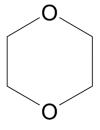


Final Risk Evaluation for 1,4-Dioxane

Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Hazard Studies

CASRN: 123-91-1



December 2020

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

Table of Contents

HERO ID	Data Type	Reference	Page
18670	Acute (0-96 hour); Aquatic; Fish	Dawson, G. W., Jennings, A. L., Drozdowski, D., Rider, E 1977. The acute toxicity of 47 industrial chemicals to fresh and saltwater fishes. Journal of Hazardous Materials 1:303-318	5
18804	Acute (0-96 hour); Aquatic; Invertebrates	G. Bringmann, R. Kuehn. 1982. Ergebnisse der Schadwirkung wassergefaehrdender Stoffe gegen Daphnia magna in einem weiterentwickelten standardisierten Testverfahren [Results of toxic action of water pollutants on Daphnia magna Straus tested by an improved standardized procedure]. Wasser und Abwasser in Forschung und Praxis 15	7
51735	Other; Aquatic; Plants	G. Bringmann, R. Kuhn. 1978. Grenzwerte der Schadwirkung wassergefahrdender Stoffe gegen Blaualgen (Microcystis aeruginosa) und Grunalgen (Scenedesmus quadricauda) im Zellvermehrungshemmtest [Limiting values for the noxious effects of water pollutant material to blue algae (Microcystis aeruginosa) and green algae (Scenedesmus quadricauda) in cell propagation inhibition tests] Vom Wasser 50:45-60	9
73652	Acute (0-96 hour); Aquatic; Invertebrates	G. Bringmann, R. Kuhn. 1977. The effects of water pollutants on Daphnia magna. Wasser und Abwasser in Forschung und Praxis 10:161-166	11
3616460	Acute (0-96 hour); Aquatic; Invertebrates	G. Bringmann, R. Kuehn. 1982. Results of Toxic Action of Water Pollutants on Daphnia magna Straus Tested by an Improved Standardized Procedure. 15:1-6(GER) (ENG ABS) (OECDG Data File)	13
3634436	Acute (0-96 hour); Aquatic; other Fish and Daphnia	Brooke, L 1987. Report of the Flow-Through and Static Acute Test Comparisons with Fathead Minnows and Acute Tests with an Amphipod and a Cladoceran.	1 6
3634436	Acute (0-96 hour); Aquatic; Invertebrates	Brooke, L 1987. Report of the Flow-Through and Static Acute Test Comparisons with Fathead Minnows and Acute Tests with an Amphipod and a Cladoceran.	18
3660853	Acute (0-96 hour); Aquatic; Fish	Geiger, D. L., Brooke, L. T., Call, D. J 1990. Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume V.	20
3661129	Chronic (>21 days); Aquatic; Fish	R. Johnson, J. Tietge, G. Stokes, D. Lothenbach. 1993. The Medaka Carcinogenesis Model.	22
4158026	Acute (0-96 hour); Aquatic; Fish	Dow Chemical. 1989. 1,4-Dioxane: Embryo-larval toxicity test with the Fathead minnow, Pimephales promelas Rafinesque.	2 4

G. Bringman, R. Kuhn. 1977. Limiting values of the harmful action of water endangering substances on bacteria (Pseudomonas putida) and green algae (Scenedesmus quadricauda) in the cell multiplication inhibition test. Zeitschrift fuer Wasser- und Abwasser-Forschung 10:87-98

Study Citation:		W.,Jennings, A. L.,Drozdowski, D.,Rider, E	1977. The	acute to	xicity of	f 47 industrial chemicals to fresh and saltwater
D		nal of Hazardous Materials 1:303-318				
Data Type: Hero ID:	Acute (0-96 18670	hour); Aquatic; Fish				
nero iD:	18070					
Domain		Metric	Rating [†]	MWF*	Score	$Comments^{\dagger\dagger}$
Domain 1: Test S	Substance					
	Metric 1:	Test Substance Identity	High	$\times 2$	2	
	Metric 2:	Test Substance Source	Low	\times 1	3	Test source was not reported.
	Metric 3:	Test Substance Purity	Low	× 1	3	The test purity was not reported.
Domain 2: Test I	Design					
	Metric 4:	Negative Controls	High	$\times 2$	2	
	Metric 5:	Negative Control Response	High	\times 1	1	
	Metric 6:	Randomized Allocation	Medium	× 1	2	Not specified, the information was implied for this metric.
Domain 3: Expos	ure Characte	prization				
Domain of Expos	Metric 7:	Experimental System/Test Media Preparation	Low	\times 2	6	limited information provided
	Metric 8:	Consistency of Exposure Administration	High	\times 1	1	
	Metric 9:	Measurement of Test Substance Concentra-	High	\times 2	2	
	Metric 10:	Exposure Duration and Frequency	High	\times 1	1	Information was provided for this metric.
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	Low	× 1	3	No information was reported; however, an LC50 was derived.
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	
Domain 4: Test ()rganism					
20maiii 1. 1050 C	Metric 13:	Test Organism Characteristics	High	$\times 2$	2	
	Metric 14:	Acclimitization and Pretreatment Conditions	High	× 1	1	
	Metric 15:	Number of Organisms and Replicates per	Medium	× 1	2	Limited info provided
		Group			_	
		Continued on next page				

		continued from previous page									
Study Citation:		W.,Jennings, A. L.,Drozdowski, D.,Rider, E nal of Hazardous Materials 1:303-318	1977. The	acute to	xicity o	f 47 industrial chemicals to fresh and saltwater					
Data Type:	Acute (0-96	Acute (0-96 hour); Aquatic; Fish									
Hero ID:	18670										
TICIO ID.	10010										
Domain		Metric	Rating [†]	MWF^*	Score	$Comments^{\dagger\dagger}$					
	Metric 16:	Adequacy of Test Conditions	High	× 1	1						
Domain 5: Outco	ome Assessme	nt									
	Metric 17:	Outcome Assessment Methodology	High	$\times 2$	2						
	Metric 18:	Consistency of Outcome Assessment	High	$\times 1$	1						
		·									
Domain 6: Confo	ounding / Var	iable Control									
	Metric 19:	Confounding Variables in Test Design and	High	$\times 2$	2	Information was reported for this metric.					
		Procedures	Q			•					
	Metric 20:	Outcomes Unrelated to Exposure	High	\times 1	1						
Domain 7: Data	Duccontation	and Analysis									
Domain 7. Data	Metric 21:	Statistical Methods	II: mla	v 1	1						
			High	$\times 1 \times 2$	$\frac{1}{2}$						
	Metric 22:	Reporting of Data	High	× 2							
	Metric 23:	Explanation of Unexpected Outcomes	N/A		N/A						
Overall Quality I	Determination	‡	High		1.4						
Extracted			No								

 $[\]star$ MWF = Metric Weighting Factor

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left[\sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right]_{0.1} & \text{(round to the nearest tenth) otherwise} \end{array} \right.,$$

[†] High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation:	twickelten s	G. Bringmann, R. Kuehn. 1982. Ergebnisse der Schadwirkung wassergefachrdender Stoffe gegen Daphnia magna in einem weiterentwickelten standardisierten Testverfahren [Results of toxic action of water pollutants on Daphnia magna Straus tested by an improved standardized procedure]. Wasser und Abwasser in Forschung und Praxis 15								
Data Type: Hero ID:	Acute (0-96 18804	5 hour); Aquatic; Invertebrates								
Domain		Metric	Rating [†]	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$				
Domain 1: Test S	Substance									
	Metric 1:	Test Substance Identity	Low	$\times 2$	6	Only the chemical name was provided.				
	Metric 2:	Test Substance Source	Low	\times 1	3	The source of the chemical was not reported				
	Metric 3:	Test Substance Purity	Low	× 1	3	The information for this metric was provided in the report.				
Domain 2: Test l	Design									
	Metric 4:	Negative Controls	High	$\times 2$	2					
	Metric 5:	Negative Control Response	High	$\times 1$	1					
	Metric 6:	Randomized Allocation	High	× 1	1					
Domain 3: Expos	sure Characte	erization								
•	Metric 7:	Experimental System/Test Media Preparation	High	\times 2	2					
	Metric 8:	Consistency of Exposure Administration	High	$\times 1$	1					
	Metric 9:	Measurement of Test Substance Concentration	High	\times 2	2	The information for this metric was provided in the report.				
	Metric 10:	Exposure Duration and Frequency	High	$\times 1$	1					
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1					
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1					
Domain 4: Test 0	Organism									
	Metric 13:	Test Organism Characteristics	High	$\times 2$	2					
	Metric 14:	Acclimitization and Pretreatment Conditions	High	× 1	1					
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1					
		Continued on next page								

Study Citation:	twickelten s	. Bringmann, R. Kuehn. 1982. Ergebnisse der Schadwirkung wassergefachrdender Stoffe gegen Daphnia magna in einem weiterenvickelten standardisierten Testverfahren [Results of toxic action of water pollutants on Daphnia magna Straus tested by an improved andardized procedure]. Wasser und Abwasser in Forschung und Praxis 15								
Data Type: Hero ID:		hour); Aquatic; Invertebrates								
Domain		Metric	Rating [†]	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$				
	Metric 16:	Adequacy of Test Conditions	High	× 1	1					
Domain 5: Outco	ome Assessme	nt								
	Metric 17:	Outcome Assessment Methodology	High	$\times 2$	2					
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1					
Domain 6: Confo	ounding / Var	iable Control								
	Metric 19:	Confounding Variables in Test Design and Procedures	High	\times 2	2					
	Metric 20:	Outcomes Unrelated to Exposure	N/A		N/A					
Domain 7: Data	Presentation	and Analysis								
	Metric 21:	Statistical Methods	Medium	$\times 1$	2	Limited information was provided for this metric.				
	Metric 22:	Reporting of Data	High	$\times 2$	2					
	Metric 23:	Explanation of Unexpected Outcomes	N/A		N/A					
Overall Quality I	Determination	‡	High		1.3					
Extracted			Yes							

 $[\]star$ MWF = Metric Weighting Factor

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left[\sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right]_{0.1} \end{array} \right. \\ \text{(round to the nearest tenth) otherwise}$$

[†] High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: Data Type:	und Grunal material to Wasser 50:4	9 (9 / 9	rungshemn	ntest [Lin	niting v	
Hero ID:	51735	auto, i tario				
Domain		Metric	Rating [†]	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$
Domain 1: Test	Substance					
	Metric 1:	Test Substance Identity	Low	$\times 2$	6	Only the chemical name was provided.
	Metric 2:	Test Substance Source	Low	$\times 1$	3	The source of the chemical was not reported.
	Metric 3:	Test Substance Purity	Low	× 1	3	Information about the test purity was not reported.
Domain 2: Test	Design					
	Metric 4:	Negative Controls	High	$\times 2$	2	
	Metric 5:	Negative Control Response	High	$\times 1$	1	
	Metric 6:	Randomized Allocation	High	\times 1	1	
Domain 3: Expo	suro Characto	orization				
Domain 6. Expo	Metric 7:	Experimental System/Test Media Preparation	High	\times 2	2	
	Metric 8:	Consistency of Exposure Administration	High	$\times 1$	1	
	Metric 9:	Measurement of Test Substance Concentration	High	\times 2	2	
	Metric 10:	Exposure Duration and Frequency	High	$\times 1$	1	
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	
	Metric 12:	Testing at or Below Solubility Limit	N/A		N/A	The solubility for 1,4-dioxane was not a factor.
Domain 4: Test	Organism					
_ :110111 1. 1050	Metric 13:	Test Organism Characteristics	High	$\times 2$	2	
	Metric 14:	Acclimitization and Pretreatment Conditions	High	× 1	1	
	Metric 15:	Number of Organisms and Replicates per	High	× 1	1	
		Group				
		Continued on next page				

Study Citation: Data Type: Hero ID:	und Grunal material to Wasser 50:4	G. Bringmann, R. Kuhn. 1978. Grenzwerte der Schadwirkung wassergefahrdender Stoffe gegen Blaualgen (Microcystis aeruginosa) und Grunalgen (Scenedesmus quadricauda) im Zellvermehrungshemmtest [Limiting values for the noxious effects of water pollutant material to blue algae (Microcystis aeruginosa) and green algae (Scenedesmus quadricauda) in cell propagation inhibition tests] Vom Wasser 50:45-60 Other; Aquatic; Plants							
Domain		Metric	$\mathrm{Rating}^{\dagger}$	MWF^{\star}	Score	$\mathrm{Comments}^{\dagger\dagger}$			
	Metric 16:	Adequacy of Test Conditions	N/A		N/A				
Domain 5: Outco	ome Assessme	ent							
	Metric 17:	Outcome Assessment Methodology	High	$\times 2$	2				
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1				
Domain 6: Confo	ounding / Var	riable Control							
	Metric 19:	Confounding Variables in Test Design and Procedures	High	\times 2	2				
	Metric 20:	Outcomes Unrelated to Exposure	High	× 1	1				
Domain 7: Data	Presentation	and Analysis							
Bomain T. Bata	Metric 21:	Statistical Methods	Medium	× 1	2	Limited information was provided for this metric.			
	Metric 22:	Reporting of Data	High	$\times 2$	2	Emilion mornation was provided for time motific			
	Metric 23:	Explanation of Unexpected Outcomes	N/A		N/A				
Overall Quality I	Determination	ı‡	High		1.3				
Extracted			Yes						

^{*} MWF = Metric Weighting Factor

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left\lfloor \sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right\rceil_{0.1} & \text{(round to the nearest tenth) otherwise} \end{array} \right.$$

 $^{^{\}dagger}$ High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation:	G. Bringma 10:161-166	ann, R. Kuhn. 1977. The effects of water pollu	tants on	Daphnia	magna.	Wasser und Abwasser in Forschung und Praxis
Data Type: Hero ID:		5 hour); Aquatic; Invertebrates				
Domain		Metric	Rating [†]	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$
Domain 1: Test S	Substance					
	Metric 1:	Test Substance Identity	Low	\times 2	6	No chemical identity information was provided for any of the chemicals including 1,4-Dioxane in this report. Only the chemical names were provided.
	Metric 2:	Test Substance Source	Low	\times 1	3	The report source did not provide any information about the manufacturer of the chemicals tested.
	Metric 3:	Test Substance Purity	Low	× 1	3	Information about the purity was not provided.
Domain 2: Test I	Design					
	Metric 4:	Negative Controls	High	$\times 2$	2	
	Metric 5:	Negative Control Response	High	× 1	1	
	Metric 6:	Randomized Allocation	High	× 1	1	
Domain 3: Expos	cura Characte	ovization				
Domain 5: Expos	Metric 7:	Experimental System/Test Media Prepara-	High	$\times 2$	2	
	Metric 7.	tion	High	X 2	2	
	Metric 8:	Consistency of Exposure Administration	High	$\times 1$	1	
	Metric 9:	Measurement of Test Substance Concentration	Low	\times 2	6	No information was provided for this metric.
	Metric 10:	Exposure Duration and Frequency	High	$\times 1$	1	
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	
	Metric 12:	Testing at or Below Solubility Limit	High	\times 1	1	
Domain 4. Test (Inconian					
Domain 4: Test (Metric 13:	Test Organism Characteristics	Uich	$\times 2$	9	
	Metric 13: Metric 14:	Acclimitization and Pretreatment Conditions	High High	× 2 × 1	2 1	
	Metric 14: Metric 15:		0	× 1 × 1	1	
	Metric 19:	Number of Organisms and Replicates per Group	High	X 1	1	
		Continued on next page				

Study Citation:	G. Bringma 10:161-166	nn, R. Kuhn. 1977. The effects of water pollu	Wasser und Abwasser in Forschung und Praxis						
Data Type:	Acute (0-96 hour); Aquatic; Invertebrates								
Hero ID:	73652	,, 1							
Domain		Metric	Rating†	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$			
	Metric 16:	Adequacy of Test Conditions	High	× 1	1				
Domain 5: Outco	ome Assessme	nt							
	Metric 17:	Outcome Assessment Methodology	High	$\times 2$	2	This metric was completely characterized.			
	Metric 18:	Consistency of Outcome Assessment	High	\times 1	1	• •			
Domain 6: Confo	- '		*** 1						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	$\times 2$	2				
	Metric 20:	Outcomes Unrelated to Exposure	High	× 1	1				
Domain 7: Data l	Procentation	and Analysis							
Domain 7. Data 1	Metric 21:	Statistical Methods	Low	× 1	3	No statistical methods were provided.			
	Metric 21:	Reporting of Data	High	\times 1 \times 2	2	No statistical methods were provided.			
	Metric 23:	Explanation of Unexpected Outcomes	N/A	^ 2	N/A				
Overall Quality I	Determination	Ţ	High		1.4				
Extracted			Yes						

 $[\]star$ MWF = Metric Weighting Factor

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left[\sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right]_{0.1} & \text{(round to the nearest tenth) otherwise} \end{array} \right.,$$

[†] High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

† The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation:		ann, R. Kuehn. 1982. Results of Toxic Actioned Procedure. 15:1-6(GER) (ENG ABS) (OECI			ants on	Daphnia magna Straus Tested by an Improve
Data Type: Hero ID:		5 hour); Aquatic; Invertebrates	o Data 1	nc)		
Domain		Metric	Rating [†]	MWF^{\star}	Score	$Comments^{\dagger\dagger}$
Domain 1: Test S	Substance					
	Metric 1:	Test Substance Identity	Low	× 2	6	The study only listed the test substance name. However, this reporting source was for multiple chemicals thus detail information could have been omitted because of publication requirements. Also, this study was published in 1983 from Germany.
	Metric 2:	Test Substance Source	Low	× 1	3	The study only listed the test substance name. However, this reporting source was for multiple chemicals thus detail information could have been omitted because of publication requirements. Also, this study was published in 1983 from Germany.
	Metric 3:	Test Substance Purity	Low	× 1	3	The study only listed the test substance name. However, this reporting source was for multiple chemicals thus detail information could have been omitted because of publication requirements. Also, this study was published in 1983 from Germany.
Domain 2: Test I)esign					
	Metric 4:	Negative Controls	High	$\times 2$	2	
	Metric 5:	Negative Control Response	High	$\times 1$	1	
	Metric 6:	Randomized Allocation	High	× 1	1	
Domain 3: Expos	sure Characte	erization				
•	Metric 7:	Experimental System/Test Media Preparation	High	\times 2	2	
	Metric 8:	Consistency of Exposure Administration	High	\times 1	1	
	Metric 9:	Measurement of Test Substance Concentration	High	\times 2	2	
	Metric 10:	Exposure Duration and Frequency	N/A		N/A	This information was reported for this metric.
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	
		Continued on next page				

... continued from previous page Study Citation: G. Bringmann, R. Kuehn. 1982. Results of Toxic Action of Water Pollutants on Daphnia magna Straus Tested by an Improved Standardized Procedure. 15:1-6(GER) (ENG ABS) (OECDG Data File) Data Type: Acute (0-96 hour); Aquatic; Invertebrates Hero ID: 3616460 Rating[†] MWF[⋆] Score $Comments^{\dagger\dagger}$ Domain Metric Testing at or Below Solubility Limit Metric 12: High $\times 1$ 1 Domain 4: Test Organism Metric 13: Test Organism Characteristics N/A N/A Acclimitization and Pretreatment Conditions Metric 14: High $\times 1$ 1 Metric 15: Number of Organisms and Replicates per N/AN/AMetric 16: Adequacy of Test Conditions High \times 1 1 Domain 5: Outcome Assessment 2 Metric 17: Outcome Assessment Methodology High $\times 2$ Consistency of Outcome Assessment Metric 18: High $\times 1$ 1 Domain 6: Confounding / Variable Control Metric 19: Confounding Variables in Test Design and 2 High $\times 2$ Procedures Metric 20: Outcomes Unrelated to Exposure High $\times 1$ 1 This information was reported for this metric. Domain 7: Data Presentation and Analysis Metric 21: Statistical Methods Low $\times 1$ 3 Limited information was provided for this metric. Only effects results were reported. Metric 22: Reporting of Data $\times 2$ 2 High Explanation of Unexpected Outcomes Metric 23: N/AN/A

Continued on next page ...

Overall Quality Determination[‡]

Extracted

High

Yes

1.4

Study Citation: G. Bringmann, R. Kuehn. 1982. Results of Toxic Action of Water Pollutants on Daphnia magna Straus Tested by an Improved

Standardized Procedure. 15:1-6(GER) (ENG ABS) (OECDG Data File)

Data Type: Acute (0-96 hour); Aquatic; Invertebrates

Hero ID: 3616460

Domain Metric Rating[†] MWF * Score Comments^{††}

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left\lfloor \sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right\rfloor_{0.1} & \text{(round to the nearest tenth) otherwise} \end{array} \right.$$

where High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3 . If the reviewer determines that the overall rating needs adjustment, the original rating is crossed out and an arrow points to the new rating.

†† Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

^{*} MWF = Metric Weighting Factor

[†] High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

		1987. Report of the Flow-Through and Static	Acute Te	est Comp	parisons with	Fathead Minnows and Acute Tests with an
		and a Cladoceran. hour); Aquatic; other Fish and Daphnia				
	3634436	nour), Aquatic, other Fish and Daphina				
	5001100				~	~ 44
Domain		Metric	Rating	MWF*	Score	Comments ^{††}
Domain 1: Test Su	bstance					
]	Metric 1:	Test Substance Identity	High	$\times 2$	2	
]	Metric 2:	Test Substance Source	High	$\times 1$	1	
]	Metric 3:	Test Substance Purity	High	\times 1	1	
Domain 2: Test De	osion					
	Metric 4:	Negative Controls	High	$\times 2$	2	
	Metric 5:	Negative Control Response	High	× 1	- 1	
]	Metric 6:	Randomized Allocation	High	\times 1	1	
Domain 3: Exposu	ro Characta	wization				
	те Спагасте Metric 7:	Experimental System/Test Media Prepara-	High	\times 2	2	
•	WICUITC 7.	tion	IIIgII	A 2	2	
]	Metric 8:	Consistency of Exposure Administration	High	\times 1	1	
]	Metric 9:	Measurement of Test Substance Concentra-	High	\times 2	2	
1	Metric 10:	tion Exposure Duration and Frequency	High	× 1	1	
	Metric 10:	Number of Exposure Groups/Spacing of Ex-	High	× 1 × 1	1	
1	Menic 11.	posure Levels	IIIgII	× 1	1	
]	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	
Domain 4: Test Or	rganism					
	Metric 13:	Test Organism Characteristics	High	$\times 2$	2	
	Metric 14:	Acclimitization and Pretreatment Conditions	High	× 1	1	
	Metric 15:	Number of Organisms and Replicates per	High	× 1	1	
		Group	S			
]	Metric 16:	Adequacy of Test Conditions	High	\times 1	1	
		Continued on next page				

Study Citation:	Brooke, L 1987. Report of the Flow-Through and Static Acute Test Comparisons with Fathead Minnows and Acute Tests with an Amphipod and a Cladoceran.						
Data Type: Hero ID:		hour); Aquatic; other Fish and Daphnia					
Domain		Metric	Rating [†]	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$	
Domain 5: Outco	ome Assessme	ent					
	Metric 17:	Outcome Assessment Methodology	High	$\times 2$	2		
	Metric 18:	Consistency of Outcome Assessment	High	\times 1	1		
Domain 6: Confo	ounding / Var	iable Control					
	Metric 19:	Confounding Variables in Test Design and Procedures	High	\times 2	2		
	Metric 20:	Outcomes Unrelated to Exposure	High	× 1	1		
Domain 7: Data	Presentation	and Analysis					
	Metric 21:	Statistical Methods	High	\times 1	1		
	Metric 22:	Reporting of Data	High	$\times 2$	2		
	Metric 23:	Explanation of Unexpected Outcomes	N/A		N/A		
Overall Quality I	Determination	‡	High		1.0		
Extracted			Yes				

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

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left[\sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right]_{0.1} & \text{(round to the nearest tenth) otherwise} \end{array} \right.$$

[†] High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation:			Acute Te	st Comp	arisons	with Fathead Minnows and Acute Tests with an
ъ. т		and a Cladoceran.				
Data Type:	`	hour); Aquatic; Invertebrates				
Hero ID:	3634436					
Domain		Metric	Rating [†]	MWF^{\star}	Score	$\mathrm{Comments}^{\dagger\dagger}$
Domain 1: Test S	Substance					
	Metric 1:	Test Substance Identity	High	$\times 2$	2	
	Metric 2:	Test Substance Source	High	$\times 1$	1	
	Metric 3:	Test Substance Purity	High	× 1	1	
Domain 2: Test I	Design					
	Metric 4:	Negative Controls	High	$\times 2$	2	
	Metric 5:	Negative Control Response	High	$\times 1$	1	
	Metric 6:	Randomized Allocation	Low	\times 1	3	Allocation not reported
Domain 3: Expos	sure Characte	erization				
Domesti or Empos	Metric 7:	Experimental System/Test Media Preparation	High	\times 2	2	
	Metric 8:	Consistency of Exposure Administration	High	$\times 1$	1	
	Metric 9:	Measurement of Test Substance Concentration	High	\times 2	2	
	Metric 10:	Exposure Duration and Frequency	High	$\times 1$	1	
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	
	Metric 12:	Testing at or Below Solubility Limit	High	$\times 1$	1	
Domain 4: Test ()rganism					
	Metric 13:	Test Organism Characteristics	High	$\times 2$	2	
	Metric 14:	Acclimitization and Pretreatment Conditions	High	× 1	1	
	Metric 15:	Number of Organisms and Replicates per	High	× 1	1	
		Group			_	
	Metric 16:	Adequacy of Test Conditions	High	\times 1	1	
		Continued on next page				

		continued from previous page				
Study Citation:	,	1987. Report of the Flow-Through and Static and a Cladoceran.	Acute Te	st Comp	arisons w	ith Fathead Minnows and Acute Tests with an
Data Type:	Acute (0-96	hour); Aquatic; Invertebrates				
Hero ID:	3634436	,				
Domain		Metric	Rating [†]	MWF^{\star}	Score	${\rm Comments}^{\dagger\dagger}$
Domain 5: Outco	ome Assessme	ent				
	Metric 17:	Outcome Assessment Methodology	High	$\times 2$	2	
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	
Domain 6: Confo	ounding / Var	riable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	\times 2	2	
	Metric 20:	Outcomes Unrelated to Exposure	High	× 1	1	
Domain 7: Data	Presentation	and Analysis				
Domain 7. Data	Metric 21:	Statistical Methods	High	× 1	1	
	Metric 22:	Reporting of Data	High	$\times 2$	2	
	Metric 23:	Explanation of Unexpected Outcomes	High	× 1	1	
Overall Quality I	Determination	\mathbf{n}^{\ddagger}	High		1.1	
Extracted			Yes			

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

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left[\sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right]_{0.1} \end{array} \right. \\ \text{(round to the nearest tenth) otherwise}$$

[†] High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation:	Geiger, D. I V.	L.,Brooke, L. T.,Call, D. J 1990. Acute toxiciti	es of orga	nic chem	icals to fathead	l minnows (Pimephales promelas): Volume
Data Type:	Acute (0-96	hour); Aquatic; Fish				
Hero ID:	3660853					
Domain		Metric	Rating [†]	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$
Domain 1: Test S	Substance					
	Metric 1:	Test Substance Identity	High	$\times 2$	2	
	Metric 2:	Test Substance Source	High	\times 1	1	
	Metric 3:	Test Substance Purity	High	\times 1	1	
Domain 2: Test l	Design					
Domain 2. Test I	Metric 4:	Negative Controls	High	$\times 2$	2	
	Metric 5:	Negative Control Response	High	× 1	1	
	Metric 6:	Randomized Allocation	High	\times 1	1	
Domain 3: Expos	cumo Chamacto	ovization				
Domain 5. Expos	Metric 7:	Experimental System/Test Media Prepara-	High	$\times 2$	2	
	Wictife 7.	tion	111611	A 2	2	
	Metric 8:	Consistency of Exposure Administration	High	\times 1	1	
	Metric 9:	Measurement of Test Substance Concentra- tion	High	\times 2	2	
	Metric 10:	Exposure Duration and Frequency	High	\times 1	1	
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	
	Metric 12:	Testing at or Below Solubility Limit	High	\times 1	1	
Domain 4: Test (Organism					
Domain 1, 1050 (Metric 13:	Test Organism Characteristics	High	$\times 2$	2	
	Metric 14:	Acclimitization and Pretreatment Conditions	High	× 1	1	
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1	
	Metric 16:	Adequacy of Test Conditions	High	\times 1	1	
		Continued on next page				

		continued from previous page				
Study Citation:	Geiger, D. I V.	L.,Brooke, L. T.,Call, D. J 1990. Acute toxiciti	es of orga	nic chem	icals to fa	thead minnows (Pimephales promelas): Volume
Data Type:	Acute (0-96	hour); Aquatic; Fish				
Hero ID:	3660853	,, 1				
Domain		Metric	Rating [†]	MWF*	Score	$Comments^{\dagger\dagger}$
Domain 5: Outco	ome Assessme	ent				
	Metric 17:	Outcome Assessment Methodology	High	$\times 2$	2	
	Metric 18:	Consistency of Outcome Assessment	High	\times 1	1	
Domain 6: Confo	ounding / Var	riable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	\times 2	2	
	Metric 20:	Outcomes Unrelated to Exposure	High	× 1	1	
Domain 7: Data	Presentation	and Analysis				
Bolliam (C Baca	Metric 21:	Statistical Methods	High	\times 1	1	
	Metric 22:	Reporting of Data	High	$\times 2$	2	
	Metric 23:	Explanation of Unexpected Outcomes	N/A		N/A	
Overall Quality I	Overall Quality Determination [‡]				1.0	
Extracted			Yes			

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

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left[\sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right]_{0.1} & \text{(round to the nearest tenth) otherwise} \end{array} \right.$$

[†] High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: Data Type: Hero ID:		, J. Tietge, G. Stokes, D. Lothenbach. 1993. Th 21 days); Aquatic; Fish	e Medaka (Carcinoge	enesis M	Iodel.
Domain		Metric	Rating [†]	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$
Domain 1: Test S	Substance					
	Metric 1:	Test Substance Identity	High	$\times 2$	2	The chemical identity was provided in this study.
	Metric 2:	Test Substance Source	Low	\times 1	3	The manufacturer was not provided.
	Metric 3:	Test Substance Purity	Low	× 1	3	The purity was not provided for this study.
Domain 2: Test I	Design					
	Metric 4:	Negative Controls	High	$\times 2$	2	
	Metric 5:	Negative Control Response	High	\times 1	1	
	Metric 6:	Randomized Allocation	High	× 1	1	
Domain 3: Expos	sure Characte	erization				
Domain o. Expos	Metric 7:	Experimental System/Test Media Preparation	High	\times 2	2	
	Metric 8:	Consistency of Exposure Administration	High	\times 1	1	
	Metric 9:	Measurement of Test Substance Concentration	Low	\times 2	6	Other chemicals were tested. This could have affected the choice for not providing this information.
	Metric 10:	Exposure Duration and Frequency	High	\times 1	1	
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	Medium	× 1	2	Limited information was provided.
	Metric 12:	Testing at or Below Solubility Limit	N/A		N/A	This test substance is very soluble.
Domain 4: Test (Organism					
20110111 1. 1050	Metric 13:	Test Organism Characteristics	High	$\times 2$	2	
	Metric 14:	Acclimitization and Pretreatment Conditions	High	× 1	1	
	Metric 15:	Number of Organisms and Replicates per	High	× 1	1	
		Group	0		_	
	Metric 16:	Adequacy of Test Conditions	High	× 1	1	
Domain 5: Outco	ome Assessme	ent				
		Continued on next page				

Study Citation: R. Johnson, J. Tietge, G. Stokes, D. Lothenbach. 1993. The Medaka Carcinogenesis Model. Data Type: Chronic (>21 days); Aquatic; Fish Hero ID: 3661129								
Domain		Metric	Rating [†]	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$		
	Metric 17:	Outcome Assessment Methodology	High	\times 2	2			
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1			
Domain 6: Confo	ounding / Var	iable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	\times 2	2			
	Metric 20:	Outcomes Unrelated to Exposure	High	\times 1	1	This endpoint is well characterized.		
Domain 7: Data	Presentation	and Analysis						
	Metric 21:	Statistical Methods	High	$\times 1$	1			
	Metric 22:	Reporting of Data	High	$\times 2$	2			
	Metric 23:	Explanation of Unexpected Outcomes	N/A		N/A			
Overall Quality Determination [‡]			High		1.2			
Extracted			Yes					

^{*} MWF = Metric Weighting Factor

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left[\sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right]_{0.1} & \text{(round to the nearest tenth) otherwise} \end{array} \right.$$

[†] High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation: Data Type: Hero ID:		cal. 1989. 1,4-Dioxane: Embryo-larval toxicity hour); Aquatic; Fish	test with	the Fath	ead mir	nnow, Pimephales promelas Rafinesque.
Domain		Metric	Rating [†]	MWF*	Score	${ m Comments}^{\dagger\dagger}$
Domain 1: Test S	Substance					
	Metric 1:	Test Substance Identity	High	$\times 2$	2	
	Metric 2:	Test Substance Source	High	$\times 1$	1	
	Metric 3:	Test Substance Purity	High	× 1	1	
Domain 2: Test I	Design					
	Metric 4:	Negative Controls	High	$\times 2$	2	
	Metric 5:	Negative Control Response	High	$\times 1$	1	
	Metric 6:	Randomized Allocation	High	\times 1	1	
Domain 3: Expos	ure Characte	erization				
	Metric 7:	Experimental System/Test Media Preparation	High	\times 2	2	
	Metric 8:	Consistency of Exposure Administration	High	$\times 1$	1	
	Metric 9:	Measurement of Test Substance Concentration	High	\times 2	2	
	Metric 10:	Exposure Duration and Frequency	High	$\times 1$	1	
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1	
	Metric 12:	Testing at or Below Solubility Limit	High	× 1	1	The information was provided for this metric.
Domain 4: Test C)rganism					
20110111 1. 1000	Metric 13:	Test Organism Characteristics	High	$\times 2$	2	
	Metric 14:	Acclimitization and Pretreatment Conditions	High	× 1	1	
	Metric 15:	Number of Organisms and Replicates per	High	× 1	1	
		Group	Ü			
	Metric 16:	Adequacy of Test Conditions	High	$\times 1$	1	
Domain 5: Outco	me Assessme	ent				
		Continued on next page				

Study Citation: Dow Chemical. 1989. 1,4-Dioxane: Embryo-larval toxicity test with the Fathead minnow, Pimephales promelas Rafinesque. Acute (0-96 hour); Aquatic; Fish 4158026								
Domain		Metric	Rating [†]	MWF*	Score	${\rm Comments}^{\dagger\dagger}$		
	Metric 17:	Outcome Assessment Methodology	High	$\times 2$	2	The information was provided for this metric.		
	Metric 18:	Consistency of Outcome Assessment	High	\times 1	1			
Domain 6: Confo	ounding / Var	riable Control						
	Metric 19:	Confounding Variables in Test Design and Procedures	High	\times 2	2			
	Metric 20:	Outcomes Unrelated to Exposure	High	\times 1	1			
Domain 7: Data	Presentation	and Analysis						
	Metric 21:	Statistical Methods	High	$\times 1$	1			
	Metric 22:	Reporting of Data	High	$\times 2$	2			
	Metric 23:	Explanation of Unexpected Outcomes	N/A		N/A			
Overall Quality Determination [‡]			High		1.0			
Extracted			Yes					

 $[\]star$ MWF = Metric Weighting Factor

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left[\sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right]_{0.1} & \text{(round to the nearest tenth) otherwise} \end{array} \right.,$$

[†] High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.

Study Citation:	G. Bringman, R. Kuhn. 1977. Limiting values of the harmful action of water endangering substances on bacteria (Pseudomonas putida) and green algae (Scenedesmus quadricauda) in the cell multiplication inhibition test. Zeitschrift fuer Wasser- und Abwasser-Forschung 10:87-98								
Data Type: Hero ID:	Other; Aqu 4438934	atic; Plants							
Domain		Metric	$\mathrm{Rating}^{\dagger}$	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$			
Domain 1: Test S	Substance								
	Metric 1:	Test Substance Identity	Low	$\times 2$	6	Only the chemical name was provided for this study.			
	Metric 2:	Test Substance Source	Low	\times 1	3	The source was not reported.			
	Metric 3:	Test Substance Purity	Low	× 1	3	The test purity was not reported.			
Domain 2: Test l	Design								
	Metric 4:	Negative Controls	High	$\times 2$	2				
	Metric 5:	Negative Control Response	High	$\times 1$	1				
	Metric 6:	Randomized Allocation	High	× 1	1				
Domain 3: Expos	sure Characte	erization							
1	Metric 7:	Experimental System/Test Media Preparation	High	\times 2	2				
	Metric 8:	Consistency of Exposure Administration	High	$\times 1$	1				
	Metric 9:	Measurement of Test Substance Concentration	High	\times 2	2				
	Metric 10:	Exposure Duration and Frequency	High	$\times 1$	1				
	Metric 11:	Number of Exposure Groups/Spacing of Exposure Levels	High	× 1	1				
	Metric 12:	Testing at or Below Solubility Limit	High	\times 1	1				
Domain 4: Test (Organism								
	Metric 13:	Test Organism Characteristics	High	$\times 2$	2				
	Metric 14:	Acclimitization and Pretreatment Conditions	High	$\times 1$	1				
	Metric 15:	Number of Organisms and Replicates per Group	High	× 1	1				
	Metric 16:	Adequacy of Test Conditions	High	\times 1	1				
		Continued on next page							

		continued from previous page				
Study Citation:						ng substances on bacteria (Pseudomonas putida) eitschrift fuer Wasser- und Abwasser-Forschung
Data Type:	Other; Aqua	atic; Plants				
Hero ID:	4438934					
Domain		Metric	Rating [†]	MWF*	Score	$\mathrm{Comments}^{\dagger\dagger}$
Domain 5: Outco	ome Assessme	ent.				
Domain o. Outco	Metric 17:	Outcome Assessment Methodology	High	$\times 2$	2	
	Metric 18:	Consistency of Outcome Assessment	High	× 1	1	
Domain 6: Confo	- '					
	Metric 19:	Confounding Variables in Test Design and Procedures	High	$\times 2$	2	
	Metric 20:	Outcomes Unrelated to Exposure	High	× 1	1	
Domain 7: Data l	Presentation	and Analysis				
Bollian (1 Bata)	Metric 21:	Statistical Methods	High	\times 1	1	
	Metric 22:	Reporting of Data	Medium	$\times 2$	4	Limited information was provided for this metric.
	Metric 23:	Explanation of Unexpected Outcomes	N/A		N/A	
Overall Quality Determination [‡]			High		1.3	
Extracted			Yes			

^{*} MWF = Metric Weighting Factor

$$\text{Overall rating} = \left\{ \begin{array}{ll} 4 & \text{if any metric is Unacceptable} \\ \\ \left\lfloor \sum_{i} \left(\text{Metric Score}_{i} \times \text{MWF}_{i} \right) / \sum_{j} \text{MWF}_{j} \right\rfloor_{0.1} \end{array} \right. \\ \text{(round to the nearest tenth) otherwise} \quad ,$$

 $^{^{\}dagger}$ High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

[‡] The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

^{††} Metrics that are rated 'High' met the criteria for high confidence as expected for this type of study, and may not require additional comments.