment of DNA strand breaks in leukocytes of workers occupationally exposed to 1-bromopropane. Toxicological Sciences.							
Type of Data Source Hero ID	Occupation 1733747	Occupational Exposure; Monitoring Data; 1733747							
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 4: Variab	Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Low $\times 1$ 3 Does not address variability/uncertainty								
Overall Quality E	Determination	$\mathbf{n}^{\dagger}$	Medium		1.9				

Type of Data Source O Hero ID 35	ccupation 355604	nal Exposure; Monitoring Data;	pyr bronnu		intou on				
FYTRACTION									
Parameter			Data						
			Data						
Life Cycle Stage:			Use						
Life Cycle Descriptio	on (Subca	tegory of Use):	Vapor De	greasing					
Physical Form:	× ·		Liquid	0 0					
Route of Exposure:			Inhalatio	1					
Exposure Concentrat	tion (Unit	t):	1.3 - 14 ]	ppm (day	1)1.6	- 21 ppm (day 2)[individual data points not			
			available]						
Number of Samples:			5						
Number of Sites:			1						
Type of Measuremen	nt or Metl	hod:	PBZ,full-	shift TW	A				
Worker Activity:			Operating	g vapor d	egrease	r			
Number of Workers:			5						
Type of Sampling:			Personal						
Sampling Location:			worker breathing zone						
Exposure Frequency:	:		when operating vapor degreaser on as-needed basis						
Engineering Control	& percen	t Exposure Reduction:	6" retrigerated cooling coil. No LEV on vapor degreaser, but room has						
			canopy exhaust ventilation						
PPE:			Safety glasses and safety shoes						
Analytic Method:			NIOSH n	nethod 10	)25				
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliabilit	17								
M	y fetric 1·	Methodology	High	× 1	1	Study was conducted by Hanley. Describes use of GC-FID via			
1.1	100110 1.	incenerating,	111811	~ 1	1	NIOSH method 1025, LOD of 0.5 ug			
Domain 2: Represent	tative								
Μ	fetric 2:	Geographic Scope	High	$\times 1$	1	US			
Μ	fetric 3:	Applicability	High	$\times 2$	2	Applies to condition of use within scope of risk eval			
Μ	fetric 4:	Temporal Representativeness	Medium	$\times 2$	4	Study conducted $8/16-18$ , 2004			
M	letric 5:	Sample Size	Medium	$\times 1$	2	5 samples. Range and average are reported, other statistics not provided			
		Cor	ntinued on r	next page	<b>;</b>				

Source Citation: Type of Data Source Hero ID	Niosh, 20 Occupation 3355604	07. Workers' exposures to n-p nal Exposure; Monitoring Dat	ropyl bromide a;	e at a pri	nted ele	ectronics circuit assembly manufacturer.
EVALUATION						
Domain		Metric	Rating	$\mathbf{MWF}^{\star}$	Score	Comments
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	Monitoring data include critical information about sample type and exposure, but lacks additional metadata
Domain 4: Variak	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Medium		1.7	

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Type of Data Source Hero ID	Occupation 3355621	nal Exposure; Monitoring I	Data;							
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrip	tion (Subca	ategory of Use):	Vapor De	greasing						
Physical Form:			Liquid							
Route of Exposure	e:		Inhalation	1						
Exposure Concentration (Unit):			0.078 - 2 shift, exh points no	ppm (PI aled)0.03 t availabl	3Z)0.33 53 - 0.5 e]	5 - 4 ppm (in-respirator)0.05 - 0.23 ppm (pre- 55 ppm (post-shift, exhaled)[individual data				
Number of Sample	es:		4		,					
Number of Sites:			1							
Type of Measuren	nent or Met	hod:	PBZ,full-	shift TW	А					
Worker Activity:			Operating	g vapor o	legreas	er, maintenance of equipment (removing sol-				
·			vents)		0					
Number of Worker	rs:		4							
Type of Sampling			Personal	Personal						
Sampling Location	n:		worker breathing zone; in-mask							
Exposure Frequen	cy:		when ope	when operating vapor degreaser on as-needed basis						
Engineering Contr	ol & percer	t Exposure Reduction:	Refrigerat	Refrigerated cooling coil, 14" freeboard height, chamber cover, no LEV						
			on degrea	on degreaser but room maintained under negative pressure with general						
			exhaust v	exhaust ventilation						
PPE:			Half-masl	Half-mask air purifying respirator with combination organic vapor car-						
			tridges a	tridges and HEPA filter, full face APF respirator with organic vapor						
			cartridge,	PVA glo	ves, sa	fety glasses, safety shoes				
Analytic Method:			NIOSH n	nethod 10	25					
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Study was conducted by Hanley. Describes use of GC-FID via				
						NIOSH method 1025				
Domain 2: Repres	entative		TT: 1		-					
	Metric 2:	Geographic Scope	Hıgh	$\times 1$	1	US				
			Continued on r	next page	1					

Source Citation: Type of Data Source Hero ID	Niosh, 20 Occupation 3355621	07. Workers' exposures to n-pro- nal Exposure; Monitoring Data;	pyl bromide	e at a hy	draulic	power control component manufacturer.
EVALUATION						
Domain		Metric	Rating	$\mathbf{MWF}^{\star}$	Score	Comments
	Metric 3:	Applicability	High	$\times 2$	2	Applies to condition of use within scope of risk eval
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Study conducted in 2004
	Metric 5:	Sample Size	Medium	$\times 1$	2	4 samples. Range and average values reported, but distribution not fully described
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Monitoring data include critical metadata
Domain 4: Variab	oility and Uı Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality E	Determinatio	$\mathbf{n}^{\dagger}$	Medium		1.7	

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Source Citation:	Moon, H. I. I,Shin, S.,Byeon, S. H 2015. Exposure Monitoring and Health Risk Assessment of 1-Bromopropane as a Cleaning Solvent in the Workplace. Human and Ecological Risk Assessment.							
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 3576615							
EXTRACTION								
Parameter			Data					
Life Cruele Sterrer			Uas					
Life Cycle Stage:	Life Cycle Stage:			Solvent	Closnin	ng (automotivo/oloctronic parts)		
Physical Form		ategory of Ose).	Liquid	Solvent	Oleann	ig (automotive/electronic parts)		
Route of Exposur	e:		Inhalatio	ı				
Exposure Concent	tration (Uni	it):	central te	ndency -	82.1 mg	g/m3max - 214.8 mg/m3[provides only ranges/		
	, , , , , , , , , , , , , , , , , , ,	,	GM at ea	ch work	olace; in	dividual data point not given]		
Number of Sampl	es:		50					
Number of Sites:			10					
Type of Sampling	:		Unknown	- Likely	area			
Engineering Cont	rol & percei	nt Exposure Reduction:	LEV (mo	st workp	laces)			
PPE:			None (for most workers)					
Analytic Method:			NIOSH method 1025					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1. Reliab	ility							
Domain 1. Honab	Metric 1:	Methodology	High	$\times 1$	1	Study conducted using NIOSH method		
			0			· · · · · · · · · · · · · · · · · · ·		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Study conducted in Korea		
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Study conducted in 2005		
	Metric 5:	Sample Size	Medium	× 1	2	50 samples. Range and geometric mean reported for each data set, but distribution not fully described		
Domain 3: Access	ibility/Clar	;+						
Domain 5: Access	Metric 6	Metadata Completeness	Low	× 1	3	Appear to be PBZ samples but includes no other metadata		
		metadata completeness	1011	// 1	0	Appear to be i bh samples but menudes no other metadata		
Domain 4: Variah	ility and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty		
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Source Citation:	Moon, H. I. l,Shin, S.,Byeon, S. H. 2015. Exposure Monitoring and Health Risk Assessment of 1-Bromopropane as a Cleaning Solvent in the Workplace. Human and Ecological Risk Assessment.							
Type of Data Source	Occupational Exposure; Me	Occupational Exposure; Monitoring Data;						
Hero ID	3576615							
EVALUATION								
Domain	Met	ric Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Overall Quality I	$\operatorname{Petermination}^\dagger$	Medium		1.9				

Source Citation:Atsdr., 20Type of Data SourceOccupatioHero ID3827325	16. Draft toxicological profile fo nal Exposure; Monitoring Data;	r1-bromopr	opane.				
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Sites: Number of Workers: Type of Sampling:			Multiple Manufacturing - Use (various) Liquid Inhalation [summarizes results from other sources w/out providing individual data points]Mfg: 0.9 - 170.5 ppm PBZUse: see source 1 37 Personal, area				
<b>EVALUATION</b> Domain	Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	Low	× 1	3	Unknown method used in the source cited		
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar Metric 6:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	Low High High Low	$ \begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \\ \times 1 \end{array} $	3 2 2 3	Exposure monitoring data for 1-BP mfg factory in China Use is within scope of RE 2017 ATSDR report 37 samples. Data described as a range without further statis- tics Monitoring data are PBZ samples but provides no other meta- data		
Domain 4: Variability and U Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty		
Overall Quality Determination	$\mathbf{n}^{\dagger}$	Medium		2.1			

Source Citation: Type of Data Source Hero ID	Cdc,. 2016 Occupation 3827326	5. Criteria for a recommended st nal Exposure; Reports for Data	andard: Oo or Informat	ccupation tion Othe	al expo er than	sure to 1-bromopropane. Exposure or Release Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descri	otion (Subca	ategory of Use):	Vapor De	greasing,	Spray	Adhesive
Number of Workers:		3,320 - 69,100 workers (8,300-40,300 workers for vapor degreaser, 400- 9,800 workers for foam mfg)				
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	oility Metric 1:	Methodology	High	$\times 1$	1	Cites a 2007 EPA source
Demein 9. Deme			_			
Domain 2: Repres	Motrie 2	Coorranhia Soona	Uich	× 1	1	
	Metric 2:	Applicability	High	$\times 1$ $\times 2$	1	US data
	Metric 4.	Temporal Representativeness	Medium	$\times 2^{\times 2}$	4	2016 document, but worker data from 2007
	Metric 5:	Sample Size	Low	$\times 1$	3	Unknown sample distribution
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	Cites a 2007 EPA source, provides a range only without other metadata
		_				
Domain 4: Variat	Motrie 7	ncertainty Matadata Completeness	Low	× 1	9	Description in the line of the
	Metric 7:	Metadata Completeness	LOW	× 1	3	Does not address variability/uncertainty
Overall Quality I	Determinatio	$\mathrm{n}^\dagger$	Medium		1.9	

Source Citation: Type of Data Source Hero ID	2014. Rep Occupatio 3860561	ort on carcinogens: 1-Bromopro nal Exposure; Monitoring Data;	pane.						
EXTRACTION			Data						
Parameter			Data						
Life Cycle Stage:			Multiple	Multiple					
Life Cycle Descrip	ption (Subca	ategory of Use):	Manufact	ure, Adh	iesives,	Drycleaning, Aerosol Degreasing, Vapor De-			
Pouto of Euroceur			greasing,	Other	I				
Exposure Concen	e. tration (Uni	it):	ND - 380	ppm (ac	hesive	use is highest, vapor degreasing lowest) [indi-			
r			vidual da	ta points	not pro	ovided]			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
	•1•,								
Domain 1: Reliat	Metric 1.	Methodology	Low	× 1	3	Unknown method used in the source cited			
	Wietifie 1.	Methodology	LOW	× 1	0	Christown method used in the source cited			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US data (primarily)			
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data mostly 10-20 years old			
	Metric 5:	Sample Size	Low	$\times 1$	3	Unknown sample distribution			
Domain 3: Access	sibility/Clar	ity							
Domain 5. Acces	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Appear to be PBZ samples but includes no other metadata			
		Å							
Domain 4: Variat	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty			
0 110 11 5		+			0.1				
Overall Quality L	eterminatio	m'	Medium		2.1				

Type of Data SourceOccupationHero ID3860562	onal Exposure; Monitoring Data;	,	1	L L	,
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Use			
Exposure Concentration (Un	it):	0.05 - 135	5 ppm (O	SHA) [	individual data points not provided]
Number of Samples:		30			
Type of Measurement or Me	thod:	PBZ, 2-4	hr TWA		
Type of Sampling:		Personal			
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Beliability					
Metric 1:	Methodology	Low	$\times 1$	3	Unknown method used in the source cited
	00				
Domain 2: Representative					
Metric 2:	Geographic Scope	High	$\times 1$	1	US data
Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data from 1999 publication
Metric 5:	Sample Size	Low	$\times 1$	3	Unknown sample distribution
Domain 3: Accessibility/Clay	rity				
Metric 6:	Metadata Completeness	Low	$\times 1$	3	Data are PBZ short-term TWA, but provides no other meta- data
Domain 4: Variability and U	ncortainty				
Metric 7	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
		Dow	<u> </u>	0	Does not address variability/ uncertainty
Overall Quality Determination	on <sup>†</sup>	Medium		2.1	
	-				

Source Citation: 1999. Nomination of 1-bromopropane (1-BP) and 2-bromopropane (2-BP) for testing by the national toxicology program.

\* MWF = Metric Weighting Factor

<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation: Type of Data Source Hero ID	2013. Rep Occupation 3860563	ort on carcinogens: monograph nal Exposure; Monitoring Data;	of 1-bromop	oropane.				
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Multiple					
Life Cycle Description (Subcategory of Use):		Manufact greasing.	Manufacture, Adhesives, Drycleaning, Aerosol Degreasing, Vapor De- greasing, Other					
Route of Exposur	e:		Inhalatior	n, dermal	l			
Exposure Concen	tration (Uni	t):	ND - 380	ppm (ac	lhesive	use is highest, vapor degreasing lowest) [indi-		
Type of Measurement or Method:		PBZ, 8- t	ta points o 12-hr T	rot pro ΓWA	ovideaj			
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Low	$\times 1$	3	Unknown method used in the source cited		
Domain 2: Repre	sentative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US data (primarily)		
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data mostly 10-20 years old		
	Metric 5:	Sample Size	Low	$\times 1$	3	Unknown sample distribution		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Includes only critical metadata		
Domain 4: Varial	oility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty		
Overall Quality I	eterminatio	$\mathbf{n}^{\dagger}$	Medium		2.0			

Source Citation:	Osha, 2010. Input received through web forum for identifying hazardous chemicals for which OSHA should develop exposure reduction strategies							
Type of Data Source Hero ID	Occupatio 3978176	nal Exposure; Monitoring Data;						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Uso					
Life Cycle Descrit	otion (Subc	ategory of Use):	Drv clear	ning				
Route of Exposur	e:	acceptly of oboli.	Inhalatio	n				
Exposure Concent	tration (Uni	it):	40 ppm (	avg), cite	s Bland	lo study		
	, ,	,		0,,,		·		
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1, Daliah	:1:4							
Domain 1. Kenab	Metric 1:	Methodology	Low	× 1	3	Unknown method used in the source cited		
	11100110 11	ineene deregy	1011					
Domain 2: Repres	sentative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US study		
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Blando study cited appears to be within 10 yr		
	Metric 5:	Sample Size	Low	$\times 1$	3	Unknown sample distribution		
Domain 3: Access	sibility/Clar	ity		_	-			
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	No description of metadata		
Domain 4. Variah	ility and U	ncontainty						
Domain 4: variat	Motric 7.	Motadata Completeness	Low	× 1	3	Dess not address veriability (upgertainty		
	metric 7:	metadata Completeness	LOW	~ 1	ა	Does not address variability/uncertainty		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		19			
Overan Quality D	, coor minable		muuum		1.0			

Source Citation:Dhhs,. 20Type of Data SourceOccupationHero ID3986431	17. Skin Notation (SK) Profile 1 nal Exposure; Published Models	-Bromopr for Expo	copane. sures or	Releases	s;			
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:			Multiple Various Liquid Dermal skin permeation coefficient - 0.00904575 cm/hr, water solubility 2.45 mg/cm3 Experimental measurement Experimental dermal dosing (Frasch et al. 2011) to simulate splash ex- posure and occluded exposure, indicating substantial dermal penetration					
<b>EVALUATION</b> Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described			
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US study Use is within scope of RE Frasch study conducted in 2011 No Comment.			
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Provides metadata			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	× 1	3	Does not address variability/uncertainty			
Overall Quality Determination	$\mathrm{n}^\dagger$	High		1.3				

Source Citation: Hanley, K 1-bromop Type of Data Source Occupatio Haro ID 607476	<ul> <li>Hanley, K. W., Petersen, M., Curwin, B. D., Sanderson, W. T 2006. Urinary bromide and breathing zone concentrations of 1-bromopropane from workers exposed to flexible foam spray adhesives. Annals of Occupational Hygiene.</li> <li>Occupational Exposure; Monitoring Data; 607476</li> </ul>							
EXTRACTION								
Parameter		Data						
Life Cycle Stage		Use						
Life Cycle Description (Subc	ategory of Use):	Sprav Ad	hesive					
Physical Form:		Liquid	1100110					
Route of Exposure:		Inhalatio	n					
Exposure Concentration (Un	it):	0.6 - 200	ppm TW	VΑ				
Number of Samples:	,	30	••					
Number of Sites:		2						
Type of Measurement or Met	hod:	Full shift	TWA					
Worker Activity:		Sprayer a	nd non-s	prayer				
Number of Workers:		30						
Type of Sampling:		Personal						
Sampling Location:		Breathing	g zone					
Exposure Duration:		Full shift						
Analytic Method:		NIOSH II	ietnod 10	JZƏ				
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability								
Metric 1:	Methodology	High	$\times 1$	1	Methodology of experimental data well described			
Domain 2: Representative								
Metric 2:	Geographic Scope	High	$\times 1$	1	US study			
Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE			
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Study published in 2006			
Metric 5:	Sample Size	Medium	× 1	2	30 samples. Range and mean are reported, but distribution not fully characterized			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Monitoring data includes most critical info such as sample/ exposure type and some descriptive worker activity info, but lacks other metadata			
	Con	tinued on r	next page	9				

		commada nom		Page				
Source Citation: Type of Data Source Hero ID	Hanley, K. W., Petersen, M., Curwin, B. D., Sanderson, W. T 2006. Urinary bromide and breathing zone concentrations of 1-bromopropane from workers exposed to flexible foam spray adhesives. Annals of Occupational Hygiene. Occupational Exposure; Monitoring Data; 607476							
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Medium $\times 1$ 2 Discuss variability between different worker activity								
Overall Quality I	$\operatorname{Determination}^\dagger$	High		1.6				

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Source Citation:	Harney, J. M., Nemhauser, J. B., Reh, C. M., Trout, D., Schrader, S. 2003. NIOSH Health Hazard Evaluation Report: HETA No. 99-0260-2906 Marx Industries Inc. Sawmills North Carolina								
Type of Data Source Here ID	Occupatio	nal Exposure; Monitoring Data;		or the Oart	Jiiia.				
	1379492								
EXTRACTION									
Parameter			Data						
Life Cycle Stage.			Use						
Life Cycle Descri	otion (Subc	ategory of Use):	Sprav Ad	hesive					
Physical Form:			Liquid						
Route of Exposur	e:		Inhalatio	n					
Exposure Concen	tration (Uni	t):	0.1-160 p	pm					
Number of Sampl	es:	,	29	•					
Number of Sites:			1						
Type of Measurer	nent or Met	hod:	TWA						
Worker Activity:			58-68.5 p	ercent 1-	BP				
Number of Worke	ers:		60						
Type of Sampling			Personal	and area					
Sampling Locatio	n:		Various						
Exposure Duratio	on:		Full shift						
PPE:			some respirator/glove use						
Analytic Method:			NIOSH draft method for 1-BP						
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1, Paliak	;1;+								
Domain 1. Kenau	Motric 1.	Methodology	High	$\times 1$	1	Methodology of experimental data well described			
	MEULIC 1.	Methodology	Ingn	~ 1	T	methodology of experimental data well described			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US study			
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2003			
	Metric 5:	Sample Size	High	$\times 1$	1	$29\ {\rm samples}.$ Individual data points provided to allow characterization of full distribution			
Domain 3: Accord	ubility /Clar	i+.,							
Domain 5: Access	Metric 6	Metadata Completeness	High	× 1	1	Providos motodata			
	1,100110-0.	Metadata Completeness	111811	~ 1	T	i formes inclatata			
		~							
	Continued on next page								

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Source Citation:	Harney, J.	Harney, J. M., Nemhauser, J. B., Reh, C. M., Trout, D., Schrader, S. 2003. NIOSH Health Hazard Evaluation Report: HETA							
Type of Data Source Hero ID	Occupation 1379492	Occupational Exposure; Monitoring Data; 1379492							
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Medium $\times 1$ 2 Discuss variability between different worker activity									
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.3					

Source Citation: Type of Data Source Hero ID	<ul> <li>Hanley, K. W., Petersen, M. R., Cheever, K. L., Luo, L 2010. Bromide and N-acetyl-S-(n-propyl)-L-cysteine in urine fit workers exposed to 1-bromopropane solvents from vapor degreasing or adhesive manufacturing. International Archives Occupational and Environmental Health.</li> <li>Occupational Exposure; Monitoring Data; 1689090</li> </ul>								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Multiple						
Life Cycle Descrip	ption (Subca	ategory of Use):	Vapor De	greasing;	Adhesi	ive Formulation			
Physical Form:			Liquid						
Route of Exposur	e:		Inhalation	1					
Exposure Concent	tration (Uni	t):	0.07 - 18.	9 ppm (r	ange pr	ovided only)			
Number of Sampl	es:		42						
Number of Sites:			6						
Type of Measurer	ment or Met	hod:	Full shift	TWA (8	-10 hr)				
Number of Worke Type of Sampling Sampling Locatio Exposure Duratio Analytic Method:	Number of Workers: Type of Sampling: Sampling Location: Exposure Duration: Analytic Method:			heavy aerospace components required large semi-automatic degreasers varied heavy aerospace components required large semi-automatic degreasers equipped with LEV, smaller parts such as optical or electronic compo- nents were cleaned with small manual units without mechanical hoists and LEV" also see description for adhesive manufacturing 42 Personal Breathing zone Full shift NIOSH method 1025					
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
	•1•,								
Domain 1: Reliab	Motrie 1	Mathadalam	Uich	× 1	1				
	metric 1:	methodology	111g11	× 1	1	Methodology of experimental data well described			
Domain 2: Repres	sentative								
I .	Metric 2:	Geographic Scope	High	$\times 1$	1	US study			
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
	Metric 5:	Sample Size	Medium	$\times 1$	2	42 samples. Range and mean are provided, but distribution not fully characterized			

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Source Citation:	Hanley, K. W., Petersen, M. R., Cheever, K. L., Luo, L. 2010. Bromide and N-acetyl-S-(n-propyl)-L-cysteine in urine from workers exposed to 1-bromopropane solvents from vapor degreasing or adhesive manufacturing. International Archives of Occupational and Environmental Health.								
Type of Data Source Hero ID	Occupation 1689090	Occupational Exposure; Monitoring Data; 1689090							
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 3: Access	sibility/Clari Metric 6:	ty Metadata Completeness	Medium	$\times 1$	2	Monitoring data includes most critical info such as sample/ exposure type and some descriptive worker activity info, but lacks other metadata			
Domain 4: Variability and Uncertainty Matria 7: Matadata Completeness — Madium × 1 — 2 — Discuss engishility between different merker estivity									
			mouralli		-				
Overall Quality I	eterminatio	n <sup>†</sup>	High		1.3				

\* MWF = Metric Weighting Factor

<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation:	Hanley, K. W., Petersen, M. R., Cheever, K. L., Luo, L. 2009. N-acetyl-S-(n-propyl)-l-cysteine in urine from workers exposed							
Type of Data Source	<ul> <li>Occupational Exposure; Monitoring Data;</li> </ul>							
Hero ID	1689272							
EXTRACTION								
Parameter			Data					
			TT					
Life Cycle Stage:	otion (Suba	torony of Uco).	Use Sprov Ad	hogino				
Physical Form:	puon (Subca	ategory of Use).	Liquid	nesive				
Route of Exposur	·e·		Inhalation	า				
Exposure Concen	tration (Uni	t).	0.635 - 12	1 21 ppm (r	ange or	nlv)		
Number of Samp	es:		30	- pp (1		···· 5 )		
Number of Sites:			2					
Type of Measure	ment or Met	hod:	Full shift	TWA				
Worker Activity:			Includes	some w	orker o	description such as sprayers, non-sprayers,		
			seamtress	es				
Number of Worke	ers:		30					
Type of Sampling	<b>g:</b>		Personal					
Sampling Locatio	n:		Breathing	g zone				
Exposure Duration	on:		Full shift					
Analytic Method:			NIOSH method 1025					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
	.1.,							
Domain 1: Reliat	Motrie 1	Mathadalagy	High	$\sim 1$	1	Mathedalam, of annonimental data well described		
	Metho 1.	Methodology	IIIgii	~ 1	1	Methodology of experimental data well described		
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US study		
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2009		
	Metric 5:	Sample Size	Medium	$\times 1$	2	30 samples. Range and mean are reported, but distribution not fully characterized		
	·1 ·1· /C1	•						
Domain 3: Access	SIDILITY/Clar Motrie 6	Ity Matadata Completeness	Modium	× 1	0			
	Metric 0:	metadata Completeness	medium	× 1	2	Sample type, exposure type and some worker activity are known, but not all metadata are provided		
Continued on next page								

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Source Citation:	Hanley, K. to 1-brome	Hanley, K. W., Petersen, M. R., Cheever, K. L., Luo, L 2009. N-acetyl-S-(n-propyl)-l-cysteine in urine from workers exposed to 1-bromopropane in foam cushion spray adhesives. Annals of Occupational Hygiene.							
Type of Data Source Here ID	Occupational Exposure; Monitoring Data;								
	1003212								
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Medium $\times 1$ 2 Discuss variability between different worker activity									
Overall Quality I	Determinatio	n <sup>†</sup>	High		1.3				

Source Citation: Type of Data Source Hero ID	Ichihara, G.,Li, W.,Ding, X.,Peng, S.,Yu, X.,Shibata, E.,Yamada, T.,Wang, H.,Itohara, S.,Kanno, S.,Sakai, K.,Ito, H.,Kanefusa, K.,Takeuchi, Y 2004. A survey on exposure level, health status, and biomarkers in workers exposed to 1-bromopropane. American Journal of Industrial Medicine. e Occupational Exposure; Monitoring Data; 1717475									
EXTRACTION										
Parameter			Data							
Life Cycle Stage: Life Cycle Descrip Physical Form:	tion (Subca	ategory of Use):	Manufact Manufact Liquid	ure ure						
Route of Exposure	e:		Inhalatio	n						
Exposure Concent	ration (Uni	it):	0.9 - 106.	8 ppm						
Number of Sample	es:		37							
Number of Sites:			1							
Type of Measurem	nent or Met	hod:	TWA	,	,	1 1				
Worker Activity:			Operator	s manual	ly pour	ed materials into reaction pots, checked tem-				
			were also	responsi	ble for i	mixing the solvent with sodium hydrogen car-				
			bonate. 1	-BP was	96.74 r	percent purity				
Number of Worker	rs:		37		50 P	F				
Type of Sampling:	1		Personal							
Sampling Location	n:		Breathing zone							
Exposure Duration	n:		Full shift							
Analytic Method:			GS-MS							
EVALUATION										
Domain		Metric	Rating	$MWF^*$	Score	Comments				
Domain 1: Reliabi	lity Matula 1	Matha dala ma	TT:l.	1	1					
	Metric 1:	Methodology	High	× 1	1	Methodology of experimental data well described				
Domain 2: Repres	entative									
	Metric 2:	Geographic Scope	Low	$\times 1$	3	China				
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2003				
	Metric 5:	Sample Size	High	$\times 1$	1	37 samples. Individual data points provided to allow characterization of distribution				
	Continued on next page									

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Source Citation:	Ichihara, H.,Kanefus 1-bromopr	Ichihara, G.,Li, W.,Ding, X.,Peng, S.,Yu, X.,Shibata, E.,Yamada, T.,Wang, H.,Itohara, S.,Kanno, S.,Sakai, K.,Ito, H.,Kanefusa, K.,Takeuchi, Y 2004. A survey on exposure level, health status, and biomarkers in workers exposed to 1-bromopropane. American Journal of Industrial Medicine.								
Type of Data Source	Occupational Exposure; Monitoring Data;									
Hero ID	1/1/4/5									
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	$\mathbf{Score}$	Comments				
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	High	× 1	1	Provides metadata				
		r · · · · ·	0							
Domain 4: Variab	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Discuss variability between different worker activity				
Overall Quality Determination <sup><math>\dagger</math></sup>			High		1.6					
Source Citation:	Kawai, T., Takeuchi, A., Miyama, Y., Sakamto, K., Zhang, Z. W., Higashikawa, K., Ikeda, M. 2001. Biological monitoring of occupational exposure to 1-bromopropane by means of urinalysis for 1-bromopropane and bromide ion. Biomarkers.									
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Type of Data Source Hero ID	Occupatio 1733873	nal Exposure; Monitoring Data;								
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrip	otion (Subca	ategory of Use):	Metal Su	rface Cle	aning ar	nd Painting				
Physical Form:			Liquid							
Route of Exposur	e:		Inhalation	1						
Exposure Concent	tration (Uni	it):	1.42  ppm	(GM) (a	actual da	ata points not provided)				
Number of Sampl	es:		33							
Number of Sites:			1							
Worker Activity:			metal sur	face prep	paration					
Number of Worke	rs:		33							
Type of Sampling	Type of Sampling:			Personal						
Sampling Location:			Breatning	g zone						
Analytic Method:			GC							
Thinking the Informed.			ae							
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Methodology of experimental data well described				
Damain 0. Dama										
Domain 2: Repres	Motria 2	Coographic Scope	Modium	$\vee 1$	9	Isson				
	Metric 2.	Applicability	High	$^{\wedge 1}$	2	Japan Use is within scope of BF				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2000				
	Metric 5:	Sample Size	Medium	$\times 1$	2	33 samples. Mean and max values reported, but distribution				
						not fully characterized				
Domain 3: Access	ibility/Clar	i+								
Domain 5. Access	Metric 6	Metadata Completeness	Low	× 1	3	Study is for PBZ sampling, but no other metadata provided				
			20.0	·· ±	5	2.2.2 - Ior I 22 camping, say no other moundate provided				
Domain 4: Variab	oility and U	ncertainty								
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Source Citation:	Kawai, T., occupation	Kawai, T., Takeuchi, A., Miyama, Y., Sakamto, K., Zhang, Z. W., Higashikawa, K., Ikeda, M. 2001. Biological monitoring of occupational exposure to 1-bromopropane by means of urinalysis for 1-bromopropane and bromide ion. Biomarkers.							
Type of Data Source	Occupation	Occupational Exposure: Monitoring Data:							
Hero ID	1733873	<b>x</b> , <b>C</b>							
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Discuss variability between different worker activity			
Overall Quality Determination <sup>†</sup>					1.8				

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

Source Citation:EisenType of Data SourceOccupHero ID17378	erg, J.,Ramsey, J 2010. Evaluatio ational Exposure; Monitoring Data; 91	n of 1-Bron	nopropan	e Use ir	n Four New Jersey Commercial Dry Cleaning Facilities.					
EXTRACTION		Dete								
Parameter		Data								
Life Cycle Stage:		Use								
Life Cycle Description (S	ubcategory of Use):	Dryclean	ing							
Physical Form:		Liquid								
Route of Exposure:		Inhalatio	n							
Exposure Concentration	(Unit):	17-40 pp	m							
Number of Samples:		7								
Number of Sites:		4								
Type of Measurement or	Method:	Full shift	TWA							
Worker Activity:		Operator	; cashier							
Number of Workers:	Number of Workers:									
Type of Sampling:	Type of Sampling:			Personal						
Sampling Location:	Sampling Location:									
DDF.	Exposure Duration:									
rrE. Applytic Mothody	PPE: Applytia Mathadi			195						
Analytic Method.		NIOSIIII	nethod 10	525						
EVALUATION										
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments					
Domain 1: Reliability										
Metri	1: Methodology	High	$\times 1$	1	Methodology of experimental data well described					
Domain 2: Representativ		TT: 1								
Metri	2: Geographic Scope	High	× 1	1	US study					
Metri	4. Terran anal Dermagantativen age	High	× Z	2	Use is within scope of RE					
Metri	4: Temporal Representativeness	пign Uigh	× 2 × 1	2 1	2010 7 second sector interaction of faile					
Metri	5: Sample Size	підп	X 1	1	7 samples. Individual data points allow characterization of full distribution					
Domain 3: Accessibility/	Clarity									
Metri	6: Metadata Completeness	High	$\times 1$	1	Provides metadata					
Domain 4. Wasiahili	d IIn containte									
Domain 4: Variability an	a Uncertainty									
	Cor	ntinued on	next page	Э						

Source Citation: Type of Data Source Hero ID	Eisenberg, Occupation 1737891	J.,Ramsey, J 2010. Evaluatio nal Exposure; Monitoring Data	n of 1-Brom	opropane	e Use in	Four New Jersey Commercial Dry Cleaning Facilities.
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Discuss variability between different worker activity
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation: Reh, C. 1 98-0153-2	M., Mortimer, V. D., Nemhauser, 883 Custom Products Inc. Moc	J. B., Trou	t, D 2	2002. N	NIOSH Health Hazard Evaluation Report: HETA No.					
Type of Data SourceOccupationHero ID1737898	Occupational Exposure; Monitoring Data; 1737898									
EXTRACTION										
Parameter		Data								
Life Cycle Stage		Use								
Life Cycle Description (Subc	ategory of Use):	Sprav Ad	hesive							
Physical Form:		Liquid								
Route of Exposure:		Inhalatio	n							
Exposure Concentration (Un	it):	60 - 381.2	2 ppm							
Number of Samples:	,	80								
Number of Sites:		1								
Type of Measurement or Me	thod:	Full shift	TWA							
Worker Activity:		Highest e	xposure	was in	the Covers dept, followed by Assembly dept					
				and Saw dept; adhesive contains 60-70 percent 1-BP						
Number of Workers:	70	70								
Type of Sampling:	Personal									
Sampling Location:	Sampling Location:									
Exposure Duration:	Exposure Duration:									
Engineering Control & perce	nt Exposure Reduction:	spray booth								
EVALUATION										
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments					
Domain 1: Reliability										
Metric 1:	Methodology	High	$\times 1$	1	Methodology of experimental data well described					
Domain 2: Representative										
Metric 2:	Geographic Scope	High	$\times 1$	1	US study					
Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE					
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002					
Metric 5:	Sample Size	High	$\times 1$	1	80 samples. Distribution fully characterized					
Domain 3: Accessibility/Cla	rity									
Metric 6:	Metadata Completeness	High	$\times 1$	1	Provides metadata					
	Cor	ntinued on r	next page	9						

- continued from previous page									
Source Citation:	Reh, C. M 98-0153-28	Reh, C. M.,Mortimer, V. D.,Nemhauser, J. B.,Trout, D 2002. NIOSH Health Hazard Evaluation Report: HETA No. 98-0153-2883, Custom Products, Inc. Mooresville, NC.							
Type of Data Source	Occupation	Occupational Exposure; Monitoring Data;							
Hero ID	1737898	1737898							
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	Discuss variability between different worker activity			
		X				v v			
Overall Quality I	Determination	$\mathbf{n}^{\dagger}$	High		1.3				

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

Source Citation:OrType of Data SourceOrHero ID23	sha,. 201 ccupatio 347177	3. OSHA/NIOSH hazard alert: nal Exposure; Monitoring Data;	1-bromopro	opane.		
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity:			Use Various Liquid Inhalation 0.08 - 254 ppm (range only) 122 6 Full shift TWA Ref. multiple other studies			
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability M	y letric 1:	Methodology	Low	× 1	3	Cites other sources for exposure data; methodology unknown
Domain 2: Represent M M M M	tative letric 2: letric 3: letric 4: letric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 4\\ 2\end{array}$	US study Use is within scope of RE Age of data ranging from 2003 - 2010 122 samples, only range of values are reported
Domain 3: Accessibil M	lity/Clar letric 6:	ity Metadata Completeness	Low	$\times 1$	3	Full-shift monitoring data, other metadata not provided
Domain 4: Variabilit	y and Uı letric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	Discuss variability between different worker activity
Overall Quality Dete	erminatio	$\mathbf{n}^{\dagger}$	Medium		1.9	

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

Source Citation:	Hsia, 2010. Petition to add n-propyl bromide to list of hazardous air pollutants regulate under section 112 of the Clean Air Act [with cover letter date $10/28/2010$ ].									
Type of Data Source Hero ID	Occupatio 3045668	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3045668								
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descri	ption (Subca	ategory of Use):	Various							
Physical Form:			Liquid							
Route of Exposur	e:		Inhalation	1						
Exposure Concen	tration (Uni	it):	up to 150	ppm (no	actual	data points, but has description of data ranges				
			for variou	s uses in	cl. hand	1 wiping, aerosol solvents, etc – see p.23/31)				
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Beliah	ility									
	Metric 1:	Methodology	Low	$\times 1$	3	Cites other sources for exposure data; methodology unknown				
Domain 2: Benre	sentative									
Domain 2. Ropio	Metric 2:	Geographic Scope	High	$\times 1$	1	US study				
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Report is dated 2010, but actual age of monitoring data is unclear - appears to be between 10-20 years $$				
	Metric 5:	Sample Size	Medium	$\times 1$	2	Contains a range of statistics without actual data points.				
Domain 2. Acces	a:la:ll:tax/Class	:								
Domain 5: Access	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Data sources are cited and generally described, but not fully				
	Metric 0.	Metadata Completeness	Medium	~ 1	2	transparent				
Domain 4. Variat	vility and U	ncortainty								
Domain 4. Variat	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability				
				·· •	-					
Overall Quality I	Determinatio	$\mathrm{on}^\dagger$	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.</li>

Source Citation:Osha, 200Type of Data SourceOccupationHero ID3978174	17. Hazard alert: 1-Bromopropa nal Exposure; Reports for Data	ne. or Informat	tion Othe	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): Engineering Control & percent Exposure Reduction: PPE:		Use Various Liquid Inhalation Cites various Hanley, NIOSH, and Blando studies and references a range of exposure concentration in those studies Discusses various controls such as isolation, ventilation, etc. Indicates that polyvinyl alcohol or multiple-layer laminates glove should be used				
<b>EVALUATION</b> Domain	Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	Low	× 1	3	Cites other sources for exposure data; methodology unknown	
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 4\\ 2\end{array}$	US study Use is within scope of RE Age of data ranging from 2003 - 2010 122 samples, only range of values are reported	
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness		Low	$\times 1$	3	Full-shift monitoring data, other metadata not provided	
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Medium	$\times 1$	2	Discuss variability between different worker activity	
Overall Quality Determination	on <sup>†</sup>	Medium		1.9		

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

Source Citation:	Harney, J. M., Hess, J., Reh, C. M., Trout, D.: 2002. Health hazard evaluation report no. HETA 2000-0410-2891, STN Cusion company, Thomasville, North Carolina.									
Type of Data Source Hero ID	Occupation 3970574	nal Exposure; Monitoring Data;								
EXTRACTION										
Parameter			Data							
Life Cycle Stare:			Use							
Life Cycle Descrir	tion (Subca	tegory of Use).	Spray Ad	hesive						
Physical Form:	non (Subca	tegory of ese).	Liquid	litebive						
Route of Exposure	9:		Inhalatio	n						
Exposure Concent	ration (Uni	t):	1st visit:	41.3 - 143	ppm fc	or sprayers2nd visit: 7.7 - 34.9 ppm for sprayer-				
•	× ×	,	sAdditior	nal data fo	or other	workers				
Number of Sample	es:		32							
Number of Sites:			1							
Type of Measuren	nent or Met	hod:	Full shift	TWA						
Worker Activity:			HHE des	cribes wo	rker ac	tivities at STN Cushion Company. Cushion				
			is assemb	is assembled by gluing together and hand pressing pieces of cut flexi-						
			ble foam.	ble foam. Adhesive is spray-applied using a compressed air spray gun.						
			Adhesive is Whisper Spray (Imperial Adhesives, Cincinnati, OH) which							
Number of Works			contains 55 percent 1-BP by weight.							
Type of Sampling			64 (52 pa Full shift	TWA	i ili sui	vey)				
Sampling Location	1.		Sprav sta	tions and	other	locations				
Exposure Duratio	n:		Full shift							
Engineering Contr	ol & percen	t Exposure Reduction:	Enclosure of spray tables							
Analytic Method:		I man i i man i	NIOSH draft method for 1-BP							
Ŭ										
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1, Paliah	:1:+									
Domain 1. Kenab	Motrie 1.	Mathadalagy	High	$\vee$ 1	1	NIOCII				
	Metho 1.	Methodology	IIIgii	~ 1	1	NIOSH publication				
Domain 2: Repres	entative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US study				
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	HHE conducted in 2000				
		Con	tinued on i	next page						
				1 0						

Source Citation:	Harney, J. company,	Harney, J. M., Hess, J., Reh, C. M., Trout, D.: 2002. Health hazard evaluation report no. HETA 2000-0410-2891, STN Cusion company, Thomasville, North Carolina.							
Type of Data Source Hero ID	Occupation 3970574	Occupational Exposure; Monitoring Data; 3970574							
EVALUATION									
Domain		Metric	Rating	$\mathbf{MWF}^{\star}$	Score	Comments			
	Metric 5:	Sample Size	High	$\times 1$	1	32 samples. Distribution fully characterized			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Provides metadata			
Domain 4: Variab	oility and Uı Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Discuss variability between different worker activity			
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	High		1.3				

\* MWF = Metric Weighting Factor

<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation:	Eisenberg, J., Ramsey, J 2010. Health hazard evaluation report no. HETA 2008-0175-3111, Evaluation of 1-Bromopropane									
Type of Data Source Hero ID	Occupation 3970603	nal Exposure; Monitoring Data;	annig fachi	<i>ties</i> .						
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrit	otion (Subca	ategory of Use):	Drvclean	ing						
Physical Form:	(		Liquid	0						
Route of Exposur	e:		Inhalatio	n						
Exposure Concent	tration (Uni	t):	17 - 40 p	pm (full s	shift TV	WA); short-term data also available				
Number of Sampl	es:	,	7							
Number of Sites:			4							
Type of Measurer	ment or Met	hod:	Full shift	TWA						
Worker Activity:			See study	v for desc	ription	of machine type and worker activities at each				
			of 4 facili	ties visite	ed					
Number of Worke	rs:		7	7						
Type of Sampling	:		Full shift TWA							
Sampling Location	n:		Breathing zone of operators and cashiers							
Exposure Duratio	n:		Full shift							
Engineering Cont	rol & percer	nt Exposure Reduction:	None							
PPE:			None used							
Analytic Method:			NIOSH method 1025							
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
	•1•,									
Domain 1: Reliab	Ility Motrie 1.	Mathadalagy	Uich	× 1	1	NIOCH and Protein				
	Metric 1:	Methodology	підп	X 1	1	NIOSH publication				
Domain 2: Repres	sentative									
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US study				
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	HHE conducted in 2008				
	Metric 5:	Sample Size	High $\times 1$ 1 7 samples. Individual data points allow characterization of full distribution							
Domain 3: Access	sibility/Clar	ity								
		Con	tinued on a	next page	9					

Source Citation: Type of Data Source Hero ID	Eisenberg, use in four Occupation 3970603	J.,Ramsey, J 2010. Health h New Jersey commercial dry cl nal Exposure; Monitoring Data	nazard evalua leaning facili a;	ation repo ties.	ort no.	HETA 2008-0175-3111, Evaluation of 1-Bromopropane
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
	Metric 6:	Metadata Completeness	High	× 1	1	Provides metadata
Domain 4: Variab	oility and Uı Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	Discuss variability between different worker activity
Overall Quality I	Determinatio	$\mathrm{n}^\dagger$	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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation:	Hanley, K 1-bromopr	. W.,Petersen, M.,Curwin, B. D ropane from workers exposed to	.,Sanderson flexible foar	n, W. T m spray a	2006. adhesive	Urinary bromide and breathing zone concentrations of es, Part3. Annals of Occupational Hygiene.
Type of Data Source Hero ID	Occupatio 3974876	nal Exposure; Monitoring Data;		1 0		
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descrip	ption (Subca	ategory of Use):	Sprav Ad	hesive		
Physical Form:			Liquid			
Route of Exposur	e:		Inhalatio	n		
Exposure Concen	tration (Uni	it):	sprayers: mean)(on	92 ppm ly ranges	n (geom and G	netric mean)other jobs: 11 ppm (geometric M provided)
Number of Sampl	les:		30			
Number of Sites:			2			
Type of Measurer	ment or Met	hod:	Full shift	TWA		
Worker Activity:			Sprayers	construct	ed poly	ure than foam furniture cushions using spray
			adhesives	. Non-spi	rayers in	ncluded glue lilne leads, sewing machine oper-
			ators, wra	appers, p	illow st	uffers, and foam and cloth cutters. Exposure
Number of Work			$\frac{20}{12}$ among no	n-spraye	rs occur 7 non ar	rred as a result of overspray and solvent drift.
Type of Sampling	ers.		50 (15 sp. Full shift	TWA	non-sp	nayers)
Sampling Locatio	5. m.		Breathing	T WA		
Exposure Duratic	n.		Full shift	5 20110		
Analytic Method:	:		NIOSH n	nethod 10	25	
					-	
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1. Roliah	,ili+.					
Domain 1. Renat	Metric 1:	Methodology	High	$\times 1$	1	Methodology of experimental data well described
	, , <b>.</b>					
Domain 2: Repres	Motrie 2	Coorrenhie Seene	Uich	× 1	1	
	Metric 2:	Applicability	High	$\times 1$ $\times 2$	1	US study
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	2 4	2005 data
	Metric 5:	Sample Size	Medium	$\times 1$	2	30 samples. Range and mean are reported, but distribution
						not fully characterized
		Cor	ntinued on r	next page	:	

					10	
Source Citation:	Hanley, K. 1-bromopr	W.,Petersen, M.,Curwin, B. opane from workers exposed t	D.,Sanderson o flexible foar	, W. T n sprav a	2006. adhesive	Urinary bromide and breathing zone concentrations of s, Part3. Annals of Occupational Hygiene.
Type of Data Source Hero ID	Occupation 3974876	nal Exposure; Monitoring Dat	a;	1 0		
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Full-shift TWA data with some worker activity info, but not all metadata are provided
Domain 4: Varial	oility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	Discuss variability between different worker activity
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	High		1.6	

\* MWF = Metric Weighting Factor

<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation:	OSHA. 2013. 1-Bromopropane Manufacturing Site Visit Report " Company A. Draft " Final. Prepared by Project Enhance-
	ment Corporation.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5018532

#### EXTRACTION Parameter

Parameter	Data
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	ND - 2.61 ppm
Number of Samples:	18
Number of Sites:	1
Type of Measurement or Method:	PBZ short-term and TWA
Worker Activity:	Product loading, sampling
Number of Workers:	3
Type of Sampling:	Personal
Sampling Location:	Breathing zone
Exposure Duration:	Short-term and Full shift
Exposure Frequency:	Approx. once per shift during product loading and/or sampling
Engineering Control & percent Exposure Reduction:	Richter and Dopak samplers; smart hose for truck loading; laboratory fume hood or nitrogen purge dry box
PPE:	Respirator worn during product loading
Analytic Method:	PV2061

## EVALUATION

Domain	Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	Sampling method is approved by OSHA
Domain 2: Representative Metric 2:	Geographic Scope	High	$\times 1$	1	US facility
Metric 3:	Applicability	High	$\times 2$	2	Mfg is within scope of RE
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013 data
Metric 5:	Sample Size	High	$\times 1$	1	Limited number of samples, but all individual data points are provided to allow characterization of distribution

Continued on next page

Source Citation:	OSHA. 20 ment Corp	13. 1-Bromopropane Manufact poration.	uring Site	Visit Rep	oort " C	ompany A. Draft "Final. Prepared by Project Enhance-
Type of Data Source	Occupation	nal Exposure; Monitoring Data	a;			
Hero ID	5018532					
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Monitoring data includes metadata such as sample type, dura- tion. etc.
Domain 4: Variał	bility and Un Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	High		1.2	

\* MWF = Metric Weighting Factor

<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation: O Type of Data Source O Here ID	SHA. 201 Occupation	13. 1-Bromopropane, Inspection nal Exposure; Monitoring Data;	/Case File	Summary	у.	
	010000					
EXTRACTION			Data			
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descriptio	on (Subca	tegory of Use):	Vapor De	greasing.	Spot C	Cleaning, Spray Adhesive, Cold Cleaning
Physical Form:	(		Liquid	0 0,	- I · · · ·	6) - <b>T</b> - <b>J</b>
Route of Exposure:			Inhalatio	n		
Exposure Concentrat	tion (Uni	t):	Varies, de	epends or	inspec	ted facility
Number of Samples:	,	,	Multiple			·
Number of Sites:			19			
Type of Measuremen	nt or Met	hod:	Full shift	TWA		
Worker Activity:			Varies for	each ins	pected	facility
Number of Workers:			Multiple			
Type of Sampling:			Personal	and area		
Sampling Location:			Breathing	g zone; fa	cility a	rea
Exposure Duration:			Full shift			
Exposure Frequency:	:		Varies			
Engineering Control	& percen	t Exposure Reduction:	Varies			
PPE:			Varies			
Analytic Method:			Not know	'n		
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1. Beliabilit	V					
M	y fetric 1·	Methodology	High	× 1	1	OSHA document
		income dellegy	8		-	
Domain 2: Represent	tative					
M	fetric 2:	Geographic Scope	High	$\times 1$	1	US facilities
Μ	fetric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE
Μ	fetric 4:	Temporal Representativeness	Medium	$\times 2$	4	Inspection date ranges from 1998 - 2011
M	letric 5:	Sample Size	High	$\times 1$	1	Individual data points are provided, which allow characterization of distribution
Domain 3: Accessibi	lity/Clari	ty				
		Cor	tinued on r	next page	<u>,</u>	

Source Citation: Type of Data Source Hero ID	OSHA. 202 Occupation 5018566	13. 1-Bromopropane, Inspectional Exposure; Monitoring Dat	on/Case File a;	Summary	7.	
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty
Overall Quality D	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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation:	U.S. EPA. adhesive, a	2006. Significant new alternati	ves policy ning applica	(SNAP) - ations. Pi	· Risk s coposed	creen on substitutes for ozone depleting substances for substitute: n-Propyl bromide.
Type of Data Source Hero ID	Occupation 2991016	nal Exposure; Monitoring Data;	0 11		1	
EXTRACTION						
Parameter			Data			
			TT			
Life Cycle Stage:	tion (Collins		Use Ven en De			
Dire Cycle Descrip	brion (Subca	ategory of Use):	Vapor De	greasing,	Aeroso	n Degreasing
Physical Form: Route of Exposur	<b>.</b> .		Inhalatio	n		
Exposure Concept	e. tration (Uni	+).	Variation	u oponda or	COURCO	of data
Number of Sampl			Multiple	epends of	i source	of data
Number of Sites:			Multiple			
Type of Measuren	nent or Met	hod:	TWA and	l short-te	erm	
Worker Activity:			Varies for	each fac	ility; so	metimes not specified
Number of Worke	rs:		Multiple		0 /	1
Type of Sampling	:		Personal	and area		
Sampling Location	n:		Breathing	g zone; fa	cility ar	rea
Exposure Duratio	n:		Full shift		-	
Exposure Frequen	icy:		Varies			
Engineering Contr	rol & percer	nt Exposure Reduction:	Varies			
PPE:			Varies			
Analytic Method:			Not know	'n		
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Beliah	ility					
	Metric 1:	Methodology	Low	$\times 1$	3	Sampling and analytical method used by individual company not specified
Domain 2. Ropros	ontotivo					
Domain 2. Repres	Metric $2$ ·	Geographic Scope	High	× 1	1	US facilities
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of BE
	Metric 4:	Temporal Representativeness	Low	$\times 2$	- 6	Date of data appears to vary, many are prior to 2003, some
		F			Ū.	aerosol degreasing data are from 1998
	Metric 5:	Sample Size	High	× 1	1	Individual data points are provided, which allow characterization of distribution
		Con	tinued on i	next page	<u> </u>	

Source Citation:	U.S. EPA. adhesive, a	2006. Significant new alternative solution of the second solution of the solut	atives policy ( eaning applica	(SNAP) - tions. Pi	Risk so oposed	creen on substitutes for ozone depleting substances for substitute: n-Propyl bromide.
Type of Data Source	Occupation	nal Exposure; Monitoring Dat	ta;			
Hero ID	2991016	<b>x</b> , <b>C</b>				
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 3: Access	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	Medium	× 1	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type
Domain 4: Variab	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Medium		2.0	

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

Parameter		Data					
Life Cycle Stage:		Use					
Life Cycle Description (Subc	ategory of Use):	Vapor De	greasing				
Physical Form:		Liquid Inhalation					
Route of Exposure:							
Exposure Concentration (Un	it):	0.01 - 0.6	3 ppm				
Number of Samples:	,	27					
Number of Sites:		1					
Type of Measurement or Met	hod:	Full shift	TWA				
Worker Activity:		Placing p	arts in me	etal wir	e basket, lower basket into degreasing solution,		
		raising ba	sket and	allow i	t to dry		
Number of Workers:		75 - 85					
Type of Sampling:		Personal	and area				
Sampling Location:		Breathing	g zone; fa	cility aı	rea		
Exposure Duration:		Full shift					
Exposure Frequency:		Varies					
Engineering Control & nerge		D					
Engineering Control & perces	nt Exposure Reduction:	Room end	closure, L	EV.			
PPE:	nt Exposure Reduction:	Room end Nitrile glo	closure, L oves and	.EV splash-j	proof goggles		
PPE: Analytic Method:	nt Exposure Reduction:	Room end Nitrile glo NIOSH d	closure, L oves and raft meth	ιΕV splash-μ lod for	proof goggles 1-BP		
PPE: Analytic Method: EVALUATION	nt Exposure Reduction:	Room end Nitrile gld NIOSH d	closure, L oves and raft meth	EV splash-j lod for	proof goggles 1-BP		
Evaluation Domain	Metric	Room end Nitrile gld NIOSH d Rating	closure, L oves and raft meth MWF*	,EV splash-j nod for Score	proof goggles 1-BP Comments		
Evaluation 2 perce. PPE: Analytic Method: EVALUATION Domain Domain 1: Beliability	Metric	Room end Nitrile gld NIOSH d Rating	closure, L oves and raft meth MWF*	EV splash- <sub>I</sub> nod for Score	proof goggles 1-BP Comments		
Evaluation 2 perce. PPE: Analytic Method: EVALUATION Domain Domain 1: Reliability Metric 1:	Metric Methodology	Room end Nitrile gld NIOSH d Rating High	closure, L oves and raft meth MWF* × 1	EV splash- <sub>I</sub> nod for Score	proof goggles 1-BP Comments NIOSH publication		
Evaluation a perce. PPE: Analytic Method: EVALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative	Metric Methodology	Room end Nitrile gld NIOSH d Rating High	closure, L oves and raft meth MWF* × 1	EV splash-p od for Score 1	proof goggles 1-BP Comments NIOSH publication		
Engineering Control & perce. PPE: Analytic Method: EVALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2:	Metric Methodology Geographic Scope	Room end Nitrile gld NIOSH d Rating High	x 1	EV splash-p nod for Score <u>1</u>	proof goggles 1-BP Comments NIOSH publication		
Engineering Control & perce. PPE: Analytic Method: EVALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3:	Metric Methodology Geographic Scope Applicability	Room end Nitrile gld NIOSH d Rating High High	x 1 × 2	EV splash-p nod for Score 1 1 2	Proof goggles 1-BP Comments NIOSH publication US facilities Use is within scope of RE		
Evaluation 2 perce. PPE: Analytic Method: EVALUATION Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4:	Metric Methodology Geographic Scope Applicability Temporal Representativeness	Room end Nitrile gld NIOSH d Rating High High High Medium	closure, I powes and raft meth $\underline{MWF^{\star}}$ $\times 1$ $\times 1$ $\times 2$ $\times 2$	EV splash-p nod for Score 1 1 2 4	Proof goggles 1-BP Comments NIOSH publication US facilities Use is within scope of RE 2000 data		
Evaluation & perce. PPE: Analytic Method: EVALUATION Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Metric Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	Room end Nitrile gld NIOSH d Rating High High High Medium High	closure, I powes and raft meth $\underbrace{MWF^{\star}}_{\times 1}$ $\times 1$ $\times 2$ $\times 2$ $\times 2$ $\times 1$	EV splash-p nod for Score 1 1 2 4 1	Proof goggles 1-BP Comments NIOSH publication US facilities Use is within scope of RE 2000 data Individual data points are provided, which allow characteriza- tion of distribution		
Engineering Control & perce. PPE: Analytic Method: EVALUATION Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar	Metric Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	Room end Nitrile gld NIOSH d Rating High High High Medium High	x 1 × 1 × 2 × 1 × 2 × 1	EV splash-p nod for Score 1 1 2 4 1	Proof goggles 1-BP Comments NIOSH publication US facilities Use is within scope of RE 2000 data Individual data points are provided, which allow characteriza- tion of distribution		

Source Citation: Type of Data Source Hero ID	NIOSH. 2001. Evaluation of Solvent Exposures from the Degreaser. Trilthic Inc., IN. Occupational Exposure; Monitoring Data; 3044962							
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Low $\times 1$ 3 Does not address variability/uncertainty						Does not address variability/uncertainty		
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.6				

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

Source Citation:OSHA. 20Type of Data SourceOccupatioHero ID5018565	18. OSHA CEHD Monitoring D nal Exposure; Monitoring Data;	ata provide	ed by Ste	phen Sc	hayer to Greg Macek on $6/21/2018$ .					
EXTRACTION Parameter		Data								
Life Cycle Stage:	Life Cycle Stage:			Ilso						
Life Cycle Description (Subc	ategory of Use).	Vapor De	oreasing							
Physical Form:	ategory of obc).	Liquid	,greasing							
Route of Exposure:		Inhalatio	n							
Exposure Concentration (Un	it):	Scored at	project	level?						
Number of Samples:		50	FJ							
Number of Sites:		15								
Type of Measurement or Met	hod:	TWA								
Worker Activity:		Not descr	ribed; sor	ne job t	itles include "parts washer/vapor degreaser"					
Type of Sampling:		Personal	/	5	1 / 1 0					
Sampling Location:		Breathing	g zone							
Exposure Duration:		TWA and	l short-te	erm						
-										
EVALUATION										
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments					
Domain I: Reliability		TT: 1	1	-						
Metric 1:	Methodology	High	× 1	1	OSHA samples					
Domain 2: Representative										
Metric 2:	Geographic Scope	High	× 1	1	US facilities					
Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of BE based on job title description					
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013 - 2016 data					
Metric 5:	Sample Size	High	$\times 1$	1	Individual data points are provided, which allow characteriza- tion of distribution					
Domain 3: Accessibility/Clar	Ity Mata data Cara data	Mall		0						
Metric 6:	Metadata Completeness	Medium	× 1	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type					
Domain 4: Variability and U	ncortointy									
Metric 7.	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty					
	metadata compreteness	LOW	// 1	5	2000 nov andress variability/ differ tallity					
	~									
	Cor	ntinued on r	next page	Э						

		sintinucu nom pr	errous page				
Source Citation: Type of Data Source Hero ID	OSHA. 2018. OSHA CEHD Monitoring Data provided by Stephen Schayer to Greg Macek on 6/21/2018. Occupational Exposure; Monitoring Data; 5018565						
<b>EVALUATION</b> Domain	Metric	Rating	MWF* Score	Comments			
Overall Quality I	$\operatorname{Determination}^\dagger$	High	1.3				

\* MWF = Metric Weighting Factor

<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation:	Blando, J. D., Schill, D. P., De La Cruz, M. P., Zhang, L., Zhang, J. 2010. Preliminary study of propyl bromide exposure among New Jersey dry cleaners as a result of a pending ban on perchloroethylene. Journal of the Air and Waste Management Association.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1619253

## EXTRACTION Parameter

Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Drycleaning
Physical Form:	Liquid
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	ND - 54.55 ppm
Number of Samples:	26
Number of Sites:	4
Type of Measurement or Method:	8-hr TWA
Worker Activity:	Operator, clerk, seamstress
Number of Workers:	2/shop
Type of Sampling:	Personal and Area
Sampling Location:	Breathing Zone; shop areas
Exposure Duration:	Full shift
Exposure Frequency:	Varies
Engineering Control & percent Exposure Reduction:	None
PPE:	None
Analytic Method:	NIOSH 1025
EVALUATION	

Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	NIOSH publication
Domain 2: Representative Metric 2:	Geographic Scope	High	$\times 1$	1	US facilities
Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010 study; data may have been collected in 2008
Metric 5:	Sample Size	High	$\times 1$	1	Limited number of samples, but individual data points allow characterization of distribution

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Source Citation:	Blando, J. 1 among New Association.	Blando, J. D., Schill, D. P., De La Cruz, M. P., Zhang, L., Zhang, J 2010. Preliminary study of propyl bromide exposure among New Jersey dry cleaners as a result of a pending ban on perchloroethylene. Journal of the Air and Waste Management Association.							
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 1619253								
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 3: Access	sibility/Clarit Metric 6:	y Metadata Completeness	Medium	$\times 1$	2	Monitoring data includes only critical metadata, e.g. sample type and exposure type			
Domain 4: Variab	bility and Unc Metric 7:	ertainty Metadata Completeness	High	$\times 1$	1	Discuss uncertainty in sampling and variability in the observed data			
Overall Quality E	Determination	t	High		1.1				

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

Source Citation:	Miller, B. 2019. Comment submitted by Bob Miller, Jr., Senior Director, Global Product Stewardship, Albemarle Corporation regarding 1-Bromopropane Docket ID: EPA-HO-OPPT-2019-0235-0029 Docket ID: EPA-HO-OPPT-2019-0235-0029									
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 5915210									
EXTRACTION			Data							
			Data							
Life Cycle Stage:			Use							
Life Cycle Description (Subcategory of Use):				egreasing						
Physical Form:			Liquid							
Route of Exposure	e:		Inhalatio	n						
Exposure Concent	ration (Uni	t):	ND $(0.2)$	ppm or 0.	3  ppm					
Number of Sample	es:		167							
Number of Sites:			1							
Type of Measurem	nent or Met	hod:	TWA							
worker Activity:			Degrease	r machine	operat	for; other employees who perform on work sta-				
Number of Worker				atea 10 - 0	oo it aw	vay from the mid-point of two degreasers				
Type of Sampling			09 Demonal							
Sampling Location	•		Broathing zono							
Exposure Duration	n.		Full shift	5 20110						
Exposure Frequen	cv:		Varies							
Engineering Contr	ol & percen	t Exposure Reduction:	Ventilatio	on (AC un	its) wit	h superior air exchange rate of 7.7 air exchange				
0 0	I I I	r	per hour							
PPE:			None							
Analytic Method:			NIOSH 1025							
-										
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliabi	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Analytical method is a NIOSH method				
Domain 2: Repres	entative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US facility				
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Monitoring data collected in 2018				
	Metric 5:	Sample Size	High	× 1	1	Individual data points are provided, which allow characteriza- tion of distribution				
		Cor	tinued on	next page						

continued from previous page										
Source Citation:	Miller, B regarding	Miller, B.: 2019. Comment submitted by Bob Miller, Jr., Senior Director, Global Product Stewardship, Albemarle Corporation regarding 1-Bromopropane. Docket ID: EPA-HQ-OPPT-2019-0235-0029. Docket ID: EPA-HQ-OPPT-2019-0235-0029.								
Type of Data Source	Occupational Exposure; Monitoring Data;									
Hero ID	5915210	5915210								
EVALUATION										
Domain		Metric	Rating	$MWF^*$	Score	Comments				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Monitoring data include associated metadata, such as sample types, sample duration, and work activitiy				
Domain 4: Variak	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Study provides limited discussion of variability and uncertainty in the exposure estimates				
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	High		1.1					

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

Source Citation:	Enviro Tech International. 2020. Comment submitted by Richard G. Morford, General Counsel on behalf of Enviro Tech International Inc. RE: Formulation Facility Exposure Testing Report November 2019, Docket EPA-HQ-OPPT-2016-0741.								
Hero ID	6465296	nomitoring Data	,						
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Processing	g					
Life Cycle Descri	otion (Subcategory of Use):		Formulati	on of vai	ious 1-1	BP based products			
Physical Form:			Liquid						
Route of Exposur	e:		Inhalatior	1					
Exposure Concen	tration (Unit):		ND - 7.2 j	ppm					
Number of Samp	es:		11 person	al, 15 are	$\mathbf{e}\mathbf{a}$				
Number of Sites:			1						
Type of Measurer	nent or Method:		8-hr TWA	1					
Worker Activity:			Mixing ro	om oper	ator un	loads a tanker of neat 1-BP into the system,			
			adds othe	er necess	ary con	nmpounds and decants finished product into			
			packaging	. Other e	employe	es work in other areas of the facility (see report			
			for more o	details).					
Number of Worke	ers:		11						
Type of Sampling	:		Personal a	and Area					
Sampling Locatio	n:		Breathing	; Zone; o	ther fac	ulity areas			
Exposure Duratio	on:		Full shift						
Exposure Freque	ncy:	1	Varies						
Engineering Cont	rol & percent Exposure Re	duction:	Facility ventilation /exhaust fans (10 air exchange/hr in Area A)						
PPE:			Viton or nitrile gloves, 3M Rugged Comfort Quick Latch Half Facepiece						
			Reusable	Respirat	or Mod	$\begin{array}{c} \text{el } 6503 \text{ (APF } 10) \\ \text{NICCH } 1011 \text{ OCHA} \end{array}$			
Analytic Method			ACS SOP	11-62 Da	ised on	NIOSH 1011, OSHA			
EVALUATION									
Domain	М	etric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	oility								
	Metric 1: Methodology		Medium	× 1	2	Anallytical method ACS SOP II-62 based on NIOSH 1011, OSHA PV-2061 with diffuse sampler. Monitoring badges meet OSHA requirements and analysis conducted in ACGIH- accredited laboratory			
Domain 2: Repre	sentative								
		Co	ntinued on r	ext nage	•				
		0	minucu on i	icht page	·				

Source Citation:	Enviro Tech International. 2020. Comment submitted by Richard G. Morford, General Counsel on behalf of Enviro Tech International Inc. RE: Formulation Facility Exposure Testing Report November 2019, Docket EPA-HQ-OPPT-2016-0741.								
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 6465296								
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
	Metric 2:	Geographic Scope	High	× 1	1	US facility			
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope of RE			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Monitoring data collected in 2019			
	Metric 5:	Sample Size	High	$\times 1$	1	Individual data points are provided, which allow characterization of distribution			
Domain 3: Access	sibility/Clar	ity							
2011011 01 110005	Metric 6:	Metadata Completeness	High	$\times 1$	1	Monitoring data include associated metadata, such as sample types, sample duration, and work activitiy			
D : 4 W : 1									
Domain 4: Variat	Matrie 7	Matadata Completeness	Madium	v 1	0				
	Metric 7:	Metadata Completeness	Medium	× 1	2	Study provides limited discussion of variability and uncertainty in the exposure estimates			
Overall Quality Determination <sup><math>\dagger</math></sup>		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.</li>

# Facility

Source Citation:IType of Data SourceIHero ID3	Niosh,. 200 Facility; R 3355604	07. Workers' exposures to n-pro- eports for Data or Information (	pyl bromide Other than	e at a pri Exposure	nted ele e or Re	ectronics circuit assembly manufacturer. lease Data;		
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Vapor Degreasing Small capacity open-top vapor degreaser used on as-needed basis for sol- dering and potting activities to clean flexible and rigid parts of PCB. Degreaser contains a hand actuated spray wand and nozzle to supple- ment the vapor cleaning (Pioneer Circuits Inc. in santa Ana, CA)					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliabili	ty Metric 1:	Methodology	High	× 1	1	NIOSH HHE		
Domain 2: Represen	ntative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
r	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope		
r	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Study conducted $8/16-18$ , 2004		
I	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accessibility/Clarity								
I	Metric 6:	Metadata Completeness	High	$\times 1$	1	Data source, assessment method, results and assumptions are clearly described.		
Domain 4: Variability and Uncertainty								
I	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty		
Overall Quality Determination <sup>†</sup>			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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .

Source Citation:Niosh, 2007. Workers' exposures to n-propyl bromide at a hydraulic power control component manufacturer.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3355621								
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Chemical Concentration:			Use Vapor Degreasing 1 vapor degreaser shared by a dozen workers in Teflon and Refurbishing dept. and is used on as-needed basis. A medium capacity open-top vapor degreasing is located in a small ventilated room. An additional iquid solvent wash tank is located outside in a chemical shed. 94 percent					
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliability Metric	l: Methodology	High	$\times 1$	1	NIOSH HHE			
Domain 2. Roprosontativo								
Metric	2: Geographic Scope	High	$\times 1$	1	US			
Metric	3: Applicability	High	$\times 2$	2	Use is within scope			
Metric	4: Temporal Representativeness	Medium	$\times 2$	4	Study conducted in 2004			
Metric	5: Sample Size	N/A		N/A	No Comment.			
Metric	5: Metadata Completeness	High	$\times 1$	1	Data source, assessment method, results and assumptions are clearly described.			
Domain A: Variability and Uncertainty								
Metric	7: Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty			
Overall Quality Determination <sup>†</sup>				1.5				

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

Source Citation: Type of Data Source Hero ID	Atsdr., 2016. Draft toxicological profile for1-bromopropane. Facility; Completed Exposure or Risk Assessments; 3827325						
EXTRACTION							
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):			Manufacture Manufacture and Import Mfg via dehydration of propanol with bromine or hydrogen bromide 5,000 mt produced in US in 2006, growing 15-20 percent per yrImport - 10.9 and 10.3MM lb in 2007 and 2011, respectively (total brominated derivatives of acryclic hydrocarbons)				
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	ATSDR report	
Domain 2: Repres	sentative Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	$2017$ report, but data are from $2006\mathchar`-2007$	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness		Low	× 1	3	underlying data/sources not well described		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	× 1	3	Does not address variability/uncertainty		
Overall Quality Determination <sup><math>\dagger</math></sup>			Medium		1.8		

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

Source Citation: Type of Data Source Hero ID	Cdc,. 2016. Criteria for a recommended standard: Occupational exposure to 1-bromopropane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3827326							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Description (Subcategory of Use):			Vapor De	greasing,	Spray	Adhesive		
Number of Sites:		2,540 - 9,280 businesses (vapor degreaser - 500-2,500; foam mfg - 100-280)						
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Cites a 2007 EPA source		
		hiothodology	111811	<u> </u>	1			
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data from 2007		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accessibility/Clarity								
Domain 9. Meees	Metric 6:	Metadata Completeness	Low	$\times 1$	3	underlying data/sources not well described		
Domain 4: Variat	Motrie 7	Metadata Completeness	Low	× 1	9			
	metric 7:	Metadata Completeness	LOW	× 1	ა	Does not address variability/uncertainty		
Overall Quality Determination $^\dagger$		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:  $\geq 1$  to < 1.7; Medium:  $\geq 1.7$  to < 2.3; Low:  $\geq 2.3$  to  $\leq 3$ .
Source Citation: Type of Data Source Hero ID	2017. Pub Facility; R 3860484	Chem: 1-Bromopropane. eports for Data or Information (	Other than	Exposure	e or Rel	lease Data;	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Manufacture Manufacture and Import Mfg by treatment of hydroxyl compound with a bromide and sulfuric acid 2002: 1-10MM lb (IUR) 41 chemical vendors				
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Process description from Kirk-Othmer; PV from IUR	
Domain 2: Repres	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 4 N/A	US Mfg is within scope Data from 2006 No Comment.	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clearly cites the source of information	
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty	
Overall Quality Determination <sup>†</sup>		High		1.5			

Source Citation: 2014. Type of Data Source Facil Hero ID 38609	Source Citation:2014. Report on carcinogens: 1-Bromopropane.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3860561								
EXTRACTION	·								
Parameter		Data							
Life Cycle Stage:		Manufa	Manufacture						
Life Cycle Description (	Subcategory of Use):	Manufa	cture and	d Impor	t				
Process Description:		Describ	es possib	ole use a	s spot remover in textile industry				
Total Annual U.S. Volu	ne (and percent of PV):	2012 - 1	$15.3 \mathrm{MM}$	lb. 2013	3 - 9.2 MM lb import, $15.6$ MM lb export (CDR)				
Number of Sites:		$21 \mathrm{~mfg}$	world-wi	de, incl.	. at least 1 in US (SRI, $2012$ )				
Domain	Metric	Rating	MWF*	Score	Comments				
		8							
Domain 1: Reliability									
Metr	c 1: Methodology	High	$\times 1$	1	Info from CDR and SRI				
Domain 9. Donnagontati									
Metr	c 2: Geographic Scope	High	× 1	1	US				
Metr	c 3: Applicability	High	$\times 2$	2	Mfg is within scope				
Metr	c 4: Temporal Representativeness	High	$\times 2$	2	Data from 2012-2013				
Metr	c 5: Sample Size	N/A		N/A	No Comment.				
Domain 3: Accessibility	Clarity		-						
Metr	c 6: Metadata Completeness	High	× 1	1	Clearly cites the source of information				
Domain 4: Variability a	d Uncortainty								
Metr	c 7: Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty				
	<b>L</b>				07 0				
Overall Quality Determine	$nation^{\dagger}$	High		1.3					

Source Citation: Type of Data Source Hero ID	1999. Nomination of 1-bromopropane (1-BP) and 2-bromopropane (2-BP) for testing by the national toxicology program. Facility; Reports for Data or Information Other than Exposure or Release Data; 3860562								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufacture						
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufact	ure and l	Import				
Total Annual U.S. Volume (and percent of PV): Number of Sites:			1 mfg est 1	1 mfg est. an additional 2.5MM lb may be used/yr as cleaning agent 1					
EVALUATION									
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	OSHA publication			
Domain 2: Bepres	sentative								
Domain 2. Hopfo	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Mfg is within scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Underlying data/sources not well described			
Domain 4: Variab	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty			
Overall Quality D	eterminatio	n†	Medium		1.8				

Source Citation: Type of Data Source Hero ID	2013. Report on carcinogens: monograph of 1-bromopropane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3860563								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufacture						
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufa	cture and	d Impor	rt			
Process Description	on:		1-BP is	produce	d by re	acting n-propyl alcohol with hydrogen bromide			
	<b>V</b> -l	- 1	and the	n removi	(200c)	water that forms"			
Total Annual U.S	. volume (a	nd percent of PV):	Mig: 1-		) (2006). fa in 20	Import: $10.3MM$ Ib (2011) (CDR data) 12 (SPI 2012)			
Number of Sites:			At least	5 1 0.5 m	1g 111 20	12 (510, 2012)			
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Beliah	ility								
Domain 1. Tenab	Metric 1:	Methodology	High	$\times 1$	1	Info from CDR and SRI			
Domain 2: Repres	Motria 2:	Coorraphie Scope	High	$\vee$ 1	1	110			
	Metric 2.	Applicability	High	$\times 1$ $\times 2$	2	US Mfg is within scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	Data from 2012			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ibility/Clar	ity Mata lata Gammalatan an	TT:l.	v 1	1				
	Metric 6:	Metadata Completeness	High	× 1	1	Clearly cites the source of information			
Domain 4: Variab	ility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty			
Overall Quality D	eterminatio	$n^{\dagger}$	High		1.3				

Source Citation:	Echa, 2014. Draft results of the 6th prioritisation of the SVHCs on the Candidate List with the objective to recommend priority substances for inclusion in Annex XIV								
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3970684								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):			Manufacture Manufacture and Import Some volume used as an intermediate in mfg of chemicals. May also be used in some laboratory analyses. 1,000 ton/yr in EU.						
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments			
			Ttating		50010				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	ECHA document, but methodology not well described			
Domain 2: Repres	Sentative	Communitie Commu	M. J	v 1	0				
	Metric 2: Motric 3:	Applicability	High	$\times 1$ $\times 2$	2	EU Mfg and uses within seens			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Ver of data unknown			
	Metric 5:	Sample Size	N/A	~ 2	N/A	No Comment.			
		•.							
Domain 3: Access	Motrie 6	Ity Motodoto Completeness	Low	× 1	9				
	metric 0:	Metadata Completeness	LOW	× 1	3	Source of info unknown			
Domain 4: Variah	ility and U	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Low		2.3				

Source Citation:	Oehha, 2007. Occupational health hazard risk assessment project for California: Identification of chemicals of concern,								
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3982225								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufact	11170					
Life Cycle Descrit	otion (Subca	ategory of Use):	Manufact	ure and I	mport				
Total Annual U.S	. Volume (a	nd percent of PV):	1-10M lb	in 2004	1				
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1. Renad	Metric 1:	Methodology	High	$\times 1$	1	Data appear to come from IUR			
Domain 2: Repres	entative	~ · · · ·	*** 1						
	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Mfg is within scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data from 2004			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accoss	ibility/Clar	ity							
Domain 5. Access	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Only some metadata			
Domain 4: Variab	ility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6				

Source Citation: Type of Data Source Hero ID	Dhhs,. 201 Facility; R 3986431	Dhhs, 2017. Skin Notation (SK) Profile 1-Bromopropane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3986431							
EXTRACTION			Data						
Farameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descri	ption (Subca	tegory of Use):	Degreasir	ıg					
Chemical Concen	tration:		95.5 perc	ent (degr	easing s	solvent) (Sclar, 1999)			
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Kenat	Motric 1.	Mathadalagy	High	$\sim 1$	1	Concentration come from one checific site visit			
	Wittine 1.	Wiethodology	IIIgii	~ 1	1	Concentration came from one specific site visit			
Domain 2: Repre	sentative								
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Data from 1999			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Little to no metadata			
Domain 4: Variat	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability/uncertainty			
Overall Quality Determination <sup>†</sup>		Medium		1.8					

Source Citation:Cdph. 2017. 1-Bromopropane.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data; 3969295Hero ID3969295								
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Aerosol degreasing, other misc. uses Indicates potential use of 1-BP in coatings for pipes and other fixtures, and use of spray aerosols containing 1-BP to clean auto parts. Source also lists a number of products containing 1-BP					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Met	ric 1:	Methodology	Low	× 1	3	Source of data and methodology unclear		
Domain 2: Representa	tive							
Met	ric $2$ :	Geographic Scope	High	$\times 1$	1	US		
Met	ric 3:	Applicability	High	$\times 2$	2	Use is within scope		
Met Met	ric 4:	Temporal Representativeness	High N / A	$\times 2$	2 N/A	2016 publication		
Domain 3: Accessibilit	y/Clar ric 6:	ity Metadata Completeness	Low	× 1	3	Little to no metadata		
Domain 4: Variability Met	and U ric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty		
Overall Quality Determination <sup>†</sup>		Medium		1.8				

Source Citation: Type of Data Source Hero ID	U.S, E. P. Facility; R 3827322	A 2001. Guide to industrial as eports for Data or Information (	ssessments for than	for pollut Exposure	ion pre <sup>,</sup> e or Rel	vention and energy efficiency. lease Data;		
EXTRACTION			Data					
1 al allieter			Data					
Life Cycle Stage:			Use					
Life Cycle Descri	ption (Subca	tegory of Use):	Degreasin	ıg				
Process Description:			Source de vent wast	Source describes cold cleaning and vapor degreasing, generation of solvent waste stream, recycling of cleaning medium (see Section 5)				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	High	× 1	1	EPA document		
					-			
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001 publication		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Acces	sibility/Clar	ity						
Domain 5. Acces	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Little to no metadata		
Domain 4: Varia	bility and Ur	ncertainty	Ŧ	1	0			
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability/uncertainty		
Overall Quality I	Determinatio	$\mathrm{n}^\dagger$	Medium		1.8			

Source Citation:	The Massachusetts Toxics Use Reduction Institute, University of Massachusetts Lowell. 2006. Five chemicals alternatives assessment study.									
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3981053									
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:				Use Degreasing 1-BP is the most widely used alternative to PERC for vapor degreasing. 1-BP has lower surface tension thatn PERC which makes it favorable for cleaning complex geometric parts. nPB cost \$13/gal, 3 times as much as PERC.						
EVALUATION		Matrix	Dating		C	C				
Domain		Metric	Rating	M W F	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	TURA document				
Domain 9. Donno	rontotino									
Domain 2. Repres	Metric 2.	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2006 publication				
	Metric 5:	Sample Size	N/A	~ _	N/A	No Comment.				
Domain 3: Access	sibility/Clari	ity								
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information				
Damain 4. Varial	:1:4 J. T.T									
Domain 4: Variat	Metric 7.	Metadata Completeness	$N/\Delta$		N/A	$N/\Lambda$ qualitative information				
	WEULC 1.	Metadata Completeness	1 <b>1</b> /A		1 <b>1</b> /A	M/A - quantative information				
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.0						

Source Citation:	The Massachusetts Toxics Use Reduction Institute, University of Massachusetts Lowell. 2006. Five chemicals alternatives									
Type of Data Source Hero ID	Facility; Published Models for Exposures or Releases; 3981053									
EXTRACTION Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Dry cleaning Dry cleaning machine load capacity: 35-65 lb (avg: 50 lb) in CA, and 45-60 lb (avg: 53 lb) in MA. In most forms of dry cleanings, spotting agents are usually used before dry cleaning takes place. Source also indicates recycling of dry cleaning solvent via a distillation unit.							
EVALUATION		Mateir	Deting	M33712*	C	Community.				
Domain		Metric	Rating	IVI VV F	Score	Comments				
Domain 1: Reliab	oility Metric 1:	Methodology	High	$\times 1$	1	TURA document				
Domain 2: Ropro	contativo									
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2006 publication				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	sibility/Clar	ity			/.					
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information				
Domain 4. Variat	ility and II-	agentainte								
Domain 4. Variat	Metric 7.	Metadata Completeness	N/A		N/A	N/A - qualitative information				
		including compreteness			11/11	1./. queneauve information				
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	High		1.0					

Source Citation: Type of Data Source Hero ID	Echa, 2015. Background document for 1-bromopropane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970681							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	tegory of Use):	Misc.					
Process Descripti	on:		1-BP may	y be used	in som	e laboratory analyses		
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	oility		TT: 1					
	Metric 1:	Methodology	High	× 1	1	ECHA document		
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU		
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015 publication		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar	itv						
Domain 5. Access	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information		
Domain 4: Varial	oility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information		
Overall Quality Determination <sup>†</sup>		High		1.2				

Source Citation:U.S, E. P. A 1995. Guidance document for the halogenated solvent cleaner NESHAP.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data; 3827323								
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Degreasing Describes batch v. in-line machine configurations and emission controls relating to NESHAP compliance (not 1-BP specific)					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EPA document		
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 6 N/A	US Use is within scope 1995 document No Comment.		
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	N/A		N/A	N/A - qualitative information		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	N/A - qualitative information		
Overall Quality D	Determinatio	n <sup>†</sup>	Medium		1.7			

Source Citation:Hsia,. 2011. Model rule for solvent defreasing.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3982145									
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Degreasing "TCE is typically recycled as part of a controlled process, leaving only filters and sludge to be disposed of. Aqueous systems require much greater water usage and produce large amounts of contaminated wastew- ater" Airless degreasers have major operational disadvantagesand are not an option in many applications. A number of companies in PA clean the narrow tubes they mfg in large (40-50 feet) custom-built equipment. No airless system is available that meets such requirements."						
EVALUATION									
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliability Metric 1	Methodology	High	$\times 1$	1	HSIA				
Domain 2: Representative									
Metric 2	Geographic Scope	High	$\times 1$	1	US				
Metric 3	Applicability	High	$\times 2$	2	Use is within scope				
Metric 4	Temporal Representativeness	High	$\times 2$	2	2011 document				
Metric 5	Sample Size	N/A		N/A	No Comment.				
Domain 3: Accessibility/Cla	urity	/ .							
Metric 6	Metadata Completeness	N/A		N/A	N/A - qualitative information				
Domain 4: Variability and	Jncertainty								
Metric 7	Metadata Completeness	N/A		N/A	N/A - qualitative information				
Overall Quality Determinat	ion <sup>†</sup>	High		1.0					

Source Citation:Hesis, 2016. 1-bromopropane (n-propyl bromide): Health hazard alert.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data; 3982242Hero ID3982242									
EXTRACTION									
Parameter									
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:			Use Misc. Indicates use of 1-BP when applying "coatings to pipes or other fixtures" and in "spray aerosols used to clean auto parts". Source identifies com- mercial products containing 1-BP (adhesives, cleaners and degreasers, and other solvents)						
EVALUATION									
Domain	Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	California Dept of Public Health				
Domain 2: Representative									
Metric 2:	Geographic Scope	High	$\times 1$	1	US				
Metric 3:	Applicability	High	$\times 2$	2	Use is within scope				
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016 document				
Metric 5: Sample Size Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness		N/A		N/A	N/A - qualitative information				
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		N/A		N/A	N/A - qualitative information				
Overall Quality Determination <sup>†</sup>		High		1.0					

EXTRACTION Parameter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (Subcategory of Use):		Misc.						
Process Description (Subcategory of Ose). Process Description:			U.S. aerospace industry identifies the use of 1-BP in solvents, vapor de- greasing and cleaning. A company in the Netherlands identifies majority of 1-BP used as an intermediate. Enviro Tech and several other compa- nies in UK indicate current use of 1-BP as direct replacement for TCE in vapor degreasing equipment (in use for several years). 1 co. in Ger- many indicates use in closed loop cleaning system with short cleaning times and usage of 3-4 LT per day. Most customers of PPC in France use their products as intermediates in pharmaceutical or agrochemical industries. They have very few customers for 1-BP, all of which are in pharmaceutical industry. 1-BP is produced in well-closed equipment at PPC and monitoring data within past 5 years were all below 10 ppm. Based on information collected by REACH Consortium for Brominated substances, 69 percent of 1-BP is used for intermediate purposes. One UK company states that stabilized 1-BP is also "used in asphalt testing as a replacement for TCE. This is a laboratory test whereby 1-BP dis- solves the bitumen out of asphalt to separate it from the aggregate and the solvent then distilled off and collected for re-use."					
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	Medium	$\times 1$	2	ECHA comment summary document; comments submitted by various companies in Europe			
Domain 1: Reliability Metric 1:	Methodology	Medium	× 1	2	ECHA comment summary document; comments submitted by various companies in Europe			
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2:	Methodology Geographic Scope	Medium	× 1	2	ECHA comment summary document; comments submitted by various companies in Europe			
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3:	Methodology Geographic Scope Applicability	Medium Medium High	$\times 1$ $\times 1$ $\times 2$	2	ECHA comment summary document; comments submitted by various companies in Europe Europe Use is within scope			
Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4:	Methodology Geographic Scope Applicability Temporal Representativeness	Medium Medium High High	$\begin{array}{c} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \end{array}$	2 2 2 2	ECHA comment summary document; comments submitted by various companies in Europe Europe Use is within scope 2011 document			

Source Citation: Type of Data Source Hero ID	Echa,. 201 Facility; R 3970682	Echa, 2011. Comments on Annex XV Dossier for identification of a substance as SVHC and response to these comments. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970682						
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	N/A		N/A	N/A - qualitative information		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	N/A - qualitative information		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.3			

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Source Citation:	Echa, 2015. Opinion of the Member State Committee on the sixth draft recommendation of the priority substances and Annex XIV entries							
Type of Data Source Hero ID	Facility; R 3970683	eports for Data or Information (	Other than	Exposur	e or Rel	lease Data;		
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Use					
Life Cycle Descrit	otion (Subca	ategory of Use):	Misc.					
Process Description:			Source in used as ir	Source indicates 1-BP does not have consumer uses, and is primarily used as intermediates in the EU				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1. Beliah	ility							
	Metric 1:	Methodology	Medium	$\times 1$	2	ECHA comment summary document; comments submitted by various companies in Europe		
Domain 2: Repres	sentative							
Domain 2. Ropros	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Europe		
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015 document		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3. Access	vibility/Clar	ity						
Domain 0. Meees.	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information		
					,			
Domain 4: Variab	ility and U	ncertainty	/ -		/ .			
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information		
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	High		1.3			

Source Citation:	Raymond, L. W., Ford, M. D 2007. Severe illness in furniture makers using a new glue: 1-bromopropane toxicity confounded by arsenic. Journal of Occupational and Environmental Medicine.								
Type of Data Source Hero ID	Facility; R 1025819	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):	Spray adl	nesive					
Process Description	on:		Glue was	applied	by spray	ying in aerosol form and directly by hand and			
Operating Days p	er Year and	Batches per Day:	8  hr/day	5 day/w	k				
Possible Physical	Form:	Detence per Day.	Liquid	o aay /					
Chemical Concentration:			70 percen	t					
EVALUATION									
Domain		Metric	Rating	$MWF^*$	Score	Comments			
Domain 1: Baliah	ility								
	Metric 1:	Methodology	High	$\times 1$	1	published journal article			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007 study			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information			
Domain 4: Variah	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.3				

Source Citation: Ntp, Cerhr. 2003. NTP-CERHR monograph on the potential human reproductive and developmental effects of 1-										
Type of Data Source Hero ID	Type of Data Source Hero IDFacility; Reports for Data or Information Other than Exposure or Release Data; 1519109									
EXTRACTION			_							
Parameter			Data							
Life Cycle Stage:			Manufact	ure						
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufact	ure and l	Import					
Process Description	on:		Mfg by re	eacting n	-propyl	alcohol with hydrogen bromide and removing				
			the water	that for	ns. Als	o can be produced by dehydration of propanol				
			other sou	nne or n rces on e	yarogei xnosure	concentration ranges				
Total Annual U.S	. Volume (a	nd percent of PV):	1.5 MM I	b in 2000	produ	ced, 2.8 MM lb imported				
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Roliah	ilitar									
Domain 1. Renab	Metric 1:	Methodology	High	$\times 1$	1	US govt publication				
Domain 2: Bepres	sentative									
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2003 publication, but data are older				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information				
Domain 4. Variah	ility and U	acontaint								
Domain 4. variau	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.3					
- 0			0							

Source Citation:	Niosh, 1997. Control of health and safety hazards in commercial drycleaners: chemical exposures, fire hazards, and ergonomic risk factors.									
Type of Data Source Hero ID	Facility; R 3044963	eports for Data or Information (	Other than	Exposure	e or Rel	lease Data;				
EXTRACTION										
Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:				Use Dry cleaning 70 percent dry cleaning shops have 1-4 employees, 17 percent have 5-9 employees. Typical process begins when garments are brought to the shop. They are initially tagged for identification. Prior to spotting or being loaded into machines, they are inspected and sorted. See source for detailed process description.						
EVALUATION										
Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	US govt publication				
Domain 2: Repres	sentative		TT· 1	1	1					
	Metric 2:	Geographic Scope	Hign II:l.	× 1	1					
	Metric 3:	Applicability	High	× 2	2	Use is within scope				
	Metric 4: Metric 5:	Sample Size	LOW N/A	X Z	N/A	1997 No Comment				
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	N/A		N/A	N/A - qualitative information				
Domain 4: Variab	Motria 7	Motodoto Completeness	NI / A		NI / A					
	Metric 7:	Metadata Completeness	IN/A		N/A	N/A - qualitative information				
Overall Quality Determination <sup><math>\dagger</math></sup>		Medium		1.7						

Source Citation:	Hsia, 2010. Petition to add n-propyl bromide to list of hazardous air pollutants regulate under section 112 of the Clean Air Act [with cover letter date $10/28/2010$ ]										
Type of Data Source Hero ID	Facility; R 3045668	eports for Data or Information (	Other than	Exposure	e or Rel	lease Data;					
EXTRACTION Parameter	CTION meter				Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):			Use Various General use information as aerosol solvents (incl. lubricants, coatings), adhesives, and vapor degreasing. use of a solvent - growing at 15-20 percent /yr in US (5,000 metric tonnes)								
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments					
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Unknown methodology					
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size			High High Medium N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 4 N/A	US Use is within scope PV data appears to be for 2007 No Comment.					
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	N/A		N/A	N/A - qualitative information					
Domain 4: Variab	Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		N/A		N/A	N/A - qualitative information					
Overall Quality Determination <sup>†</sup>		High		1.5							

Source Citation:	U.S, E. P. A 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1-Bromopropane.								
Type of Data Source Hero ID	Facility; R 3827328	eports for Data or Information (	Other tha	n Exposi	ure or R	Release Data;			
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Chemical Concentration:			Use Various Use Dossier provides indication of various uses Use Dossier indicates 2015 PV to be 25.8 MM lb (2016 CDR) See Use Dossier for concentration for each product						
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EPA publication			
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US Use is within scope 2016 CDR data No Comment.			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	N/A		N/A	N/A - qualitative information			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		N/A		N/A	N/A - qualitative information				
Overall Quality Determination <sup>†</sup>		High		1.0					

Source Citation: Type of Data Source Hero ID	Source Citation:2017. Chemical data reporting: 1-bromo-propane.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3860454								
EXTRACTION									
Parameter			Data						
Life Cycle Stage			Use						
Life Cycle Descrip	tion (Subca	tegory of Use):	Various						
Process Description	on:		Chemvi	ew data,	provide	es specific names of companies that manufacture			
			or impo	rt 1-BP	from 20	12 CDR			
Total Annual U.S.	. Volume (a	nd percent of PV):	Based o	on 2012 C	CDR dat	ta, national aggregate PV is 15 MM lb			
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Matala 1		TT:l.	1	1				
	Metric 1:	Methodology	High	× 1	1	EPA publication			
Domain 2: Repres	entative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012 CDR data			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
	·1 ·1·· / <i>C</i> 1 ·								
Domain 3: Access	Motric 6:	ty Motadata Completeness	N/A		N/A	N/A qualitative information			
	Methic 0.	Metadata Completeness	n/n		$\mathbf{N}/\mathbf{A}$	N/A - quantative information			
Domain 4: Variab	ility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information			
Overall Quality Determination <sup>†</sup>			High		1.0				

Source Citation:Ashford, R. D 2001. Ashford's Dictionary of Industrial ChemicalsN-propyl bromide.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3860433									
EXTRACTION									
Parameter		Data							
Life Cycle Stage:	Life Cycle Stage		Manufacture						
Life Cycle Description (Subc	ategory of Use):	Manufact	ure						
Process Description:		Ashford Chemical Dictionary indicates 1-BP production is from n-							
Possible Physical Form:		propanol with ydrochromic acid (alcohol bromination) Liquid							
EVALUATION									
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliability									
Metric 1:	Methodology	High	$\times 1$	1	Ashford Chemical Dictionary				
Domain 2: Representative									
Metric 2:	Geographic Scope	High	$\times 1$	1	US				
Metric 3:	Applicability	High	$\times 2$	2	Mfg is within scope				
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2001 edition				
Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Accessibility/Clarity									
Metric 6:	Metadata Completeness	N/A		N/A	N/A - qualitative information				
Demain 4. Variability and Uncertainty									
Metric 7:	Metadata Completeness	N/A		N/A	N/A - qualitative information				
Overall Quality Determination <sup>†</sup>		High		1.3					

Source Citation:	IRTA. 2016. Alternative Compliance Strategies for Enclosed and Conveyorized Vapor Degreasers under a Prohibition of Trichloroethylene. Draft									
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 5018567									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Uso							
Life Cycle Descrit	Life Cycle Description (Subcategory of Use):		Degreasir	Use						
Number of Sites:	courses	accept; of eso).	100 vacu	ım degrea	asers an	d 800 conveyorized degreasers using 1-BP				
EVALUATION										
Domain		Metric	Rating	$\mathbf{MWF}^{\star}$	Score	Comments				
Demein 1. Delieb										
Domain 1: Kellad	Metric 1:	Methodology	Low	$\times 1$	3	Data sources and estimation techniques not specified				
					-	I I I I I I I I I I I I I I I I I I I				
Domain 2: Representative										
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016 document				
	Metric 5:	Sample Size	Low	$\times 1$	3	Estimate not characterized by statistics				
Domain 3: Access	sibility/Clar	Mata data Gammalatan ara	Τ	1	9					
	Metric 6:	Metadata Completeness	LOW	× 1	3	Underlying data and methods not fully transparent				
Domain 4: Variability and Uncertainty										
Domain 4. Variat	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Variability and uncertainty not addressed				
Overall Quality Determination <sup><math>\dagger</math></sup>		Medium		1.9						
• 0										

Source Citation:	Enviro Tech International. 2017. RE: 1-Bromopropane, Docket ID number EPA-HQ-OPPT 2016-0741. The Use of 1- bromopropane (nPB) in the Dry Cleaning Industry.							
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 5018569							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV): Number of Sites:		Use Dry cleaning <50,000 lb 1-BP used in dry cleaning sector in 2015, <40,000 lb in 2016, and likely <30,000 lb in 2017 9 converted PERC machines and 19 DrySolv machines were in service in 2016						
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Data from company expected to be knowledgeable with the sector, but industry data may present potential biase		
becco, but industry data may present potential blase								
Domain 2: Repres	sentative		TT: 1	-	1			
	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High	× 2	2	Use is within scope		
	Metric 4: Metric 5:	Sample Size	N/A	X Z	$^{2}$ N/A	2017 public comment No Comment.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Data comes from a company likely knowledgeable with the in- formation but underlying data are not fully transparent.		
						and an and an and and and and and and an		
Domain 4: Variability and Uncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Variability and uncertainty not addressed		
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.5				

Source Citation: Type of Data Source Hero ID	U.S. EPA. 2013. Use and market profile for 1-bromopropane in vapor degreasers, spray adhesives, and aerosol solvents. Facility; Reports for Data or Information Other than Exposure or Release Data; 3045699						
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Sites:		Use Aerosol Degreasing 1,000 - 5,000 businesses used 1-BP-based aerosol solvents in 2002					
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	US govt publication	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope	
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	Medium N/A	$\times 2$	$^{4}$ N/A	2013 publication, which cites data from a 2007 document No Comment.	
Domain 3: Accessibility/Clarity							
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	Underlying data and methods not fully transparent	
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Low × 1 3 Does not address variability/uncertainty							
Overall Quality Determination <sup>†</sup>		Medium		1.8			

Source Citation:	Enviro Tech International. 2019. Personal communication between R. Morford (Enviro Tech International, Inc.) and D. Parsons (U.S. EPA).						
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 5261917						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Use				
Life Cycle Descrip	otion (Subca	ategory of Use):	Dry clean	ing			
Number of Sites:			8 dry clea	aning esta	ablishm	ents use 1-BP in 2019	
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	Medium	$\times 1$	2	Data from company expected to be knowledgeable with the sector, but industry data may present potential biase	
Domain 2. Bepres	sentative						
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Use is within scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2019 communication	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 2. Accordibility/Clarity							
Domain 5. Access	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Data comes from a company likely knowledgeable with the in- formation, but underlying data are not fully transparent as the location of the specific establishments is not known	
Demain 4. Vanishility and Uncentainty							
Domain 4: Variab	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Variability and uncertainty not addressed	
Overall Quality Determination <sup>†</sup>		High		1.5			